Impact of Physiotherapy on Older Adults Admitted to Hospital: A Realistic Evaluation

Jacky Jones

THESIS
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Part One

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Statement of Originality

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Name: Jacky Jones

Signature:

Date: 27th November 2014
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Abstract

**Background:** A rise in life expectancy has increased the likelihood of complex co-morbidities and disability resulting in a change in the make-up of hospitalised older adults and their rehabilitative requirements, including physiotherapy. Studies to date of the impact of physiotherapy on older adults admitted to hospital have investigated the intervention in isolation from context and have resulted in inconsistent outcomes. There remains a lack of evidence and theory regarding why physiotherapy is effective in some instances and not in others.

**Purpose:** The thesis aims to examine the mechanisms might or might not work for patients, the influence of context on the actions of stakeholders to impact on outcomes and finally the appropriate methodology with which to investigate physiotherapy intervention.

**Method:** Realistic evaluation (RE) was used as a framework for the study. Initial theories about the impact of physiotherapy on medically unwell older adults were expressed terms of context-mechanism-outcomes configurations and developed into hypotheses with stakeholders. Testing of hypotheses utilised a sequential mixed methods design including quantitative and qualitative measures, obtained from a convenience sample of older medically unwell patients (n=75) and a purposive sample of physiotherapists (n=6), patients and carers (n=8) respectively. Outcomes included measures of physiotherapy intervention, patient health status and hospital performance. Descriptive data analysis with subgroup comparison (frail/non-frail or cognitive impairment/cognitive impairment) was undertaken for outcome measures using Mann-Whitney U and Spearman’s correlation co-efficient. Qualitative data were analysed using framework analysis. Quantitative and qualitative study findings were reviewed, integrated and context-mechanism-outcome threads identified. Initial theories were refined in light of study outcomes.

**Findings:** The sample mean age was 84.8 years (SD±7.1), 73% of individuals were identified as frail and 52% had cognitive impairment. Median hospital length of stay was 14 days (9-26). Median (IQR) physiotherapy interventions were 5 (3-10), total amount of physiotherapy
3.5 hours (1.8-7.21 hours) and frequency of physiotherapy intervention was 0.4 interventions/day (0.3-0.5). Subgroup analysis revealed patients had no between group differences in physiotherapy interventions. Moderate to large associations relating to a positive effect of physiotherapy on change in health status outcomes were present in unimpaired subgroups only. Physiotherapists and patient accounts indicated that organisational commitment to physiotherapy service provision, patient presentations of frailty and cognitive impairment and the priority of rehabilitation activities in the clinical ward setting triggered specific actions in frontline staff and patients. Patient and staff actions influenced by contextual factors affected the dose of physiotherapy and independent patient activity on the ward and contributed to explanation of patient health status outcomes in this study.

**Conclusion:** The use of RE has resulted in the emergence of important elements related to context and stakeholder actions, which act as barriers or facilitators to physiotherapy implementation and effects of physiotherapy on medically unwell older adults admitted to hospital. Further testing of revised theories is required to enhance understanding of the impact of physiotherapy in terms of what works or doesn't work for older adults. However, the in-depth knowledge revealed in this study has utility for informing models of physiotherapy and rehabilitation provision in the acute setting to best meet the needs of patients.

Key words: Acute care, Physiotherapy, Older adults, Realistic Evaluation, Rehabilitation
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## Glossary of Terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstraction</td>
<td>The thinking process that allows understanding of an event as an instance of a more general class of happening.</td>
</tr>
<tr>
<td>Acute care provider</td>
<td>Hospital care provision</td>
</tr>
<tr>
<td>Activities of daily living (ADL)</td>
<td>Basic, routine tasks, such as bathing, dressing, eating and using the toilet.</td>
</tr>
<tr>
<td>CMO configuration</td>
<td>A proposition stating what it is about an intervention that works for whom, in what circumstances.</td>
</tr>
<tr>
<td>Cognitive impairment</td>
<td>Is an inclusive term to describe any characteristic that acts as a barrier to the cognition process. In older adults the most common forms are dementia and delirium.</td>
</tr>
<tr>
<td>Context</td>
<td>The spatial, institutional locations of social situations together with the norms, values and inter-relationships found in them. Also, subgroups of the subjects within and between interventions.</td>
</tr>
<tr>
<td>Cumulation</td>
<td>An accumulation of insights which may be from a variety of empirical studies into what works for whom and why.</td>
</tr>
<tr>
<td>Delirium</td>
<td>An acute confusional state characterised by the recent onset of fluctuating inattention and confusion common in older adults admitted to hospital.</td>
</tr>
<tr>
<td>Dementia</td>
<td>A progressive condition leading to a decline in memory, reasoning and communication skills, and a gradual loss of skills needed to carry to daily activities</td>
</tr>
<tr>
<td>Frailty</td>
<td>Is a distinctive health state of increased vulnerability in which multiple body systems gradually lose their in-built reserves.</td>
</tr>
<tr>
<td>Functional ability</td>
<td>The ability to walk and/or the ability to perform basic activities of daily living such as standing up.</td>
</tr>
<tr>
<td>Functional decline</td>
<td>Loss of independence in one or more activities of daily living as a result of illness requiring hospital admission compared with ability prior to admission.</td>
</tr>
<tr>
<td>Functional disability</td>
<td>A long-term limitation in activity resulting from a condition or health problem.</td>
</tr>
<tr>
<td>Functional trajectory</td>
<td>Functional status changes from baseline over time</td>
</tr>
<tr>
<td>Gait</td>
<td>The pattern of movement of the body during locomotion; walking.</td>
</tr>
<tr>
<td>Gait impairment</td>
<td>Abnormalities in walking.</td>
</tr>
<tr>
<td>Health status</td>
<td>A holistic concept, determined by more than the presence or absence of any disease, including functional ability and mental well-being.</td>
</tr>
<tr>
<td>Health status measure</td>
<td>Measures of function, physical illness, and mental wellbeing.</td>
</tr>
<tr>
<td>Hospital de-conditioning</td>
<td>The generalised functional decline associated with the process of hospitalisation.</td>
</tr>
<tr>
<td>Impact</td>
<td>A marked effect or influence</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>----------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Mechanism</td>
<td>The choices and capabilities of a subject, which lead to regular patterns of behaviour.</td>
</tr>
<tr>
<td>Medically Unwell</td>
<td>Requiring hospitalisation for a medical condition as opposed to for surgical intervention.</td>
</tr>
<tr>
<td>Middle range theory (MRT)</td>
<td>Testable suggestions regarding how an intervention may work that involve a level of abstraction but are close enough to the observed data to allow further empirical testing.</td>
</tr>
<tr>
<td>Mobility limitation</td>
<td>Restriction in walking.</td>
</tr>
<tr>
<td>Motor adaptation</td>
<td>An error-driven (trial-to-trial) motor calibration process for novel demands resulting in the modification of movements based on error feedback. It may be influenced by practice.</td>
</tr>
<tr>
<td>Motor control</td>
<td>The biomechanical and nervous control of intentional movements.</td>
</tr>
<tr>
<td>Motor learning</td>
<td>The formation of a new motor pattern that occurs via long-term practice.</td>
</tr>
<tr>
<td>Neuroplasticity</td>
<td>The ability of the brain to respond to decreasing sensory, motor, and cognitive abilities through practice and learning.</td>
</tr>
<tr>
<td>Outcome</td>
<td>The resultant impact of an intervention.</td>
</tr>
<tr>
<td>Patient presentation/clinical presentation</td>
<td>A presenting symptom or group of symptoms.</td>
</tr>
<tr>
<td>Physiotherapy</td>
<td>An intervention that aims to develop, maintain and restore movement and functional ability, maximising quality of life for people affected by disease, injury and disability through exercise, manual therapy, technology, education and advice.</td>
</tr>
<tr>
<td>Prioritisation</td>
<td>The exercise of judgement between competing claims which in healthcare is associated with decision-making relating to allocation of clinical services.</td>
</tr>
<tr>
<td>Realistic evaluation (RE)</td>
<td>A framework for evaluation of social programmes and healthcare interventions.</td>
</tr>
<tr>
<td>Regularities</td>
<td>Consistencies.</td>
</tr>
<tr>
<td>Sarcopenia</td>
<td>The age-associated loss of skeletal muscle mass, which results in decreased strength and aerobic capacity and thus functional capacity.</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>The extent or strength of one's belief in one's own ability to complete tasks and reach goals.</td>
</tr>
<tr>
<td>Theory</td>
<td>A proposal that suggests how the mechanism of an intervention might be affected by the systems into which it is introduced (context) to produce a given outcome.</td>
</tr>
<tr>
<td>Therapies</td>
<td>Collective term for healthcare professions physiotherapy, occupational therapy, speech and language therapy.</td>
</tr>
</tbody>
</table>
Chapter 1 Introduction

The thesis aims to examine the mechanisms might or might not work for patients, the influence of context on the actions of stakeholders to impact on outcomes and finally the appropriate methodology with which to investigate physiotherapy intervention. One of the successes of society and medicine in the past 50 years has been the increase in life expectancy. However, as people age, they are increasingly more likely to live with complex co-morbidities and disability (Oliver, Foot and Humphries, 2014). These changes and the plethora of initiatives to keep people out of hospital have resulted in a change in the make-up of medically unwell, hospitalised older adults and their commensurate rehabilitative requirements of which physiotherapy is a crucial component. The most efficacious physiotherapy management of hospitalised older adults has therefore become an increasingly important question in the provision of physiotherapy services and a challenge in my current role as the lead for physiotherapy services within an acute hospital setting.

However, the impact of physiotherapy on older adults admitted to hospital is unclear. Impact, described as the effects or consequences of one entity’s action or influence upon another (The University of Oxford, 1999), can by definition be positive or negative. The desired impact or effect of physiotherapy is the ability of the intervention to produce a positive effect for patients. In clinical practice, physiotherapists seek to positively affect patients’ health status by means of physical activity interventions. However, positive outcomes as a consequence of physiotherapy interventions, in studies to date, are inconsistent.

This chapter provides background information regarding the national perspective of the ageing population, followed by a summary of the physiological effects of ageing. The effects of hospitalisation and physiotherapy intervention to this population are presented followed by the specific context of the local hospital and physiotherapy services for the older adults’ population at the study site. The researcher’s clinical background and the development of the research question in the clinical context are explained. Finally, an outline of the study, a
realistic evaluation (RE) of the impact of physiotherapy on older adults admitted to hospital, the evolution of the methodology and a summary are presented.

1.1 An ageing society

There is no general agreement on when a person becomes old but the World Health Organisation suggests that developed countries accept the definition of an older or elderly person being an adult with a chronological age of 65 years or greater (World Health Organisation (WHO), 2012); this definition was used in the current study. Life expectancy has been growing steadily for the past 50 years with the result that more people are living longer; in 1951, a man aged 65 could expect on average to live to the age of 77, in 2014, he can expect to live to 86, and by 2050 to the age of 91 (Great Britain. Department for Work and Pensions, 2014). In 2010, approximately 640,000 people in the UK turned 65; in 2012, the figure was 800,000 (Office for National Statistics, 2011). There are now over 10 million people aged 65 years and older in the United Kingdom and this figure is increasing (Office for National Statistics, 2013).

1.1.1 Policy

The needs of the ageing society have become more prominent in society as a whole and this is reflected in the number of policy and guidance documents related to ageing over the past decade. Professional bodies such as the British Geriatrics Society, non-government organisations such as the King’s Fund and charities such as Age UK and the Alzheimer’s Society have all been influential in shaping Government policy on healthcare provision for older adults. Despite this some argue that health and care services have failed to keep up with the ageing population (Oliver, Foot and Humphries, 2014) and moreover that particular sub-populations, notably those with frailty and dementia, are still not adequately addressed by policy makers (Meyer, 2014). A criticism is that health professionals presume that they understand what matters to older people, which can be dissonant with the reality of what older people feel matters to older people (Alessi, 2014). However, with a more prominent
focus on patients’ say in the services they receive, patient-centred care, there is evidence of change (Dykes et al., 2014, NHS England, 2013a).

1.1.2 Physiological and physical impacts of ageing

Ageing is a gradual decrease in physiological reserve occurring at the cellular, organ and systems level and the interaction of these processes with the effects of various environmental factors such as nutrition and infection (Clegg et al., 2013, Maguire and Slater, 2013). The process of ageing is complex (Lara et al., 2013) and is, between individuals, heterogeneous in both time and magnitude (Ferrucci et al., 2012). Furthermore, the processes associated with ageing accelerate with advancing age (Hughes et al., 2001). It is known that the various processes of ageing effect the totality of the body’s systems but the underlying mechanisms are less clear (Almeida and O’Brien, 2013).

Structural and physiological changes in the brain occur during ageing, some of these changes are inconsistent across individuals and might be important in cognitive decline such as dementia (Clegg et al., 2013). There is also a reduction in the ability of the immune system to respond to stressors such as acute inflammation (Clegg et al., 2013) and, between the ages of 60-70 years, an abrupt decline in respiratory system capacity, cardiovascular responsiveness and a reduction in basal metabolic rate (Maguire and Slater, 2013). Physical function is particularly associated with the well being of the musculo-skeletal system and here the effects of ageing are also manifested. Loss of bone mass and a decline in bone formation are reported (Almeida and O’Brien, 2013) and the effects of ageing on muscle mass and muscle strength are recognised from about the fourth decade (Ferrucci et al., 2012). The plethora of mechanisms hypothesised to account for a decline in muscle strength can be attributed to a combination of neural and muscular factors (Manini, Hong and Clark, 2013); factors which are affected by individual susceptibilities and/or coexisting diseases present during ageing (Ferrucci et al., 2012).
The challenge with increasing life expectancy is therefore to maintain health and well being through the additional years of life (Lara et al., 2013) and thus healthy ageing in terms of quality of life is the aspiration of society (Lamb, 2011). The ability to thrive depends on a range of basic functions including standing and walking as well as seeing, hearing and perception (Lamb, 2011). Physical limitations in these basic tasks, in interaction with the demands of the environment, are a consequence of neural and muscular factors and thus these factors in turn influence an individual’s ability to prosper in old age (Ferrucci, Giallauria and Guralnik, 2008). Physical activity limitations are important risk factors for subsequent disability, institutionalisation, care support and compromised quality of life in older adults (Brovold et al., 2014, Fried and Guralnik, 1997, Lamb, 2011). It is therefore not surprising that functional ability has been identified as one of the factors associated with successful ageing, in both biomedical and socio-psychological models (Bowling and Dieppe, 2005). Moreover, mobility impairment is identified as one of the main causes of social isolation and thus increased mortality (Steptoe et al., 2013). In a study of stroke patients, 74.6% of participants considered the ability to get out into a setting in the community as essential or very important (Lord et al., 2004).

Regular exercise and adequate nutrition appear to decelerate most detrimental cardiopulmonary and metabolic processes (Maguire and Slater, 2013) and in particular, exercise in the form of strength training, as opposed to other modes of exercise intervention, has been shown to improve muscle strength and function in older adults (Lamb, 2011). The Government recommend physical exercise levels of at least 30 minutes a day, at least 5 days a week, of at least moderate intensity (NHS Choices, 2014). Nevertheless, of English adults aged 65-74 years only 19% and only 7% of adults older than 75 years report that they meet this minimum level of activity (Health and Social Care Information Centre, 2009). Two of the most challenging expressions of ageing, frailty and cognitive decline, might provide some explanation for these findings.
1.1.2.1 Frailty

Frailty is a distinctive health state, related to the ageing process, which develops over 5-10 years (Great Britain (GB). Department of Health (DH), 2014) in which multiple body systems gradually lose their in-built reserves (British Geriatrics Society, 2014). The term frailty is therefore:

“...a practical, unifying notion in the care of elderly patients that directs attention away from organ-specific diagnoses towards a more holistic viewpoint of the patient and their predicament”

(Clegg et al., 2013 page 759)

Around 9% of people aged over 65 years have frailty, this rises to between 25-50% of those aged over 85 years (Collard et al., 2012). There is commonality between frailty and physical disability but they are discrete conditions; people with frailty may also present with disability but people with a physical disability might not have frailty (British Geriatrics Society, 2014). Frailty is not static, individually it varies in severity and at various life stages can improve or worsen (British Geriatrics Society, 2014). People with frailty are important to identify, since stressor events, such as admission to hospital, can lead to adverse outcomes such as increase in falls rate, immobility or confusion (Clegg and Young, 2011, Clegg et al., 2013).

There are two accepted models of frailty; the phenotype model (Fried et al., 2001), which describes a group of patient characteristics (unintentional weight loss, reduced muscle strength, reduced gait speed, self-reported exhaustion and low energy expenditure) and the cumulative deficit model (Rockwood et al., 2005). The phenotype model assesses the presence or absence of the identified variables; those with 3 or more factors are identified as frail, those with one or two factors are pre-frail and those with no factors as not frail (Clegg et al., 2013). The cumulative deficit model requires identification of the presence or absence of a list of baseline variable symptoms, originally 92 but reduced to 30, which results in a
cumulative frailty score (Clegg et al., 2013). Frailty as determined by either model will increase the risk of adverse health outcomes. The cumulative deficit approach to defining frailty is broader than the phenotype approach, encompassing co-morbidity and disability as well as cognitive, psychological and social factors (British Geriatrics Society, 2014). In response to identifying frailty based on these approaches a number of frailty scoring systems have been developed over the years (Moorhouse and Rockwood, 2012), with the parallel aims of identifying frailty and being feasible in the clinical setting. It remains the case however, that most scoring systems have a large number of elements and are time consuming to complete for the clinician.

It is acknowledged that older people who are frail require a different level and type of support from those who are younger and fitter (GB. DH, 2014). A central feature of physical frailty is sarcopenia, the loss of skeletal muscle mass and function (Sayer et al., 2013) but the loss of muscle strength in older adults is only weakly associated with the loss of muscle mass and maintaining or gaining muscle mass does not prevent aging-related declines in muscle strength (Manini and Clark, 2012). It appears that, although the mechanisms are not completely understood, encouraging frail older people to take more exercise, particularly strength training exercise against resistance, can minimise the impact of frailty (Sayer et al., 2013).

Thus, the complexity and unknown aspects of frailty make it one of the most challenging manifestations of aging. Cognitive impairment, most commonly dementia, in the older adult, is another manifestation of aging that presents challenges to health service providers.

1.1.2.2 Dementia

The term ‘dementia’ is used to describe a collection of symptoms, including a decline in memory, reasoning and communication skills, and a gradual loss of skills needed to carry out
daily activities (Knapp and Prince, 2007). Dementia is a progressive condition that can affect people of any age, but is most common in older people (GB. DH, 2009); one in 6 people over 80 and one in 14 people over 65 has a form of dementia (Knapp and Prince, 2007). About 750,000 people in the UK have dementia, and this number is expected to double in the next thirty years (GB. DH, 2012). There are several types of dementia of which Alzheimer’s is the most common type accounting for approximately 60% of dementia sufferers (Knapp and Prince, 2007). Dementia is one of the main causes of disability in later life due to the significant impact of the disease on a person’s capacity for independent living (Knapp and Prince, 2007). A recent UK review highlighted a number of significant adverse outcomes for people with dementia associated with hospitalisation including longer hospital stays, higher mortality rates and increased likelihood of functional decline (Dewing and Dijk, 2014).

Delirium and dementia are closely interrelated but are clinically distinct. Delirium is an acute confusional state (Inouye et al., 1999) characterised by the recent onset of fluctuating inattention and confusion, it is common in older adults with frailty admitted to hospital (GB. DH, 2014) and might be superimposed on dementia (British Geriatrics Society, 2012). Delirium complicates hospital stays and is a predictor of adverse outcomes including functional decline (Inouye et al., 1998). Cognitive impairment is an inclusive term to describe any characteristic that acts as a barrier to the cognition process; in older adults the most common forms of cognitive impairment are dementia and delirium.

1.1.3 Hospitalisation in older adults

Much national strategy for older adults is focussed on prevention of problems, enabling people to live well with chronic conditions, retain their independence and keep out of hospital (GB. DH, 2014).
“But, in the end we must also be realistic in acknowledging that older people often do need acute hospital admission…”

(Professor D. Oliver, GB. DH, 2014 page 2)

The number of elderly patients admitted to secondary care in the United Kingdom is increasing; a 50% growth and 65% growth from 2000-01 to 2010-11 in the 60-74 years age group and the 75 years and older age group respectively (Health and Social Care Information Centre, 2012). Of people admitted to hospital non-electively 43% are over 65 years old, accounting for 53% of all bed days (Health and Social Care Information Centre, 2013). Adults over 65 years old also account for 80% of hospital admissions that involve stays of more than 2 weeks (Poteliakhoff and Thompson, 2011).

Functional ability, defined as the ability to walk and/or the ability to perform basic activities of daily living (ADL), declines in the weeks preceding hospital admission (Wakefield and Holman, 2007) and continues to decline in at least a third of older adults post hospital admission (Kortebein et al., 2008). Of this population more than 40% will not return to their baseline function at 3 months (Mudge et al., 2011, Sager et al., 1996). Moreover, this functional decline may be compounded by physical activity levels for older adults whilst in hospital, which are not optimal. Reports suggest patients spend only a median of 3%-4% or 43-59 minutes per day standing or walking (Brown et al., 2009, Fisher et al., 2011b). Bed rest in older adults in hospital is acknowledged to lead to a range of adverse effects including cardiac de-conditioning, reduced lung function, loss of muscle mass, strength and endurance and impaired skin integrity (Knight, Nigam and Jones, 2009, Nigam, Knight and Jones, 2009). Even in healthy adults 10 days of bed rest can result in up to a 14% reduction in lower limb muscle strength and a 12% reduction in aerobic capacity (Kortebein et al., 2008). Furthermore, without any voluntary muscle contractions it has been reported that muscle strength can decrease by as much as 5% per day (Creditor, 1993). The generalised functional decline associated with the process of hospitalisation, hospital de-conditioning, is a
contributing factor to these statistics and is described by a number of authors (Kortebein et al., 2008, McCusker, Kakuma and Abrahamowicz, 2002). Studies show that functional and physiological markers of illness may follow dissimilar trajectories and that functional trajectories might reflect health status better than physiological markers of acute illness (Sleiman et al., 2009).

Importantly for both patients and healthcare providers, the number of unsuccessful discharges is increasing, median readmission rates within 28 days for those over 75 years of age are reported to be 14% (Health and Social Care Information Centre, 2012) and the number of emergency readmissions for people aged 75 years or older in 2009/10 in English hospitals has risen by 88% since 1999/2000 (Age UK, 2012). The current NHS priorities to decrease hospital length of stay (LOS) and avoid emergency admissions may provide some insight into these statistics. One conjecture is that the increasing complexity and acuity of older adults admitted to hospital together with a commensurate pressure to discharge them more rapidly is contributing to these numbers. Certainly older people frequently report a lack of confidence on discharge from hospital (Age UK, 2012) and this together with a reduced functional ability contribute to the discharged patients’ higher risk of social isolation (Oliver, Foot and Humphries, 2014) and associated health risks (Steptoe et al., 2013).

Up to 60% of older people in hospital have mental health problems or develop them during their stay (Royal College of Psychiatrists, 2006). In adults aged over 70 years admitted to an acute hospital it is suggested that 50% have cognitive impairment of which 27% have previously diagnosed dementia and 27% have delirium (Goldberg et al., 2012). Patients with dementia stay in hospital on average for 7 days longer than others with similar conditions (Alzheimer's Research Trust, 2010). Frailty can remain undiagnosed until people present to services (Oliver, Foot and Humphries, 2014) and these patients are particularly vulnerable to adverse consequences of hospital admission (Clegg and Young, 2011). The high incidence
of frailty and cognitive impairment therefore make it imperative that acute physiotherapy services are appropriately designed to meet the rehabilitation needs of these patients groups.

1.1.4 The role of physiotherapy

“Physiotherapy is a profession, which works to develop, maintain and restore movement and functional ability, maximising quality of life for people. Physiotherapists are experts in movement and function who work with patients and carers/families, other healthcare professionals and the public. They help people of all ages affected by disease, injury and disability through exercise, manual therapy, technology, education and advice”

(Chartered Society of Physiotherapy (CSP), 2014)

The physical activity aspect of physiotherapy intervention consists of high repetition, functional task specific practice or exercise undertaken with the intention of causing perturbations of sensory-motor and cardiovascular systems to drive motor adaptation (Bastian, 2008). The degree to which physiotherapy is successful in producing a desired result, the effectiveness of physiotherapy, can be determined by changes in objective or subjective health status measures. However, the aetiology of poor physical function in older adults, such as slow gait speed, is the result of multi-factorial and complex processes that are influenced by biological, psychological, environmental, and sociological factors (Verbrugge and Jette, 1994). In addition there remain a number of physiological unknowns (Ferrucci et al., 2012) making targeting and evaluation of physiotherapy challenging. In parallel with this knowledge is the attractive proposal that function of hospitalised older adults can be rehabilitated through high dose repetition of exercise and task specific activity (Covinsky, Pierluissi and Johnston, 2011), that physiotherapy might improve mobility, activity and participation (Peiris, Taylor and Shields, 2011b) and positively affect de-conditioned elderly populations (Sullivan et al., 2007). However, the evidence is inconclusive (de Morton, Keating and Jeffs, 2007b). Consequently a disconnect exists between the ambition of physiotherapy and evidence of effectiveness from studies to date. It appears that
physiotherapy, like rehabilitation, is effective, some of the time, for some problems, of some patients (Dijkers et al., 2014). What is therefore unknown is whether physiotherapy has a positive impact on medically unwell older adults and if so for whom, how and in what circumstances?

1.2 Local service context

The study site, an acute urban teaching NHS trust, is organised in terms of service departments, grouped into directorates. The NHS has traditionally designed medical specialities around single organ diseases (Oliver, Foot and Humphries, 2014) and at the study site this is true to some extent, for example the renal and thoracic departments. However, care for medically unwell older adults is provided by the Older Person’s Unit (OPU), a specialist unit providing holistic care to this group of patients. Older adults are also admitted to other hospital departments such as orthopaedic, vascular and renal specialities. The OPU consists of 3 wards of 28 beds each, 99% of admissions are emergency admissions through the Accident and Emergency department of the trust and average LOS is 15.3 days. The multi-disciplinary team (MDT) is well established and there are 12, weekly, medical consultant led multi-disciplinary team meetings (MDM) lasting 30-60 minutes each during which patient progress and next steps are discussed.

Costs associated with acute care and any subsequent intermediate and primary care are not insignificant; mean acute bed-day costs are presented as £225 (NHS Institute for Innovation and Improvement, 2012). Local trust data suggests a mean LOS of 15.3 days (local data 2013/14) equating to an estimated care episode cost of £3442. Local evaluation reports mean bed-based intermediate care episodes cost £4854 (£128/day [mean 5-6 weeks]) and mean home-care episodes cost £3038 (£98/day [mean 4-5 weeks]) (personal communication with lead of Lambeth Rehabilitation and Re-ablement Services 2014). These figures, while estimates for this locality, are likely to be accurate in terms of magnitude at this point in time.
Thus the functional decline trajectories of hospitalised older adults represent significant healthcare costs to the state.

Patients’ access to physiotherapy services varies within the hospital and is dependent on the organisational commitment to days of service and staffing resource. Physiotherapy staffing is therefore representative of historical investment based on ad hoc local and national priorities. It has been reported that on older adult wards the patient-to-nurse ratios and the skill mix (the ratio of qualified to unqualified staff) of nurses tends to be lower than on other medical wards (Ball and Pike, 2009). Physiotherapy staffing in the local context also reflects this; the stroke unit has 22 beds and 7 physiotherapy staff and the OPU has 84 beds and 9 staff. Of the physiotherapy staff on the OPU, 83% are either in training (bands 5-6) or unqualified (bands 2-3) compared with 64% on the stroke unit.

Unlike nursing provision which is provided 24 hours a day, 7-days a week, the physiotherapy service to the OPU is provided 7.5 hours a day, 5-days a week. This raises questions regarding the continuity of physiotherapy care for patients admitted to the unit. Continuity of care is considered to be the extent to which the healthcare provided for patients’ needs is coherent and connected (Haggerty et al., 2003). There are two different aspects of continuity to consider; continuity of relationship such as the therapeutic relationship between a patient and individual clinician and continuity of management, the continuity and consistency of clinical management (Freeman and Hughes, 2010). Recently there has been much publicity and strategy around the support for 7-day working services (NHS England, 2013a) but historical models of 5-day working in physiotherapy persist. At the study site, and by convention in acute hospitals across England, physiotherapy intervention for older patients on acute wards is provided from Monday to Friday (08.30-16.45). This 5-day working model is perplexing with respect to provision of the right care, at the right time, in the right place (DH, 2000). A recent Kings Fund report (Cornwall et al., 2012), on the importance of
continuity of care, argued forcibly that without continuity of care it was unlikely that care would be clinically effective, appropriately risk managed, personalised, efficient or cost-effective. The continuation of 5-day working models for physiotherapy and other support services is possibly a consequence of limited evidence to support the cost-effectiveness of such models of service provision (Peiris et al., 2011).

1.3 The researcher’s background

My clinical background is broad-based but has, through my 25-year career been focussed on the delivery of physiotherapy interventions to hospital inpatients rather than to musculo-skeletal outpatients that are more commonly associated with the profession. During my clinical career I have worked in a number of inpatient specialities including general surgery, vascular surgery, critical care and acute medicine. I have progressed managerially and clinically and as a physiotherapy manager have been challenged to provide higher quality services with ever diminishing resources. As a clinician who believes that physiotherapy has a positive impact on outcomes for patients the current 5-day model of service provision is illogical. If patients require physiotherapy Monday-Friday, it makes no sense to me that they would not require it Saturday and Sunday; the alternative perspective is that patients do not need physiotherapy at all. The national focus on the provision of 7-day services gained momentum at the start of my period of study and funding was provided for the provision of a 7-day service to the OPU at the study site. Initially, early ideas for the research project were focussed on evaluating a 7-day service to medically unwell older adults in terms of organisational and patient health status impact compared to the historical 5-day service.

However, with the vagaries of service provision in the National Health Service (NHS) the key personnel within the acute medicine directorate changed, the period of austerity within the NHS began and funding was no longer forthcoming for a 7-day physiotherapy service. The period of austerity also provided a challenge for me as service lead to make financial
savings, unfortunately in a mainly staffing budget the reality of this was cutting posts or skill-mixing posts to a lower grade. This led me to reflect at this point with regards to my study and I began to question what was known about the impact of physiotherapy interventions on medically unwell older adults admitted to the hospital, as they were provided at the time. Given the acknowledged heterogeneous nature and complexity of older adult medical adults, was the current service provision meeting the needs of all patients? And if so how was it meeting the needs of the patients? This knowledge appeared to me to be fundamental to ensure changes to service provision did not adversely affect patients.

1.4 Summary of the research project

The first stage of the research project was therefore to establish what was known with regard to the impact of physiotherapy in medically unwell, older adults from the published literature. Physiotherapy is primarily a physical activity intervention (PAI) but there are other terms for PAI. The literature review needed to capture the impact of not just physiotherapy but also the relevant surrogate terms, rehabilitation and exercise. A secondary aim of the literature review was to seek to understand the theoretical basis by which PAI might have resulted in outcomes. The literature review revealed inconsistent outcomes and considerable variation in terms of the effect of PAI in medically unwell older adults. The literature review raised a number of further questions regarding the mechanisms of how physiotherapy might or might not work for patients, the influence of context on the actions of stakeholders to impact on outcomes and finally the appropriate methodology with which to investigate physiotherapy intervention. The evolutionary process to identify an appropriate methodology to answer the research questions is described in more detail in Chapter 3. The final research design was a mixed method study using a RE methodology with the aim of answering the research questions posed.
The purpose of the study was:

1. To determine whether physiotherapy works or doesn’t work for medically unwell older adults admitted to the study site in terms of a positive effect on health status and hospital outcomes:
   a. Whether amount, frequency and time to first physiotherapy intervention differ between subgroups of medically unwell adults admitted to the study site?
   b. Whether change in health status measures (admission and discharge) and hospital performance measures differ between subgroups of medically unwell adults admitted to the study site?
   c. Whether change in health status measures (admission and discharge) and hospital LOS are associated with the amount, frequency and time to first physiotherapy interventions? In addition, whether this differs between the defined subgroups of medically unwell adults admitted to the study site?

2. To understand the patient and staff perspectives of how physiotherapy works or doesn’t work for patients, how and in what circumstances?
   a. To explore the underlying physiotherapist and patient actions that influence the effect of physiotherapy interventions in practice
   b. To understand how contextual factors combine with physiotherapist and patient actions to enable or constrain physiotherapy in achieving a positive effect on health status.

The study followed the four-phase RE cycle (Pawson and Tilley, 1997). Data capture occurred at the study site over 4 months and involved firstly quantitative and then qualitative data collection (Chapter 4), which was analysed using descriptive statistics and framework analysis respectively (Chapter 5).

The use of the RE methodology allowed specific insights into the impact of physiotherapy on medically unwell older adults. Important elements emerged about physiotherapy presence in the clinical setting, patient characteristics in terms of frailty and cognitive impairment and interprofessional working for rehabilitation in the ward setting. These individual, interpersonal and institutional contexts triggered a range of reactions in patients, physiotherapists and MDT staff to impact on patient health status outcomes at the study site. The findings
contribute to development of theoretical explanations regarding the impact of physiotherapy on medically unwell older adults. RE proved a feasible and valuable methodology for investigating physiotherapy interventions in an acute healthcare setting. The implications of the findings are discussed in Chapters 6 and 7 with recommendations for clinical practice and further research.

1.5 Summary

This chapter has provided an initial background to and a brief overview of the study. The use of a RE methodology as a means to answer the research questions has been proposed; the rationale is outlined in more detail in Chapter 3. Data collection occurred over a four-month period and data analysis took a further 4 months, details of the method are provided in Chapter 4. The data analysis and findings are reported in detail in Chapter 5. The study findings are discussed in respect to current knowledge in Chapter 6 and the implications of the findings for clinical practice and further research are proposed in Chapter 7. The study has evolved over the past 3 and half years to produce the final evaluation and thesis.
Chapter 2 The Impact of Physiotherapy on Older Adults

This chapter provides a review of the relevant literature pertaining to physiotherapy provision to medically unwell, hospitalised older adults. The aim of the review was firstly to consider the literature evidence in order to establish outcome patterns regarding the impact of physiotherapy on medically unwell older adults and secondly to establish whether studies proposed a theoretical basis for outcomes in terms of effect of the intervention. The search strategy is described. The terms exercise and rehabilitation were included in the search as surrogate terms for physiotherapy and the term physical activity intervention (PAI) used to encapsulate this group of interventions. An overview of the quality of experimental papers is provided with regards to theoretical base and design of trials. Study outcomes in terms of effect of PAI are reviewed with respect to interventions and are compared between trials. Qualitative study outcomes are then presented. Finally, gaps from the literature review regarding the impact of physiotherapy in the medically unwell older adults are identified and the purpose of the study presented.

2.1 Search strategy

A Comprehensive Review of the literature was conducted using the PICO framework (Schardt et al., 2007) to structure the search (Table 1 and appendix 1). The primary aim of the review was to investigate the impact of PAI interventions to medically unwell older adults on patient outcomes. A secondary aim was to understand the theoretical basis by which PAI might have resulted in those outcomes. In order to capture the spectrum of literature in this area, the search was not limited by study design. The aim of physiotherapy in this cohort of patients is to maintain or restore movement and functional ability; the most frequent modality to achieve this is exercise. Rehabilitation is defined as to restore (someone) to health or normal life by training and therapy after illness (The University of Oxford, 1999). Rehabilitation and exercise were therefore viewed as surrogate terms for physiotherapy and the search was expanded to include literature in both domains in an attempt to capture the
spectrum of literature pertinent to the impact of physiotherapy in this patient cohort. Exercise and rehabilitation were further defined as specific, directed physical exercise or intervention. The term physical activity intervention (PAI) is used to denote physiotherapy, exercise or rehabilitation activity from this point forward.

Extra PAI can be defined as both additional sessions per day and/or additional days of service provision and the nomenclature in the literature reflects this variation (Peiris, Taylor and Shields, 2011a). Additional days of service provision models are often termed 6 or 7-day working to distinguish them from the historical 5-day a week service model. The search also attempted to capture this variability.

Table 1: Literature search terms using the PICO framework

<table>
<thead>
<tr>
<th>Population</th>
<th>Intervention</th>
<th>Comparison (where stated)</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main keyword</td>
<td>‘Hospitalised older adults’</td>
<td>Physiotherap*</td>
<td>‘Usual physiotherapy*’</td>
</tr>
<tr>
<td>Synonyms</td>
<td>‘Acute medic*’</td>
<td>Physical Therap* Rehabilitation Exercis*</td>
<td>‘5-day’ or ‘five day’ service</td>
</tr>
<tr>
<td>Synonyms</td>
<td>‘Frail* or Elder* or Aged or Old*’</td>
<td>Additional or dose or intensity or extra 7-day ‘6-day’ or ‘six day’ or ‘7-day’ or ‘seven day’ or ‘weekend’ or ‘Saturday’ or ‘Sunday’ or ‘extended hours’</td>
<td>‘Fear of falling’</td>
</tr>
</tbody>
</table>

Denotes wildcard truncation utilised in literature search, †LOS: Hospital length of stay

To confer congruence with the proposed study population, only studies carried out in acute care were included. An acute care facility was defined as a facility offering emergency services and specialised inpatient care and services for patients requiring the direction or supervision of a physician (The Healthcare Foundation, 2013). Studies in intermediate care, sub-acute, rehabilitation or long-term facilities were excluded. Studies prior to 2000 were also excluded as being of questionable relevance given the level of investment prior to 2000 in schemes that impact on patients’ hospital stay such as proactive discharge planning,
supported discharge and hospital at home (Fisher et al., 2011a), which make comparisons of outcomes challenging.

Electronic databases (CINAHL, AMED, EMBASE, MEDLINE, Cochrane and Pubmed) were searched from January 2000 to April 2014. Searches of grey literature and policy included Google, Google scholar, the British Library Electronic Thesis on line Service, the Department of Health website and NHS websites. Supplementary searches included citation tracking using reference lists of retrieved papers and search by authors and journals with the highest number of relevant articles.

2.2 Search Results

A total of 571 studies were identified through the initial search. The titles and abstracts of all papers were reviewed using the PICO criteria in order and those that did not meet the required population or intervention were discarded. The search revealed a total of 4 systematic reviews and 18 full text papers, which included, experimental studies, service evaluation, prospective and historical cohort studies and qualitative studies. Studies were assessed for quality using the Consolidated Standards of Reporting Trials (CONSORT) (Moher, Schulz and Altman, 2003), STROBE guidelines for reporting observational studies (STROBE, 2008) and the Critical Skills Appraisal Tools for Systematic Reviews for qualitative studies (CASP), although quality appraisal of qualitative studies is contested (Garside, 2013).

Studies were assessed for quality using Critical Skills Appraisal Tools (CASP) checklists for systematic reviews, randomised controlled trials, case control trials, cohort studies and qualitative reviews (CASP, 2014).
2.3 Systematic reviews

Two systematic reviews were identified from the literature that specifically investigated the impact of additional physiotherapy to inpatients (Brusco and Paratz, 2006, Peiris, Taylor and Shields, 2011a). Both reviews included studies investigating the effects of a change in service provision through provision of supplementary physiotherapy as additional service days (6 or 7-day working). One review also included studies that provided supplementary...
physiotherapy in the form of longer individual physiotherapy sessions (Peiris, Taylor and Shields, 2011a).

One review included only randomised controlled trials (RCTs) (Peiris, Taylor and Shields, 2011), the other included RCTs, quasi-RCTs, case control studies, prospective and historical cohort studies (Brusco and Paratz, 2006). Both reviews considered study outcomes of length of stay (LOS), patient function on discharge and quality of life. In addition, Peiris, Taylor and Shields (2011) considered pulmonary complications, discharge destination, cost saving, adverse events and mortality. Quality was assessed using the standardised physiotherapy evidence database scale (PEDro) (Centre for Evidence-Based Physiotherapy, 1999) in both reviews. The PEDro scale is a 0-11 score of which the first item related to external validity is not scored, accordingly the maximum score is 10. A PEDro score of less than 4 out of 10 is considered to be low quality (Maher, 2000). Both assessed the quality of studies to be low to medium with mean PEDro score of 5 (Brusco and Paratz, 2006) and 6.5 (Peiris, Taylor and Shields, 2011a) reflective of the differing study designs included.

The reviews reached different conclusions. Brusco and Paratz (2006) were unable to conclude that additional out of hours physiotherapy provision to inpatients made a significant improvement to patient outcomes. In reaching this conclusion they commented that the small number of trials provided conflicting evidence as to the benefit of additional physiotherapy provided outside business hours. Conversely, Peiris, Taylor and Shields (2011) concluded that additional physiotherapy reduces LOS by one day in the acute setting and improves the rate of improvement in walking ability, activity and quality of life but not self-care. Four of the 5 studies included by Peiris, Taylor and Shields (2011) in the acute LOS analysis were in surgical patients with a mean age of <65 years of age. Thus, this outcome might not be replicated in a heterogeneous, older and medically unwell older adult population. Whilst more inclusive, the review by Brusco and Paratz (2006) is more limited in terms of generalisability.
as the data from studies could not be combined due to multiple limiting factors for example design and varying definitions of LOS. Therefore their conclusions were descriptive. Notably Brusco and Paratz (2006) highlighted a crucial issue regarding context of the studies, specifically the studies’ incongruent patient cohorts, models of service provision, therapeutic interventions and evaluation measures. It is important to note that whilst Peiris, Taylor and Shields (2011) propose that repetitive intervention has a significant effect on improving walking ability and activity due to the impact of repetitive activity on motor learning and neuroplasticity, their review included studies in both rehabilitation and acute settings and whilst their reasoning might be correct in the former locality, it is more questionable in the acute setting with short LOS.

Two systematic reviews of the impact of exercise in older adults, including those hospitalised, have been conducted since 2000 (de Morton, Keating and Jeffs, 2007a, Kosse et al., 2013); these reviews considered the effectiveness of exercise for medically unwell, hospitalised older adults and early physical rehabilitation programmes respectively. Both reviews included RCTs in populations of hospitalised older adults 65 years or older, in addition de Morton, Keating and Jeffs (2007a) included case control trials. The latter review by de Morton, Keating and Jeffs (2007a) was also published as a review for the Cochrane collaborations incorporating the same studies (de Morton, Keating and Jeffs, 2007b). The reviews considered 9 trials (de Morton, Keating and Jeffs, 2007a) and 13 trials (15 articles) (Kosse et al., 2013). Cerebral vascular accidents (stroke) and non-general medical conditions (e.g. orthopaedic conditions) were excluded. Both reviews included uni-intervention and multi-intervention trials and the quality of included studies was assessed as moderate using the PEDro scale (de Morton, Keating and Jeffs, 2007a) and a Delphi scale (Kosse et al., 2013). Outcomes assessed were intervention detail, patient and hospital outcomes.
The review by de Morton, Keating and Jeffs (2007a) concluded that multi-component intervention, including exercise, might increase the proportion of patients discharged to home and reduce length and cost of hospital stay for hospitalised older medical patients. The authors recommend caution in interpretation of the results as LOS and cost data were skewed and the validity of conclusions of pooling skewed data is unclear (de Morton, Keating and Jeffs, 2007a). Exercise only interventions did not significantly improve hospital LOS, costs or the proportion of patients discharged home. The authors suggest that the impact seen in multi-component interventions is therefore likely to be due to factors other than additional exercise. Only 3 exercise only trials were available for pooling however, so definite conclusions were unable to be established. Conversely Kosse et al. (2013) concluded that patients participating in physical rehabilitation, either as part of a multi-intervention programme that included exercise or a uni-intervention programme additional to usual care improved more on functional tests and were less likely to be discharged to a nursing home. Only multi-component programmes significantly reduced hospital LOS (Kosse et al., 2013).

The reviews in hospitalised older adults conclude with varying degrees of certainty that PAI may improve functional outcomes and have a positive effect on LOS but that this is more likely as part of a targeted, multiple intervention, multi-disciplinary team (MDT) approach. However, the effects attributable to individual elements of multi-intervention programmes including exercise cannot be partitioned (de Morton, Keating and Jeffs, 2007a). Although undertaken with slightly different aims, both reviews highlighted some common issues related to the context of the studies (de Morton, Keating and Jeffs, 2007a, Kosse et al., 2013). Specifically, the poor descriptive detail regarding the dose of the exercise components and usual care interventions to control groups. The heterogeneity of the study participants is also discussed; patients with multiple co-morbidities were often excluded from the trials and in such a varied population the response to exercise is likely to be inconstant (de Morton, Keating and Jeffs, 2007a). Moreover, local and national health care provider environments vary between studies and may contribute to inconsistency of study findings.
2.4 Quality of quantitative studies

The quality assessment of quantitative studies evaluated key components of the studies in terms of theoretical underpinnings, study design and outcomes with respect to effect of PAI (Table 2 -Table 4).

2.4.1 Theoretical base

The theoretical perspective for researchers’ knowledge claims is a critical component in any research study since it should inform the design, methods of data collection and analysis to be used (Cresswell, 2013b). Philosophical perspectives form part of the theoretical base and influence the practice of research and should also be identified (Cresswell, 2013b). Identification of a philosophical or theoretical basis for studies or outcomes of PAI was absent for all studies. This appears to be a consistent limitation across physiotherapy and rehabilitation published research (Nicholls and Gibson, 2012).

2.4.2 Study Design

One case study and 14 experimental studies (10 uni-intervention trials and 4 multi-intervention trials) were identified from the search. Designs were pragmatic, which is understandable due to naturalistic study settings. In some studies, intervention and usual care participants were located on the same ward, attracting criticisms of possible contamination with regard to motivation impact on the non-intervention group (Brusco et al., 2007, Killey and Watt, 2006, Mudge, Giebel and Cutler, 2008).
<table>
<thead>
<tr>
<th>Study</th>
<th>Country</th>
<th>Design</th>
<th>Population</th>
<th>Age (years)</th>
<th>Exclusion criteria</th>
<th>Intervention/Usual care</th>
<th>Outcome measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blanc-Bisson (2008)</td>
<td>France</td>
<td>RCT of early physiotherapy compared to usual care</td>
<td>Hospitalised patients</td>
<td>&gt; 70 years</td>
<td>Not independent in walking within previous 3 months, Lower limb neuro-muscular disease, Chronic respiratory impairment, Severe heart failure, Peripheral vascular disease, Palliative care, Muscle impairing pharmacy</td>
<td>Early physiotherapy programme started 1-2 days post admission 30 mins x2/day (Monday to Friday)</td>
<td>ADL (Katz)*, Handgrip strength</td>
</tr>
<tr>
<td>Brusco (2007)</td>
<td>Australia</td>
<td>RCT of additional physiotherapy compared to usual care</td>
<td>Hospitalised patients</td>
<td>&gt; 70 years</td>
<td>Cognitive impairment, Specialised geriatric evaluation and management, Non-English speaking</td>
<td>Usual care: Transfer bed-chair as soon as possible post admission, Physiotherapy x2/week from day 3-6</td>
<td>Hospital LOS*, Physiotherapy LOS Independence (FIM), Activity (FRT/TUG/10mWT), Flexibility (hip/knee ROM), Strength, Discharge destination, Adverse events (falls/infection/mortality)</td>
</tr>
<tr>
<td>Cardiff and Vale</td>
<td>UK</td>
<td>Service evaluation</td>
<td>Hospitalised older medical patients</td>
<td>Not reported</td>
<td>Not reported</td>
<td>Usual care + extended day and 7-day working physiotherapy service, Usual care: Physiotherapy Mon-Fri</td>
<td>Hospital LOS*</td>
</tr>
<tr>
<td>de Morton 2007</td>
<td>Australia</td>
<td>CCT of additional exercise compared to usual care</td>
<td>Acute medical</td>
<td>≥ 65</td>
<td>Medically unwell, Non-ambulating, Nursing home resident, Palliative</td>
<td>Usual care + one of 4 levels of additional exercise x2/day, 5-days/week, Usual care: AHP input on referral</td>
<td>Discharge destination*, Function (Bi/TUG/ FAC), LOS, Adverse events (readmission, falls, mortality, ICU admission)</td>
</tr>
<tr>
<td>Jones (2006)</td>
<td>Australia</td>
<td>RCT of additional exercise compared to usual care</td>
<td>Acute medical</td>
<td>≥ 65</td>
<td>Cognitive impairment, Medically unwell, Non-weight bearing, Nursing home resident</td>
<td>Usual care + one of 4 levels of additional exercise x2/day, Usual care: Physiotherapy assessment and discharge planning</td>
<td>Function (mB1/TU5), LOS, Discharge destination, Adverse events (falls, ICU admission), Self-efficacy scale</td>
</tr>
<tr>
<td>Killey (2006)</td>
<td>Australia</td>
<td>CCT of additional supervised walking compared to usual care</td>
<td>Acute medical</td>
<td>≥ 70</td>
<td>Cardio-respiratory morbidity, Cognitive impairment (significant), Diabetes</td>
<td>Usual care + nurse supervised/assisted walk x2/day, 7-days/week, Usual care: 1-2 sessions of physiotherapy</td>
<td>Function (Distance walked* and BI), Self-efficacy scale</td>
</tr>
<tr>
<td>Latham (2001)</td>
<td>NZ</td>
<td>RCT of resistance exercise compared to passive range of movement exercise</td>
<td>Acute medical</td>
<td>≥ 65</td>
<td>Cognitive impairment, Leg ulcers, Limited knee extension, Lower limb fracture, Medically unwell</td>
<td>Usual care + progressive resistance training x1/day, 5-days/week, Usual care: Ongoing physiotherapy</td>
<td>Quadriceps strength*, Timed 10m walk TUG, Balance (BBT)</td>
</tr>
<tr>
<td>Study</td>
<td>Country</td>
<td>Design</td>
<td>Population</td>
<td>Age (years)</td>
<td>Exclusion criteria</td>
<td>Intervention</td>
<td>Outcome measures</td>
</tr>
<tr>
<td>---------</td>
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</tr>
<tr>
<td>Mallery (2003)</td>
<td>Canada</td>
<td>RCT of additional resistance exercise compared to usual care</td>
<td>Acute medical</td>
<td>≥ 70</td>
<td>Cardio-respiratory morbidity, Fracture (recent), Musculo-skeletal condition (acute), Neurological condition (progressive), Non-ambulating</td>
<td>Usual care + resistance exercise programme x1/day, 3x/week</td>
<td>Participation*, Adherence*, Quadriceps strength</td>
</tr>
<tr>
<td>Nolan (2008)</td>
<td>Australia</td>
<td>CCT of a tailored functional maintenance plan compared to usual care</td>
<td>Acute medical</td>
<td>≥ 70</td>
<td>Cognitive impairment (severe), Palliative, NH resident</td>
<td>Usual care + tailored functional maintenance plan (exercises +/- functional walking) x1/day, 6-days/week</td>
<td>Feasibility*, LOS, Function (EMS), Readmission</td>
</tr>
<tr>
<td>Siebens (2000)</td>
<td>USA</td>
<td>RCT of additional exercise compared to usual care</td>
<td>Acute older adults</td>
<td>≥ 70</td>
<td>Cardiac diagnosis, Nursing home resident, Palliative</td>
<td>Usual care + daily exercise and walking programme x2/day</td>
<td>LOS*, Function (FIM/ALS/IADL), Self-report activity</td>
</tr>
<tr>
<td>Troosters 2010</td>
<td>Belgium</td>
<td>RCT of resistance training compared with usual care</td>
<td>Acute respiratory</td>
<td>&lt; 85</td>
<td>Neurolocomotor condition limiting exercise, Patients admitted Fri-Sun</td>
<td>Usual + quadriceps resistance training x1/day, 7-days/week</td>
<td>Quadriceps force*, 6MW, Systematic inflammation</td>
</tr>
</tbody>
</table>

*primary outcome(s), C – control, I – intervention

<table>
<thead>
<tr>
<th>Study</th>
<th>Country</th>
<th>Method</th>
<th>Population</th>
<th>Age n (C/I*)</th>
<th>Exclusion criteria</th>
<th>Intervention</th>
<th>Outcome measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cumming (2008)</td>
<td>Australia</td>
<td>RCT comparing a multi-factorial falls programme with usual care.</td>
<td>Acute older adults</td>
<td>≥ 65</td>
<td>None</td>
<td>Usual care + additional exercises, mobility practice and individualised falls prevention interventions</td>
<td>Falls*</td>
</tr>
<tr>
<td>Inouye (2003)</td>
<td>USA</td>
<td>Clinical cohort study of the role of adherence on the effectiveness of nonpharmacologic interventions</td>
<td>Acute older adults</td>
<td>≥ 70</td>
<td>No delirium on admission Intermediate risk of delirium on admission Profound aphasia Intubation/coma Palliative</td>
<td>Usual care + delirium prevention interventions including mobilisation and active exercises 3x/day</td>
<td>New onset delirium*</td>
</tr>
<tr>
<td>Jeffs (2013)</td>
<td>Australia</td>
<td>RCT comparing exercise and orientation intervention with usual care</td>
<td>Acute older adults</td>
<td>≥ 65</td>
<td>Dysphasia (severe) Palliative Cognitive impairment Admission to ICU/CCU Isolation for infection control Contraindication to mobilisation</td>
<td>Usual care + progressive resistance exercises and supervised walking + orientation interventions x2/day 5-days/week</td>
<td>Delirium (CAM*) Duration/severity of delirium LOS Discharge destination</td>
</tr>
<tr>
<td>Mudge (2008)</td>
<td>Australia</td>
<td>CCT comparing exercise and cognitive intervention with usual care</td>
<td>Acute older adults</td>
<td>≥ 65</td>
<td>Fully dependent NH resident Medically unstable Palliative</td>
<td>Usual care + graduated exercise programme + education programme + cognitive intervention</td>
<td>Function (mBI*) Change in delirium LOS Falls Activity on the ward (observation) Discharge destination and readmission</td>
</tr>
</tbody>
</table>
Thirteen of the studies compared one or more forms of intervention with usual care; the remaining 2 studies were a non-comparative, descriptive study (Inouye et al., 2003) and a comparison of two forms of an intervention without reference to usual care (Mallery et al., 2003). One study design included stratification of patients by co-morbidity and anticipated LOS based on Diagnostic Related Group (DRG) and further categorisation of patients by exercise dose (Siebens et al., 2000). No analysis by either DRG or exercise category was possible due to a differential drop out of subjects at 1-month follow up.

2.4.2.1 Participants

Trials were conducted at hospitals in Australia (8 trials), the North Americas (3 trials), Belgium (1 trial), France (1 trial), New Zealand (1 trial) and UK (1 trial). Nine studies had large sample sizes (n=62-2047) and 5 smaller samples (n=10-38). A detailed description of participant characteristics was included in all studies with one exception (Troosters et al., 2010). Unsurprisingly, there was heterogeneity of exclusion criteria across the studies, although patients with multiple co-morbidities and/or cognitive impairment were for the most part excluded. The majority of study populations, therefore, were reflective of the methodological requirements of study design to control variability and as a result were not representative of populations found in an acute hospital setting. The characteristics of the population samples such as co-morbidities including cognitive status and functional ability provide useful information with which to interpret findings. For example, in one study the intervention group was more highly functioning than the control group on admission, which might have influenced study outcomes (Jones et al., 2006).

2.4.2.2 Physical Activity intervention

Twelve trials compared intervention to usual care, which was provided according to the routines of the study site. Most trials did not describe or described with minimal detail usual physiotherapy or other PAI routines and the number of staff involved in providing usual care
was also not detailed. One study reported that usual care, defined as medical, nursing and allied health professional interventions, was dependent on the resources available on the general medical wards (Jones et al, 2006). Another trial reported that no additional staffing was provided although established physiotherapy resourcing was relatively generous (Mudge, Giebel and Cutler, 2008). Siebens et al., (2000) reported an unanticipated increase in in-hospital physiotherapy staffing in the control group compared with the intervention group, which they hypothesised to have affected outcomes (Siebens et al., 2000).

Intervention designs were diverse regarding the dose of PAI, which includes consideration of mode (type of exercise, walking practice), frequency (days/week or interventions/day), duration (hours/day) and intensity (repetitions, load/resistance or distance) of the intervention (Theou et al., 2013). Multi-intervention studies combined PAI with a variety of non-PAI such as individualised falls prevention interventions (Cummings et al., 2008), delirium prevention interventions (Inouye et al., 2003), orientation intervention (Jeffs et al., 2013) and cognitive intervention (Mudge et al., 2008. Description of the PAI was inconsistent and generally more detailed in the uni-intervention studies than the multi-intervention studies.

Total amount of intervention (Table 5 - Table 7) was determined by frequency, duration and in most studies hospital LOS. Frequency was defined as number of sessions per day (range 1-2) and number of days per week (5-days to 7-days). Duration referred to the length of a session (range 10-30 minutes). Total duration was determined by LOS (range 5-days to 21.2-days). Duration of intervention in one study was pre-determined at 7-days (Troosters et al., 2010). Five studies failed to state LOS or duration of intervention (Blanc-Bisson et al., 2008, Cardiff and Vale Health Board, 2009, Cumming et al., 2008, Inouye et al., 2003, Mallery et al., 2003). All three studies that provided intervention 7-days a week reported significant differences between intervention and usual care groups in primary outcomes; distance walked (Killey and Watt, 2006), quadriceps force (Troosters et al., 2010) and
hospital LOS (Cardiff and Vale Health Board, 2009). The latter study employed an additional six specialist physiotherapists to provide the service (Cardiff and Vale Health Board, 2009).

The total PAI received by the intervention groups varied and the amount of additional intervention over and above usual care PAI was inconsistently reported. Four studies reported amount of intervention over and above usual care in the range of an additional 20-40 minutes of intervention per day (de Morton et al., 2007b, Jeffs et al., 2013, Jones et al., 2006, Mallery et al., 2003), although this was at a frequency of 5/days per week or less. Brusco and Paratz (2007) reported an additional 4.1 interventions (Brusco and Paratz, 2007). These studies do not show superior outcomes.

PAI was supervised by a qualified physiotherapist (Brusco et al., 2007, Cumming et al., 2008, Mallery et al., 2003, Mudge, Giebel and Cutler, 2008, Troosters et al., 2010), an unqualified physiotherapy assistant (de Morton et al., 2007b, Jeffs et al., 2013, Jones et al., 2006, Nolan and Thomas, 2008, Siebens et al., 2000), nurse (Killey and Watt, 2006) or other trained assistant (Inouye et al., 2003) and one paper did not specify the personnel involved (Latham, Stretton and Ronald, 2001). Detail was lacking regarding the number of staff delivering the intervention or whether additional staff had been resourced to deliver the PAI.

Interventions were delivered in individual one to one sessions in the majority of studies. Two studies utilised a combination of group and individual sessions (Brusco and Paratz, 2007, Cumming et al., 2008) and mode of delivery was not stated in one study (Cardiff and Vale Health Board, 2012). Interventions were delivered in the ward environment reflecting clinical practice with the exception of one study in which participants were taken outside of the ward environment to perform PAI (Troosters et al., 2010). Two studies included follow up measures post discharge, 1-month follow up, no intervention (Troosters et al., 2010) and 1-month post discharge, outpatient exercise intervention (Siebens et al., 2000).
<table>
<thead>
<tr>
<th>Study</th>
<th>LOS (IQR/SD)</th>
<th>Amount of intervention</th>
<th>Patient Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Total intervention (IQR/SD)</td>
<td>Minutes per session (IQR/SD)</td>
</tr>
<tr>
<td>Blanc-Bisson (2008)</td>
<td>Not stated</td>
<td>Not stated</td>
<td>Improvement in ADL was found in intervention group when the model was adjusted on 'function' factor items.</td>
</tr>
<tr>
<td>Brusco and Paratz (2007)</td>
<td>21.2 days (14.0)</td>
<td>24.3 interventions (18.7)</td>
<td>No significant between group difference in mean hospital LOS of 3.2 days (p= 0.09) No significant between group difference in mean physiotherapy LOS of 2.5 days (p=0.15) No significant between group difference in secondary outcomes</td>
</tr>
<tr>
<td>Cardiff and Vale Healthcare</td>
<td>Not stated</td>
<td>Not stated</td>
<td>Bed days were reduced by 1.5 per patient Not stated Physiotherapy response times from referral to contact improved from an average of 13.7 hours to 2.3 hours</td>
</tr>
<tr>
<td>de Morton (2007)</td>
<td>5.0 days (3-9.5)</td>
<td>20-30 mins (x2/day)</td>
<td>No significant effect of the additional exercise programme on any outcomes: Between group difference in LOS 5.0 days (3.0-9.75) vs. 6.0 days (3.25 to 9.75) (p=0.45)</td>
</tr>
<tr>
<td>Jones (2006)</td>
<td>8 days (4-12)</td>
<td>160 mins (120-360)</td>
<td>Intervention group had a shorter total LOS 2 days (p=0.097) but after adjusting for confounding variables HR 1.46 (95%CI 1.04-2.05) p=0.026 No significant between group differences in other outcomes Significant interaction effect between group and admission mBI (p=0.024). When admission mBI scores were low there was a greater improvement in mBI scores in the intervention group</td>
</tr>
<tr>
<td>Killey (2006)</td>
<td>7 days</td>
<td>Not stated</td>
<td>Significant change in distance walked; difference between sample means 31.58m (p=0.04) BI difference between sample means 15.63 (p=0.03) The data obtained from the self-efficacy scale were skewed and no conclusions could be drawn</td>
</tr>
<tr>
<td>Latham (2001)</td>
<td>1.7 weeks</td>
<td>Not stated</td>
<td>Significant between group difference in quadriceps strength 4.7kg vs. 0.1 kg (p=0.02) Changes in intervention vs. control (SD): Timed walk (-7.7m/s (14.2) vs. -3.1m/s (4.0); difference -4.6m/s; 95% CI -15.6 – 6.4) Balance (5.3 (3.4) vs. 2.9 (6.1); difference 2.4; 95% CI -2.4 – 7.4) TUG (-7.4 secs (9.0) vs. -2.1 secs (3.6); difference -5.3 secs; 95% CI -13.8-3.1)</td>
</tr>
<tr>
<td>Study</td>
<td>LOS (IQR/SD)</td>
<td>Amount of intervention</td>
<td>Patient Outcomes</td>
</tr>
<tr>
<td>------------</td>
<td>-------------</td>
<td>------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Full dialysis per session (IQR/SD)</td>
<td>% of intervention</td>
<td></td>
</tr>
<tr>
<td>Mallery (2003)</td>
<td>Not stated</td>
<td>36.2 (4.8)</td>
<td>Resistance exercise can be successfully performed shortly after hospitalisation</td>
</tr>
<tr>
<td>Nolan (2008)</td>
<td>10.01 days ± 7.88</td>
<td>70% of inpatient days</td>
<td>Feasibility of exercise programme was supported; High uptake (89%), low withdrawal (17%) compliance (70%)</td>
</tr>
<tr>
<td>Siebens (2000)</td>
<td>12 (±8.2)</td>
<td>Not stated</td>
<td>No significant between group difference in LOS controlling for baseline characteristics and diagnoses intervention was associated with better function in IADL at 1 month follow up (β=.433 (95% CI, 0.044-0.842)</td>
</tr>
<tr>
<td>Troosters 2010</td>
<td>8 days (8-9)</td>
<td>Not stated</td>
<td>Significant between group difference in quadriceps force (+9.7N ±16% vs -1N±13% p=0.05)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Significant between group difference in 6 min walk</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Significant between group difference in myostatin levels (p = 0.03)</td>
</tr>
</tbody>
</table>

ADL – Activities of Daily Living, BI – Barthel index, IADL – instrumental activities of daily living, LOS – hospital length of stay, mBI – modified Barthel index, N – Newtons, TUG – Timed up and go
<table>
<thead>
<tr>
<th>Study</th>
<th>LOS (IQR/SD)</th>
<th>Total intervention (IQR/SD)</th>
<th>Minutes per session (IQR/SD)</th>
<th>% days of intervention</th>
<th>Patient Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cumming (2008)</td>
<td>Not stated</td>
<td>Not stated</td>
<td>Not stated</td>
<td>No significant between group difference in falls rate</td>
<td></td>
</tr>
<tr>
<td>Inouye (2003)</td>
<td>Not stated</td>
<td>Not stated</td>
<td>Not stated</td>
<td>Delirium rates were lower when adherence was higher for mobility protocol</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Incidence of delirium: 14% in low adherence group and 3% in high adherence group (p=0.002)</td>
<td></td>
</tr>
<tr>
<td>Jeffs (2013)</td>
<td>5.5 days (3.29-9.2)</td>
<td>38 minutes (25-52)</td>
<td></td>
<td>No significant between group difference in outcomes</td>
<td></td>
</tr>
<tr>
<td>Mudge (2008)</td>
<td>10 days (6.75-13)</td>
<td>Not stated</td>
<td></td>
<td>Significant between group difference in median mBI 8.5 vs. 3.5 (p=0.03) and incident delirium 19.4% vs. 35.5% (p=0.04)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No significant between group difference in other outcomes</td>
<td></td>
</tr>
</tbody>
</table>

LOS – hospital length of stay, mBI – modified Barthel index
2.4.2.3 Outcome measures

Hospital performance measures, measures of patient health status and measures of participation were the primary or secondary outcome measures for trials. All studies included patient outcomes in terms of functional ability utilising a wide variety of measures. Hospital performance measures included LOS and adverse events. Adverse events selected were numerous; readmissions within a defined time period (de Morton et al., 2007b, Jones et al., 2006, Nolan and Thomas, 2008), mortality (de Morton et al., 2007b, Siebens et al., 2000), critical care admission (de Morton et al., 2007b, Jones et al., 2006), injuries (Latham, Stretton and Ronald, 2001) or development of delirium (Inouye et al., 2003, Jeffs et al., 2013). There may be global and local variability as to the criteria for critical care admission or what constitutes an injury, as with LOS there is also a plurality of factors that might affect these measures. With the exception of development of delirium, there was no significant impact of PAI on adverse events in any trials. Incident delirium can be defined according to different methods and this was evident between studies. The Confusion Assessment Method was used in two studies (Inouye et al., 2005, Jeffs et al., 2013), however Mudge et al., (2008) used a chart-based method of identifying delirium (Mudge, Giebel and Cutler, 2008). This method has been validated in older adults but is not recommended for individual patient care or diagnostic purposes due to the substantial number of false negatives that can occur (Inouye et al., 2005).

There were a wide variety of measures used to capture patient functional and physical outcomes. Patient outcome measures related to function have reported ceiling or floor effects and these might have influenced study findings. A ceiling effect occurs when a measure possesses a distinct upper limit for potential responses and a large concentration of participants score at or near this limit, a floor effect is the opposite effect (Hessling, Traxel and Schmidt, 2004). The EMS, BI and mBI have acknowledged ceiling effects (de Morton and Nolan, 2011, Wade and Collin, 1988). The Timed Up and Go Test (TUG) revealed a floor effect in two trials (de Morton et al., 2007b, Jones et al., 2006). The use of these scales
to capture functional ability might therefore have led to an under or over estimation of the benefit of the intervention. There is a paucity of validated functional measures sensitive enough to capture functional change over short periods of time (Latham, Stretton and Ronald, 2001) and requirement for a measure that can capture the broad spectrum of abilities of older medical patients (de Morton, Keating and Jeffs, 2007a). This may provide explanation for the battery of functional measures used in studies to date, which proved challenging when reviewing study findings. Patient reported outcome measures (PROM) were rare. One study did include a self-efficacy PROM (Killey and Watt, 2006) however, the self-efficacy tool selected was not validated in the study population and was in fact developed to investigate the impact of a health promotion campaign. The data obtained from this measure were skewed and no conclusions could be drawn.

2.4.2.4 Data Analysis

A power analysis is the probability that a given test will find an effect assuming one exists in the population (Pallant, 2010) and enables researchers to correctly identify whether there is a difference between groups. All studies in the review provided a power analysis in relation to their sample size with two exceptions (Cardiff and Vale Health Board, 2009, Nolan and Thomas, 2008). The size of the sample affects the power of a test. Most studies in the review were large (n≥100) and were therefore adequately powered (Stevens, 2012). There is the possibility that a non-significant finding is due to insufficient power in small studies (n≤20) (Pallant, 2010). Smaller samples also make it more difficult to analyse for mediating variables (Cockle-Hearne and Faithfull, 2010). It has been advocated that when small group sizes (n≤20) are involved it is preferable to adjust the alpha level to 0.1 or 0.15 to compensate and improve power (Stevens, 2012). This was not undertaken in the 3 studies with small numbers (Latham, Stretton and Ronald, 2001, Mallery et al., 2003, Troosters et al., 2010).
Three studies failed to reach the required sample size (Brusco et al., 2007, Jeffs et al., 2013 and Mudge, Giebel and Cutler, 2008) and two studies also failed to complete all measurements for a large proportion of patients originally included in each of the study arm (Latham, Stretton and Ronald, 2001, Troosters et al., 2010). An inability to perform an intention to treat analysis due to the nature of the patient withdrawals is likely to reduce the internal validity of the findings and thus the power to detect differences in these studies (Cockle-Hearne and Faithfull, 2010). Hospital LOS should be adjusted for both clinical and non-clinical factors since unadjusted LOS might not be a valid outcome measure (Brasel et al., 2007). Confounding variables used in the adjustments were not always stated and when stated were different between studies.

2.4.3 Effects of Physical Activity Intervention

Study findings in terms of effect of PAI on primary and secondary outcome measures were inconsistent across trials (Table 5 - Table 7).

2.4.3.1 Length of stay

Length of stay was included as an outcome measure in 7 studies (Brusco et al., 2007, de Morton et al., 2007b, Jones et al., 2006, Mudge, Giebel and Cutler, 2008, Jeffs et al., 2013, Nolan and Thomas, 2008, Siebens et al., 2000). In one uni-intervention study the intervention group had a non-significant shorter LOS (median 2 days p=0.097) however, when LOS was adjusted for confounding factors the effect became significant (HR 1.46 [95% CI 1.04+2.05], p=0.026) (Jones et al., 2006). One study reported the average LOS was greater in the intervention group than the control group although this did not reach significance (10.5 days ± 7.1 versus 12 ± 8.2 days [p=0.09]) (Siebens et al., 2000). The other studies identified a shorter LOS but this did not reach significance. However, mean LOS was relatively short in some studies (5.5-10 days), which may have influenced the potential for impact of the intervention (de Morton et al., 2007b, Jones et al., 2006, Mudge, Giebel and Cutler, 2008,
Jeffs et al., 2013, Nolan and Thomas, 2008). The study reporting the longest LOS during which participants received an additional hour of PAI per week showed no significant differences between the intervention and usual care groups in study outcomes (Brusco et al., 2007).

LOS is an ever-present measure in acute healthcare intervention studies due to the direct correlation of the measure to cost, which makes it an attractive outcome measure to organisations (Brusco et al., 2007). However, the plurality of contextual factors such as local discharge policies and social care arrangements that influence LOS are acknowledged (Clarke, 2002) and this may provide some explanation for the variation seen in this outcome measure in study findings. LOS may also reflect other care and health issues during a hospital admission, such as healthcare staffing resource (Clarke 2014). One study included physiotherapy LOS as well as hospital LOS (Brusco et al., 2007). Results showed that physiotherapy LOS was on average 1.6 days and 2.3 days less in the intervention and control groups respectively, than hospital LOS, providing evidence that factors affecting hospital LOS are multi-factorial and not influenced by PAI alone.

2.4.3.2 Strength

Two studies investigated the impact of strength training interventions. Studies specifically assessed quadriceps function as an outcome in terms of strength (Latham, Stretton and Ronald, 2001) and force (Troosters et al., 2010). Both studies reported significant differences between groups for these outcomes. Whilst there was consistency in the mode of intervention (knee extension in a chair), the exact dosage in terms of load, progression, amount and duration was inconsistent across studies. There was no significant difference in secondary measures of activity despite the significant change in muscle strength reported.
The participants in one study were younger, (Troosters et al., 2010). Both studies report a significant change in muscle strength, which may suggest that age is not a barrier to such improvement and also, given the differing regimes, raises questions regarding the dose of exercise required to achieve an outcome. Importantly, there must be consideration of whether increase in strength is practically useful for patients, given the findings in secondary outcomes. The authors do not attempt to suggest the mechanism by which the changes observed occurred but not withstanding study limitations, the results suggest changes in muscle strength in hospitalised older adults are possible even during short courses of rehabilitation (8-12 days).

2.4.3.3 Functional ability

Most studies reported that there were no significant differences in measures of functional ability between groups post intervention with three exceptions. Killey and Watt (2006) reported a significant increase in distance walked and functional independence in the intervention group. A small but significant change in functional status, in the intervention group, was reported by Mudge, Giebel and Cutler (2008). Siebens et al., (2000) reported that the intervention was associated with better function in instrumental activities of daily living (IADL) at 1 month follow up, but there was no report of physical activity levels of participants post discharge. None of these studies reported amount of intervention received by the intervention group. It is noteworthy that Killey and Watt (2006) aimed to provide one of the higher frequencies of intervention amongst studies, twice a day, 7-day/week intervention.

Multivariate analysis of change in Barthel Index score (BI) in one study revealed a significant interaction effect between group and admission BI (p=0.024). (Jones et al., 2006). Indicating that when admission BI was ≤ 48 (scale 0-100) there was a greater improvement in mBI score in the intervention than the control group. This effect diminished with increasing (representing increased dependence) admission BI scores. A similar finding is reported in a
pooled meta-analysis of exercise intervention following analysis conducted at the individual patient data level including only those papers where the effect of exercise could be portioned (de Morton et al., 2007a). Stratification of patients based on admission BI scores suggested that the effect of the intervention was greater in some categories of patients than others. A significant relationship existed between the intervention and admission and discharge scores for patients with admission BI scores of 21-60 points (100 point scale) but not for those with admission BI scores in the lowest and highest categories. The authors acknowledge that they were not able to comment confidently on the impact of exercise in the highest performing group at admission due to the known ceiling effect of the BI. The analysis also suffered from a lack of relevant studies, only two studies were included in the review.

Two studies conducted measures post discharge from hospital. Troosters et al., (2010) reported that participants maintained improvement in quadriceps force at 1-month follow up but that 6-minute walking distance was not significantly different from the usual care group. Whilst Siebens et al., (2000) reported that intervention was associated with better functional outcomes at 1-month follow up. Patients in both studies received post discharge rehabilitation interventions.

2.4.3.4 Delirium

Three studies captured incident delirium during hospital stay and this was the primary outcome in one study (Inouye et al., 2003). The authors of this study report that higher levels of adherence with the multi-intervention strategy including exercise resulted in lower delirium rates (p=0.002), the significance of the result persisted after stratification by baseline delirium (p=0.04). Mudge, Giebel and Cutler (2008) also report a reduction in delirium occurrence in the intervention group (19.4% versus 35.5% [p=0.04]). This latter result should be interpreted with caution however, since the assessment method used to detect delirium is not robust and
there was a higher incidence of delirium in the control group on admission. Jeffs et al., (2013) reported the intervention had no effect on duration or severity of delirium.

Two studies provided intervention over 7-days and reported a significant impact on incident delirium (Inouye et al., 2005, Mudge, Giebel and Cutler, 2008), conversely the study which provided intervention over 5-days reported no impact (Jeffs et al., 2013). This suggests that the consistency of the intervention might be important in patients with cognitive impairment and influence patient outcomes.

2.4.3.5 Falls

Number of falls was a primary outcome in a multi-centre study (Cumming et al., 2008) and a secondary outcome in the study by Mudge, Giebel and Cutler (2008). No significant difference in falls rates between groups was reported in either study.

The study by Cumming et al., (2008) was conducted over a 3-year period (October 2003 to October 2006) during which time the profile of falls prevention was increasing (Oliver et al., 2004). It is possible that the increase in profile of improving falls prevention management affected management of patients at risk on the control wards. Conversely, it is possible that the raised awareness of falls in the intervention wards resulted in more assiduous reporting than on the control wards. Either of these factors might have influenced the falls count making it more difficult to demonstrate an effect. Due to the multi-site nature of the study, the intervention team (physiotherapist and nurse) spent only 3 months at each intervention site. As the authors suggest this might have been too little time to change ward culture but it might also have been too little time to ensure that supervision of the exercise programme and other modification management were robust.
2.4.4 Summary of experimental review

In summary studies investigating PAI for medically unwell older adults are twofold; uni-intervention and multi-intervention that includes PAI. Studies were of variable quality but overall outcomes were inconsistent, the majority of the studies reported no significant effects of the intervention. Study designs were heterogeneous, which may explain the lack of consistency in study findings. The inclusion of multiple interventions in 4 trials, increased complexity and made it difficult to unpick whether study findings were the result of individual components or the synergy of the different interventions.

A theoretical basis for studies and evaluation of findings was absent in all studies. Some key contextual factors were highlighted. Staffing establishment to deliver the PAI was poorly described, PAI was inconsistently quantified and there were no studies seeking to correlate PAI with outcomes. Usual care intervention was also poorly described both in terms of staffing and study site routines for PAI interventions such as physiotherapy. Post-hoc analysis in some studies suggests that patient presentation may be an influencing factor on outcomes (de Morton et al., 2007a, Jones et al., 2006).

2.5 Qualitative studies

There were 3 qualitative studies revealed by the search related to patient experience of PAI in the acute setting. Studies investigated the experiences and expectations of older adults regarding rehabilitation and exercise (Atwal et al., 2007, So and Pierluissi, 2012) and the barriers and enablers of physical activity (Brown et al., 2007, So and Pierluissi, 2012). Sample sizes varied between 10 and 28 participants. One study also included staff interviews (n=19) (Brown et al., 2007).
The only UK study concluded that nurses and allied health professionals are not actively providing rehabilitative services to promote health and well-being, contradicting the focus of active ageing (Atwal et al., 2007) and the tenets of both physiotherapy (CSP, 2014) and nursing (Henderson, 1966). Hospitalised older adults perceived that independence was lost on admission to hospital and placed importance on social interaction as well as the restoration of lost abilities. Older adults valued interaction with healthcare professionals but felt that their stay could have been socially enhanced with more interactions. Psychosocial factors were not evident as being an integral part of the rehabilitation process. Some patients identified that nurses allowed them to perform self-care without offering any assistance. The advocated aim of nursing is to restore independence (Henderson, 1966) thus patient reported experience in the study (Atwal et al., 2007) may have been as a result of a difference in expectations regarding self-care. The authors conclude that successful ageing is dependent on both biomedical and psychological approaches and acute environments should ensure that social rehabilitation form an integral part of any rehabilitation programme (Atwal et al., 2007).

Two North American studies (Brown et al., 2007 and So and Pierluissi, 2012) both utilised semi-structured interviews and identified similar barriers to exercise and mobility in hospital: symptoms (weakness, fatigue and pain), institutional barriers (tethering by equipment, lack of support from healthcare professionals, lack of walking aids) and fear of injury (falls). In addition, So and Pierluissi (2012) identified motivators for exercise in hospitalised older adults as avoiding the negative effects of bed rest, promoting a sense of well being, improving functional recovery and being asked to exercise. Brown et al., (2007) also questioned staff regarding barriers to patient mobility, the same barriers as those reported by patients were identified with one addition. Patient motivation was identified as a barrier by 67% of staff; in comparison no patients identified this as a barrier. This highlights the importance of obtaining the patient’s perspective directly, rather than by staff proxy. The finding of a discrepancy between the groups regarding patient motivation as a barrier to
mobility might be explained by social desirability bias, the desire of patients to present themselves in a positive light (Bowling, 2005).

There are several limitations to these studies. Interviews were conducted retrospectively post discharge by telephone (Atwal et al., 2007), which may have been affected patients’ ability to recall events and associated feelings related to their hospital stay (Holliday et al., 2012). Participants might also have modified their responses to questions in relation to aspects of their care and their perceptions, for fear that this would negatively affect future healthcare requirements (Cooper et al., 2013a). Interviews were not tape recorded (Atwal et al., 2007), which may have influenced the researchers ability to listen to the interviewee and probe in-depth (Ritchie and Lewis, 2003). Small sample size (So and Pierluissi, 2012) and the potential influence of the interviewing style of one researcher in all studies might also have influenced findings. National contextual factors must also be considered; two studies were conducted in North American hospitals (Brown et al., 2007, So and Pierluissi, 2012). A large proportion of the patients (40%) had bed-rest ordered by their physician, which might have influenced patient responses to questioning. Physician ordered bed-rest is more common in North American hospitals than in UK hospitals, which may limit the applicability of the results (Morris, 2007). Interestingly, Brown et al., (2007) did not consider that fear of falling was a potentially modifiable barrier, however, the number of studies investigating interventions to reduce falls (Zijlstra et al., 2007) would suggest that this is not an internationally held belief. Brown et al., (2007) also cite the current medico-legal environment as a reason for minimisation of mobility remaining the default solution for nursing staff, which again may not be reflective globally.

The authors (Atwal et al., 2007, Brown et al., 2007, So and Pierluissi, 2012) do not attempt to discuss possible theoretical bases to provide insight into their findings or how the attitudinal factors of patients and staff might be modified. Two studies refer to fear of falling and
motivation (Brown et al., 2007, So and Pierluissi, 2012), both of which are well described in the theoretical literature (Bandura, 1977, Resnick, 2002), but the authors do not attempt to analyse their findings in light of this work.

2.5.1 Summary of qualitative studies

The qualitative literature provides consistent evidence of a number of barriers to mobility within hospital settings, although the importance of the barriers to the patients varied across studies. Fear of falling, symptoms, staff shortages, environment, tethers and lack of assistive devices were all identified as barriers. One study (So and Pierluissi, 2012) also identified four major motivators for exercise; avoiding the negative effects of bed-rest, promoting a sense of wellbeing, improved functional recovery and being asked to exercise. These studies highlight the potential contribution of the clinical setting, healthcare professionals and patient behaviours to rehabilitation success and have further implications in terms of identification of modifiable factors with the potential to positively impact on patient outcomes. No attempt is made, however, to interpret study findings with respect to theoretical concepts related to behaviour and behavioural change.

2.6 Discussion of literature review and implications for study

Many studies of PAI in older adults have targeted participants in the community, in care homes or in rehabilitation hospitals and reported positive outcomes (Crocker et al., 2013, Latham, 2004). Participants in these settings undergo programmes of several months duration and consequently older adults admitted to hospital with acute medical illness represent a non-comparable cohort. Opportunities for PAI in the acute setting are limited due to patients’ acuity and hospital LOS, therefore positive outcomes with PAI might be less likely in an acute hospitalised older adult population with an average LOS of 15.3 days (local trust data). The aim of the literature review therefore was to investigate the impact of PAI interventions to medically unwell older patients on patient outcomes. A secondary aim was to
understand any theoretical basis for study outcomes. The literature review provided evidence of inconsistent outcomes from studies to date that do not allow definitive conclusions as to the effect of PAI on medically unwell older adults admitted to hospital. An assumption in all quantitative studies was that study outcomes would be affected by PAI. Yet there was no evidence from this review of any attempt to investigate the association of the intervention with outcomes observed, although this has been reported in studies of stroke patients and patients with chronic lung disease (DePew et al., 2013, Karges and Smallfied, 2009).

Quantitative study findings were not explained in terms of the constituents of successful or unsuccessful outcomes. Neither the mechanisms through which interventions might have brought about outcomes nor the influence of contextual factors were discussed (Moore et al., 2015). It was therefore not possible to identify a theoretical basis to explain outcomes. This is not unexpected; currently many areas of physiotherapy and rehabilitation are underdeveloped from a theoretical perspective (Whyte, 2008). The review of qualitative studies in the area provided evidence that the impact of PAI on hospitalised older medical patients might encompass the psychological as well as the physiological domain. The small number of qualitative studies provided information regarding potentially modifiable patient behaviours such as motivation, in relation to PAI. Although not explicitly stated in any studies, contextual factors were identified from the studies that may have contributed to outcomes.

### 2.6.1 The importance of context

Context is infinitely complicated but is an integral part of a programme or healthcare intervention (Pawson 2013) and has been the subject of increased focus recently in implementation research (McCormack et al., 2002, Moore et al., 2015, Rycroft-Malone, 2008). Context is defined as relating to the micro-meso-macro levels where micro represents small scale, meso, middle or intermediate and macro, large scale (The University of Oxford,
1999) although there are differing interpretations of these levels in healthcare. For example macro may relate to national policy, meso to a national programme and micro to the organisation (Caldwell and May 2012), alternatively the location level could constitute the meso-level and the micro level refer to the patient and healthcare staff delivering health care (Legare et al., 2011). Contextual layers are thus dynamic and intertwined so that interventions never take place in exactly the same circumstances twice (Pawson 2013). Context is important because of how it might influence stakeholder actions and is critical to interpreting findings and generalising beyond a specific evaluation (Moore et al., 2015). One reason for the inconsistent outcomes of studies investigating the effect of PAI may be the influence of context on the actions of stakeholders.

There is evident, growing acknowledgement of the complexity of interventions and the influence of context on outcomes of healthcare interventions (Moore et al., 2015, Wells et al., 2012). Context encompasses anything external to an intervention that can facilitate or hinder its application or effects (Moore et al., 2015) and therefore includes the influence of individuals, teams, organisational structures, cultures, resources and relationships (McCormack et al., 2002). The included studies, in the main, did not define or describe context beyond nation, hospital location (acute, rehab, community) or general population demographics. However, further contextual factors could be identified from the review and might provide some explanation for the inconsistency of study findings. Contextual factors that may influence study findings in this review were identified as those related to the service, the intervention and the patient.

2.6.2 Physiotherapy service provision

The amount and frequency of physiotherapy intervention contributes to the dose of PAI (Theou et al., 2013) and are influenced by days of service provision, staffing establishment and hospital LOS. The detail of service provision was inconsistent although some studies
suggest that there might be an association between days of service provision, physiotherapy staffing resource and positive outcomes. Studies that provided an investment in physiotherapy staffing reported a positive impact on outcomes (Brusco et al., 2007, Cardiff and Vale Health Board, 2009) as did those that provided services over 7-day (Cardiff and Vale Health Board, 2009, Killey and Watt, 2006 and Troosters et al., 2010). Where physiotherapy staffing resource was reported as optimal in the usual care group this was also cited as a reason for lack of difference in outcomes between control and intervention groups (Mudge, Giebel and Cutler, 2008, Siebens et al., 2000). This might suggest that the participants in the usual care groups experienced a similar improvement in outcomes to the intervention group.

The qualitative studies reviewed provided indications that service factors such as staff availability might influence patient physical activity. Not seeing a healthcare professional and being told to exercise were identified as a barrier and a motivator to exercise respectively (So and Pierluissi, 2012). Both nursing and physiotherapy specifically state in their professional definitions a purpose to restore function and independence (Henderson, 1966, CSP, 2014).

Direct patient interaction with either a nurse or a physiotherapist in an inpatient setting is determined by days of service provision and staffing resource (capacity). At the study site, physiotherapists are only present on the ward 5-days a week for a maximum of 7.5 hours a day limiting patient access to the profession. Nurses and nursing assistants by contrast are the only group of health care professionals within the hospital setting providing support to patients 24-hours a day and 7-days a week (Kneafsey 2012). Thus nurses, by virtue of their level of contact with patients, are well placed to support vital rehabilitation activity and thus skills practice (Clarke 2014) that ensures carry over and rehabilitation gains for patients. This assumes, however, that nurses have developed knowledge of rehabilitation techniques and regard these as legitimate nursing activity (Clarke 2014) and that the staffing resource is adequate to allow nursing staff to support such activities (Kneafsey, Clifford and Greenhill, 2013).
2.6.3 Patient characteristics

The varied exclusion criteria of studies suggest that the heterogeneous nature of hospitalised older patient characteristics might also be an important contextual factor for consideration. Patients with multiple co-morbidities and cognitive impairment are not well represented in studies to date, possibly researchers theorise that these patient characteristics will affect study outcomes. These populations of older adults are therefore not well served by the evidence base of current medicine but nationally, 60% of patients admitted to older persons’ wards have or develop some form of cognitive impairment (Royal College of Psychiatrists, 2006) and up to 80% present with frailty and multiple co-morbidities (Andela et al., 2010). Moreover, recent expert gerontological opinion from academic and charitable organisations has called exercise the most promising intervention to prevent or delay cognitive decline and/or frailty in older adults (Ray and Davidson, 2014). However, this review revealed relatively few studies of PAI including exercise in an acute hospital setting and considerable variation in outcomes regarding PAI in medically unwell older adults. Since these groups represent the largest proportions of older adults admitted to the study site it is vital that the impact of PAI on these groups of patients are understood in order to provide best care to all patients regardless of clinical presentation.

Two studies attempted to stratify patients by admission functional ability (de Morton et al., 2007b, Jones et al., 2006) and report that outcomes were different by stratification group. These 2 studies suggest that patient presentation may affect the impact of exercise interventions on study outcomes but do not propose an explanatory theory. It is unfortunate that in the study by Siemens et al., (2000) analysis by patient presentation stratification group and exercise stratification group was not performed, since this might have produced findings that support or refute these assumptions. The implications of the study findings (de Morton et al., 2007b, Jones et al., 2006) are twofold. Firstly that patient presentation may affect the degree to which similar exercise interventions produce an improvement in outcomes.
Secondly, and as a result, the dose of exercise intervention required to positively affect health status outcomes might be different between subgroups of medically unwell older adults admitted to hospital.

2.6.4 Physical activity intervention

Another inconsistency across studies was the detail regarding two other factors contributing to the dose of PAI, the mode and intensity of the intervention. The mode of intervention constitutes the components of the exercise intervention such as walking practice or exercises to develop strength, flexibility or balance. The intensity of exercise refers to how much energy is expended when exercising and is varied by increasing the load for example by increasing the number of repetitions of an exercise or the speed of walking (Dejong et al., 2004). Both the mode and intensity of PAI are determined by a clinician with the aim of challenging the sensory-motor and cardiovascular systems to drive motor adaptation (Bastian, 2008) and in turn, positively affect functional health status. Detail was variable regarding mode and intensity of the intervention for both intervention and control groups. The mode and intensity of PAI is an important context to consider in relation to outcomes and was acknowledged in one study, which reported that the exercise programme might not have been sufficiently challenging to impact on the measures chosen (Siebens et al., 2000). The content of the physiotherapy intervention at the study site is guided by an evidence-based algorithm based on patient need identified at assessment (appendix 2) to limit variability in mode and intensity of intervention related to patient deficits.

2.7 Summary

The outcomes of the literature review, which includes studies that span a number of years (2000-2014), are inconsistent although the impact is likely to include effects at physiological, functional and psychosocial levels (Verbrugge and Jette, 1994). Consequently, it was not possible to extract the constituents of successful PAI in medically unwell older adults.
However, patient behaviours and several key contextual elements were highlighted as possible contributing factors to explain study outcomes. The lack of consistent outcomes from studies to date is unhelpful in the clinical setting where there is a need to develop productive models of physiotherapy service provision based on patients’ needs. An increased level of understanding of whether, for whom, how and in what circumstances physiotherapy has an impact on outcomes in medically unwell older adults in the local context is required.

Authors of systematic reviews similarly advocate further investigation to explore the possibility of a dose-response relationship for the amount of PAI provided (Kosse et al., 2013, Peiris, Taylor and Shields, 2011) and understand the effect of patient characteristics on benefits gained from exercise intervention during acute hospitalisation, to allow effective targeting of healthcare services (de Morton et al., 2007). The outcome of this literature review therefore provides rationale for further study into physiotherapy to medically unwell older adults, to identify the impact of physiotherapy in terms of whether physiotherapy works for patients, if so for whom, how and in what circumstances?

2.8 The purpose of the research

The literature review confirmed that there remains considerable, unexplained variation in outcomes of studies to date about the impact of PAI on medically unwell older adults. The gaps in the current knowledge laid the foundations for the proposed research. A need was identified to better understand if physiotherapy, the main deliverer of PAI in the local context, works or doesn’t work for medically unwell older adults. An additional requirement was to understand for whom, how and in what circumstances physiotherapy is or is not successful. Despite recognition in the review that patient actions and contextual factors may influence the impact of PAI in terms of outcomes, there are no studies to date that seek this level of explanatory detail.
The aim of this study was therefore to investigate the impact of physiotherapy to medically unwell older adults hospitalised at a large NHS Foundation Trust (the study site) through generation of theoretical explanations regarding for whom, how and in what circumstances physiotherapy intervention works or doesn't work for medically unwell older adults. The term impact was used to acknowledge that whilst a positive effect, evidence of effectiveness, was desired there might be no impact or a negative impact of the intervention. Effectiveness in this study context was defined as a positive effect of physiotherapy determined by an association between measures of physiotherapy and change in hospital and health status outcomes.

The potential contextual factors that might affect the actions of stakeholders and contribute to the success or failure of physiotherapy intervention are numerous. Due to the limited resources to undertake this study, a process of prioritisation was required (Pawson, 2013). The literature review highlighted 3 specific contexts that appeared from study findings to influence actions of stakeholders in PAI; service, patient and intervention. The mode and intensity of the physiotherapy intervention at the study site is guided by an evidence-based algorithm based on patient need identified at assessment (appendix 2) to limit variability and therefore this context was not prioritised for the current study. The service context as it relates to access to physiotherapy and the impact on the amount of and frequency of physiotherapy intervention received by the patient was acknowledged in the literature to relate to days of service provision and commensurate staffing resource. Patient characteristics were also highlighted in the literature as another important contextual factor, specifically the patient characteristics of cognitive impairment and frailty. The physiotherapy service context as it relates to days of service provision and staffing levels and the patient characteristics of frailty and cognitive impairment were therefore prioritised for investigation in the study.
The purpose of the study was specifically:

1. To determine whether physiotherapy works or doesn’t work for medically unwell older adults admitted to the study site in terms of a positive effect on health status and hospital outcomes:
   a. Whether amount, frequency and time to first physiotherapy intervention differ between subgroups of medically unwell adults admitted to the study site?
   b. Whether change in health status measures (admission and discharge) and hospital performance measures differ between subgroups of medically unwell adults admitted to the study site?
   c. Whether change in health status measures (admission and discharge) and hospital LOS are associated with the amount, frequency and time to first physiotherapy interventions? In addition, whether this differs between the defined subgroups of medically unwell adults admitted to the study site?

2. To understand the patient and staff perspectives of how physiotherapy works or doesn’t work for patients, for whom and in what circumstances?
   a. To explore the underlying physiotherapist and patient actions that influence the effect of physiotherapy interventions in practice
   b. To understand how contextual factors combine with physiotherapist and patient actions to enable or constrain physiotherapy in achieving a positive effect on health status.

To date, studies of PAI to medically unwell older adults do not penetrate beneath the surface of observable inputs and outputs (Pawson and Tilley, 1997) to provide sufficient depth of understanding to determine the impact of physiotherapy to medically unwell older adults. Therefore, alternative methodologies to address the research questions were investigated and are described in Chapter 3.
Chapter 3 Methodology

This chapter begins by reflecting on the purpose of the study identified at the end of the literature review. The nature of physiotherapy in an acute setting is explored in terms of complex interventions and complex systems as they relate to healthcare and the challenges of studying complexity are described. The model of realistic evaluation (RE) is proposed and justified as an appropriate framework with which to undertake the current study in order to answer the research questions. A more detailed review of RE follows with respect to its philosophical and theoretical roots and the applicability of the methodology to the study of healthcare interventions and physiotherapy in particular are discussed. The methodology and methods of RE and the appropriateness of mixed methodology/methods within the framework are discussed and theories for testing are presented. The chapter concludes with a summary.

3.1 Reflections on the purpose of the study

The purpose of the study was to understand what impact physiotherapy has on older adults admitted acutely to hospital. Specifically, to know whether any effect in terms of change in patient health status and hospital performance measures varied with consistencies of physiotherapy provision (amount, frequency and time to first intervention) and patient presentation (frailty or cognitive impairment). To provide further illumination regarding intervention effects, I also wanted to understand from the staff and the patient perspective what works, for whom, how and in what circumstances?

It was evident in the literature review that although the impact of physiotherapy and other physical activity interventions is often studied, studies attempt to control for confounding variables including complexity of patient presentation by excluding certain patient groups for example, cognitive impairment and frailty. This is incongruent with the reality of clinical practice where these subgroups represent the most common presentations of medically
unwell older adults. In addition, the literature revealed that the stakeholder perspective, patient or staff, is rarely obtained. The interactions between all these factors appear complicated. I first investigated whether physiotherapy in the acute clinical setting is complex and if so, I sought to understand how that complexity might highlight the most appropriate design for the study.

3.2 Complexity

3.2.1 Defining complexity

Care of patients in an acute hospital setting is intuitively described as complex; more specifically it is a series of complex interventions (Medical Research Council (MRC), 2000) provided within a complex system (Plsek and Greenhalgh, 2001); physiotherapy exists within and contributes to this complex environment. Therefore to appropriately and robustly evaluate complex interventions, complexity itself must be defined in order to reveal what it is that makes interventions complex (Petticrew, 2011).

Defining complexity is not straightforward, the term itself is contested (Wong, 2013) with disagreement on both its nature and the methods by which it should be studied (Pawson, 2013). A generic definition of complex is proposed as consisting of many different and connected parts, not easy to understand, complicated or intricate (The University of Oxford, 1999). This definition alone is applicable to both a healthcare intervention and system. The Medical Research Council (MRC) proposes a more detailed definition of complex interventions specific to healthcare as:

“Complex interventions are built up from a number of components, which may act both independently and interdependently. The components usually include behaviours, parameters of behaviours (e.g. frequency, timing), and methods of organising and delivering those behaviours (e.g. type (s) of practitioner, setting and location)”

(Medical Research Council (MRC), 2000 page 2)
There are other definitions of complex interventions, all of which emphasise that the interventions have multiple interacting components (Clark, 2013), a degree of flexibility, non-standardisation, non-linear causal pathways (Petticrew, 2011, Wong, 2013) and uncertainty (Wade, 2011). If these characterisations are applied, physiotherapy intervention can be understood as a complex intervention. A complex system definition within healthcare is proposed as:

“A collection of individual agents with freedom to act in ways that are not always totally predictable, and whose actions are interconnected so that one agent’s actions changes the context for other agents. Examples include just about any collection of humans (for example, a family, a committee, or a [...] healthcare team”

(Petticrew, 2011 page 625)

Further complexity is added by the often conflicting priorities and power relations of the actors existing within the acute hospital setting (Ham, 2009), which may include differing perspectives on prioritisation of access to services, profitability, high quality, safety, convenience, patient-centeredness and satisfaction (Porter, 2010).

Evaluators of social programmes have proposed definitions regarding the basic components of complex interventions or programmes introduced within complex social systems. Recently, Pawson (2013) has proposed that programme complexity is assured from seven components; the decisions of the subjects, implementation chains of the programme, the context in which the programme is embedded, the historical context of the programme, monitoring systems, competition and impact of other rival programmes/policies and potential emergent effects. I suggest that if the term ‘programme’ is replaced with healthcare intervention it is possible to see how this checklist is equally applicable to clinical healthcare interventions.
Historically, physiotherapy has not been viewed as a complex intervention. A clinical problem has been viewed as a linear model to be broken down into functioning and malfunctioning body parts in order to determine the physiotherapy intervention required to resolve each fault (Wilson, Holt and Greenhalgh, 2001), what some authors have described as a ‘Cartesian’ view of the body (Nicholls and Gibson, 2010). This situation is possibly a product of the profession’s Victorian roots and the adoption of a biomedical approach to patients (Nicholls and Cheek, 2006). This approach has dominated the twentieth century practice of physiotherapy and placed emphasis on anatomy, biomechanics, pathology and physiology (Nicholls, 2005). Similarly physiotherapy interventions to address malfunctions have been viewed as relatively linear and non-complex. More recently, however, there has been acknowledgement of the diversity of both the population requiring physiotherapy and physiotherapy itself. The former require acknowledgement and understanding that human nature is complex (Plack, 2005) and the latter as a diverse profession with multiple approaches, methods and ways of knowing within a background of political, social and economic influences (Gibson, Nixon and Nicholls, 2010, Nicholls and Cheek, 2006). Consequently, the impact of physiotherapy on patients might be more far reaching than the linear model might suggest.

These definitions help to make sense of the current example where the introduction of the intervention, in this case physiotherapy, into the locale, the Older Persons’ Unit and its subsequent interactions are non-linear, adding to the complexity (Shiell, Hawe and Gold, 2008). In practice, no part of the equation of physiotherapy intervention to an medically unwell older adult can be described as “constant, independent or predictable” (Plsek and Greenhalgh, 2001 page 625). Therefore, a simple cause and effect method of inquiry is unlikely to meet the requirements of the current evaluation (Wilson, Holt and Greenhalgh, 2001).
3.2.2 Studying complexity

The modern healthcare environment demands both effective and efficient services and as such there is a clear need for organisations contemplating change to ensure that high-quality performance measures are chosen to evaluate the success or failure of the innovation (Comans et al., 2011). However, research into physiotherapy is still relatively nascent and current practice is not well understood. If achieving high value for patients is the overarching goal of all health care delivery (Porter, 2010) services must be evaluated, especially where knowledge does not exist and irrespective of whether they are innovative or not.

The literature review confirmed the empirical nature of most physiotherapy related studies. It is perhaps not surprising given the history of the profession that research in physiotherapy has traditionally been approached from a biomedical model of health, although it is not alone in terms of healthcare professions in this regard (Plack, 2005). This may be partly attributed to history and the active garnering of medical patronage through adoption of the biomedical view of the body in order to confer legitimacy on the Society of Trained Masseuses (precursor of the Chartered Society of Physiotherapy) (Nicholls and Gibson, 2012). Then latterly perhaps, to the aspirations of physiotherapy, like nursing, to attain the same professional status as the hegemonic medical profession (Crinson, 2009) and in doing so to utilise the preferred methodology of that profession in an attempt to legitimise their ambition.

Although, there is argument that the situation is changing (Walt et al., 2008), other authors have yet to be persuaded:

“And when push comes to shove—when editorial boards and tenure committees weigh in, and final decisions are made about publications and positions—it is to the positivist standards that we must all still appeal”

(Gorski, 2013 page 661)
Whatever the explanation for the current position, the resultant body of knowledge has a positivist, biomedical viewpoint captured within a generally quantitative evidence base that fails to capture the complexity of physiotherapy practice (Shaw, Connelly and Zecevic, 2010) and I would argue is unsuitable for the purpose.

The study of complex interventions in naturalistic settings provides challenges for traditional experimental and quasi-experimental designs (Green and South, 2006) as the study designs require attempts to control contextual variability. Recently a number of authors have questioned the appropriateness of such scientific, reductionist strategies for the investigation of complex interventions and systems (Brown, 2006, Greenhalgh et al., 2010, Mackenzie et al., 2010). Experimental logic treats control conditions in healthcare studies as stable and identical when really they are context dependent systems that are complex and ever-changing (Pawson, 2013). Thus, experimental studies may produce probabilities but have only minimal engagement with the extent to which those probabilities hold across contexts (external validity) (Marchal et al., 2013), impacting the generalisability of the results. In orthodox medical science the mechanisms of action exist at the physiological, not the social level, but in order to determine the success of clinical interventions, patient behaviours also require consideration and observation (Pawson, 2013). Consequently attempts to reduce a complex system to individual elements might actually be counterproductive, limiting the ability to understand that which we are seeking to comprehend (Kernick, 2006).

Whilst it is acknowledged that Randomised Controlled Trials (RCTs) can provide accurate, unbiased information regarding a causal relationship between treatment and outcome (Sibbald and Roberts, 1998), they are conducted in an artificially closed system. Consequently, the results, although generalisable to an extent, cannot provide illumination regarding the outcomes resulting from the same intervention in an open system. Complex interventions, particularly those with some degree of tailoring to individual needs, such as
physiotherapy management of older adults, can include widespread and person-varying effects (Mayo and Scott, 2011). Consequently, outcomes will be dependent upon the relationship of the intervention with other mechanisms existing within any given context (Porter and O'Halloran, 2012). Certainly, the conflicting outcomes reported in the literature regarding the effect of physiotherapy on patient health status and hospital performance outcomes suggest that context and mechanisms might be significant contributing factors to these outcomes. However, this has not been investigated with the experimental methods employed in studies to date.

The MRC original and updated framework for investigation of complex interventions (Medical Research Council (MRC), 2000, Medical Research Council (MRC), 2008) was therefore rejected for this evaluation. The more recent framework accepts some adaptation to local settings, however it underestimates complexity and although social science methods are acknowledged, there is an assumption that evaluators should continue to strive towards use of the experimental trial (Mackenzie et al., 2010, Pawson, 2013). It is therefore not deemed appropriate for this evaluation due to the hypothesised importance of context on outcomes. Inquiry utilising the constructivist paradigm was also rejected. Although, from a diametrically opposed philosophical position to experimental inquiry, methods of inquiry utilising a constructivist paradigm, likewise do not address the issue of the wider impact of any given programme (Blamey and Mackenzie, 2007). The purpose of qualitative methods of inquiry is not to draw representative samples that allow generalisations to wider populations, a key objective of this evaluation. Furthermore, whilst the constructivist approach seeks the perspectives of the participants, Pawson and Tilley (1997) suggest that it ignores the structural and institutional features of society, which may be independent of individuals' reasoning and desires (Pawson and Tilley, 1997).
Recently, new methodologies have emerged that may improve the quality and scientific power of healthcare research in the face of challenges such as heterogeneity of populations and the contribution of behavioural factors (Cresswell et al., 2011). Theory-driven evaluation evolved in social science to investigate complex social programmes and has been used for two decades in health systems research (Marchal et al., 2012). The hypothesised importance of mechanism and context on outcomes indicated that a theory-driven evaluation would be appropriate for this inquiry in order to offer potential for insights that go beyond the narrow experimental paradigm of the RCT (Wong et al., 2013a).

There are a number of theory-driven approaches to evaluation. I considered Theories of Change and RE as conceptual frameworks for the current study as they are established in evaluation of healthcare in the UK (Blamey and Mackenzie, 2007). There are similarities in the approaches; both are concerned with understanding the theory of an initiative. However, authors suggest that they are suited to different parts in the evaluation course, Theories of Change being more suited to the macro level whilst micro level evaluation is more appropriately addressed utilising RE (Blamey and Mackenzie, 2007). Thus, Pawson and Tilley’s RE (1997) was adopted as an appropriate framework for this study (Pawson and Tilley, 1997). It’s utility is warranted in order to understand what works, for whom, how and in what circumstances with regards to physiotherapy interventions delivered to medically unwell older adults.

3.3 Realistic evaluation (RE)

Realistic evaluation is a framework for evaluation of social programmes and interventions developed by Ray Pawson and Nick Tilley which utilises descriptive and/or experimental data arising from both quantitative and qualitative methodologies and methods (Pawson, 2013, Pawson and Tilley, 1997). The model has evolved over a number of years and has roots in philosophy, the sociology of social science and social science methodology (Pawson, 2013).
The terms realist and realistic evaluation are used interchangeably in the literature. Pawson provides clarification in his most recent book; the evaluation in a realist evaluation is grounded in the reasoning of the stakeholders and thus the term realistic evaluation is sometimes substituted for realist evaluation (Pawson, 2013). The term realistic evaluation (RE) is used in the current study.

3.3.1 Realistic evaluation and philosophical position

Realistic evaluation is one of a family of theory-based approaches to evaluation but uniquely RE has a distinct philosophical orientation (Astbury, 2013) that is underpinned, by a realist philosophical paradigm situated between the positions of positivism and relativism (Pawson and Tilley, 1997, Wong, Greenhalgh and Pawson, 2010).

Historically, physiotherapy has lacked a robust philosophical orientation (Nicholls and Gibson, 2012). However, there is congruency in the realist position with recent views of the position that a physiotherapy theoretical framework might adopt (Bithell, 2005, Gibson, Nixon and Nicholls, 2010). Recent authors argue that rather than take the biomedical view (positivist) of the body that marginalizes other views such as cultural and social or the social constructivist (relativist) view that largely ignores the anatomical, physiological and pathological aspects of the body, that there might be an approach that attempts to reconcile these two positions (Nicholls and Gibson, 2010). The key tenets of a realist philosophy are described as:

1. There is a reality that cannot be measured directly, because it is processed through human thoughts, influenced by factors such as language and culture but can be known indirectly, that is, relative to the researcher (Marchal et al., 2012, Wong, Greenhalgh and Pawson, 2010).
2. Instead of a dichotomous distinction between the macro and the micro, realists believe that the social world is stratified in character and that causal mechanisms operate at the different levels of strata or reality (Gorski, 2013, McEvoy and Richards, 2003, Pawson and Tilley, 1997); crucially, this stratified reality exists independent of our knowledge of it.

3. Two or more phenomena can conjoin to give rise to new phenomena, whose properties are irreducible to their constituent parts, this is termed emergence (Sayer, 2000). The emergent nature of change means that social programs or healthcare systems may change the macro context (for example, by introducing legislation). They may also change the resources or opportunities available to participants and, in that sense, change the context for those participants (Pawson, 2006, Wong, Greenhalgh and Pawson, 2010).

4. To understand the relationship between context and outcome, realism stresses the mechanics of explanation (generative mechanisms) (Marchal et al., 2012, Pawson and Tilley, 1997). The resultant explanation leading to a partial but progressive body of scientific knowledge (Pawson, 2013, Pawson and Tilley, 1997).

The realist philosophy has common ground with critical realism, a relatively new philosophical approach (McEvoy and Richards, 2003), associated with the critique of the positivist approach. It is associated with Roy Bhaskar who, developing the work of Rom Harré, gave critical realism a coherent philosophical language (Danermark et al., 2005) Critical realism involves a shift from epistemology to ontology, that is from theories of knowledge to theories about reality (Cruickshank, 2012), and within ontology a switch from events to mechanisms (Danermark et al., 2005).

Critical realism acknowledges two dimensions of reality; the intransitive and the transitive (Danermark et al., 2005). The intransitive object is reality, the world as it really is and the transitive object is our changing knowledge of it (Gorski, 2013). Science aspires to knowledge (transitive) about reality (intransitive) and to bridge this ontological gap, theories, the transitive objects of science, must be developed (Danermark et al., 2005). Theories make
sense of observable regularities (consistencies) and propose where to look but also what to look for (Pawson, 2013). Inconsistencies appear during empirical testing of hypotheses derived from theories, and inform further theory development (Pawson and Tilley, 1997).

The tenets of stratification and emergence allow for understanding at different levels of reality and hence accommodate the complexity of healthcare and can contribute to the disentanglement of complex interventions (McEvoy and Richards, 2003). For example abnormality in movement is a common subject of physiotherapy assessment of presenting patients. Movement, a change in position, can occur at multiple interacting levels along the continuum from microscopic to the person acting in society and each level may be influenced by physical, social, psychological and environmental factors (Allen, 2007). Thus, there are human behaviours (both staff and patient) as well as multiple interactions between the numerous components of an healthcare intervention, such as physiotherapy (Wong, Greenhalgh and Pawson, 2010). Emergence means that a definitive understanding of any given complex intervention will always be incomplete, but for the realist (if not the critical realist) there is value in partial knowledge (Pawson, 2013).

Critical realism espouses three ontological domains; real, actual and empirical. The real consists of objects, natural and social, and their structure and powers (Sayer, 2000). Any given object has ‘real’ causal powers that can be activated to generate ‘actual’ events in the world regardless of whether or not that is ‘empirically’ observed (Lizardo, 2013, Sayer, 2000). The ‘real’ domain is where the generative mechanisms that create an event are located (Danermark et al., 2005, Pawson, 2013). However, Bhasker’s view that the ‘real’ domain is only realised when the three levels come together, through closed system experimentation is rejected by realists (Pawson, 2006, Pawson, 2013).
Critical realism locates causality in the generative powers of causal mechanisms (Porter and O'Halloran, 2012) as opposed to the “successionist model” of causality (cause X is activated and effect Y follows) characterised in clinical trials (Pawson et al., 2005 page 21) and is a core concept of critical realism and RE.

“The hallmark of realist enquiry is its distinctive understanding of causality”

(Pawson et al., 2005 page 21)

The generative model of causality considers that phenomena have the potential to be transformed by an intervention dependent on the conditions and the circumstances in which the intervention acts (Pawson and Tilley, 1997) (Figure 2). That is the mechanism (M) of any intervention might be influenced by the systems into which it is introduced, the context (C), with a corresponding effect on outcomes (O) (Pawson and Tilley, 1997). Any RE must begin with development of a theory which reflects this model; an idea about what makes the intervention work which can then be tested (Pawson, 2013). It is this attention to theory development which results in better focus to the outcome analysis (Pawson, 2013, Pawson and Manzano-Santaella, 2012).

![Figure 2: Generative causation](Pawson and Tilley, 1997 page 58)
There is disparity between critical realism and realism, on the matter of whether social science should be a critical exercise (critical realism) or an empirical science (evaluation science) (Pawson, 2006, Pawson, 2013) and thus the appropriate study designs for investigation. Bhasker’s critical realist view does not support the epistemology of mechanisms gained outside the confines of closed experiment systems; a method impossible in social settings (Pawson, 2006) and in naturalistic healthcare settings. That mechanisms can never be uncovered in society since investigation takes place in an open system rather than a closed system is rejected by realists (Pawson, 2013). Epistemologically, it is acknowledged that, only partial knowledge can ever be elicited because the influences of contextual components and their interactions on the desired outcomes can never be fully understood (Wong, 2013). Nonetheless, the resultant partial knowledge can be useful and even if limited in terms of reliability, validity and generalisability, it is nevertheless real (Pawson, 2013).

In studying the world, realists accept that scientific observations are fallible (McEvoy and Richards, 2003). Theories must be tested again and again in order to refine them through falsification, the use trial and error to refine interventions (Tilley, 2000). That a theory has survived the most rigorous testing available does not predict its ability to survive future testing, but the partial knowledge elicited allows for refinement of the theory and further testing (Pawson, 2013). Realism recognises the importance of both the individual and the influence of the structures and culture of society. It therefore has a philosophical stance in keeping with the study of complex and interacting phenomena involving individuals and a healthcare intervention such as physiotherapy (Byng, 2005).

3.3.2 Realistic evaluation and theory driven evaluation

Historically, evaluation of social programmes was conducted primarily in terms of effects; little consideration was given to how those effects were produced, the so called ‘black box’
There are parallels here with physiotherapy; the lack of understanding of how and why treatment effects are produced have led to similar labelling ‘black box’ and ‘Russian doll’ respectively (Dejong et al., 2004, Whyte and Hart, 2003).

Realistic evaluation is considered one of the family of theory-driven evaluations (Astbury, 2013) that developed in the field of sociology, one of the roots of RE (Wong et al., 2013a). All theory-driven evaluations focus not only on the implementation and effectiveness of an intervention but also the contexts and mechanisms that might trigger change (Chen 1990).

Realistic evaluation is “avowedly theory-driven” (Pawson and Manzano-Santaella, 2012 page 178) but there are differences between RE and other members of the theory-driven evaluation family (Marchal et al., 2012, Pawson and Tilley, 2004). One important difference is the distinct philosophical orientation of realist evaluation (section 3.3.1), a result of the intellectual evolution of RE from the European based critical realist movement as opposed to the American tradition of theory-driven evaluation (Astbury, 2013). The methodology as well as the philosophical foundations of RE differ from other theory-driven approaches (Marchal et al., 2012) and will be described in detail in section 3.3.4.

Theory driven evaluation describes and advocates what evaluators do or should do when undertaking evaluations (Coryn et al., 2011) and historically have been developed to evaluate social programmes. This type of evaluation has, however, been used increasingly in health, recognising that people are not passive recipients in their healthcare process (Blamey and Mackenzie, 2007). Two components are recognised in theory-driven evaluation; the theoretical and the empirical (Rogers et al., 2000). Theory-driven evaluations aim to explain a programme theory or model whilst empirically the evaluations seek to study how programmes cause intended or observed outcomes (Coryn et al., 2011). The approach to theory development can be deductive, inductive or stakeholder derived (Chelimsky, 1998, Patton, 2008).
Examples of theory-driven evaluation models are numerous and include theory-based evaluation, theory-guided evaluation, theory-of-action, theory-of-change, programme logic, logical frameworks, outcomes hierarchies and realist or RE. However, a common vocabulary, definition, and shared conceptual and operational understanding has yet to be defined (Coryn et al., 2011). As such the language of theory-driven evaluation is confusing and at times hard to interpret. Theory-driven evaluation, theories of change and RE are often used interchangeably (Marchal et al., 2012). Programme theories are the building blocks of theory-driven evaluation (Coryn et al., 2011) and theory-driven evaluation is thus sometimes referred to as programme theory evaluation. A realist hypothesis is called a programme theory by some realist evaluators (Marchal et al., 2013) and the term theory is also used in different ways in different approaches (Blamey and Mackenzie, 2007). The current study is a RE as described by Pawson and Tilley (Pawson and Tilley, 1997); the term theory will therefore refer to the psychological and motivational responses leading to behaviours and the theories will be proposed by and owned by me based on my knowledge and experience (Blamey and Mackenzie, 2007, Pawson and Tilley, 1997).

Theory-driven evaluation is espoused to provide a systematic method of evaluation that results in exposure of mechanisms in defined contexts that lead to the observable outcomes. The level of detail and mixed methods employed in testing can enhance the provenance of claims, enhance transferability of findings to other settings and increase the relevance to stakeholders (Marchal et al., 2012). However, criticisms of theory-driven evaluation range from those at the conceptual level; whether there is any necessity for theory to enable evaluation (Scriven, 2007) to those at the empirical level; the bias of evaluators in undertaking the study (Stufflebeam and Shinkfield, 2007). In addition there is often little guidance in the various models on how to develop the theory (Coryn et al., 2011), which can be challenging for investigators new to the process. What constitutes a mechanism and a context is not agreed (Astbury and Leeuw, 2010), although for those undertaking RE Pawson and Tilley provide clear definitions (Pawson and Tilley, 1997). Finally undertaking theory-
Driven evaluations can be resource intensive in terms of both time and cost (Blamey and Mackenzie, 2007).

Acknowledging the criticisms of theory-driven evaluation I would argue that there is a need to develop a theory to enable an evaluation of physiotherapy to acute older adults. Without an underpinning theory the outcome of the study is merely descriptive and provides no insight as to why the outcomes might have been observed. I agree with the view that the value of theory-driven evaluation is in determining not only whether a programme or an intervention work but, more specifically, how and why they work (Coryn et al., 2011, Pawson, 2013). If the findings of an evaluation are to enable recommendations regarding possible modifications to an intervention or programme to improve participant outcomes then an understanding of why outcomes occurred is an absolute necessity.

I acknowledge the criticism that these types of evaluation sometimes create an intrinsic conflict of interest in that I am evaluating theories that I developed. However, there is often a lack of theory related to the problem under study (Astbury and Leeuw, 2010) as revealed in the literature review and as such the theories in this study can only be developed based on my knowledge and experience of the subjects and the setting (Pawson and Tilley, 1997). The collection of qualitative data will be the process most open to my influence but the interviews that elicit this data need to be driven by my theory and Pawson and Tilley require that the researcher plays an active role in this process (Pawson and Tilley, 1997). Therefore, to minimise bias in undertaking this study I will need to self-reflect on my ontological and epistemological beliefs, past experiences, preconceptions and biases throughout the process (Marshall and Rossman, 2011).
3.3.3 Realistic evaluation and evaluation of healthcare interventions

Realist review has its origins in philosophy and sociology and has focussed on programme evaluation as described. Clinical interventions and social programmes are different, only the former makes claims to physiological effects, but there is a commonality, that is, any clinical intervention such as physiotherapy, has to cope with the exigencies of treating people (Pawson, 2013). There are other commonalities in health care interventions and social and health programmes; both are described as complex (section 3.2.) and historically evaluation has primarily concentrated on effects with little attention paid to how the effects are produced (Astbury and Leeuw, 2010, Dejong et al., 2004). If physiotherapy is efficacious then the reasons are unclear (Shaw and DeForge, 2012) as intervention studies to date have resulted in variable outcomes. The lack of congruent evidence from the literature review could be in part due to the differing, often opaque, mechanisms and contexts of the studies, a result of the philosophical origins of the methodological approaches utilised.

The aim of physiotherapy is to develop, maintain and restore movement and functional ability, maximising quality of life for people affected by disease, injury and disability through exercise, manual therapy, technology, education and advice (Guy's and St Thomas' NHS Foundation Trust, 2013a). Such an ambition requires physiotherapy to impact at a biological and physiological level but also, concurrently, at the psychological and social levels (Barron, Klaber Moffett and Potter, 2007, Shaw, Connelly and Zecevic, 2010). Physiotherapy interventions might therefore have an impact due to a physiological action, a psychological action related to patient beliefs and expectations as well as facilitating an endogenous healing mechanism (Bellavite et al., 2006). Most studies to date have concentrated on the physiological action of physiotherapy (Barron, Klaber Moffett and Potter, 2007, Nicholls and Gibson, 2012, Shaw, Connelly and Zecevic, 2010), despite some evidence supporting the impact of beliefs and perceptions on patient behaviour (Barron, Klaber Moffett and Potter, 2007). Nevertheless, the evidence related specifically to patient behaviour and physiotherapy is limited and in a medically unwell older adult population sparse. Thus in this study
physiotherapy is aligned with social programmes in that the area of interest is stakeholder behaviours within the clinical setting and how such behaviours in conjunction with contextual factors contribute to the success or failure of the intervention.

RE provides an suitable evaluation framework for studying healthcare interventions (Pawson, 2013) with the aim of identifying the people and situations for whom the intervention is beneficial by identifying the success and failure rates of different subgroups of subjects (Pawson and Tilley, 1997). The number of studies that have utilised a RE study design however, is small (Marchal et al., 2012) and the use of the methodology in health intervention studies as opposed to health systems research smaller still. The author is aware of no RE studies in physiotherapy but proposes that RE potentially affords another way to illuminate the “diagnosis-treatment dynamic” (Pawson, 2013 page 156) from which physiotherapy can learn.

3.3.4 Realistic evaluation and methodology

The RE model of evaluation meets the requirements that evaluation of healthcare interventions must do so from the patient, clinician and healthcare provider perspectives (Comans et al., 2011). Such an evaluation however, would require integration of potentially conflicting ontological and epistemological positions of methodological approaches. Pawson and Tilley (1997) embed RE firmly in the traditional principles of research in natural sciences; what distinguishes realist design, they suggest, is content rather than form which they summarise in the RE cycle (Figure 3).
Abstract theories are formulated in terms of mechanism, contexts and outcomes to generate context-mechanism-outcome (CMO) configurations. Specific hypotheses are derived from the CMO configurations; these are statements regarding the implications of the theory, specific predictions in terms of what might work, for whom and in what situation? All subsequent inquiry follows from this and theory formation and development of the CMO configurations are anticipated as iterative processes. Stakeholder involvement is critical in RE (Pawson and Tilley, 1997). Stakeholders in the intervention under investigation confirm, falsify and refine the researcher’s theories prior to the observation element of the cycle (Pawson and Tilley, 1997). The terminology of RE is not used consistently, which has implications for interpretation (Marchal et al., 2012). For the current study the terms are as defined by Pawson and Tilley and their collaborators:
Contexts are the location of the intervention and include individuals, interpersonal relations, institutional settings and infrastructure (Pawson, 2013) together with the customs, values and interrelationships found there. Context also refers to different subgroups of subjects for whom the initiative will be beneficial within and between interventions (Pawson and Tilley, 1997).

Mechanisms signify the choices and capacities of the participants that lead to patterns of behaviour (Pawson and Tilley, 1997). It is mechanisms rather than interventions that are the agents of change. Interventions work by providing some resource that persuades a subject to change and this is the underlying mechanism around which the investigation is constructed (Pawson, 2013).

Outcomes are the consequence of an intervention. Outcomes are not only analysed to see if an intervention worked but also to identify if the proposed context/mechanism theories are confirmed or falsified. Importantly, outcomes require interpretation which can be contested (Pawson, 2013).

The final element of the cycle requires specification of outcome patterns in terms of mechanisms and contexts, as they exist in researcher’s understanding at the current time. Crucially, this knowledge feeds back into further developing the researcher’s theories into middle range theories. Middle range theories are testable proposals that involve a level of abstraction but are close enough to the observed data to allow further empirical testing (Merton, 1967). Abstraction is the thinking process that allows understanding of an event as an example of a more general level of happening (Pawson, 2013).

In realistic inquiry, the use of a particular data collection strategy does not commit the researcher to interpretation of the results in the philosophical framework of the method.
employed (Pawson and Tilley, 1997). Realistic evaluation is “method neutral” (Marchal et al., 2013 page 127) and consequently pluralistic methods of data collection are supported in the observation phase of the evaluation. A mixed methodology was therefore selected for the evaluation. Pawson and Tilley (1997) suggest that quantitative and qualitative methodologies can both be utilised within RE in order to elicit “explanatory completeness” (page 158). Furthermore, Pawson advocates the use of both methodologies, suggesting that whilst quantitative data elicited from studies in complex interventions might demonstrate correlation it cannot provide explanation in terms of why the results occurred (Pawson and Manzano-Santaella, 2012). Equally the description, provided by qualitative data, might suggest why an intervention has an impact but does not provide data on whether outcomes actually changed (Pawson, 2013). Thus RE is one of the few methodologies where quantitative and qualitative methodologies are seen as complementary and synergistic;

“…in the realm of research evidence one obtains the best of both worlds by operating in both worlds”

(Pawson, 2013 page 27)

### 3.4 Mixed methodology

Mixed methods studies combine elements of qualitative and quantitative research approaches, enabling different aspects of the evaluation to be addressed, with the aim of eliciting a breadth and depth of understanding and corroboration (Johnson, Onwuegbuzie and Turner, 2007, Woolley, 2009). The use of both quantitative and qualitative methodologies for investigating medically unwell older adults is supported in the literature. A recent Kings Fund report (Cornwall, 2012) argued whether any study purporting to investigate quality of care can do so without garnering the voice of patients who directly experience that care. Contrarily, functional ability assessed using performance measures allows for more variation than when assessed by self-report and might bring to light improvements in functional ability prior to personal awareness of such a change (Stewart, 2003). Physiotherapy practice requires assessment techniques that involve obtaining
information about patients’ perspectives of their current problems, such as perspectives about quality of life issues, as well as objectively measuring impairments of body structure, function and functional abilities to inform clinical reasoning and decision-making. Physiotherapy practice thus aligns theoretically with both quantitative and qualitative research methodologies to support clinical reasoning and decision-making (Shaw, Connelly and Zecevic, 2010).

The use of mixed methodologies and methods is supported in critical realism (McEvoy, 2006), theory driven evaluation (Chen, 2006) and RE (Pawson, 2013). The latter concerns how methods are used the former questions contrasting assumptions and ideologies about social phenomena and knowledge (Chen, 2006, Morgan, 2007). It is acknowledged that there is debate regarding the potential incompatibility of the epistemological positions of quantitative and qualitative methodologies (Morgan, 2007). More recently, however, authors have argued for a pragmatic philosophy to underpin mixed methods research (Johnson, Onwuegbuzie and Turner, 2007, Morgan, 2007). A realist philosophy supports mixed methods research to enable an understanding of what works for whom, how and in what circumstances and has been adopted in this study with the aim of enabling a more complete understanding of the impact of the physiotherapy interventions in the study population (Woolley, 2009).

Quantitative methods identify patterns and associations that may otherwise be masked and this might help to identify new and unforeseen causal relationships (Astbury and Leeuw, 2010, McEvoy, 2006). The key strength of qualitative methods, from a realist perspective, is that they are open-ended and may allow themes to emerge during the course of an inquiry that could not have been anticipated in advance as well as interpreting, elucidating, describing and corroborating quantitative results (Johnson, Onwuegbuzie and Turner, 2007, McEvoy, 2006, Morgan, 2007). Qualitative methods can therefore help to illuminate complex
concepts and relationships that are unlikely to be captured by quantitative measures (McEvoy, 2006).

3.5 Theory development and initial CMO configurations

Theory development in RE requires consideration of how and why interventions might work and requires consideration of contexts, mechanisms and outcomes related to the intervention of interest. The literature review and researcher experience are utilised to develop theories that might explain outcomes (Pawson and Tilley, 1997). The potential contexts that might impact on physiotherapy intervention to medically unwell older adults are many and complex and relate to the individual, interpersonal relations, institutional settings and infrastructure (Pawson 2013). Like all studies, there was a limit to what the current evaluation could include (Pawson, 2006) and therefore a prioritisation process was undertaken (Pawson, 2013). Although macro level considerations such as policy and professional culture are likely to affect the intervention, physiotherapy intervention is primarily about the relationship, in the clinical ward setting, between physiotherapist and patient (Byng, 2005) and these contexts were prioritised. In this study therefore, the focus of the study was at the micro-level context of the individual stakeholders, patients and health care staff and the meso-level of the clinical setting, the older person’s unit, which is acknowledged to be influenced by the national context, both political and professional.

The literature review identified considerable variation in outcomes with physical activity interventions in studies to date. Physiotherapy service provision and patient characteristics were prioritised as contextual conditions of interest, which may contribute to this inconsistency through their impact on stakeholder actions. The patient action of motivation was also identified in the literature review from qualitative studies to date. Researcher experience regarding staff and patient behaviours, identified physiotherapist decision-making related to service provision and patient engagement as a likely stakeholders mechanisms
influenced by contextual factors of interest. Given the stated purpose of physiotherapy (CSP, 2014), outcomes of interest were health status measures that physiotherapy intervention seeks to positively affect. Hospital LOS was included as an outcome of interest to the organisation. Thus, the literature review and my experience informed the initial theories, which are presented as conjectured CMO configurations (Table 8). Once theories are proposed stakeholder involvement is key in refining theories into testable hypotheses. Stakeholder involvement took place from the early stages of the study (Phase 2) in order to guide hypothesis development. Stakeholders were identified as participants and practitioners (Pawson and Tilley, 1997), in this study, patients, physiotherapists and other healthcare practitioners and managers working on the older persons’ unit. Patients can provide insight into why interventions might work or not work for them but might be sensitised to mechanisms (Pawson and Tilley, 1997). Practitioners are likely to be knowledgeable about outcomes, successes and failures, why the intervention might work or not work (mechanisms) and the people and places for whom it works (context) (Pawson, 1996).

Table 8: Proposed CMO configurations (theories)

<table>
<thead>
<tr>
<th>Context</th>
<th>Mechanisms</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1: Service: Patients have access to variable amounts of physiotherapy intervention from Monday to Friday</td>
<td>M1: Physiotherapy staff make decisions regarding which patients receive physiotherapy intervention due to limited resources (days of service provision and staffing)</td>
<td>O1.1: Effect on amount, frequency and time to first physiotherapy intervention</td>
</tr>
<tr>
<td></td>
<td></td>
<td>O1.2: Change in health status measures between admission and discharge and LOS vary with amount, frequency and time to first physiotherapy intervention</td>
</tr>
<tr>
<td>C2.1: Patients identified as having a cognitive impairment</td>
<td>M2.1: Patients have minimal/modest level of engagement with physiotherapy sessions</td>
<td>O2.1: There is a difference in amount, frequency and time to first physiotherapy intervention between patients with frailty or cognitive impairment and unimpaired patients</td>
</tr>
<tr>
<td>C2.2: Patients identified as frail</td>
<td></td>
<td>O2.2: No or smallest magnitude of change in health status measures between admission and discharge and LOS compared with non-frail and cognitively unimpaired patients</td>
</tr>
<tr>
<td></td>
<td></td>
<td>O2.3: Associations between health status measures and LOS and physiotherapy performance measures differ from unimpaired patients</td>
</tr>
</tbody>
</table>
An explanatory sequential mixed methods design (Cresswell, 2013a) was employed in the observation phase of the study (Phase 3), specifically qualitative data were collected after quantitative data collection. This allowed firstly the quantitative data collection to inform the qualitative data collection (sample and interview questions), secondly to allow outcomes to be explored in greater depth in qualitative data collection (Zhang and Creswell, 2013) and thirdly, was pragmatically achievable for a solo investigator.

3.6 Summary

Physiotherapy interventions are complex moreover they are delivered to medically unwell older adults within the complexity of the ward setting. The traditional biomedical approaches to investigation are limited in this domain as they seek to control the variables of healthcare interventions in a naturalistic setting. Consequently, the approach is isolated from context (Rycroft-Malone et al., 2010) with the result that findings are reductionist by nature and not applicable to real world situations. Constructivist inquiry is also limited, delivering outcomes that whilst information rich are not generalisable to the wider populations. Thus, studies to date investigating the impact of physiotherapy utilising these methodologies provide only a superficial understanding related to observations of input and output. A deeper understanding of how and in what circumstances outcomes might occur is not possible because studies lack consideration of how context and mechanisms impact on outcomes (Moore, et al., 2015). The knowledge elicited from studies aligned with either methodological position is therefore unhelpful to physiotherapy clinical managers in terms of how an intervention might be replicated in their local context (Moore et al., 2015) and thus in informing service delivery models to best meet patients’ rehabilitation needs.

Realism and critical realism come in many varieties but all approaches share an explanatory mission, which starts with the development of theories that might explain why outcomes occur and then robustly testing the theories (Pawson, 2012). The ultimate goal of such
investigation is not to identify generalisable laws (positivism) or to identify the lived experience or beliefs of actors (interpretivism) but to develop deeper levels of explanation and understanding (McEvoy, 2006). Realism proposes that interventions trigger mechanisms in order to produce outcomes but equally important is the situation, the context, in which mechanisms of action occur, because it can change the way the actions of stakeholders and hence outcomes (Wong et al., 2013a). Rather than ‘does this work’ RE asks what works, for whom, how and in what circumstances?

Pawson and Tilley’s RE (1997) with its underpinning of realism was identified as an appropriate model to investigate the complexity of physiotherapy provided to medically unwell, hospitalised older adults. The model’s use in a physiotherapy study is novel but justified as RE is well suited to the study of complexity and supports a mixed methodological approach in order to provide explanatory clarity and depth to observed outcomes. Thus it was hoped the model’s use in this study would provide deeper knowledge regarding the impact of physiotherapy to medically unwell older adults in the local context (Rycroft-Malone and Burton, 2010).
Chapter 4 Method

This chapter firstly reiterates the research questions and then describes the methods employed in the phases of the study as they relate to Pawson and Tilley’s realistic evaluation (RE) cycle and follows the directions set by them (Pawson and Tilley, 1997). Phase 1 (theory development) considers how the outcome patterns related to physiotherapy interventions to medically unwell older adults were identified from the literature and researcher experience to determine context-mechanisms-outcomes configurations (theories) that might explain outcomes. Phase 2 (hypothesis confirmation) and phase 3 (observations) are described in detail including participants and data collection strategies for each and the findings of Phase 2 are included as they were integral to the development of Phase 3. The measures employed to collect the outcome data in Phase 3 are detailed and justified. Phase 4 data analysis, is briefly described for completeness but is discussed in detail in Chapter 5. This is followed by consideration of the relevant ethical concerns in the study within a population of vulnerable adults and a summary of the chapter.

The aim of the study was to investigate the impact of physiotherapy on medically unwell older adults admitted to hospital, specifically:

1. To determine whether physiotherapy works or doesn’t work for medically unwell older adults admitted to the study site in terms of a positive effect on health status and hospital outcomes:
   a. Whether amount, frequency and time to first physiotherapy intervention differ between subgroups of medically unwell adults admitted to the study site?
   b. Whether change in health status measures (admission and discharge) and hospital performance measures differ between subgroups of medically unwell adults admitted to the study site?
   c. Whether change in health status measures (admission and discharge) and hospital LOS are associated with the amount, frequency and time to first physiotherapy interventions? In addition, whether this differs between the defined subgroups of medically unwell adults admitted to the study site?
2. To understand the patient and staff perspectives of how physiotherapy works or doesn’t work for patients, for whom and in what circumstances?
   a. To explore the underlying physiotherapist and patient actions that influence the effect of physiotherapy interventions in practice
   b. To understand how contextual factors combine with physiotherapist and patient actions to enable or constrain physiotherapy in achieving a positive effect on health status.

The subgroups of medically unwell adults admitted to the study site were defined by the presence or absence of frailty or cognitive impairment.

The phases of the project as they relate to the RE cycle (Pawson and Tilley, 1997) are represented in Figure 4.

4.1 Phase 1 – theory development

A comprehensive review of the evidence base pertinent to the intervention, in this case physiotherapy, to medically unwell older adults, was undertaken (Chapter 2). This enabled identification of consistencies regarding the effect of physiotherapy on hospitalised older medical patients, which informed theory development. Realistic evaluation requires that theories are developed as context-mechanism-outcome (CMO) configurations and thus tentative theories were defined, based on information revealed by the literature review combined with my 20 years of experience to take forward to phase 2 of the study.

4.2 Phase 2 – confirmation of hypotheses for testing

Phase 2 of the RE required researcher theorising and qualitative inquiry in preparedness for testing of hypotheses in Phase 3 (Pawson and Tilley 1997). In addition to researcher expertise in developing hypotheses for testing, knowledge also lies with actors involved (Pawson and Tilley, 1997).
In Phase 2 stakeholders were identified as patients, specialist physiotherapists and other professional staff who have experience or work in the care of older persons.

To elicit stakeholder knowledge for Phase 2 of the study, interviews, focus groups and questionnaires were considered as possible methods. The choice of method depends on the stage of theory development (Pawson and Tilley, 1997). Questionnaires are useful when theory development is nascent and a large number of subject responses are useful. When theories are further developed, as in this study, interviews are more useful for fine-tuning the areas of interest. In addition, stakeholders need to understand the overall conceptual structure of the investigation (Pawson and Tilley, 1997), as RE is novel in physiotherapy I felt that this would require explanation that would be difficult to convey in a questionnaire. Therefore, individual semi-structured interviews were undertaken with specialist staff and

Figure 4: Adapted from the realistic evaluation cycle
Adapted from (Pawson and Tilley, 1997 page 85)
patients and my theories were presented for discussion in order to confirm, falsify and refine them into hypotheses for testing (Pawson and Tilley, 1997).

4.2.1.1 Participants

A purposive sample of members of staff (n=12) and patients (n=6) were invited to participate in the individual interviews by email. All senior, clinical specialist staff working permanently in the on the OPU were contacted and reflected a range of healthcare professions that included physiotherapists, occupational therapists, doctors and nurses. In addition the senior physiotherapist at another local NHS Foundation trust was also invited to participate. Staff were identified by the clinical specialist physiotherapist on the Older Persons’ Unit (OPU). It was supposed that these staff would have the required level of specialist knowledge and insight into why physiotherapy intervention might or might not work for patients. Physiotherapists working in the Older Persons’ Assessment Unit (OPAU) identified potential patients who had been an inpatient and received physiotherapy at the study site within the previous month and were currently undergoing treatment in OPAU. Thus consenting patients could be interviewed whilst attending for their outpatient appointment.

Inclusion criteria

- Specialist staff working permanently with medically unwell older adults at the study site; band 7 and above.
- Patients, 65 years of age or older, that had recently (within the previous calendar month) been an inpatient on the OPU and were currently undergoing outpatient physiotherapy at the OPAU.

Exclusion criteria

- Junior staff - identified as those in training positions (band 5/6).
- Patients less than 65 years of age.
- Patients not able to consent to participate in the study, either because of language or cognitive reasons, and for whom it was not possible to use an advocate or interpreter.
Prospective staff participants were given an information sheet (appendix 3) by the clinical specialist physiotherapist outlining the purpose of the study. Prospective patient participants were given an information sheet (appendix 4) by the staff at OPAU outlining the purpose of the study. Staff \((n=4)\) and patients \((n=2)\) who agreed to be interviewed by contacting the researcher, were then telephoned or emailed to arrange a suitable time to meet to obtain written informed consent (appendices 5 and 6) and to undertake a semi-structured interview (appendix 7). Three staff worked at the study site; a clinical specialist physiotherapist, a senior specialist occupational therapist and a matron. In addition a senior specialist physiotherapist from a local NHS trust was also interviewed to minimise bias related to the position of the researcher at the study site. Interviews took place in a private room at a convenient time for the interviewee; the interview was tape-recorded and lasted no longer than 45 minutes. Interview data were transcribed verbatim and analysed using framework analysis (Ritchie and Lewis, 2003) (section 4.2.4).

### 4.2.1.2 Outcome of Phase 2 interviews

The interviewees both confirmed my initial theories and identified some additional contexts, mechanisms and outcomes that required consideration and rationale for including or excluding them from further study (Table 9). The information elicited was used to refine the proposed theories into hypotheses for testing in the format of CMO configurations (Table 10). An RE evaluation always begins with development of one or more theories regarding what it is about an intervention that makes it work. These theories are then articulated as hypotheses specifying the specific condition where the theory is expected to apply, which can then be empirically tested (Pawson, 2013).
### Table 9: Additional factors identified from Phase 2 interviews

<table>
<thead>
<tr>
<th>CMO</th>
<th>Factor</th>
<th>Include/exclude</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Context</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Type of physiotherapy intervention</td>
<td>Exclude</td>
<td>Focus on gross measures of physiotherapy (amount, frequency). A consideration in further study</td>
</tr>
<tr>
<td><strong>Mechanism</strong></td>
<td>MDT decision-making</td>
<td>Exclude</td>
<td>Focus of the study is physiotherapy</td>
</tr>
<tr>
<td></td>
<td>Continuity of physiotherapy interventions</td>
<td>Exclude</td>
<td>Elected to capture a gross measure of frequency</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Pragmatics of manual data collection of continuity for the sample size. A consideration in further study</td>
</tr>
<tr>
<td><strong>Outcome</strong></td>
<td>Patient confidence</td>
<td>Include</td>
<td>Patient reported measure of balance confidence might be influenced by context and mechanisms of interest.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Pragmatics of ability and timeliness to collect accurate data. A consideration in further study</td>
</tr>
<tr>
<td></td>
<td>Patient activity levels</td>
<td>Exclude</td>
<td></td>
</tr>
</tbody>
</table>

### Table 10: CMO configurations; hypotheses for testing

<table>
<thead>
<tr>
<th>Context</th>
<th>Mechanisms</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>C1:</strong> Service: Patients have access to variable amounts of physiotherapy intervention from Monday to Friday</td>
<td>M1: Physiotherapy staff make decisions regarding which patients receive physiotherapy intervention due to limited resources (days of service provision and staffing)</td>
<td>O1.1: Effect on time to first physiotherapy intervention, amount of physiotherapy and frequency of physiotherapy</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>C2.1:</strong> Patients identified as having a cognitive impairment</td>
<td>M2.1: Patients have minimal/modest level of engagement with physiotherapy sessions</td>
<td>O2.1: There is a difference in amount, frequency and time to first physiotherapy intervention between patients with frailty or cognitive impairment and unimpaired patients</td>
</tr>
<tr>
<td><strong>C2.2:</strong> Patients identified as frail</td>
<td></td>
<td>O2.2: No or smallest magnitude of change in health status measures (gait velocity, functional ability, balance confidence and grip strength) between admission and discharge compared with non-frail and cognitively unimpaired patients</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.3 Phase 3 – Observations

Following confirmation of theories and formation of hypotheses in Phase 2, testing took place in Phase 3 using a sequential mixed methods design (Figure 5), requiring data capture of both quantitative and qualitative measures (Table 11).

4.3.1 Quantitative measures

The purpose of the quantitative measures was to determine what works for whom with regards to impact of physiotherapy intervention on patient and hospital outcomes. The following quantitative measures were selected, detail is provided in Table 11:

1. Patient characteristics.
2. Hospital performance metrics.
3. Physiotherapy intervention metrics.
4. Patient health status measures.

Patient characteristic and hospital performance data were obtained from the electronic patient record (EPR) on patient discharge; EPR was also reviewed 30 days after the last participant was discharged to obtain re-admission data. Data related to physiotherapy intervention measures were entered into EPR by the treating physiotherapist and were extracted on patient discharge. Grade of staff treating the patient was determined as the
grade that had proportionally the most interventions with a patient during their episode of stay.

Table 11: Data collection measures and sources

<table>
<thead>
<tr>
<th>Data descriptor</th>
<th>Data source</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patient characteristics</strong></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>Electronic Patient Record</td>
</tr>
<tr>
<td>Gender</td>
<td>Electronic Patient Record</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>Electronic Patient Record</td>
</tr>
<tr>
<td><strong>Hospital performance</strong></td>
<td></td>
</tr>
<tr>
<td>Length of hospital stay</td>
<td>Electronic Patient Record</td>
</tr>
<tr>
<td>Discharge destination</td>
<td>Electronic Patient Record</td>
</tr>
<tr>
<td>Readmission within 30 days</td>
<td>Electronic Patient Record</td>
</tr>
<tr>
<td><strong>Physiotherapy intervention</strong></td>
<td></td>
</tr>
<tr>
<td>Number of physiotherapy interventions during hospital stay (frequency of intervention)</td>
<td>Electronic Patient Record</td>
</tr>
<tr>
<td>Total amount of patient facing physiotherapy intervention during hospital stay</td>
<td>Electronic Patient Record</td>
</tr>
<tr>
<td>Time to first PT intervention</td>
<td>Electronic Patient Record</td>
</tr>
<tr>
<td>Grade of staff most frequently providing interventions during a patient’s episode of care</td>
<td>Electronic Patient Record</td>
</tr>
<tr>
<td><strong>Health status</strong></td>
<td></td>
</tr>
<tr>
<td>Co-morbidities</td>
<td>Hard copy Patient Health Record</td>
</tr>
<tr>
<td>Cognition</td>
<td>First person observation and recording</td>
</tr>
<tr>
<td>Frailty</td>
<td>First person observation and recording</td>
</tr>
<tr>
<td>Self-selected gait velocity</td>
<td>First person observation and recording</td>
</tr>
<tr>
<td>Activities of Daily Living</td>
<td>First person observation and recording</td>
</tr>
<tr>
<td>Muscle strength</td>
<td>First person observation and recording</td>
</tr>
<tr>
<td>Confidence</td>
<td>First person observation and recording</td>
</tr>
<tr>
<td><strong>Qualitative measures</strong></td>
<td></td>
</tr>
<tr>
<td>Patient perspective</td>
<td>Semi-structured interviews</td>
</tr>
<tr>
<td>Staff perspective</td>
<td>Focus group</td>
</tr>
</tbody>
</table>

Health status data were selected in order to determine the subgroup of each patient and to capture the impact of physiotherapy intervention on functional ability. Gait velocity, balance and strength have all been identified as important factors in preventing age-related decline in mobility (Mullen et al., 2012). In addition the results of Phase 2 indicated that a patient reported measure of confidence should be included. Therefore measures of these factors were incorporated into the study.

Gait velocity is a principal element of gait function. It has been demonstrated to be a predictor of health decline, difficulties in activities of daily living (ADL) and increased
incidence of falls in older adults (Viccaro, Perera and Studenski, 2011). Measurements of gait velocity have been shown to be reliable and valid and normative data have been published (Bohannon and Williams Andrews, 2011). A small clinically meaningful change of 0.05 m/s and a substantial change of 0.10 m/s for gait speed are reported (Perera et al., 2006). There is no established or agreed protocol for obtaining gait velocity data (Graham et al., 2008a, Graham et al., 2008b). A 6m course was the longest straight, unimpeded distance available on the wards and a gait velocity protocol for this distance was therefore developed (appendix 8).

It is acknowledged, however, that gait velocity is not appropriate for those who walk at very slow speeds or are unable to walk (Richards, Wood-Dauphinee and Malouin, 2006). The Barthel index (BI) was therefore also included as a measure of patient health status that could be obtained on all participants. The original BI was scored in steps of five points to give a maximum total score of 100 but the modified scale (range of 0-20) (appendix 9), which was developed by the original authors (Collin et al., 1988), has been widely adopted (Sainsbury et al., 2005, Stone et al., 1993) and was used in this study. The index is an ordinal scale comprising ten activities of daily living (ADL) (Sainsbury et al., 2005) and is a gross measure of ADL. Collin et al. (1988) established the reliability and accuracy of the tool for patient self-report, report by proxy or assessment by a health professional. Consequently it was deemed particularly suitable for a heterogeneous population of medically unwell older adults that would include participants with cognitive dysfunctions. A difference of 2 points is reported as being highly likely to represent a genuine change in functional ability (Collin et al., 1988). As both the original and modified BI (mBI) have a reported ceiling effect in high functioning subjects (de Morton, Berlowitz and Keating, 2008), it was anticipated that such subjects in this study would be able to undertake a gait velocity test to establish change in health status.
Lower limb muscle strength is reported as a factor in successful completion of functional activities including walking (Brown, Sinacore and Host, 1995). Reduced grip strength, measured using a hand held dynamometer, has been significantly associated with lower limb muscle weakness (Batista et al., 2012). Grip strength was measured using a Jamar dynamometer (Lafayette Instrument Company, USA) using an established protocol (Roberts et al., 2011) (appendix 10) and dominant hand was identified by enquiry or observation. Pragmatically, this method provided a straightforward, quick and easily replicable measure for an older population (Schaubert and Bohannon, 2005). Minimal detectable change in force measurements for grip strength has been described in older adults in acute inpatient settings (Bohannon et al., 2012). Normative data by age are available (Bohannon et al., 2006) and this measure was used to determine frailty in the sample (Syddall et al., 2003). A change of more than 6kg is necessary to detect a genuine change in grip strength (Nitschke et al., 1999). Grip strength was not adjusted for BMI since current literature exploring the relationship between BMI and hand grip strength has provided incongruent findings (Massy-Westropp et al., 2011).

The CONFbal scale (appendix 11) is a 10-item measure of balance confidence developed in the UK from the ‘Confidence in everyday activities’ instrument developed for use with older people (Hallam and Hinchcliffe, 1991). Patients are asked to respond to questions about their functional ability in terms of their confidence in being able to undertake specified activities. Responses are categorised as not confident, slightly confident or confident. Scoring is allocated based on the responses, higher scores reflect reduced balance confidence and lower scores reflect higher confidence. The unit of analysis is the subject’s total score, which can range from 10 to 30, and a clinically meaningful change is 3-scale points (Simpson et al., 2009). The CONFbal scale demonstrates excellent internal consistency (Cronbach’s alpha = 0.91), test–retest reliability (intra-class correlation coefficient 0.96 (95% CI 0.92 to 0.98) and has proved acceptable to frail elderly patients admitted to acute geriatric medical wards at a London hospital (Simpson et al., 2009). The CONFbal scale is considered superior to other
self-related confidence scales since it is specifically designed to monitor people who may have a greater range of health and mobility problems such as those who are hospitalised (Simpson et al., 2009). The CONFbal was administered according to the protocol described by the developers of the tool (appendix 12) (Simpson et al., 2009).

The Charlson co-morbidity index (Charlson et al., 1987) is a validated measure which classifies co-morbidity based on a history of concomitant disease according to the risk of mortality (de Groot et al., 2003). It is frequently used in studies involving older adults and was therefore selected for the current study to contribute to the description of the sample. It is based on a subject’s history of concomitant disease such as cardiovascular disease, diabetes mellitus, cancer etc. and has recently been validated in older adults admitted for acute medical conditions (Frenkel et al., 2014). Co-morbid conditions identified from the health record are weighted from 1 – 6 and a total score is calculated by adding the weights (appendix 13). The higher the total score the greater the burden of co-morbid disease (Charlson et al., 1987).

A recent review found a lack of evidence to help clinicians select a well-validated tool to screen for dementia (Russ et al., 2012). A challenge is that patients in hospital have several potential reasons for impaired cognition including the most common cause, delirium (Shenkin et al., 2014). I wanted to establish cognitive impairment in the sample, which would include patients with delirium or dementia and I therefore selected the 4A Test screening tool (MacLullich, Ryan and Cash, 2011) (appendix 14). It is designed to be performed at first contact with the patient and incorporates a shortened version of the Abbreviated Mental Test (AMT4), a validated very brief screening tool for general cognitive impairment (Swain and Nightingale, 1997). Importantly the 4AT allows for screening of acute delirium as well as general cognitive screening and also allows for assessment of patients who cannot undergo
cognitive testing due to drowsiness or agitation (MacLullich, Ryan and Cash, 2011). The results of this screening tool were used to determine cognitive impairment within the sample.

4.3.2 Stakeholder experience

There is no correct way to measure stakeholder experiences; different approaches can be used for different purposes and in depth interviews and focus groups are both useful for discovering the relationship between healthcare events and their circumstances (Foot and Fitzsimons, 2011). I needed to select those with knowledge of successful and unsuccessful physiotherapy interventions in order to begin to unpick ‘why’ the intervention had or had not worked. This required interviewees to have been present at a physiotherapy session. Data were collected over 2 months, September and October 2013.

Physiotherapists working on the OPU at the time (n=9) were invited take part in a focus group. Focus groups can elicit data in quantity quickly and participant interaction can generate novel information (Marshall and Rossman, 2011). A criticism, however, is the potential for participants to conform with the perceived view of the group (Hollis, Openshaw and Goble, 2002). Another criticism in the current study is that only one focus group was undertaken. This was determined by the available time of the researcher and the small number of physiotherapists working on the OPU. Although, it is suggested that fewer, smaller focus groups are required when the issues to be discussed are complex and related to a narrow category of people with similar backgrounds (Hollis, Openshaw and Goble, 2002), in this study physiotherapists. The group consisted of all grades of staff, which might have been intimidating for the more junior members or unqualified members of staff. However, I viewed the interaction between therapists as a potential generator of novel information. My role within the group therefore, was to be both a moderator, to prevent dominance, and also facilitator to make it comfortable and easy for all participants to speak freely (Ritchie and Lewis, 2003). A non-clinical manager, not from physiotherapy, was also present at the focus
group as an impartial observer and to take notes. To minimise distraction and allow the patients and carers the necessary thinking time, patient and carer experience was captured using tape-recorded individual patient and carer interviews.

4.3.2.1 The realistic interview

The interest in RE in the way mechanisms employed in a programme either trigger or do not trigger outcomes has given rise to a particular orientation to qualitative data gathering, termed the realistic interview. This was adopted in the current study. The realistic interview is situated between quantitative and qualitative interview traditions of structured and unstructured interviews (Pawson, 1996). The focus of the interview is the theory under investigation and the purpose is for the interviewee to confirm, falsify or refine the researcher’s theory (Pawson and Tilley, 1997).

Realistic interviews can achieve this aim in two ways, either by the researcher sharing their thoughts about how a programme might work with programme participants (deliverers and recipients) and eliciting comment on the plausibility of these. Alternatively, participants can be asked which aspects of the programme impact most and how this contributes to outcomes experienced (Timmins and Miller, 2007). A combined approach was used with the physiotherapists, and the latter approach with patients and carers. Semi-structured interview schedules guided the interviews and focus group (appendices 15 and 16).

4.3.3 Data collection

All quantitative outcome measures used in the study are routinely collected within normal physiotherapy clinical practice on the OPU.
Sample size

Quantitative measures

A convenience sample of patients (n=75) was obtained over 2 months. Recommendations for appropriate sample size for feasibility studies suggest n=30 (Lancaster, Dodd and Williamson, 2004). New patient admission rate to the older person’s unit is approximately 100 patients per month. Two months was deemed to allow necessary recruitment numbers to study subgroups allowing for exclusions and limited data collection (Monday-Friday only). A previous local case-mix evaluation at the Trust demonstrated no confounding ward-level characteristics (local trust data). The primary outcome of the study was the Barthel Index and secondary outcome measures were identified as; total amount of physiotherapy, frequency of physiotherapy, time to first physiotherapy intervention, patient self-selected gait velocity, patient balance confidence, patient dominant grip strength and hospital LOS.

Qualitative measures

Pawson and Tilley (1997) do not give guidance regarding suitable sample sizes for interviews. A purposive sample of patients, based on the population characteristics of the participants in the quantitative data collection part of the study, was identified in an attempt to capture a patient sample that was representative of the population with the aim of testing as robustly as possible the proposed CMO configurations. Qualitative data collection took place between September and October 2013, with the aim of garnering a sample of patients and carers (n=up to 20) (Wand et al 2011). The actual sample size of patients and carers (n=8) was ultimately pragmatic and reflected the number of interviews per week that could be conducted whilst the investigator continued in their professional role (maximum 4/week) and the availability of acutely unwell patients and their carers. A focus group was held with a purposive sample of physiotherapy staff (n=6). This was the maximum number of staff available at one time during the study period, and represented a diversity of grades responsible for physiotherapy service provision.
Recruitment for quantitative measures

The study population was a heterogeneous population of medically unwell older patients admitted to the OPU at the study site.

Inclusion criteria

- Older adults (65yrs or older) admitted to the OPU.

Exclusion criteria

- Patients admitted to the OPU less than 65 years of age.
- Patients admitted to the OPU for less than 48 hours.
- Patients who were not able to consent to participate in the study either for language or cognitive reasons or for whom it was not possible to utilise an advocate or interpreter so that the assessments were completed in the study protocol timeframe.
- Patients identified by medical staff for palliative care only.

New patients, admitted to the OPU, were identified from the daily ward board-rounds (Monday-Friday) by the researcher. Patient measures of gait velocity, grip strength, ADL and confidence were collected at two time points to allow any change in these measures to be captured. These measures were undertaken within 48 hours of admission and within 48 hours of discharge (Barthuly, Bohannon and Gorack, 2012, de Morton et al., 2007b) by the researcher. No data collection took place at weekends. Patient measures took no more than 30 minutes to obtain and the resultant information also informed individual patients’ physiotherapy management in line with normal clinical practice. Hospital performance data, physiotherapy intervention data and patient characteristics data were obtained retrospectively once a patient was discharged from the hospital. A data collection tool was developed and piloted on 10 patients in June 2013. No amendments were required and data collection was undertaken during July and August 2013.
Quantitative data collection informed subsequent qualitative data collection in two ways. Firstly, the demographic proportions of the quantitative data in terms of frailty, cognitive impairment and gender informed the purposive sample for interview. Secondly, changes noted in the patient outcomes informed questions in the interview schedule.

**Recruitment for interviews**

**Staff**

A purposive sample of staff (n=6) was selected from physiotherapists working on the OPU at the time of the study to ensure that at least one physiotherapist of each grade was represented in the focus group. I wanted to include all grades of staff including unqualified staff in an attempt to obtain rich data and postulated that less experienced staff in training posts may reveal mechanisms not identified by physiotherapy experts.

**Inclusion criteria**

- Physiotherapy staff working on the OPU.

**Exclusion criteria**

- Unavailability of staff due to leave or work commitments.

Physiotherapists working on the OPU at the time were provided with information about the study (appendix 17) and invited take part in a focus group by email. Those who responded positively were invited to attend the focus group, which took place in a private room at a convenient time to the team. No physiotherapy staff declined to participate but 3 staff were unable to attend the focus group as it was scheduled for a day that they were not working. The focus group (n=6) was tape-recorded and an impartial observer took notes. It lasted no longer than 75 minutes.
Patient

Recruitment of patients or carers from the population was made directly by the investigator in discussion with the nursing and physiotherapy staff on the wards. Individual interviews were conducted within the week prior to the patient’s estimated date of discharge to overcome the challenges of patient recall and possible retrospective reinterpretation (Clark et al., 2005). Access to vulnerable groups of people, such as those with dementia might present problems for the researcher as formal or informal gatekeepers may deny or restrict access in order to protect patients (Bryman, 2004). I liaised with the physiotherapist on the wards each day regarding suitable participants and personal introduction was sought by the treating physiotherapist as this has been suggested as a way of accessing a community (Marshall and Rossman, 2011). I was sensitive at all times to any reluctance of subjects to participate in an initial discussion about the study from their verbal or non-verbal cues such as eye contact, facial expression, tone of voice (Riess and Kraft-Todd, 2014). Cognitive impairment and frailty were determined as in the quantitative sample using the 4A test and grip strength.

Inclusion criteria

- Older adults (65 years of age or older) admitted to the OPU.

Exclusion criteria

- Patients admitted to the OPU less than 65 years of age.
- Patients admitted to the OPU for less than 48 hours.
- Patients not able to consent to participate in the study for either language or cognitive reasons and for whom it was not possible to utilise an advocate or interpreter so that the assessments were completed in the study protocol timeframe.
- Patients identified by medical staff for palliative care only.
Carer

Inclusion criteria

- Carer of a patient included in the study who had been present for one or more physiotherapy sessions.

Exclusion criteria

- Carer of a patient excluded from the study.
- Carer of an included patient in the study who had not been present on at least one physiotherapy session.

Patients and carers who agreed to be interviewed were given an information sheet (appendix 18) outlining the purpose of the study and a reply slip, which was collected by one of the ward physiotherapists. Those who agree to be interviewed were spoken to and a suitable time to obtain written informed consent and undertake the interview was arranged. The interview took place in a private room, was tape-recorded and took no longer than 40 minutes. The ward manager was made aware when an interview was in progress and undertook to be available should the interviewee become distressed at any point during the interview. Between 0 and 2 interviews took place per week, determined by patient, carer and researcher availability. A purposive sample of patients (n=6) and carers of patients unable to consent (n=2) based on the population characteristics of the participants in the quantitative data collection part of the study were interviewed over data collection period.

4.3.4 Data analysis

Quantitative data analysis

A trust-commissioned statistician advised regarding data analysis. All descriptive data are reported using appropriate measures of central tendency; mean and standard deviation for continuous (approximate) normally distributed variables, medians and inter-quartile ranges for non-normally distributed variables and frequencies and percentages for categorical
variables. Data were tested for normality by visual inspection of their distribution and the Shapiro-Wilk test. Differences and comparisons of the primary and secondary endpoints between subgroups were assessed with independent t-test for normally distributed continuous data and Mann-Whitney U tests for continuous (skewed) and ordinal data. Chi-square tests were used to assess baseline subgroup differences in the categorical variables. Spearman’s correlation co-efficient was used as an indicator of the relationships between hospital LOS, change in health status measures and measures of physiotherapy intervention. All tests were two sided and p values <0.05 considered statistically significant. Quantitative data were coded and entered into SPSS spread sheets (SPSS Inc. version 21). When studying hospitalised older adults many of whom have a cognitive impairment, it is conceivable that secondary quantitative patient data may be incomplete. In this event analyses were undertaken using only those participants with a complete set of data.

**Qualitative data analysis**

Clear instructions are given regarding collecting the views of the stakeholders in RE (Pawson and Tilley, 1997). However, no such direction is provided regarding analysis of the collected data. Studies utilising RE were therefore reviewed for suitable analysis methods. There appears to be no consensus in method; coding frames (McGaughey et al., 2010), open coding (Tolson et al., 2007), thematic analysis (McCormack et al., 2002), linked coding (Jackson and Kolla, 2012) and framework analysis (FA) (Douglas, Gray and van Teijlingen, 2010, Noyes et al., 2013) are variously described.

I elected to analyse the data from transcriptions of the interviews with patients, carers and staff using framework analysis (FA) (Ritchie and Lewis, 2003) to identify common themes and connections between themes. For nascent qualitative researchers, FA provides an effective map and enables a case and theme-based approach to data analysis (Smith and Firth, 2011). Other advantages of FA are that it is practical (Gale et al., 2013, Ward et al., 2013) since it is well described by its authors (Ritchie and Lewis, 2003) and it provides an
audit trail, which improves dependability (Smith and Firth, 2011). It is also a dynamic process that allows change, addition or amendment throughout the process (Srivastava and Hopwood, 2009) and unlike entirely inductive and iterative approaches, such as grounded theory, it might be shaped by existing ideas (Ward et al., 2013).

FA is not aligned with a particular epistemological, philosophical, or theoretical approach (Gale et al., 2013). However its ontological position has been suggested as most closely aligned to subtle realism (Snape and Spencer, 2003). Subtle realism maintains that the social world exists independently of individual subjective understanding, but is only accessible in qualitative research via participants’ interpretations, which are further interpreted by the researcher (Hammersley and Atkinson, 2007). This is congruent with an holistic approach to care (Ward et al., 2013) and with mixed methods research in order to build greater understanding of the lived world than is possible from one approach alone (Snape and Spencer, 2003).

FA can be time consuming, a disadvantage inherent in all qualitative data analysis methods (Ward et al., 2013). FA has been criticized for lacking the same theoretical underpinning as other qualitative approaches such as grounded theory and ethnography (Smith and Firth, 2011) although this is contested (Snape and Spencer, 2003). The systematic approach holds an inherent risk that the researcher might attempt to quantify data (Gale et al., 2013). Reflexivity, rigour, reliability and quality are issues that are requisite in FA just as in other qualitative methods (Gale et al., 2013, Snape and Spencer, 2003). In this study, sensitivity to the data was achieved through close listening to of each interview, credibility was maintained by establishing a rapport with interviewees, recording interviews and presenting accurate descriptions of participants’ perspectives and reliability was accomplished by cross-checking emerging categories with the original transcripts (McGaughey et al., 2010). Analysis was conducted using Excel (Microsoft Corporation, 2010).
A 5-step process was used in the FA; familiarisation, identifying a thematic framework, indexing, charting and mapping and interpretation (Ritchie and Lewis, 2003). Familiarisation involved becoming immersed in the data, which started during the transcription of the interviews, continued through re-reading the transcripts and recognition and noting of recurrent themes (Srivastava and Hopwood, 2009). The recurring themes were added to a framework as categories and sub-categories. The transcripts were then reviewed and the themes and sub-themes identified in each section (Ward et al., 2013). It was during this stage that themes and sub-themes were refined. At this point in the analysis, all transcript data fitted into one of the categories or sub-categories in the framework. The material was then reduced into brief but comprehensible summaries of what the participants had said (Ward et al., 2013). The final interpretation stage involved reading through the synthesised data and going backwards and forward between the data (Ritchie and Lewis, 2003) and the original transcripts, which ensured that full or partial CMO configurations in the original transcripts were not lost.

A consideration with framework analysis is that although the researcher may have a set of a priori themes and sub themes, it is important not to force the data to fit these (Srivastava and Hopwood, 2009). This is a particular concern with RE since mechanisms are identified a priori (section 4.1.2). However, in the current study the stated hypotheses were not used to develop the framework but rather the framework was developed from the actual narrative of the patients in order to minimise this risk.

### 4.3.5 Ethical considerations

Ethical issues can occur at all phases of an evaluation study (Green and South, 2006) in the acute setting, where it is acknowledged that professional healthcare staff are powerful and patients vulnerable (Banks and Gallagher, 2009). Participants must therefore be protected from being physically or psychologically harmed by the research project. The outcome measures proposed for this study are carried out as part of normal physiotherapy practice on
The study site policy for obtaining consent from vulnerable adults and their advocates (Guy's and St Thomas' NHS Foundation Trust, 2013b) was adhered to in this study. All trust staff, including the researcher, undertake mandatory training in this domain. The project was submitted for approval from the acute trust research and development department who advised that they considered the project a service evaluation (RJ112/N250). The project was also submitted for ethical review by the University of Surrey (EC 2013 03). The evaluation complied with standards of Good Clinical Practice (International Conference on Harmonisation (ICH), 2002) including researcher completion and maintenance of Good Clinical Practice training.

A concern when interviewing patients was the ability of persons with delirium or dementia to cognitively process and adequately articulate responses to questioning. Previous qualitative studies, however, have demonstrated that people with dementia are able to express feelings and concerns with clarity even in the latter stages of the disease (Clare et al., 2008) and furthermore, carers were also interviewed. Information regarding the proposed interviews was provided to staff, patients and carers (appendices 3, 4, 17 and 18) and all participants were allowed time, always greater than 24 hours, to consider participation in the study. Signed consent was sought from those participants who indicated a willingness to take part in the interviews. Where potential participants did not have the capacity to consent (n=2), due to significant cognitive impairment, then assent was sought from a suitable advocate such as the next of kin so as not to exclude this important population from the study. The study was discussed with the Safeguarding Adults Trust Lead for additional advice regarding the appropriate involvement of vulnerable adults.

A potential criticism is that my own views of the impact of physiotherapy might have influenced the way that I conducted the focus group and interviews. Realistic interviews require confirmation and falsification of the investigator's hypotheses and it is expected the
researcher shares their thoughts about how a programme might work with programme participants. There was also potential influence of the researcher also working at the study site that may have influenced both staff and patient responses. In relation to the physiotherapists, none of the staff had a direct reporting line to me and the questions were deemed to be not sensitive. I had no relationship with the patients professionally; I wore my own clothes rather than uniform and introduced myself as a researcher so that there was minimal association with the physiotherapists. However, it is acknowledged that the interview process was not anonymous and that this may have influenced patient answers. Patients might have wanted to please treating physiotherapists and have had concerns related to their on-going treatment. I attempted to moderate this effect by acknowledging the potential bias, by being a reflective practitioner independently and with my supervisors. I also set out the design of the interviews in advance and an impartial observer attended the focus group to add transparency to the process.

Other ethical issues for consideration included the accurate recording and robust and confidential management of data produced by the project. All documentation including consent forms and data collection sheets were kept in site files in the investigators office at the study site during the active phase and subsequent phases. Electronic data were stored on the investigators personal computer at the study site, the access to which complied with the data protection requirements of the study site.

4.4 Phase 4 – Evaluation/specification

The evaluation phase of RE is called programme specification, recognising RE’s social programme evaluation roots and centres on the development of explanatory theory and ultimately “middle range theories” (Pawson and Tilley, 1997 page 123). During data analysis constant comparison of the data from quantitative and qualitative methods were undertaken which enabled refinement of the conjectured theories (McGaughey et al., 2010). The
explanatory theories developed as a result of this study will relate specifically to the intervention at the study site but also provide transferable lessons for other NHS trusts. Crucially, the revised theories will allow for further testing and refinement of the theories regarding the intervention.

4.5 Summary

This chapter describes the phases of RE as they relate to the current study and includes description and justification of the data collection methods, analysis and ethical considerations in undertaking the study. The data collection and analysis were not discrete activities as they occurred over a number of phases for example, analysis of Phase 2 informed Phase 3. Thus, the outcome of the Phase 2 interviews informed the inclusion of patient confidence as a possible outcome related to physiotherapy and the hypotheses to be tested in Phase 3 were amended to include this. The following chapter, Chapter 5, details the findings of the data analysis.
Chapter 5 Findings

This chapter presents the findings of this realistic evaluation, presented sequentially; quantitative data is presented first followed by the findings from the patient and carer interviews and staff focus group. Patient characteristics, of the sample of medically unwell older adults are described and health status, hospital performance and physiotherapy intervention measures related to the sample reported. Patient characteristics, physiotherapy intervention and hospital performance measures for frail, non-frail, cognitively impaired and cognitively unimpaired subgroups of the sample are presented and differences between the subgroups described. Correlations between physiotherapy intervention measures and change in health status measures are presented firstly, for the sample and secondly, for the subgroups. Characteristics of the patient and staff participants in the interviews are reported and findings from the patient, carer and staff interviews are presented. Finally the study findings are integrated with respect to context, mechanism and outcomes to provide insight into what worked for whom, why and in what circumstances within the sample to inform further theory development and a summary presented.

5.1 Sample data

The sample profile is reported (n=75), followed by a description of the profile of the subgroups (frail or non-frail and cognitively impaired or unimpaired). Associations between physiotherapy intervention metrics, hospital performance metrics and patient health status measures are described. With the exception of age, continuous variables presented with skewed distributions, the mean (SD) is presented for age and the median (IQR) for all other continuous variables (Bork, 1993). Categorical data are presented as frequencies (percentages). Between July and August 2013, a convenience sample of 75 patients was recruited. All patients admitted between these dates were screened; all included patients were assessed with 48 hours of admission to one of the older person unit wards and 103 patients were excluded (Figure 6)
5.1.1 Sample analysis

The majority of the patients were female (Table 12), Caucasian and admitted following a fall. The mean age was 84.8 years (SD 7.1) and median hospital LOS was 14 days (9.0-26.0). This reflects an older group with a longer LOS in this study than nationally (mean age 78 years, median LOS 13 days) (Health and Social Care Information Centre, 2013). Forty-three patients (57.3%) were assessed as having cognitive impairment (AT4>0) and of the patients who were able to undertake a grip strength assessment (n=65) 49 (73%) were classified as frail. Fifteen patients (20%) presented with multi-comorbidities as determined by the Charlson index (score ≥ 2), the median score was 1.0 (0-1.0) indicating the group’s overall co-morbidity level was lower than expected.

Median modified Barthel Index (mBI) was 10 (4-13), median gait velocity 0.0m/s (0.0-0.2) and median dominant grip strength was 10kg (7.0-14.5) on admission indicating that the sample was functionally dependent on admission (Table 12). Pre-morbid functional ability was less dependent; median mBI 2 weeks prior to admission was 17 (15-18). Self-reported confidence in balance (CONFbal) was achievable in the majority but not all patients (n=52, 69%). Median CONFbal score on admission was 23.5 (20.75-28) indicating that the sample had substantial problems with balance confidence in functional activities. Patients received a median 210 minutes (110-430) or 3.75 hours (1.8-7.2) of physiotherapy during their stay. Initial physiotherapy intervention was delivered after a median of 2.0 days (1-4) and is reflective of a Monday to Friday only service. Over admission episodes, median number of physiotherapy interventions was 5 (3-10) and median physiotherapy intervention frequency was 0.4 contacts/day (0.3-0.5) equivalent to one physiotherapy contact, of 42 minutes, every 2.8 days. Most patients (n=72, 96%) received the majority of their physiotherapy interventions from junior qualified staff (band 5 and 6) or unqualified staff (band 3).
Median discharge functional measures showed improvement in all measures from admission data but the group remained functionally dependent; median mBI 16 points (12-18), median gait velocity 0.15m/sec (0.0-0.36) and median dominant grip strength 11.75kg (9.0-17.0). Median discharge CONFbal score was 20 (18-23.75) and 63 (84%) of the patients were discharged home with or without enhanced supported discharge despite their functional dependency. 15 patients (20%) were re-admitted within 30 days of their discharge; this rate is consistent with local data on re-admission rates and represents an ongoing challenge to the trust.
# Table 12: Sample characteristics

<table>
<thead>
<tr>
<th>Patient Characteristics (n=75)</th>
<th>mean (SD)</th>
<th>84.77 (7.063)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at assessment (years)</td>
<td>Gender</td>
<td>Male 27 (36%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Female 48 (64%)</td>
</tr>
<tr>
<td></td>
<td>Ethnicity</td>
<td>White British 57 (76%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>White Other 10 (13%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Black Caribbean 4 (5%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other 4 (5%)</td>
</tr>
<tr>
<td></td>
<td>Reason for admission</td>
<td>Fall 30 (40%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Respiratory 12 (16%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Musculo-skeletal 11 (14.7%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Urinary tract Infection 8 (10.7%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cardiac 7 (9.3%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other 7 (9.3%)</td>
</tr>
<tr>
<td></td>
<td>Hospital Performance</td>
<td>LOS (days) median (IQR) 14.0 (9.0-26.0)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Discharge destination n(%) Home 41 (54.7%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ESD 22 (29.3%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N/H/RH 6 (8%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BBR 6 (8%)</td>
</tr>
<tr>
<td></td>
<td>Readmission</td>
<td>15 (20%)</td>
</tr>
<tr>
<td></td>
<td>Physiotherapy intervention</td>
<td>Number of Physiotherapy interventions median (IQR) 5 (3-10)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total Amount Physiotherapy (mins) median (IQR) 210 (110-430)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Daily Physiotherapy (mins) median (IQR) 13.75 (8.42-20.9)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Time to first PT (days) median (IQR) 2.00 (1.0-4.0)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Frequency of PT (days) median (IQR) 0.4 (0.3-0.5)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Skill mix (grade) n(%) Band 3 16 (21.3%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Band 5 29 (38.7%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Band 6 27 (36.0%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Band 7 1 (1.3%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Band 8 2 (2.7%)</td>
</tr>
<tr>
<td></td>
<td>Patient Health Status</td>
<td>Charlson index n (%) 0 33 (44%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 27 (36%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>≥2 15 (20%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>median (IQR) 1.0 (0.0-1.0)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cognitive impairment n (%) Cognitive impairment 43 (57.3%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No cognitive impairment 32 (42.7%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Frailty (n=67) n (%) Frail 49 (73%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Non-frail 18 (27%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>mBI (0/20) median (IQR) Prior to admission 17 (15.0-18.0)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>On admission 10 (4-13)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>On discharge 16 (12-18)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Change adm to d/c 5 (3-8)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CONFbal (0/30) (n=52) median (IQR) On admission 24.5 (21.0-28.0)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>On discharge 20 (18-23.75)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Change -3 (-6 -1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Gait velocity (m/s) median (IQR) On admission 0.0 (0.0-0.2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>On discharge 0.15 (0.0-0.36)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Change 0.06 (0.08-0.16)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dominant grip strength (Kg) (n=65) median (IQR) On admission 10 (7.0-14.5)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>On discharge 11.75 (9.0-17.0)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Change 2.0 (0-4.25)</td>
</tr>
</tbody>
</table>

ESD: Early Supported Discharge; BBR: Bed Based rehabilitation; NH/RH: Nursing/Residential home; mBI: Modified Barthel index.

## 5.1.2 Subgroup analysis

Subgroups of interest were defined *a priori* as the presence or absence of cognitive impairment or frailty; further data analysis was conducted by subgroup. Differences between impaired and unimpaired subgroups with respect to patient characteristics, hospital performance, physiotherapy intervention and change in health status measures between
subgroups were assessed with independent t-test for normally distributed continuous data and Mann-Whitney U tests for continuous (skewed) and ordinal data. Chi-square tests were used to assess subgroup differences in the categorical variables.

5.1.2.1 Cognitive impairment

There was no statistically significant difference between groups with respect to age, gender, ethnicity, frailty or functional ability (mBI) on admission (Table 13). Less physiotherapy was delivered to the impaired group but this was not statistically significant (median 170 minutes [80-410] versus 210 minutes [110-430] p=0.71). There was no difference between groups in the frequency of physiotherapy intervention and time to first physiotherapy intervention between impaired and unimpaired groups, median 0.38 contacts/day (0.29-0.45) versus 0.40 contacts/day (0.29-0.54) (p=0.27) and 2.0 days (1.0-3.0) versus 2.5 days (1.0 - 4.75) (p=0.14), respectively.

There was no significant difference in change in mBI between groups impaired versus unimpaired (median 5 [2-8] versus 5 [3-7] p=0.86). There was a statistically and clinically significant between group change in gait velocity, the unimpaired group presenting with a greater change during their hospital admission (0.11m/s [0.0-0.24] versus 0.0m/s [0.0-0.1] p=0.01). There was a greater increase in median grip strength in the unimpaired group than in the impaired group but this is of questionable clinical relevance and did not reach statistical significance (2.0kg [0.0-4.0] versus 0.5kg [0.0-4.0] p=0.51). There was no significant difference in change in CONFbal between groups (-4 [-6 - 0.5] versus -3 [-7 – -1] p=0.91), unlike the other functional measures this could only be conducted on those with minimal cognitive impairment in the impaired group (n=20). Length of hospital stay (LOS), discharge destination and readmission rates were not significantly different between groups.
Table 13: Between-group comparisons by cognitive impairment

<table>
<thead>
<tr>
<th>Patient characteristics</th>
<th>Impaired n=43</th>
<th>Unimpaired n=32</th>
<th>Test statistic</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at assessment</td>
<td></td>
<td></td>
<td>t=-1.12</td>
<td>0.27</td>
</tr>
<tr>
<td>Gender n(%)</td>
<td>Male 19 (44.2%)</td>
<td>Female 24 (55.8%)</td>
<td>χ²=2.93</td>
<td>0.09†</td>
</tr>
<tr>
<td>Ethnicity n(%)</td>
<td>White 38 (88.4%)</td>
<td>British/Irish 5 (11.6%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reason for admission n(%)</td>
<td>Fall 18 (41.9%)</td>
<td>MSK 6 (14.0%)</td>
<td>24 (75%)</td>
<td>t=0.55</td>
</tr>
<tr>
<td>Hospital Performance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOS (days) median (IQR)</td>
<td>17(8-26)</td>
<td>12.5 (10-22.8)</td>
<td>U=667.5</td>
<td>0.83</td>
</tr>
<tr>
<td>Discharge destination n(%)</td>
<td>Home 22 (51.2%)</td>
<td>ESD 12 (27.9%)</td>
<td>19 (59.4%)</td>
<td>t=0.08</td>
</tr>
<tr>
<td>Physiotherapy intervention</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amount direct PT (mins)</td>
<td>170 (80-410)</td>
<td>210 (110-430)</td>
<td>U=653</td>
<td>0.71</td>
</tr>
<tr>
<td>Average direct PT (mins/day)</td>
<td>13.75</td>
<td>13.81</td>
<td>U=653</td>
<td>0.60</td>
</tr>
<tr>
<td>Time to first PT (days)</td>
<td>2.0 (1.0-3.0)</td>
<td>2.5 (1.4-8)</td>
<td>U=552.5</td>
<td>0.14</td>
</tr>
<tr>
<td>Frequency of PT (days)</td>
<td>0.38 (0.26-0.46)</td>
<td>0.40 (0.31 – 0.51)</td>
<td>U=524</td>
<td>0.27</td>
</tr>
<tr>
<td>Skill mix (Grade) n(%)</td>
<td>8 27 (62.8%)</td>
<td>18 (41.9%)</td>
<td>18 (56.3%)</td>
<td>χ²=3.34</td>
</tr>
<tr>
<td>Patient Health status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Charlson index n(%)</td>
<td>0 15 (34.9%)</td>
<td>18 (41.9%)</td>
<td>18 (56.3%)</td>
<td>χ²=0.14</td>
</tr>
<tr>
<td>Frailty impairment n(%)</td>
<td>Frail (n=36) 27 (62.8%)</td>
<td>Non-Frail (n=31) 9 (20.9%)</td>
<td>U=541</td>
<td>0.09</td>
</tr>
<tr>
<td>Admission mBI median (IQR)</td>
<td>8 (4-12)</td>
<td>12 (6.5-13)</td>
<td>U=671</td>
<td>0.11</td>
</tr>
<tr>
<td>Change mBI median (IQR)</td>
<td>5 (2-8)</td>
<td>5 (3-7)</td>
<td>U=439</td>
<td>0.31</td>
</tr>
<tr>
<td>Change Gait velocity (m/s)</td>
<td>0.00 (0.00-0.10)</td>
<td>0.11 (0.00-0.24)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change Dominant Grip strength (kg.)</td>
<td>0.5 (0.4-4.0)</td>
<td>2.0 (0.4-4.0)</td>
<td>U=472.5</td>
<td>0.51</td>
</tr>
<tr>
<td>Change CONFbal (/30) median (IQR)</td>
<td>-4 (-6 -- -0.5)</td>
<td>-3 (-7-- -1)</td>
<td>U=191.5</td>
<td>0.91</td>
</tr>
</tbody>
</table>

† Fischer Exact Test
MSK: Musculo-skeletal; UTI: Urinary tract infection; PT: Physiotherapy; ESD: Early Supported Discharge; BBR: Bed Based rehabilitation; NH/RH: Nursing/Residential home; mBI: Modified Barthel index.

In summary, patients admitted with cognitive impairment had similar characteristics on admission and similar physiotherapy interventions as the cognitively unimpaired group. Changes in health status measures on discharge were similar between groups with the exception of gait velocity, which improved significantly in the cognitively unimpaired group.
compared to the cognitively impaired group. Hospital performance metrics; LOS, discharge
destination and readmissions were similar in both groups.

5.1.2.2 Frailty

The frail group (n=49) was larger than the non-frail group (n=18). Characteristics and
differences between the groups are presented in Table 14. There was no significant
difference between groups in terms of age, gender, ethnicity, cognitive deficit or function on
admission (mBI). There was an expected significant difference between groups with respect
to number of co-morbidities (Charlson index score), the frail group had a significantly higher
scores compared with the non-frail group (median score 1.0 [0.0-2.0] versus 0.0 [0.0-1.0]
p=0.04).

The median amount of physiotherapy received was greater for those patients who were frail,
however this difference was non-significant (190 minutes [110-400] versus 140 minutes [65-
528] p=0.56). The median frequency of days of intervention and time to first physiotherapy
intervention was similar between frail and non-frail groups (median 0.39 contacts/day [0.30-
0.50] versus 0.36 contacts/day [0.25-0.50] p=0.55 and 2 days [1.0-3.5] versus 2.5 days [1-
4.25] p=0.89) respectively.

There was no significant difference in change in mBI scores between the frail and non-frail
groups (median scores 5 [2.5-8] versus 6 [2.25-8] p=0.89). Between groups (frail versus non-
frail) there were significant differences in change in gait velocity (median 0.05m/s [0.00-0.13]
versus 0.13m/s [0.02-0.32] p=0.049), and dominant handgrip strength (median 2.0kg [0 –
5.0] versus 0kg [-2.0 – 2.0] p = 0.004) change over the episode of hospital admission. There
was a larger change in CONFbal score between admission and discharge in the frailty group
compared to the non-fraility group but this did not reach significance (median -4.0 [-6.0 – -1.0]
versus -1.0 [-7.0 – 1.0] p=0.23). There was no significant difference between groups in hospital LOS, discharge destination or readmission rates.

Table 14: Between-group comparisons by frailty

<table>
<thead>
<tr>
<th>Patient characteristics</th>
<th>Frail n=49</th>
<th>Non-frail n=18</th>
<th>Test statistic</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at assessment (SD)</td>
<td>85.6 (5.85)</td>
<td>83.0 (8.55)</td>
<td>t=1.4</td>
<td>0.17</td>
</tr>
<tr>
<td>Gender n(%)</td>
<td>Male 15 (30.6%)</td>
<td>Female 34 (69.4%)</td>
<td>χ²=2.15 (df=1)</td>
<td>0.14</td>
</tr>
<tr>
<td>Ethnicity n(%)</td>
<td>White 44 (88.9%)</td>
<td>Other 5 (10.2%)</td>
<td>χ²=0.99† (df=1)</td>
<td>0.33</td>
</tr>
<tr>
<td>Reason for admission n(%)</td>
<td>Fall 22</td>
<td>MSK 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>UTI 6</td>
<td>Cardiac 4</td>
<td></td>
<td>0.26†</td>
</tr>
<tr>
<td></td>
<td>Respiratory 6</td>
<td>Other 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital performance</td>
<td>LOS (days) median (IQR)</td>
<td>17.92 (9-22.5)</td>
<td>19.67 (9-33)</td>
<td>U=389.3</td>
</tr>
<tr>
<td>Discharge destination n(%)</td>
<td>Home 27 (55%)</td>
<td>ESD 16 (33%)</td>
<td>NH/RH 3 (6%)</td>
<td>0.79†</td>
</tr>
<tr>
<td>Readmission (&lt;30 days)</td>
<td>12 (24.5%)</td>
<td>1 (13%)</td>
<td></td>
<td>0.16†</td>
</tr>
</tbody>
</table>

Physiotherapy intervention

| Amount direct PT (mins) median (IQR) | 190 (110-400) | 140 (65-528) | U=399.5 | 0.56 |
| Average direct PT mins/day (IQR) | 14.3 | 11.6 | U=395 | 0.52 |
| Time to first PT (days) | 2 (1-3.5) | 2.5 (1.5-4.25) | U=425.5 | 0.89 |
| Freq of PT (days) | 0.39 (0.3-0.5) | 0.36 (0.3-0.5) | U=389 | 0.46 |
| Skill mix (Grade) n(%) | 8 | 7 | 6 | 5 | 3 | 0.99† |
| Patient Health Status | | | | | |
| Charlson index median (IQR) | 0 | 1 | ≥2 | 0.03† |
| Cognitive impairment n(%) | Cog. impair 22 (44.9%) | Non Cog Impair 27 (55.1%) | χ²=0.14 (df=1) | 0.71 |
| Admission mBI median (IQR) | 10 (4.0-12.0) | 12 (5.0-14.5) | U=319 | 0.08 |
| Change mBI (IQR) | 5 (2.5-8) | 6 (2.3-8) | U=431 | 0.89 |
| Change Gait velocity (m/s) median (IQR) | 0.05 | 0.13 | U=303.5 | 0.049 |
| Change Dominant Grip strength (kg), median (IQR) | 2.0 | 0.0 | U=203.5 | 0.004 |
| Change CONFbal (/30) median (IQR) | -4 (-6 -1) | -1 (-7 -1) | U=113 | 0.4 |

† Fischer Exact Test

MSK: Musculo-skeletal; UTI: Urinary tract infection; PT: Physiotherapy; ESD: Early Supported Discharge; BBR: Bed Based rehabilitation; NH/RH: Nursing/Residential home; mBI: Modified Barthel index.
In summary, patients admitted with frailty had similar characteristics on admission and similar physiotherapy interventions as the non-frail impaired group. Change in function (mBI) and self-reported measures on discharge were similar between groups. Gait velocity improved significantly over the hospital episode compared to admission in the non-frail group when compared with the frail group. Conversely dominant grip strength increased significantly between admission and discharge in the frail group compared with the non-frail group. Hospital performance metrics were similar in both groups. However, the non-frail group was small having only 18 subjects.

5.1.3 Analysis of associations

Spearman’s analysis of correlation was undertaken to establish associations between physiotherapy intervention metrics and change in health status measures for the sample as a whole and then by subgroups. Summarised findings are presented (Table 15 - Table 19); full results are presented in appendix 19. The associations of interest as they pertain to the research questions are shaded in grey.

There was small positive association (r=.137) between time to first physiotherapy contact and change in gait velocity, no other associations between time to first physiotherapy intervention and change in health status measures were observed. There was a large significant association between LOS and total direct minutes of physiotherapy (r=.622). There was a small positive association between total direct minutes of physiotherapy and change in mBI (r=.212) and change in dominant grip strength (r=.104) and a small negative association with change in CONFbal (r=-.200). There were no associations between total direct minutes of physiotherapy and change in gait velocity. There was a small positive association between frequency of physiotherapy intervention and change in mBI (r=.226) and change in dominant grip - strength (r=.176). No other associations were observed.
Table 15: Sample correlations: Physiotherapy and patient outcomes

<table>
<thead>
<tr>
<th></th>
<th>Time to first PT</th>
<th>Direct PT mins</th>
<th>Freq. PT mins</th>
<th>Hosp. LOS</th>
<th>Gait change</th>
<th>mBI change</th>
<th>CONFbal change</th>
<th>Dom.GS change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time to first PT</td>
<td>1.000</td>
<td>-1.111</td>
<td>-1.143</td>
<td>-0.088</td>
<td>0.137</td>
<td>-0.009</td>
<td>0.037</td>
<td>0.024</td>
</tr>
<tr>
<td>Direct PT mins</td>
<td>-1.111</td>
<td>1.000</td>
<td>0.527**</td>
<td>0.707**</td>
<td>-0.031</td>
<td>0.212</td>
<td>-0.200</td>
<td>0.104</td>
</tr>
<tr>
<td>Freq. PT mins</td>
<td>-0.143</td>
<td>0.527**</td>
<td>1.000</td>
<td>0.127</td>
<td>0.045</td>
<td>0.226</td>
<td>0.151</td>
<td>0.176</td>
</tr>
<tr>
<td>Hosp. LOS</td>
<td>-0.088</td>
<td>0.707**</td>
<td>0.127</td>
<td>1.000</td>
<td>-0.114</td>
<td>0.116</td>
<td>-0.221</td>
<td>0.057</td>
</tr>
<tr>
<td>Gait change</td>
<td>0.137</td>
<td>-0.031</td>
<td>0.045</td>
<td>-0.114</td>
<td>1.000</td>
<td>0.218</td>
<td>-0.144</td>
<td>0.063</td>
</tr>
<tr>
<td>mBI change</td>
<td>-0.009</td>
<td>0.212</td>
<td>0.226</td>
<td>0.116</td>
<td>0.218</td>
<td>1.000</td>
<td>-0.275</td>
<td>0.015</td>
</tr>
<tr>
<td>CONFbal change</td>
<td>0.037</td>
<td>-0.200</td>
<td>0.151</td>
<td>-0.221</td>
<td>-0.144</td>
<td>-0.275</td>
<td>1.000</td>
<td>-0.080</td>
</tr>
<tr>
<td>Dom.GS change</td>
<td>0.024</td>
<td>0.104</td>
<td>0.176</td>
<td>0.057</td>
<td>0.063</td>
<td>0.015</td>
<td>-0.080</td>
<td>1.000</td>
</tr>
</tbody>
</table>

*: Correlation is significant at the 0.05 level (2-tailed). **: Correlation is significant at the 0.01 level (2-tailed).
PT: Physiotherapy; mins: minutes; Freq.: frequency of physiotherapy intervention; Hosp. LOS: Hospital length of stay; mBI: modified Barthel index; Dom.GS: Dominant grip strength.
The associations of interest as they pertain to the research questions are shaded in grey.

5.1.3.1 By cognitive impairment

Time to first physiotherapy intervention

There was a small negative association between time to first physiotherapy intervention and hospital LOS in cognitively impaired patients (r=-.186). There was also a small positive association between time to first physiotherapy intervention and change in gait velocity in cognitively unimpaired patients (r=-.156). There were no other associations observed.

Direct minutes of physiotherapy

There was a large positive association between direct minutes of physiotherapy and hospital LOS which was highly significant in both cognitively impaired and unimpaired subgroups (r=.706) and (r=.706) respectively.

In patients with cognitive impairment there were no other associations observed. Conversely in patients that were unimpaired there was a large significant positive association between
direct minutes of physiotherapy and change in mBI ($r=.511$) and a moderate negative association with balance confidence ($r=-.438$) which was significant. In addition in this group there was a moderate negative association with change in dominant grip strength ($r=-.229$).

**Frequency of physiotherapy interventions**

There was a small positive association between frequency of physiotherapy and change in mBI ($r=.213$) and change in dominant grip strength ($r=-.242$) in patients with cognitive impairment. There was also a moderate positive association between frequency of intervention and CONFbal ($r=.470$). In unimpaired patients there was a small positive association between frequency of physiotherapy intervention and change in mBI ($r=.270$) only and change in dominant grip strength ($r=.299$) only.

### 5.1.3.2 By frailty

**Time to first physiotherapy intervention**

There was a small negative association between time to first physiotherapy intervention and change in dominant grip strength ($r=-.135$). Conversely there were moderate to large positive associations with time to first physiotherapy intervention and change in gait velocity ($r=.419$), balance confidence ($r=.309$) and change in dominant grip strength ($r=.327$).

**Total direct minutes of physiotherapy**

As with the previous subgroupings there was a large positive association between direct minutes of physiotherapy and hospital LOS which was highly significant in both frail and non-frail groups ($r=.702$) and ($r=.770$) respectively. In frail patients there were small positive associations between minutes of physiotherapy intervention and change in mBI ($r=-.130$) and dominant grip strength ($r=.211$). In non-frail patients there was a moderate positive associations between amount of physiotherapy and mBI ($r=.470$) which was significant.
There was also a moderate negative association in this group between amount of physiotherapy and change in CONFbal ($r=-.320$) and dominant grip strength ($r=.412$).

**Frequency of physiotherapy interventions**

There were small associations between frequency of intervention and change in mBI in both groups; frail ($r=.249$) and non-frail ($r=.257$). In the frail group there were positive associations between frequency of physiotherapy and change in gait velocity ($r=.205$), CONFbal ($r=.256$) and change in dominant grip strength ($r=.319$) which was significant. In the non-frail group there was a small positive association between frequency of intervention and change in mBI ($r=.257$) and a small negative associations with change in gait velocity ($r=-.241$) and change in dominant grip strength ($r=-.326$)

In summary, there were no moderate or large associations between change in health status measures and physiotherapy intervention metrics in the sample as a whole with the exception of a large association between amount of physiotherapy and LOS. This is perhaps expected; patients who stay in hospital longer inevitably receive more physiotherapy. However, there were no or small associations between physiotherapy intervention and health status measures of interest in the sample as a whole. On subgroup analysis, associations between change in health status measures and physiotherapy intervention metrics were not present or small in cognitively impaired and frail subgroup analysis with two exceptions. In patients with cognitive impairment there was a positive association between frequency of physiotherapy interventions and change in CONFbal. This indicates a worsening of balance confidence as frequency of intervention increased. In the frail subgroup there was a significant positive association between dominant grip strength and frequency of physiotherapy intervention. There were moderate to large associations in both the cognitively unimpaired and non-frail groups between amount of physiotherapy and change in mBI and balance confidence.
In the non-frail subgroup there were also moderate to large associations between time to first physiotherapy intervention and change in gait velocity, CONFbal and dominant grip strength.

Table 16: Correlations (cognitive impairment): Physiotherapy and patient outcomes

<table>
<thead>
<tr>
<th></th>
<th>Time to first PT</th>
<th>Direct PT mins</th>
<th>Freq</th>
<th>Hosp LOS</th>
<th>Gait change</th>
<th>mBI change</th>
<th>CONFbal change</th>
<th>Dom GS change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time to first PT</td>
<td>1.000</td>
<td>-0.090</td>
<td>-0.089</td>
<td>-1.000</td>
<td>-0.186</td>
<td>-0.097</td>
<td>-0.064</td>
<td>-0.036</td>
</tr>
<tr>
<td>Direct PT mins</td>
<td>-0.090</td>
<td>1.000</td>
<td>0.441**</td>
<td>-1.000</td>
<td>0.706**</td>
<td>-0.030</td>
<td>0.042</td>
<td>0.054</td>
</tr>
<tr>
<td>Freq</td>
<td>-0.089</td>
<td>0.441**</td>
<td>1.000</td>
<td>-0.144</td>
<td>0.081</td>
<td>0.213</td>
<td>0.470</td>
<td>0.242</td>
</tr>
<tr>
<td>Hosp LOS</td>
<td>-1.186</td>
<td>0.706**</td>
<td>0.144</td>
<td>1.000</td>
<td>-0.098</td>
<td>-0.023</td>
<td>0.001</td>
<td>0.317</td>
</tr>
<tr>
<td>Gait change</td>
<td>0.097</td>
<td>-0.030</td>
<td>0.081</td>
<td>-0.098</td>
<td>1.000</td>
<td>0.153</td>
<td>-0.180</td>
<td>0.080</td>
</tr>
<tr>
<td>mBI change</td>
<td>-0.064</td>
<td>0.042</td>
<td>0.213</td>
<td>-0.023</td>
<td>0.153</td>
<td>1.000</td>
<td>-0.478</td>
<td>-0.190</td>
</tr>
<tr>
<td>CONFbal change</td>
<td>-0.036</td>
<td>0.054</td>
<td>0.470</td>
<td>-0.001</td>
<td>-0.180</td>
<td>-0.478</td>
<td>1.000</td>
<td>-0.003</td>
</tr>
<tr>
<td>Dom GS change</td>
<td>0.075</td>
<td>0.260</td>
<td>0.242</td>
<td>0.317</td>
<td>0.080</td>
<td>0.190</td>
<td>-0.003</td>
<td>1.000</td>
</tr>
</tbody>
</table>

* Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).

PT: Physiotherapy; mins: minutes; Freq.: frequency of physiotherapy intervention; Hosp. LOS: Hospital length of stay; mBI: modified Barthel index; Dom.GS: Dominant grip strength.
The associations of interest as they pertain to the research questions are shaded in grey

Table 17: Correlations (cognitive unimpairment): Physiotherapy and patient outcomes

<table>
<thead>
<tr>
<th></th>
<th>Time to first PT</th>
<th>Direct PT mins</th>
<th>Freq</th>
<th>Hosp LOS</th>
<th>Gait change</th>
<th>mBI change</th>
<th>CONFbal change</th>
<th>Dom GS change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time to first PT</td>
<td>1.000</td>
<td>-0.173</td>
<td>-0.280</td>
<td>-0.003</td>
<td>0.156</td>
<td>0.076</td>
<td>0.052</td>
<td>-0.040</td>
</tr>
<tr>
<td>Direct PT mins</td>
<td>-0.173</td>
<td>1.000</td>
<td>0.663**</td>
<td>0.706**</td>
<td>0.023</td>
<td>0.511**</td>
<td>-0.438*</td>
<td>-0.229</td>
</tr>
<tr>
<td>Freq</td>
<td>-0.280</td>
<td>0.663**</td>
<td>1.000</td>
<td>0.150</td>
<td>-0.096</td>
<td>0.270</td>
<td>-0.090</td>
<td>0.030</td>
</tr>
<tr>
<td>Hosp LOS</td>
<td>-0.003</td>
<td>0.706**</td>
<td>0.150</td>
<td>1.000</td>
<td>-0.114</td>
<td>0.344</td>
<td>-0.386</td>
<td>-0.414*</td>
</tr>
<tr>
<td>Gait change</td>
<td>0.156</td>
<td>0.023</td>
<td>-0.096</td>
<td>-0.114</td>
<td>1.000</td>
<td>0.290</td>
<td>-0.205</td>
<td>-0.026</td>
</tr>
<tr>
<td>mBI change</td>
<td>0.076</td>
<td>0.511**</td>
<td>0.270</td>
<td>0.344</td>
<td>0.290</td>
<td>1.000</td>
<td>-0.125</td>
<td>-0.291</td>
</tr>
<tr>
<td>CONFbal change</td>
<td>0.052</td>
<td>-0.438*</td>
<td>-0.090</td>
<td>-0.386</td>
<td>-0.205</td>
<td>-0.125</td>
<td>1.000</td>
<td>-0.095</td>
</tr>
<tr>
<td>Dom GS change</td>
<td>-0.040</td>
<td>-0.229</td>
<td>0.030</td>
<td>0.414*</td>
<td>-0.026</td>
<td>-0.291</td>
<td>-0.095</td>
<td>1.000</td>
</tr>
</tbody>
</table>

* Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).

PT: Physiotherapy; mins: minutes; Freq.: frequency of physiotherapy intervention; Hosp. LOS: Hospital length of stay; mBI: modified Barthel index; Dom.GS: Dominant grip strength.
The associations of interest as they pertain to the research questions are shaded in grey
Table 18: Correlations (frail): Physiotherapy and patient outcomes

<table>
<thead>
<tr>
<th></th>
<th>Time to first PT</th>
<th>Direct PT mins</th>
<th>Freq</th>
<th>Hosp LOS</th>
<th>Gait change</th>
<th>mBI change</th>
<th>CONFbal change</th>
<th>Dom GS change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time to first PT</td>
<td>1.000</td>
<td>-.026</td>
<td>-.194</td>
<td>-.032</td>
<td>-.072</td>
<td>-.086</td>
<td>-.074</td>
<td>-.135</td>
</tr>
<tr>
<td>Direct PT mins</td>
<td>-.026</td>
<td>1.000</td>
<td>.494**</td>
<td>.702**</td>
<td>.090</td>
<td>.130</td>
<td>-.028</td>
<td>.211</td>
</tr>
<tr>
<td>Freq</td>
<td>-.194</td>
<td>.494**</td>
<td>1.000</td>
<td>.187</td>
<td>.265</td>
<td>.249</td>
<td>.256</td>
<td>.319*</td>
</tr>
<tr>
<td>Hosp LOS</td>
<td>-.032</td>
<td>.702**</td>
<td>.187</td>
<td>1.000</td>
<td>-.046</td>
<td>-.023</td>
<td>-.061</td>
<td>.110</td>
</tr>
<tr>
<td>Gait change</td>
<td>-.072</td>
<td>.090</td>
<td>.265</td>
<td>-.046</td>
<td>1.000</td>
<td>.190</td>
<td>-.097</td>
<td>.126</td>
</tr>
<tr>
<td>BI change</td>
<td>-.086</td>
<td>.130</td>
<td>.249</td>
<td>-.023</td>
<td>-.190</td>
<td>1.000</td>
<td>-.313</td>
<td>.081</td>
</tr>
<tr>
<td>CONFbal change</td>
<td>-.074</td>
<td>-.028</td>
<td>.256</td>
<td>-.061</td>
<td>-.097</td>
<td>-.313</td>
<td>1.000</td>
<td>.097</td>
</tr>
<tr>
<td>Dom GS change</td>
<td>-.135</td>
<td>.211</td>
<td>.319*</td>
<td>.110</td>
<td>.126</td>
<td>.081</td>
<td>.097</td>
<td>1.000</td>
</tr>
</tbody>
</table>

* Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).

PT: Physiotherapy; mins: minutes; Freq.: frequency of physiotherapy intervention; Hosp. LOS: Hospital length of stay; mBI: modified Barthel index; Dom.GS: Dominant grip strength.
The associations of interest as they pertain to the research questions are shaded in grey.

Table 19: Correlations (non-frail): Physiotherapy and patient outcomes

<table>
<thead>
<tr>
<th></th>
<th>Time to first PT</th>
<th>Direct PT mins</th>
<th>Freq</th>
<th>Hosp LOS</th>
<th>Gait change</th>
<th>mBI change</th>
<th>CONFbal change</th>
<th>Dom GS change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time to first PT</td>
<td>1.000</td>
<td>-.162</td>
<td>-.151</td>
<td>.128</td>
<td>.419</td>
<td>.053</td>
<td>.309</td>
<td>.327</td>
</tr>
<tr>
<td>Direct PT mins</td>
<td>-.162</td>
<td>1.000</td>
<td>.588*</td>
<td>.770**</td>
<td>-.084</td>
<td>.470*</td>
<td>-.320</td>
<td>-.412</td>
</tr>
<tr>
<td>Freq</td>
<td>-.151</td>
<td>.588*</td>
<td>1.000</td>
<td>.113</td>
<td>-.241</td>
<td>.257</td>
<td>-.028</td>
<td>-.326</td>
</tr>
<tr>
<td>Hosp LOS</td>
<td>.128</td>
<td>.770**</td>
<td>.113</td>
<td>1.000</td>
<td>.120</td>
<td>.386</td>
<td>-.303</td>
<td>-.255</td>
</tr>
<tr>
<td>Gait change</td>
<td>.419</td>
<td>-.084</td>
<td>-.241</td>
<td>.120</td>
<td>1.000</td>
<td>.325</td>
<td>-.729*</td>
<td>.257</td>
</tr>
<tr>
<td>BI change</td>
<td>.053</td>
<td>.470*</td>
<td>.257</td>
<td>.386</td>
<td>.325</td>
<td>1.000</td>
<td>-.266</td>
<td>-.050</td>
</tr>
<tr>
<td>CONFbal change</td>
<td>.309</td>
<td>-.320</td>
<td>-.28</td>
<td>-.303</td>
<td>-.729*</td>
<td>-.266</td>
<td>1.000</td>
<td>-.411</td>
</tr>
<tr>
<td>Dom GS change</td>
<td>.327</td>
<td>-.412</td>
<td>-.326</td>
<td>-.255</td>
<td>.257</td>
<td>-.050</td>
<td>-.411</td>
<td>1.000</td>
</tr>
</tbody>
</table>

* Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).

PT: Physiotherapy; mins: minutes; Freq.: frequency of physiotherapy intervention; Hosp. LOS: Hospital length of stay; mBI: modified Barthel index; Dom.GS: Dominant grip strength.
The associations of interest as they pertain to the research questions are shaded in grey.

5.1.4 Summary of patient characteristic and health status findings

The sample was a heterogeneous sample of an older adult medical population admitted medically to hospital with a median LOS of 14 days (9-26). The sample had an evident functional deterioration during the two weeks prior to admission and was functionally limited at the point of admission, however, functional ability improved during the course of the
hospital episode. Patients did not receive physiotherapy on a daily basis but all patients received a similar amount of, frequency of and time to first physiotherapy intervention; the majority of the patients were seen by unqualified staff or staff in training. Gait velocity significantly improved in the cognitively unimpaired and the non-frail groups compared to the cognitively impaired and frail groups respectively. Dominant grip strength significantly improved over the course of the hospital stay in the frail group compared with the non-frail group. There were no other significant differences in change in health status measures between subgroups.

On sample correlation analysis there was a large positive association between the amount of physiotherapy and LOS however there were no other associations between physiotherapy performance measures and LOS. There were no associations between physiotherapy performance metrics and change in health status measures. There were few associations between measures of physiotherapy intervention and change in health status measures for the cognitive impairment and frail subgroups. There were more moderate to large associations observed between some measures of physiotherapy and outcomes of interest in the cognitively unimpaired and non-frail subgroups. Unsurprisingly there were no negative associations between physiotherapy intervention metrics and hospital LOS in any group, indicating, that in this study, physiotherapy was not associated with a reduced LOS (section 2.4.5).

The quantitative data cannot however provide information as to ‘why’ these findings might have occurred in terms of how physiotherapy might or might not be working for patients. This requires information that can only be elicited from stakeholders, in this study, patients, carers and physiotherapists. The results of the stakeholder interviews and focus group are described in the next section.
5.2 Patient, carer and staff qualitative data

Results of the semi-structured interviews with patients and carers are presented first followed by the results of the focus group undertaken with physiotherapy staff.

5.2.1 Patients

Seven patients and one carer (patient proxy [P2]) were interviewed for the study. The characteristics of the patients are detailed in Table 20. The mean age of the patients was 80 years (SD 8.76). The participants were predominantly women (n=5, 63%) and had been admitted after a fall (n=5, 63%). Three (38%) of the patients were cognitively impaired (4AT score of >0) and six (75%) were frail as assessed by dominant grip strength. The patients were similar in terms of characteristics compared with the quantitative sample, with the exception of cognitive impairment (57.3% versus 38%). All participants had experienced at least 5 physiotherapy interventions at the time of the interview. Interviews lasted an average of 23.7 minutes (range 20 – 30). An example of a patient transcript is presented in appendix 20.

Table 20: Individual patient interview participant characteristics

<table>
<thead>
<tr>
<th>Code</th>
<th>Gender</th>
<th>Age</th>
<th>Reason for admission</th>
<th>Grip strength (kg)</th>
<th>Frail</th>
<th>4AT</th>
<th>Cognitive impairment</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>M</td>
<td>71</td>
<td>Fall</td>
<td>10</td>
<td>Y</td>
<td>0</td>
<td>N</td>
</tr>
<tr>
<td>P2</td>
<td>M</td>
<td>89</td>
<td>Fall</td>
<td>0</td>
<td>Y</td>
<td>6</td>
<td>Y</td>
</tr>
<tr>
<td>P3</td>
<td>M</td>
<td>86</td>
<td>Fall</td>
<td>12</td>
<td>Y</td>
<td>0</td>
<td>N</td>
</tr>
<tr>
<td>P4</td>
<td>F</td>
<td>93</td>
<td>Leg ulcers</td>
<td>12</td>
<td>Y</td>
<td>1</td>
<td>Y</td>
</tr>
<tr>
<td>P5</td>
<td>F</td>
<td>71</td>
<td>Respiratory</td>
<td>16</td>
<td>Y</td>
<td>0</td>
<td>N</td>
</tr>
<tr>
<td>P6</td>
<td>F</td>
<td>71</td>
<td>Fall</td>
<td>28</td>
<td>N</td>
<td>0</td>
<td>N</td>
</tr>
<tr>
<td>P7</td>
<td>F</td>
<td>77</td>
<td>Fall</td>
<td>24</td>
<td>N</td>
<td>0</td>
<td>N</td>
</tr>
<tr>
<td>P8</td>
<td>F</td>
<td>80</td>
<td>Respiratory</td>
<td>7</td>
<td>Y</td>
<td>3</td>
<td>Y</td>
</tr>
</tbody>
</table>
The themes and sub-themes that emerged from the interviews are presented in Table 21. Two main themes emerged: patient beliefs regarding physiotherapy and the patient/physiotherapist relationship.

Table 21: Patient and carer interview themes and sub-themes

<table>
<thead>
<tr>
<th>Themes</th>
<th>Sub themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient beliefs</td>
<td>How physiotherapy helps</td>
</tr>
<tr>
<td></td>
<td>Responsiveness of physiotherapy to their needs</td>
</tr>
<tr>
<td>Patient/physiotherapist relationship</td>
<td>Encouraging and motivational physiotherapists</td>
</tr>
<tr>
<td></td>
<td>Trust and confidence</td>
</tr>
</tbody>
</table>

5.2.1.1 Patient beliefs

How physiotherapy helps

In describing their experiences patients often spoke about how physiotherapy helped them, sometimes the description summarised the impact of physiotherapy in physiological terms such as ‘strengthening’ or ‘blood flow’ but predominantly they spoke of physiotherapy enabling patients to do things for themselves. There was consistency amongst the patients regardless of whether they were frail or cognitively impaired or not.

“So I think it’s essential, when he [the patient] knows that his catheter is full up, he can walk to the toilet and empty it, which they’ve learnt him to do. But it gives him that independence, for his own independence and he knows that he can do this he doesn’t have to sit around waiting for me or if he wants to go and make a cup of tea he can do it” (P2)

“When I first started getting out of the um, well getting hold of that Sarah Edge thing, I couldn’t get hold of it because I hadn’t got the power, see? But now I find I’m strengthening, gradually strengthening with their help and now I can hold it, see?” (P3)

“I think they [exercises] make you feel better, they help the blood flow, like me and my balance...cause they gave me dignity because I could do things” (P6)

“Physiotherapy meant that I was able to go from the bed to the toilet.......I was able to go to the loo on my own, that was great” (P7)
Patient beliefs: Responsiveness of the physiotherapy service to patient needs

Patients’ valued physiotherapy but had different views regarding whether the service met their needs in two areas; daily service provision (Monday-Friday only) and the flexibility of the service on any given day. Regarding the former some patients, all of whom were frail, felt that a rest at the weekend was needed for the patients themselves and for staff.

“I don’t think it hurts [not to have physiotherapy at the weekends] him [the patient] I think doing it 5 days is quite enough for an elderly person” (P2)

“Weekends I don’t but they [physiotherapists] always say to me um, here’s one or two things to carry on with [laughs] But I can’t guaranteed that it’s all followed but I’m waiting for them on the Monday ‘cos there’s a time when you need a rest um at weekends that’s my time [laughs], to rest. ‘Cos I get tired, you know at my age” (P3)

“Well I feel that it’s a day off for me and it’s a nice weekend off for them [physiotherapists]” (P4)

Other patients associated the amount of physiotherapy they received with their progress and felt that they regressed over the weekend and would have liked to have physiotherapy over weekends and bank holidays. Patients that responded in this way were both frail and non-frail patients.

“I feel now I’ve seen them [the physiotherapists] for a couple of days and I’ve got on better than what I thought, another couple of days and I could be great, know what I mean” [but no weekend physiotherapy]” (P5)

“Not having physiotherapy over a Bank Holiday made a difference...Well it did, definitely, definitely. I didn’t expect it but it was hard on the Monday you know?” (P7)

In terms of the flexibility of the service each day, ‘a little and often’ was a phrase that was used by a number of patients in articulating how much physiotherapy intervention they would like, patients also expressed a preference for ‘more’ physiotherapy. These patients were all frail and included cognitively impaired and cognitively unimpaired patients.

“…a little and often. If they [physiotherapists] come in once or twice rather than too much in one go.” (P2)
“I could have a little bit more [physiotherapy], a bit more with the stairs .... a little and often you know, a bit more walking and on the stairs would get me on better” (P5)

Patients also wanted a service that was flexible to their needs, that when the physiotherapist came they might not feel like undertaking physiotherapy.

“They suggested I needed physio and when they [physiotherapist] came in I wasn’t ready for it the first time when the lady [physiotherapist] approached me….I was feeling too weak and too dizzy” (P6)

5.2.1.2 Patient/physiotherapist relationship

All patients talked about the relationship that they had with the physiotherapist and what it meant to them, regardless of their clinical presentation (frail or cognitive impairment).

Patient/physiotherapist relationship: Encouraging and motivational physiotherapists

Patients expressed positive attitudes about their physiotherapists who they regarded as encouraging and motivational which enabled them to undertake activity in the physiotherapy session that they wouldn’t do if left alone.

“But when they’re there there’s a bit of priming in your head and when they’re gone you might not do it” (P1)

“Makes all the difference [having physiotherapist there] they follow me with the chair and as soon as I say I’ve had enough I sit down, no you see you wouldn’t do it on your own” (P4)

Non-frail patients reported that they were motivated to undertake physical activity outside of physiotherapy sessions but were not always encouraged by ward staff.

“I tried to do a little walk, they [nurses] said I should be aided if I went to the toilet, someone should accompany me to the toilet ‘cos I could go off balance” (P6)

“I did walk round the bed and got told off [by the nurses] for doing it but I did hold onto the bed” (P7)
Overall, physiotherapy was seen as a positive experience.

“…… on the whole to see a physio anyway whoever it is, it’s a happy feeling” (P4)

“And I do it [physiotherapy] and feel good about meself and then I can keep doing it you know? Getting better each day, you know?” (P5)

Patient/physiotherapist relationship: Trust and confidence

Patients trusted the physiotherapists because they perceived the physiotherapists were knowledgeable and made them feel safe, in that they would not come to harm undertaking physical activity if the physiotherapist was with them.

“For one thing you can ask questions and they can explain, you know? And they give you assurance” (P6)

“I feel safe because I trust them and I trusted him [the physiotherapist] you know he’d say come on do this and I would do it. Well the reason you trust any professional, he knew his job” (P7)

But this was not necessarily the case with patients with cognitive impairment:

“Well usually it’s just one physiotherapist and me. He [patient] says [Carer’s name], do I have to do this? Because when he looks at the other person he doesn’t really know them. This is what I figuring in my mind, he doesn’t know them” (P2)

This in turn positively affected patients’ confidence in the activities that they undertook.

“I’m always afraid of falling. I mean I haven’t fallen, touch wood, for a very long time but prior to that I used to have a few falls. So that’s one reason what I’m afraid. They [physiotherapists] do give me confidence, they do they do” (P4)

“Provided I’ve got somebody with me, I feel more confident. It’s because they’re [physiotherapists] there and I know that if I’ve got somebody with me, for a short time then I feel that yes, I can go ahead with it” (P8)
5.2.1.3 Summary of interviews with patients

Patients believed that physiotherapy would help them to be able to do things for themselves and some patients linked this to restoring their dignity. Personal interaction with the physiotherapists and the aspiration to be able to do things for themselves were the main reasons that patients were motivated to engage in physiotherapy sessions. Patients trusted the physiotherapist to achieve outcomes that they believed were important; getting stronger, being able to do things for themselves such as go to the toilet. Because they trusted the physiotherapists being with the physiotherapist gave patients confidence to undertake activities that they would not undertake on their own. The personal interaction with the physiotherapist was also a motivator in terms of the encouragement and feedback the patients received and successfully completing activities. However, some patients felt that their outcomes were affected by the amount of physiotherapy they received and would like to have more physiotherapy. Patients that were frail spoke of having physiotherapy ‘a little and often’ to meet their needs and that they would like a ‘rest’ at the weekend. Non-frail patients reported that they were not encouraged by nursing staff to be active when physiotherapists were not present at the weekend.

5.2.2 Focus group with physiotherapy staff

Six physiotherapy staff contributed to the focus group, at least one representative of each grade that works on the older person’s unit attended. Participant details are provided in Table 22. The focus group lasted 1 hour 15 minutes. The group was very engaged in the discussion and required little prompting from the facilitator. As anticipated (section 4.1.3.2 for rationale) there was a tendency for the senior grade staff to dominate the discussion and the facilitator had to be cognisant of this and facilitate the contribution of the non-qualified and more junior staff (appendix 21).
Table 22: Focus group participant characteristics

<table>
<thead>
<tr>
<th>Code</th>
<th>Grade</th>
<th>Role description</th>
<th>Experience of working with older adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>3</td>
<td>Physiotherapy assistant – non qualified</td>
<td>5 years</td>
</tr>
<tr>
<td>S2</td>
<td>5</td>
<td>Newly qualified physiotherapist</td>
<td>&lt; 2 months</td>
</tr>
<tr>
<td>S3</td>
<td>6</td>
<td>Senior physiotherapist in training</td>
<td>1 year</td>
</tr>
<tr>
<td>S4</td>
<td>7</td>
<td>Team lead physiotherapist – specialist in physiotherapy</td>
<td>2 years</td>
</tr>
<tr>
<td></td>
<td></td>
<td>care of older adults</td>
<td></td>
</tr>
<tr>
<td>S5</td>
<td>7</td>
<td>Team lead physiotherapist – specialist in physiotherapy</td>
<td>3 years</td>
</tr>
<tr>
<td></td>
<td></td>
<td>care of older adults</td>
<td></td>
</tr>
<tr>
<td>S6</td>
<td>8</td>
<td>Clinical specialist physiotherapist – expert in</td>
<td>10 years</td>
</tr>
<tr>
<td></td>
<td></td>
<td>physiotherapy care of older adults</td>
<td></td>
</tr>
</tbody>
</table>

The themes and sub-themes that emerged from the focus group are presented in Table 23.

Two main themes emerged from analysis of the data; the nature of the physiotherapy service provision and the therapeutic relationship.

Table 23: Focus group themes and sub-themes

<table>
<thead>
<tr>
<th>Themes</th>
<th>Sub themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nature of service provision</td>
<td>Influences on and challenges of physiotherapist decision-making</td>
</tr>
<tr>
<td></td>
<td>Impact on patients</td>
</tr>
<tr>
<td>Therapeutic relationship</td>
<td>Trust</td>
</tr>
<tr>
<td></td>
<td>Motivating patients</td>
</tr>
<tr>
<td></td>
<td>Influence of patient presentation</td>
</tr>
</tbody>
</table>

5.2.2.1 Nature of service provision

Nature of service provision: Influences on physiotherapist decision-making

All the physiotherapists felt strongly that the current service provision (Monday to Friday only) and in particular the staffing of the current service meant that they could not see all the patients that required physiotherapy intervention every day. This then required them to make decisions about who received physiotherapy each day, which they termed prioritisation.

“Patients could get more physiotherapy but due to staffing resource staff have to prioritise which patients to see” (S1)

“It’s not necessarily the quality or the length of the individual sessions, it’s more the regularity of the sessions and the frequency of the sessions because of the
“increase in the requirements of patients, have to spread the staffing resource more thinly” (S4)

Various factors determined how the physiotherapists prioritised any particular patient on any given day. Factors that influenced decision-making included whether the patient had been seen before or not (new patient), whether they were unwell (acute respiratory crisis), their planned discharge date and the need to have credible information for the multi-disciplinary team meeting (MDM).

“If determined by MDM that a patient is going on Thursday that really determines how much physiotherapy that patients receive. You really try and step up the intervention on that patient in the next few days” (S2)

“We’re constantly juggling that between those patients that are unwell and those patients that need the rehab time. It’s that constant juggling act of which is going to be the priority” (S3)

“Patients that aren’t a new patient and haven’t changed acutely are prioritised way down the list. You’re just hoping that you have time in the afternoon” (S4)

“If we don’t have the confidence which comes from that daily input, it can have an impact on the individual therapist ability to communicate the level of function or the specific goals for the patient and I think that can be quite challenging when you’ve got strong personalities in multi-disciplinary meetings and you know the Consultant led bias perhaps that can be quite challenging” (S5)

The requirement to present current information about patients’ functional ability at the MDM also meant that the physiotherapists prioritised the content of the physiotherapy session. Physiotherapists prioritised assessment and re-assessment over active physiotherapy interventions such as exercise with a patient due to the need to have up to date information for the multi-disciplinary team (MDT) either for meetings or for other standard operational information such as the mobility chart above the patients’ beds.

“The physiotherapist has a list from the day before and you prioritise but it can change in the board handover if people have deteriorated over night, so you want to reassess them to see if you need to update the information on the sheet above them” (S2)

“You end up constantly, rather than treating, doing constant re-assessment” (S4)
Nature of service provision: Impact on patients

All the physiotherapists felt that their prioritisation decisions directly impacted on patients. This impact could be on patients’ functional ability or behaviours, which the physiotherapists termed ‘carry over’.

“If you miss a day and then it’s the next day, that gap makes a huge difference to their carry over and you do kind of take a step back.” (S2)

“Motivation is a big part of it, if you know you’re going to get to a patient and you’re going to spend 10-15 minutes having a conversation with them, 5 minutes documenting it and you haven’t actually achieved anything or you feel like you haven’t achieved anything because you haven’t done anything functionally, hopefully you have because they get to know you but if you don’t go back for a few days then it’s lost” (S3)

You realise that it’s 4 days since you’ve seen him [patient] and there’s a huge functional decline in comparison to when we last saw him, then you’re kind of starting again” (S4)

5.2.2.2 Therapeutic relationship

All participants highlighted the therapeutic relationship that the physiotherapist developed with the patient as key to engaging the patient and the achievement of positive patient outcomes. The ‘therapeutic relationship’ was the term that the physiotherapists used repeatedly when describing the physiotherapist/patient relationship and a positive therapeutic relationship was based on a number of factors.

Therapeutic relationship: Trust

All physiotherapists highlighted the importance of patients being able to trust them as the key to engaging the patients in the therapeutic relationship. Physiotherapists reported that they felt that patient trust was adversely affected by gaps in seeing the patient and re-engagement with the patient took more time, the longer the gap between treatments.

“If you can see patients on a more regular basis staff have built up the relationship with the patient and I can talk about myself so the treatment is more efficient if you can build up this relationship with the patient so the trust is increasing” (S1)
“Important to build a rapport and the only way to get to that rapport and building that rapport is trust. You see a patient and then you can’t see them and that damages some aspects of the trust, the relationship building that you’re trying to achieve” (S6)

“I’ll talk to the patient and say Ok I’ll come and see you tomorrow and we’ll do this and tomorrow but if there’s more new patients by the time you’ve got through those and seen some other priority people you might not see them that day as promised, it might be the next day and they don’t complain about it but it doesn’t mean that they’re not registering the fact that we weren’t there when we said we were going to be there. It’s hard to follow through on those promises and that can affect that trust relationship” (S2)

**Therapeutic relationship: Motivating patients**

Motivating patients was also a key role of the physiotherapists; aspects included communication with the patients, whether the patient was self-motivated and frequency of the intervention.

“If you can see patients on a more regular basis then through this the treatment is more efficient and the patient in him or herself can be more willing to do so we can motivate better and there’s good relationship with us and that really helps therapeutic relationship” (S1)

“You do get those patients that are fiercely independent and motivated ‘cos they want to get out of that environment but a lot of them will be quite accepting of that and they quite like, on some level, having things brought to them and therefore don’t have the motivation to change that so much.” (S3)

“If someone isn’t motivated for whatever reason, if I go back to the patient after 3 or 4 days an ask them if they want some rehab now, well if you’re only going to come every 3 or 4 days what’s the point of that whereas if you’re able to go in a bit more regularly you might build up that rapport better and actually get them to engage” (S3)

**Therapeutic relationship - patient presentation**

The physiotherapists reported that patient presentation influenced the therapeutic relationship with the physiotherapists and that in turn affected the outcomes of the physiotherapy intervention. The participants felt that patients with cognitive impairment presentations took longer to engage, because they had to re-build the trust each time, and
that this engagement once gained could be lost if intervention was not consistent. Any given physiotherapy session therefore could contain less physical activity and more time in conversation to engage and build a rapport with the patient.

“And you do notice that difference when you go and see a patient [with cognitive impairment] and you might say ‘hi, I’m [name] the physio’ and they say ‘oh yes I remember we did this yesterday’ or ‘I did this’ and you’re instantly then in to go that’s what we’re going to do, we’re going to take it from there.” (S4)

“Delirium also, the level of skill required to engage a patient with a significant dementia or someone who’s acutely confused, I think that has a huge impact on the time taken to engage and you know the methods that you need to utilise to communicate and engage that patient um that has a big impact.” (S5)

Once the rapport had been established the physical activity of any session was tailored to the needs of a patient with cognitive impairment and would differ from a patient that was unimpaired.

“With patients with delirium or dementia you have to keep it really functional, they’re not going to know what you mean if you say right now Mrs [name] we’re going to do 10 repetitions of this quadriceps exercise. So, you have to encourage them to do transfers or walking and that bring us back to that relationship you have with them as we talked about earlier” (S4)

Whether patients were frail or not also affected engagement with physiotherapy intervention due to the patients reduced exercise tolerance.

“The frailty of the population means that their exercise tolerance is generally very poor and so they can’t do an hour, an hour and a half session a couple of times a week” (S1)

“The frailty of the patient affected how much we could do in one session” (S3)

5.2.2.3 Summary of focus group with physiotherapy staff

Physiotherapists identified the days of service provision and the staffing provision as directly influencing their decision-making in terms of prioritisation regarding which patients were seen on any given day. The MDT also influenced physiotherapists’ decision-making regarding
whether patients were seen and also the content of physiotherapy; physiotherapists felt that they spent a lot of time assessing and re-assessing patients rather than undertaking active therapy with patients because of the need to update and appear credible to the MDT. They felt strongly that both of these directly impacted on patients in terms of patient engagement and functional progression.

All physiotherapists talked about the “therapeutic relationship.” A positive therapeutic relationship was one where the patient was engaged with the physiotherapist and thus the intervention. The therapeutic relationship was based on the trust between the patient and the physiotherapist and the motivation of the patients; these were affected by service provision and patient presentation. If patients could not be seen every day then it took longer to re-engage with that patient the next time. Motivating patients was a key role of the physiotherapists and again if the patient could not be seen for several days it could affect patient motivation levels. This then meant the amount of time in active therapy was reduced.

Physiotherapists felt that patient presentation influenced the therapeutic relationship and subsequently the outcomes for that patient. It took longer to engage with patients with cognitive impairment and these relationships were significantly affected by the lack of consistency between sessions. Physiotherapists felt they were starting from scratch each time and time was spent on re-engagement rather than a physical intervention. Content of the physiotherapy session for patients with cognitive impairment varied from those unimpaired patients in that the activities were more functional. Frail patients by contrast could not engage with less frequent, longer physiotherapy sessions because of the impact of their frailty on their exercise tolerance.
5.2.3 Summary of the qualitative data

The study hypotheses for testing in this RE were presented as context-mechanism-outcome (CMO) configurations. During the interviews patients, carers and physiotherapists did not consciously present their thoughts as CMO configurations, although these configurations were either partially or wholly discernable within the dialogue. A process of revisiting the data numerous times over the course of the analysis was required together to ensure that relationships between context, mechanism and outcomes where they existed in the dialogue, were maintained (appendix 22) and incorporated in the integration of the data sets.

5.3 Integration of the data sets

Integration refers to the process by which the different data sets are brought into relation with each other (Moran-Ellis et al., 2006). It is distinct from triangulation, a term widely used within mixed methods research but the meaning of which has become unclear (Hammersley, 2008). The realistic evaluation (RE) methodology allows for methods to be integrated at the outset and remain integrated in the process of data analysis and interpretation (Moran-Ellis et al., 2006, Pawson, 1995). Outcomes are not inspected simply in order to see if interventions work, but are analysed to discover if the conjectured context, mechanism, outcome theories are confirmed (Pawson and Tilley, 1997). Therefore both quantitative and qualitative findings must be reviewed in light of the mechanisms and contexts proposed (Table 24 and Table 25). Links between the context, mechanism and outcome threads identified are then refined to form a range of refined context-mechanism-outcomes configurations (Table 26). The aim of CCMOc is to provide an overall initial description of what worked, for whom, how and in what circumstances. CCMOc therefore represent development of the original study theories, a revision of the proposed interplay between contexts, mechanisms and outcomes related to the impact of physiotherapy on hospitalised medical older adults based on study findings and represent further testable propositions.
<table>
<thead>
<tr>
<th>Context</th>
<th>Mechanism</th>
<th>Outcomes</th>
<th>Qualitative findings</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>C1:</strong> Physiotherapy service provision - Monday to Friday service (08.30-16.45) with an inadequate staffing resource</td>
<td>M1.1: Staff decision-making (prioritisation)</td>
<td><strong>O1.1:</strong> Sample patients were functionally dependent and had a substantial lack of balance confidence on admission</td>
<td>Physiotherapy staff: O1.1: Prioritisation affects the amount and frequency of physiotherapy that patients receive.</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>O1.2:</strong> Patients regardless of sub-group receive a statistically similar amount (total minutes) and frequency of physiotherapy intervention</td>
<td>O1.2: Patients require daily physiotherapy intervention but this is not possible due to staffing levels and 5-day service provision</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>O1.3:</strong> Patients received physiotherapy on less than 40% of their days in hospital</td>
<td>O1.3: Patient clinical presentation is not the most important factor considered when prioritising whether to see a patient on any given day</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>O1.4:</strong> No associations between measures of physiotherapy and change in patient health status outcomes in the sample</td>
<td>O1.4: Patients do not receive enough physiotherapy intervention, which inhibits positive change in patient health status outcomes</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>O1.1:</strong> Prio...</td>
<td></td>
</tr>
<tr>
<td><strong>C2:</strong> Physiotherapy service provision</td>
<td>M2.1 Patients were motivated to undertake activity when physiotherapists were present because they trusted that no harm would come to them</td>
<td><strong>O 2.1:</strong> Significant association between amount of physiotherapy and increase in balance confidence in cognitively unimpaired and frail subgroups</td>
<td>Physiotherapy staff: O2.1: &quot;Patients often fearful to undertake activity on their own&quot;</td>
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<td></td>
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<td><strong>O 2.1:</strong> Significant association between amount of physiotherapy and increase in balance confidence in cognitively unimpaired and frail subgroups</td>
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<td>Context</td>
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<td>M3.2: Staff decision-making (content of physiotherapy session)</td>
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<td>O3.3: No associations between physiotherapy intervention metrics and patient health status outcomes in the impaired subgroups. Moderate to large associations observed in the unimpaired groups</td>
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<td>M4.2: Physiotherapy staff decision-making (content of physiotherapy session)</td>
<td></td>
<td>O4.2: Discharge date determined at MDM affected prioritisation of patient to receive/not receive physiotherapy. The decision to discharge a patient made a MDM may be at odds with physiotherapist preference</td>
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<td></td>
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<td></td>
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Table 26: Refined context, mechanism, outcome configurations

<table>
<thead>
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<th>Refined context, mechanism, outcome configurations (CCMO)</th>
<th>Primary themes</th>
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<tr>
<td>CCMO 1</td>
<td>Organisational commitment to levels of physiotherapy staffing and physiotherapist decision-making determines amount and frequency of physiotherapy</td>
<td>Prioritisation</td>
<td>Physiotherapy presence</td>
</tr>
<tr>
<td>CCMO 2</td>
<td>Presence of physiotherapy staff and patient trust leads to adjustment of patient behaviour</td>
<td>Patient confidence</td>
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</tr>
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<td>CCMO 3</td>
<td>Presence of cognitive impairment or frailty and building a rapport leads to poor health status outcomes with physiotherapy</td>
<td>Patient engagement</td>
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<td>CCMO 4</td>
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<tr>
<td>CCMO 5</td>
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<td>Staff attention to activity</td>
<td>Interprofessional working for rehabilitation</td>
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5.3.1 Physiotherapy presence

Prioritisation

The physiotherapy staffing resource and agreed days of service provision represented the organisational commitment to physiotherapy service provision. The days of service did not include weekend provision so patients did not receive physiotherapy at the weekend.

"Not providing a service at the weekend, doesn’t mirror what happens in the week” (S6)

Physiotherapists wanted to see all patients everyday but this was not possible within the staffing resource, this in turn required the physiotherapists to decide which patients would receive physiotherapy on any given day, construed as the mechanism of prioritisation. That physiotherapists prioritised was recognised by patients as well as staff.

“Patients could get more physiotherapy but due to staffing resource staff have to prioritise which patients to see” (S1)

“It’s according to what time they’ve got sometimes, that’s fair enough because there’s probably people worse off than me that needs to be seen to so they’ve got to come first and then they see to me afterwards” (P4)

Prioritisation determined in the amount and frequency of physiotherapy that a patient received. Quantitative study data revealed that all patients in the study sample received the
same amount and frequency of intervention, regardless of patient characteristics, at a frequency of 1 intervention every 2-3 days. This amount and frequency of intervention was not associated with a positive effect on health status outcomes.

“So for him being quite frail and at great risk of functional decline from a starting point, he went from step transferring with assistance of one to being full hoisted within a few days, he wouldn’t have declined to the same extent, had he had some more input from us” (S3)

Patient confidence

Patient trusted physiotherapists because they were perceived to be knowledgeable and would not let harm come to the patients.

“I feel safe because I trust them…….well the reason you trust any professional, he knew his job” (P3)

The presence of a physiotherapist and the trust that patients had in them led to an increased in confidence in the patients to undertake activity.

“I try and walk a little bit but I’m not that confident on my own yet (P6)

“If they didn’t have that little walk with the physiotherapists they’d never be able to walk when they get out. They lose confidence, I’ve noticed that, his confidence just plummets” (P2)

Quantitative data provided confirmatory evidence of a significant, moderate association between patient self-reported confidence and total amount of physiotherapy in unimpaired patients.

5.3.2 Patient Characteristics

Patient engagement

The presence of cognitive impairment and frailty in the patient sample was 57.3% and 73% respectively. All patients regardless of presence of cognitive impairment or frailty believed
that physiotherapy helped them but physiotherapy staff reported that these patients were less engaged with physiotherapy.

“Delirium also, the level of skill required to engage a patient with a significant dementia or someone who’s acutely confused, I think that has a huge impact on the time taken to engage and you know the methods that you need to utilise to communicate and engage that patient um that has a big impact” (S5)

“It takes time encouraging those patients that are frail and more dependent or more fearful about walking” (S6)

Patients that were frail reported that they struggled to be motivated to undertake physical activity.

“But it’s such a task it really is, you think is it all worth it. As much as I want to finish this I get the feeling that sometimes this is getting a bit too much” (P3)

“Because sometimes your body aches you so much that you can’t even lift your hand to tie your hair” (P8)

Patients and physiotherapy staff reported the importance of developing trust in the therapeutic relationship

“With that particular population [cognitive impairment] trust is the key, if they recognise you and know what you are trying to achieve and you can tap into that memory” (S4)

All subgroups received statistically the same amount and frequency of physiotherapy. However, time taken to engage with patients for reasons of motivation and trust resulted in patients with cognitive impairment or frailty not receiving as much physical activity intervention compared to unimpaired groups. Physiotherapists reported that sessions with these patient groups consisted of more discourse with the patient as the therapist sought to engage the patient with the proposed physical activity rather than the undertaking of physical activity interventions.
“If you know you’re going to get to a patient and you’re going to spend 10-15 minutes having a conversation with them, 5 minutes documenting it and you haven’t actually achieved anything or you feel like you haven’t because you haven’t done anything functionally, hopefully you have because they get to know you but if you don’t go back for a few days then it’s lost” (S3)

Minimal associations were observed between physiotherapy intervention and positive effect on health status outcomes in cognitively impaired and frail subgroups

5.3.3 Interprofessional working for rehabilitation

Physiotherapist attention to MDT priorities

Physiotherapists were part of the MDT on the ward but the priorities of the MDT did not always align with the individual physiotherapists’ priorities for the patient.

“Strong Consultant led MDMs where the decision’s been made and you’re to trying like slow down that process in the interest of the patient ‘cos you know that they’re off their baseline and going straight home when they’re completely off their baseline isn’t necessarily appropriate but that’s what they’re pushing for.” (S2).

The physiotherapists paid attention to the requirements of the MDT and used these as a method of prioritisation by incorporating these into their daily prioritisation of physiotherapy services and the content of the physiotherapy intervention.

“I know if it’s a Monday, it can often be a time limit put on the patient. If MDT determines where the patient is going on Thursday that determines how much physiotherapy that patient receives.” (S4)

“You do constant re-assessment so that then you go into those MDMs more informed. That’s perhaps not the best utilisation of their therapy time and not maximising our skills” (S4)

Staff attention to activity

Organisational commitment to physiotherapy service provision resulted in a 5-day service to the OPU. There was no physiotherapy presence at the weekends and this along with the
attention paid to patient activity particularly by nursing staff meant that there was reduced support for patient activity on the ward. Possible reasons for this lack of support for activity from nursing staff were perceived differently by patients and physiotherapy staff.

“Well the nurses are so busy and I’m afraid to ask them because I don’t like to be refused. They’ll say oh we’ll see you in a minute but that minute’s gone and it comes to 20 minutes and then 30 minutes and you don’t see them” (P4)

“Nurses aren’t confident to mobilise patient admitted on Friday/over the weekend. So the physiotherapist comes in on a Monday and the patient’s still sat waiting which impacts on their functional recovery” (S6)

Patients that were able to mobilise independently reported that they were not encouraged to mobilise at the weekends.

“I did walk round the bed and got told off by the nurses for doing it but I did hold onto the bed.” (P7)

The organisational commitment to a 5-day service ensured that patients did not receive physiotherapy over the weekend and therefore patient activity at weekends represented the practice element of rehabilitation that is essential for functional gains. The lack of patient activity over the weekend at the study site resulted in a perception by both staff and patients that patients regressed functionally over the weekend, although this was not directly observed in this study

“Not having physiotherapy over the Bank Holiday made a difference, definitely, definitely. I didn’t expect it but it was hard on the Monday you know?” (P7)

“The older person, this client group, they deteriorate quite quickly and you might have started the programme and then they don’t have any therapy over the two days and by the time you see them on a Monday they’ve regressed” (S4)

### 5.4 Summary

The findings and analysis of a sequential mixed method data collection as part of a RE of the impact of physiotherapy intervention in a convenience sample of hospitalised older adults
have been presented. This study highlighted how specific contexts of the acute care setting can influence the actions of healthcare staff and patients to impact on outcomes. These findings have not been described previously in relation to physiotherapy interventions in this population. The innovative use of RE methodology to investigate the impact of physiotherapy in a sample of hospitalised older adults has enabled insight into what it is about physiotherapy intervention that works for patients and staff, how and in what circumstances. These findings and the value of RE as a methodology in physiotherapy are discussed further in relation to existing knowledge in the next chapter (Chapter 6).

5.4.1 Key messages

- Physiotherapy presence on the wards prompted a range of reactions from physiotherapists, other frontline staff and patients
- The clinical presentations of cognitive impairment and frailty impacted on patient engagement with physiotherapy resultant in variation in health status outcomes across subgroups of patients
- The priority status of rehabilitation activities and interprofessional working on the wards with regards to rehabilitation triggered reactions in frontline staff and patients
- RE is a feasible and valuable methodology for investigating the impact of physiotherapy interventions in an acute healthcare setting
Chapter 6 Discussion

The aim of this study was to generate theoretical explanations regarding the impact of physiotherapy on medically unwell patients. The innovative use of realistic evaluation (RE) methodology has resulted in findings that provide an explanatory account of what works, for whom, how and in what circumstances in terms of physiotherapy to medically unwell hospitalised older adults. The chapter considers study findings and the theoretical suppositions proposed in terms of existing knowledge and their contribution to knowledge in the field of physiotherapy. Lastly, the innovative adoption of RE methodology in investigating the impact of physiotherapy on medically unwell older adults is discussed in terms of feasibility and value of the current study findings. The chapter concludes with a summary.

The literature review provided evidence that studies to date investigating physical activity interventions in medically unwell older adults are descriptive rather than explanatory (Byng, Norman and Redfern, 2005) resultant in intervention and outcome information only. The influence of context and mechanisms of action in terms of outcomes are not considered in studies to date. Consequently, there is no information on how interventions might be replicated in the local context or whether study outcomes will be reproduced (Moore, et al., 2015), constituting a risk with regards to changing service models based on published trial data. But context has an important influence on peoples’ behaviours (Pawson, 2013), and people, such as patients and staff, are key stakeholders in any healthcare intervention. In clinical practice, context refers to any factors external to an intervention that may act as a barrier or a facilitator to its implementation or effects (Moore et al, 2015). Contextual factors related to service and patient characteristics were identified as potentially important with regard to physiotherapy interventions in the acute setting. These were highlighted from the literature review and along with stakeholder perspectives were incorporated into a priori hypotheses for testing (section 4.1.2.2). The service context constituted the ward setting and the organisational commitment to the days of physiotherapy provision and commensurate
service staffing resource, which resulted in physiotherapy presence on the wards. The wards, the clinical setting, comprised the older persons’ unit (OPU), which included interpersonal relationships between physiotherapists and patients and also other members of the multi-disciplinary team (MDT). The organisational culture and MDT are acknowledged to be influenced by macro level health policies and professional bodies (Legare, F. et al., 2011). The literature review revealed that certain groups of patients were frequently excluded from studies, for example cognitively impaired patients and patients with multiple co-morbidities. This is not representative of clinical practice and constituted an important context for consideration in this study, patients for whom physiotherapy does or doesn’t work.

Study findings confirmed that certain contextual conditions influenced physiotherapist, multi-disciplinary team (MDT) staff and patient choices with a resultant effect on outcomes. The importance of context has previously been reported in relation to physiotherapy interventions (Jensen, 2007, Whiteneck et al., 2012) but despite this, is not commonly recognised in trials or in clinical practice within physiotherapy. My findings suggest that it is crucial to understand the influence of contexts on stakeholder actions in order to understand and positively influence outcomes with physiotherapy.

6.1 Physiotherapy presence

Organisational commitment for the physiotherapy service was the key determinant in the availability of physiotherapy staff on the older person’s unit. The availability of physiotherapy staff triggered a process of decision-making carried out by the physiotherapists, construed as the mechanism of prioritisation. This determined the amount and frequency of physiotherapy intervention that patients received. The presence of physiotherapy staff also triggered a reaction in patients; patients trusted physiotherapists and seeing the physiotherapist increased their confidence to undertake activity.
Organisational commitment to physiotherapy was manifested in the days of physiotherapy service provision, Monday to Friday with no weekend service, and the staffing of the service Monday to Friday. The physiotherapy service context therefore hinged on both the available hours for physiotherapy and the staffing resource during these hours, manifesting in physiotherapy presence on the ward. There are no nationally agreed physiotherapy staffing levels for this cohort of patients. By comparison, models of safe staffing levels for nurses on adult inpatient wards have been developed recently in the light of the Francis report (NHS England, 2013b). The professional body of physiotherapy has stated it’s intention to undertake this work (Gray, 2013) but is yet to be near dissemination. Current physiotherapy staffing levels and grade mix are therefore representative of pragmatic historical arrangements, working practices and local priorities accepted as being influenced by medical hegemony (Crinson, 2009). Recently, national benchmarking of service data has been collated for inpatient therapy services including physiotherapy (NHS Benchmarking, 2013). However, the level of granularity in the data does not enable comparison in terms of numbers of physiotherapists per bed specifically for older adults’ wards but does provide data regarding average skill mix. Comparison with the current study site staffing is presented (Table 27) and shows some comparable proportions. However overall, there are proportionally less senior specialist staff (Band 7-8a) and more staff in-training (bands 5-6) and unqualified staff (bands 2-3) at the local site.

Table 27: Comparison of national and local staff proportions by grade

<table>
<thead>
<tr>
<th>Grade</th>
<th>National (% of workforce)</th>
<th>Local (% of workforce)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Band 8a (most experienced)</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>Band 7</td>
<td>18%</td>
<td>11%</td>
</tr>
<tr>
<td>Band 6</td>
<td>28%</td>
<td>28%</td>
</tr>
<tr>
<td>Band 5 (least experienced)</td>
<td>23%</td>
<td>22%</td>
</tr>
<tr>
<td>Band 2/3 (unqualified)</td>
<td>26%</td>
<td>33%</td>
</tr>
</tbody>
</table>

The literature on presence of certain staff groups on the wards is focused on the visibility of staff with specific remits for the promotion of positive practices such as infection control
(Healthcare Commission 2007, Williams, Burton and Rycroft-Malone, 2013). There are no studies related to the presence of physiotherapy staff on acute older adults’ wards. This study highlights that the presence of physiotherapists is important to patients’ rehabilitation, moreover study findings suggest that physiotherapy presence at the study site is not optimal in terms of service capacity, leading to prioritisation of services and implications for the trust relationship developed with patients to impact health status outcomes.

6.1.1 Effect on physiotherapist prioritisation

My study findings support the hypothesis that physiotherapy presence in terms of daily staffing complement influences physiotherapists’ decision-making in relation to which patients will receive physiotherapy. The decision-making process is interpreted as the mechanism of prioritisation that was undertaken prior to any decision-making regarding specific clinical interventions. Prioritisation related to whether to provide physiotherapy intervention on any given day to any given patient. Physiotherapy staff determined, which patients to provide intervention to through a process of prioritisation based on historic criteria of patient status (new, due for discharge or in acute respiratory crisis) and the requirements of the MDT before other clinical requirements such as patient rehabilitation needs or patient ability to engage in the rehabilitation process.

Prioritisation of healthcare interventions is acknowledged and considered as distinct from clinical decision-making, which is a complex, unique, patient-focused and creative process (Smith, Higgs and Ellis, 2008), to enable clinicians to choose a course of action in relation to what treatment intervention to undertake with an individual patient (Hastie, 2001). Clinical decision-making and prioritisation are both part of the broader concept of clinical reasoning, the cognitive processes associated with the clinician’s examination of the patient, which are acknowledged to be open to contextual influence (Higgs, 2008). Although contextual influences have been alluded to (Higgs, 2008), especially in relation to time, there is minimal
exploration of these aspects in the literature related to physiotherapy. The consideration of context is often excluded from physiotherapy studies, which tend to utilise more outcome driven methodologies (Blanc-Bisson et al., 2008, Brusco and Paratz, 2007) highlighting the value of RE’s more explanatory methodology.

The term prioritisation has been described as the exercise of judgement between competing claims (Spicker, 2009), which in healthcare is associated with clinicians’ decision-making in the allocation of their services (Harding, Taylor and Shaw-Stuart, 2009). Prioritisation requires grouping of patients in some way, in the current study by patient status or discharge date, and by definition, assumes a mismatch between need and availability of resources. Thus, although there might be a clinical element to the prioritisation, as in this case, there is implicit in the process a rationing of service resources (Harding, Taylor and Shaw-Stuart, 2009, Malone and Rycroft-Malone, 1998). The process may or may not include formal pre-determined systems/tools, used to categorise patients according to whether and when intervention should be provided to patients (Porter and Jamieson, 2013). The prioritisation that the physiotherapists undertake at the study site is not a formal tool or a system. It is a historical, professional tacit process (Greenhalgh et al., 2008), in that it is not written down but passed on to new physiotherapy staff as they commence work on the wards by senior physiotherapy staff. Prioritisation is individual, sometimes with overview of a senior clinician, and is therefore potentially inconsistent (Porter and Jamieson, 2013).

The physiotherapists’ mode of prioritisation was determined by their need to have knowledge about the patient. This enabled them to actively contribute to MDT decision-making, appropriately advocate for the patients, appear credible to the MDT and also to have knowledge of the patient to allow further prioritisation. The priority allocation undertaken by the physiotherapists was therefore one of precedence, that is, the patients had a pre-determined priority and prioritised patients had precedence over the non-priority patients.
There was also a lexical ordering of prioritisation (Spicker, 2009). New patients had to be assessed to determine the need for physiotherapy intervention and were then re-prioritised.

Here it was established that the prioritisation process undertaken by the physiotherapists on the older persons’ unit was directly influenced by the number of physiotherapy staff present on the ward each day. Prioritisation was not based on patient clinical presentation, with respect to frailty or cognitive impairment or the rehabilitation needs of the patients. It is not clear why physiotherapists did not consider these factors. Possibly, they did not consider that these were important factors to consider or that they were not as important as other influencing factors such as the requirements of the MDT. Although the physiotherapists acknowledged the prioritisation process, their aspiration was that all patients would be seen daily, however, the daily physiotherapy staffing complement meant that this did not happen.

Objective study findings provided concordant data that patients did not receive daily intervention. Physiotherapy intervention frequency for the sample (n=75) was one physiotherapy intervention every 2.8 days during hospital LOS (median 14 days [9-26 days]). Importantly, physiotherapy intervention measures were not associated with change in patient health status measures in the sample, which has not been reported previously.

The opinion of the physiotherapy staff was that patients did not receive enough physiotherapy to achieve maximal change in their health status. This perception was grounded in the importance the staff placed on the “carry over” of patients. The staff used this term to apply to both patients’ recollection of a physiotherapy session and the re-learning of motor skills manifesting as progressive functional ability. The literature supports the physiotherapists’ views. Older adults do not demonstrate the same level of retention of motor tasks found in young adults, that is, better performance in the early portion of the subsequent training session than at the end of the previous training session (King et al., 2013). Moreover,
to ameliorate age-related declines in motor performance, any improvements gained during a physiotherapy session must be maintained beyond the conclusion of the training session (King et al., 2013). This suggests that older adults are able to acquire new motor skills but in a different way to younger adults and require more practice both in terms of more frequent physiotherapy interventions and physical activity to consolidate the functional gains.

The patient perspective on the prioritised physiotherapy service that they received was mixed regarding whether it met their needs. Some patients reported that they would have liked to receive more physiotherapy intervention particularly at the weekend and felt that they deteriorated functionally without this intervention. Conversely, some patients with frailty were content to not have physiotherapy at the weekend, identifying this time as a time for rest but contrariwise also reported that a ‘little and often’ in terms of physiotherapy intervention would be better for them. From both the staff and patient perspective, outcomes are explained by an inadequate dose of physiotherapy. The organisational commitment to physiotherapy service levels triggered a process of prioritisation by the physiotherapists resultant in a dose of physiotherapy inadequate to influence change in health status measures. The dose of physiotherapy, like exercise, includes the mode of intervention (type of physical activity), the frequency (number of sessions), the intensity (metabolic demand determined by resistance, tempo and repetitions) and the duration (temporal measure of each session and cumulative sessions) (Theou et al., 2011). The amount and frequency of physiotherapy are therefore two factors considered in determining the dose of physiotherapy. However, despite the physiotherapists' view that more physiotherapy would have resulted in greater change in health status outcomes, the evidence regarding the optimal dose of physiotherapy interventions to effect outcomes are lacking (Singh et al., 2012b). An alternative interpretation for the current study findings could be that the study measures selected were not sensitive to physiotherapy intervention, or that some other, unknown factor impacted on outcomes. This highlights the challenge of investigations in complex interventions in naturalistic settings and the potential influence of other contextual factors on mechanisms of
interest. Understanding the impact of different doses of physiotherapy on acutely unwell older adults is important to ensure best outcomes for patients and warrants further investigation.

6.1.2 Effect on patient trust

The presence of physiotherapists had a cognitive impact on patients. Patients trusted the physiotherapists, which led to an increase in patient confidence to undertake activity. Although patients understood the benefits of physiotherapy and physical activity, patients were not confident to undertake this activity alone. Patients trusted their physiotherapists because they had specialist knowledge that would assist them to improve functionally; this was identified as important to patients (section 5.2.2.2). Patients also trusted that the physiotherapists' competence would stop any harm coming to them when they were physically active. Thus the patient narrative corresponds with the definition of trust, understood as:

“The optimistic acceptance of a vulnerable situation in which the trustor believes the trustee will care for the trustor's interests”

(Hall et al., 2001 page 615)

At the micro-level of the patient, trust relationships are categorised as interpersonal as opposed to organisational or institutional relationships (Calnan et al., 2006). Trust as an interpersonal concept is a voluntary response of an individual based on personal expectations of another person’s behaviour that involves vulnerability and risk and is based on the foundation that one person will have concerns for the other (Gilson, 2006). As such the development of a trusting relationship between healthcare practitioner and patients is fundamental to care and has traditionally played a significant part in the relationships between patients and clinicians in the NHS (Rowe and Calnan, 2006). This is not unexpected since the healthcare setting is characterised by uncertainty for patients and an element of risk concerning the competence and intentions of the healthcare staff on whom the patient is
reliant (Alaszewski, 2003). Consequently the need for patients to trust clinicians can relate to the vulnerability associated with being ill but also to the unequal relationships which arise from the specialist nature of scientific, medical knowledge and expertise (Calnan and Sanford, 2004).

In this case, it was established that patients trusted physiotherapists because they had conviction that they were competent. There is little evidence regarding trust relationships specifically between patients and physiotherapists in an inpatient setting but this finding is supported in the literature related to nursing. Knowledge and skill to undertake procedures (Dinc and Gastmans, 2013), belief that the trustee is working in the best interests of the trustor (Rowe and Calnan, 2006), a generalised trust in nurses due to their professional status and interpersonal caring attributes of nurses as human beings (Dinc and Gastmans, 2013) have all been reported. Patients did not highlight clinician personal qualities as an important aspect in developing trust relations with patients. This might be due to a different emphasis in questioning in the current study or might represent concerns from patients regarding influencing their on-going physiotherapy treatment (Cooper et al., 2013a), it might also reflect that the clinical personal qualities exhibited by the physiotherapy staff were in accordance with patient expectations. Despite the skill mix within the physiotherapy team, patients did not appear to differentiate between senior, in training or unqualified physiotherapy staff in relation to the trust relationship (Calnan and Rowe, 2006), possibly due to their expectations of what physiotherapy behaviours constituted competence. The development of trust is an individualised, temporally dependent, dynamic process, during which trust can be broken and re-established (Dinc and Gastmans, 2013). The physiotherapists in the current study reported that the trust relationship with the patient was enabled by continuity of contact with the patient, which allowed trust to grow through the partnership developed with the patient (Gilson, 2006, Haggerty, 2012). Factors such as remaining distant (Helene Hem, Heggen and Ruyter, 2008), busy workloads and inadequate
time (Hilliard and O’Neill, 2010) have been reported to undermine patients’ trust in nursing studies.

The current study findings reflect those of previous studies, that older adults belief in the benefit of activity does not influence their activity behaviour (Boyd and Stevens, 2009) and that rehabilitation patients do more activity when therapy is supervised (Gaxatte et al., 2011, Newall et al., 1997). Trust appears to be important where there is uncertainty and a level of risk (Calnan et al., 2006). Here patients’ perceived undertaking activity alone as a hazardous due to the risk of falling and this finding is well reported (Boltz et al., 2014) and also correlated with loss of confidence and subsequent restriction of physical activity (Boyd and Stevens, 2011, Gaxatte et al., 2011). My study determined that the presence of physiotherapists influenced the trust relationship between physiotherapist and patient, eliciting an increase in patient confidence.

Patients on admission had a substantial lack of confidence in balance to undertake physical activity indicated by a median (IQR) balance confidence (CONFbal) score in the sample at admission of 24.5 points (21-28). Physiotherapy presence led to an increase in patient confidence in patients due to the patient’s trust in undertaking activity when the physiotherapist was present. Observational data however, showed a large association between physiotherapy intervention and increase in balance confidence in non-frail and cognitively unimpaired patients only. The same association was not present in the impaired cohorts. The current model of service provision determined the physiotherapy presence on the ward and did not allow the staff to see each patient everyday, which may have adversely impacted upon the trust relationship and subsequent impact on confidence in the more vulnerable groups, such as those with frailty or cognitive impairment.
Study findings therefore, suggest that the current model of physiotherapy service provision is not optimal in terms of contact with patients to enhance the development of a trusting relationship and to increase patient confidence in all patient groups. It has been proposed that increased trust relations between clinician and patient has the potential to improve the efficacy of treating disease (Lee and Lin, 2009). The findings of this study suggest that the trust relationship may improve the efficacy of physiotherapy interventions for the purpose of treating functional disability. Increasing patients’ confidence to undertake activity could support the practice element of activity outside of therapy sessions required to consolidate functional gains made with therapy (King et al., 2013).

6.1.3 Increasing the presence of physiotherapists

Increasing the presence of physiotherapists through a 7-day a week service could, if adequately resourced, reduce the need for prioritisation and support and promote patient activity as physiotherapists do Monday-Friday. There has been much national debate on the provision of 7-day services across the NHS, the clinical argument generally highlighting the variation in mortality risk between weekend and weekday admissions (NHS improvement, 2012). Ten standards have been set to describe the minimum level of service that patients admitted through emergency routes, the entry route for 99% of acutely unwell older adults at the study site, should expect to receive regardless of the day of the week (NHS England, 2013a). These standards include one directly related to physiotherapists in terms of assessment within 24 hours of admission. A recent study has argued however, that based on current evidence, the cost of implementing 7-day working greatly exceeds the maximum amount that the NHS should spend on eradicating the negative effects observed at weekends (Meacock, Doran and Sutton, 2015). Other policy and guidance highlighted in the literature review supports physiotherapy intervention 7-days a week so that patients do not deteriorate over weekends (Academy of Royal Colleges, 2013). However, the correlation between increasing the amount of physiotherapy provided to patients over 7-days and improvement in function and in increasing activity time is not proven (English, Bernhardt and...
Hillier, 2014). The impact of 7-day physiotherapy services thus requires further careful investigation including a health economic assessment.

### 6.2 Patient characteristics affect patient engagement

The presence of frailty or cognitive impairment affected patient engagement with physiotherapy, through patient motivation and trust respectively to impact changes in health status outcomes with physiotherapy.

In this study it was proposed that patients with frailty or cognitive impairment would be less engaged with physiotherapy and would, as a result receive less physiotherapy intervention. However, this hypothesis was not supported. In fact in this study these patient cohorts received a similar amount and frequency of intervention to the unimpaired patients statistically. However, on analysis of associations between physiotherapy intervention and health status outcomes for patients with frailty or cognitive impairment there was only one moderate correlation. A moderate positive association was identified between frequency of physiotherapy intervention and change in dominant grip strength in frail patients but this was not clinically significant. This was in contrast to the un-impaired subgroups where moderate to large associations between physiotherapy intervention and positive change in health status measures were observed.

The patient sample in this study was older (85 years versus 78 years) but had a similar LOS (14 days versus 13 days) when compared with national data (Health and Social Care Information Centre, 2013). The older age of the patient sample is not reflected in the local demographics; the two metropolitan boroughs served by the study site each have modest proportions (8%) of adults ≥ 65 years (Office of National Statistics, 2011), and this is more likely explained by the inclusion criteria adopted, for example patients admitted for less than 48 hours were excluded. Older patients are more likely to require a longer stay in hospital
due acceleration of physiological processes associated with ageing (Hughes, et al., 2001). The sample was representative of hospitalised patients, in terms of proportion presenting with cognitive impairments, compared with national data, 57% and 60% (Royal College of Psychiatrists, 2006) respectively. A large proportion of the study sample were assessed as being frail (73%) but this is difficult to compare nationally due to elusive definition of frailty (Moorhouse and Rockwood, 2012) and variety of tools employed to determine its existence (Hilmer et al., 2009). Other studies have reported proportions of frail adults in acute populations of between 40-80% (Andela et al., 2010, Joosten et al., 2014) reflecting this variability. A previous study conducted at the study site and using grip strength to determine frailty, reported a similar frailty rate of 72% (Buttery and Martin, 2009). Given the high proportion of frail patients in the study it was unexpected to find that median (IQR) Charlson score was 1 (1-3) and only 20% of the sample presented with multi-co-morbidities as determined by the Charlson index although on subgroup analysis 26.5% of frail patients had multi co-morbidity. Other studies in similar populations have reported median Charlson score of 2 (Jones et al., 2006, Mallery et al., 2003). Although recently validated in older patients (Frenkel et al., 2014), it may be that such co-morbidity indexes are unable to completely define these complex patients (Nardi et al., 2007) or that the relevant detail of co-morbidities was lacking from the healthcare record at the study site.

It emerged that those patients with frailty and cognitive impairment made different choices in terms of their engagement with physiotherapy from unimpaired patients. This affected the mode (content) of the physiotherapy session, which is proposed to adversely impact on health status outcomes with physiotherapy. In this study encouragement, a discourse intervention, from a physiotherapist was highlighted to be important in engaging patients to participate in the physiotherapy session. As a proportion of a total physiotherapy session, discourse was reported to take longer in patients with frailty and cognitive impairment than in unimpaired patients. There are no studies investigating patient engagement with physiotherapy in acute settings and those undertaken in non-acute settings have considered
the patient cohort as a homogenous group when reporting findings (Hill et al., 2011, Medley and Powell, 2010). The narrative of patients and physiotherapy staff provided another level of insight, specifically that patients with frailty were less motivated to engage with physiotherapy and patients with cognitive impairment take longer to develop a trust relationship.

6.2.1 Motivation for physical activity is reduced in frail patients

The presence of frailty influenced patient motivation and thus engagement with physiotherapy constraining the mode of physiotherapy intervention resultant in an impact on health status outcomes. Patients reported that they were less motivated to undertake activity with the physiotherapists due to fatigue, reported as tiredness and the desire to rest.

Although estimates suggest that between a quarter to half the population aged 85 and older are frail (Song, Mitnitski and Rockwood, 2010), it is not unexpected that the proportion of frail adults on an acute medical ward will be considerably higher than in a community-based population since it is agreed that frailty results in vulnerability to even minor stressors (Clegg and Young, 2011). Patients with frailty represent a large proportion of the acute hospitalised older adult population, the proportion of frail patients in the sample was high (73% [n=49]), and therefore knowledge about what works for them in terms of physiotherapy is crucial to ensure services are targeted to maximise positive changes in health status outcomes. Of concern in the current study is the finding that physiotherapy provision to patients with frailty was not associated with positive changes in health status measures.

Motivation, described as an inner urge, a desire, to act in order to achieve a goal (Resnick, 2002) is a component of personality but is also influenced and modified by factors extrinsic to the individual (Bandura, 1977, Shaughnessy and Resnick, 2009). It has moreover been identified as an important factor in older adults’ recovery from disabling events (Geelen and Soons, 1996). Knowledge regarding the motivation levels of patients is therefore attractive to
physiotherapists as a modifiable factor that can positively influence health status outcomes. In this study, patient beliefs and the relationship with the physiotherapist were identified as patient motivating factors for engagement with physiotherapy. All patients reported that they were motivated by the belief that participation in physiotherapy would enable them to be able to do things for themselves, which was important to them, by interaction with the physiotherapist, by successful achievement of functional tasks and by positive feedback within a physiotherapy session. These findings are highly congruent with other studies carried out in acute and sub-acute settings with regard to motivating factors; expectations about the outcome of rehabilitation, participation in activities after discharge, personal interactions with staff, seeing progress with rehabilitation, rehabilitation as a positive experience and the presence of physical sensations such as pain and shortness of breath (Peiris, Taylor and Shields, 2012, Resnick, 2002, So and Pierluissi, 2012).

Studies (Resnick, 2002, Peiris, Taylor and Shields, 2012) also reported that patients found observing success in other patients to be a motivator. When individuals see others experiencing success and experience success with their own efforts, they begin to feel more capable and confident (Hibbard and Mahoney, 2010). This was not identified by the current study or the other study carried out in the acute setting (So and Pierluissi, 2012). This could be because patients at acute sites receive physiotherapy interventions individually, often behind curtains or in a gym space, rather than in groups. This may also be reflective of patient expectations and the practicalities of delivering care in an acute, short stay environment as opposed to a sub-acute rehabilitation facility; for example, gym spaces are more common in rehabilitation settings than on a short-stay acute ward. This introduces the context of environment, which was not addressed in the current study but would warrant further investigation in terms of impact on patient activity levels.
Although, in this study, patients with frailty reported similar motivating factors as non-frail patients only frail patients reported that they struggled to be motivated to undertake physical activity due to the effort required. The findings of rehabilitation intervention studies in frail populations are inconsistent, consequently knowledge regarding which patients with frailty will do well with rehabilitation, or the specific dose to acquire these improvements is elusive (Clegg and Young, 2011, Singh et al., 2012b). Frailty has been shown to be associated with higher odds of adverse rehabilitation outcomes compared with age, gender or co-morbidity (Singh et al., 2012a). Conversely, a systematic review reported that frail patients could make functional gains with physical activity interventions (Weening-Dijksterhuis et al., 2011), although the dosing and intensity of the interventions in the included studies was not detailed. The findings of the this study suggest that one reason for non-achievement of change in health status measures with physiotherapy is that patients with frailty are less motivated to engage with activity due to fatigue.

Fatigability is conceptualised as the resting metabolic rate, energy cost of activities of daily living and functional reserve which make up the total energy that can be expended for a day (Schrack, Simonsick and Ferrucci, 2010). Patients in this study reported that they struggled to be motivated to undertake activity because it was perceived to be too effortful. It is well reported that frail patients can experience a greater level of fatigability and are physically inactive (Fried et al., 2001). Energy availability may be a critical determinant of frail individuals’ avoidance of physical exertion (Schrager et al., 2014) through adoption of behaviours perceived to conserve energy (Julius et al., 2012, Latham et al., 2003a, Schrack, Simonsick and Ferrucci, 2010). However, physical activity may be important for patients with frailty to undertake since studies have reported that motor adaptation achieved through practice reduces metabolic demands in healthy older adults (Huang and Ahmed, 2014).
Frailty is the most challenging manifestation of population ageing (Clegg et al., 2013), and this in turn is challenging for provision of services to this group. The finding of this study is that patients with frailty are less motivated to engage with physiotherapy and this influenced the mode of physiotherapy intervention. Proportionally more time was spent in discourse between the physiotherapist and the patient than in physical activity, as the physiotherapists sought to motivate and engage the patients in activity. This is proposed to explain the lack of association between physiotherapy intervention measures and change in patient health status measures in frail patients. However, frailty is complicated and multi-factorial hence fatigue might only be one factor in frail patients’ motivation to engage with physiotherapy or physical activity. Moreover, the number of patients in the non-frail subgroup was small, which might have influenced study findings.

### 6.2.2 Trust relationships with physiotherapists are affected by cognitive impairment

The current study identified trust as mechanism for patient engagement with physiotherapy (section 6.1.2). The presence of cognitive impairment influenced the trust relationship with physiotherapists constraining the mode of physiotherapy intervention to impact on health status outcomes.

Patients with cognitive impairment accounted for 57.3% (n=43) of the sample in this study and on subgroup analysis there were differences between this group and unimpaired patients with respect to associations between measures of physiotherapy and health status outcomes. There were no or minimal associations observed in patients with cognitive impairment, compared with moderate to large associations observed in the unimpaired cohort. The narrative of patients and staff suggest that one difference between the patient subgroups was the trust relationship developed between the therapist and the patient. More specifically that patients with cognitive impairment were less trusting of the physiotherapists and this affected their engagement with the physiotherapist and physiotherapy.
It is critical to understand the effects of rehabilitation on patient with cognitive impairment since they represent a significant and increasing proportion of the population of older adults that are hospitalised (Oliver, Foot and Humphries, 2014). Understanding why and how physiotherapy might work for this cohort of the population is important as evidence, from this study and others, suggests these patients have worse outcomes following acute hospital admission than cognitively unimpaired patients (Connolly and O'Shea, 2013). However, to date cognitively impaired patients as a group, are more likely to be excluded than included in studies, as the literature review confirmed. This cohort of patients is therefore under-represented in studies of rehabilitation in the acute setting to date. Current opinion regarding the effect of cognitive impairment on outcomes with rehabilitation is divided as a result of the conflicting outcomes of studies in this area (Poynter et al., 2011). Cognitive ability has been described as a predictive factor for ineffective rehabilitation (Denkinger et al., 2010) yet conversely, and contrary to the findings of the current study, exercise has been shown to benefit those with cognitive impairment (Johnson, Whitlatch and Menne, 2013, Pomeroy et al., 2001) regardless of severity of the impairment (Poynter et al., 2011).

Evidence exists that patients with cognitive impairment can make gains in functional health status (Pomeroy et al., 2001, Poynter et al., 2011) but study settings are non-comparable to the current site with respect to LOS and length of time spent in rehabilitation. The sample in the current study had a median LOS of 14 days (9-26 days) as opposed to the 6-weeks LOS reported in both studies (Pomeroy et al., 2001, Poynter et al., 2011). Trust has been reported to develop over repeated engagements in order to allow for communication between actors to enable them to get to know each other (Gilson, 2006). I would suggest that this requires memory of the interaction from one interaction to the next, and might be one reason why a trusting relationship is difficult to attain in patients with cognitive impairment. Another explanation for positive study findings regarding rehabilitation interventions in patients with cognitive impairments (Poynter et al., 2011, Pomeroy, 1993) could be that engagement of patients with rehabilitation professionals took longer as a result of the impact of cognition on
trust relationships but did develop over time and influenced improvement in health status measures. Thus, it is proposed that trust relationships can develop between physiotherapists and cognitively impaired patients but that this relationship takes longer to develop than with unimpaired patients. The current frequency of physiotherapy intervention, one intervention every two to three days together with the short LOS is likely to incompatible with the development of such a relationship. As well as developing a trust relationship it is known that patients with cognitive impairment have a diminished capacity for communication, which might also have affected their ability to engage with physiotherapy (Bridges and Wilkinson, 2011).

In physiotherapy clinical practice, developing trust and respecting a patient’s autonomy are complex processes (Cooper et al., 2013b) and the current study findings suggest that this could be particularly true for patients with cognitive impairment. Engagement has been highlighted as an important factor in patients with dementia undertaking physical activity (Teri, Logsdon and McCurry, 2008) although the trust relationship has not been specifically investigated. Thus, the a priori hypothesis was confirmed with regards to mechanism but not with regards to outcome. I hypothesised that patients with cognitive impairment would be less engaged with physiotherapy and therefore receive less physiotherapy intervention. Here cognitively impaired and unimpaired patients received similar amounts of physiotherapy intervention in terms of amount and frequency. However, findings suggest a difference in the association of physiotherapy intervention with positive patient outcomes since these were only present for unimpaired patients. The finding of this study is that patients with cognitive impairment take longer to develop a trust relationship with physiotherapists, this affects patient engagement, which like patients with frailty, influences the mode of physiotherapy intervention such that more of the physiotherapy session is spent talking rather than undertaking physical activity.
6.2.3 Identifying patient engagement with physiotherapy

Patients with frailty and cognitive impairment did not demonstrate the strength of association between physiotherapy intervention metrics and improvement in health status measures that the unimpaired subgroups showed. Patient engagement is a factor in these findings and patient motivation and trust emerged as patient choices affected by the patient characteristics of frailty and cognitive impairment respectively. The motivation of frail patients and the trust of cognitively impaired patients to engage with physiotherapy required the physiotherapists to spend more time encouraging the patient to participate. Thus, although patients with frailty and cognitive impairment received a similar amount and frequency of physiotherapy, the proportion of the physiotherapy session spent undertaking physical activity was less in the impaired groups.

In this study the presence of frailty or cognitive impairment influenced engagement with physiotherapists and physiotherapy to affect the mode of the physiotherapy session. The physiotherapists spent proportionally more time in discourse with the patient utilising engagement strategies, for example motivational interviewing (Miller, 1996) rather than a physical activity intervention such as exercise or walking practice. Capturing scheduled therapy time only, as in this study, has previously been reported to overestimate actual active time during sessions (Lenze et al., 2012). This is proposed as a theoretical explanation for the lack of associations between physiotherapy and change in health status measures observed in this study since measures were selected for their sensitivity to physical activity intervention. Content of the physiotherapy sessions in terms of mode of interventions was not captured in the current study but is important and deserves further unpacking.

Theories of behaviour change including social cognitive theory (Bandura, 1977), self-regulatory theory (Rasmussen et al., 2006) and self-determination theory (Kirkland et al., 2011) have been suggested to have importance in older adults engagement in rehabilitation.
Although they are distinct behavioural change theories there are commonalities, for example a patient’s ability to undertake a task is reported to improve engagement; self-determination theory would refer to this as competence (Kirkland et al., 2011) and self-efficacy theory within social cognitive theory would refer to this as mastery (Resnick, 2002). However, most behavioural change theories focus on one behaviour at a time (Hibbard and Mahoney, 2010) and hence these theoretical models have been criticised as having a somewhat linear approach (Resnick, 2002). The work presented here represents the reality of providing physiotherapy service in an acute setting and suggests a more pragmatic approach to identifying patients’ engagement with physiotherapy is required. Focusing on individual behavioural theories might not provide the best solution for service and patients’ needs. Current trust LOS requires physiotherapists to positively influence patients, to achieve best effect with physiotherapy interventions, in a short time period.

It is clear that patient activation is a related but more generalised concept than constructs such as self-efficacy, self-regulation and readiness to change, but captures elements of each (Hibbard and Gilburt, 2014) and is therefore, potentially more applicable in the acute setting. Patient activation refers to the degree an individual understands that they must play an active role in managing their health and crucially, the extent to which they feel able to fulfil that role (Hibbard and Mahoney, 2010). Patient activation is a measure of patient engagement and is further defined as an individual’s knowledge, skill and confidence for managing their health and health care (Hibbard et al., 2005). An individual patient’s activation level is determined by the Patient Activation Measure (PAM), a combined score of between 0 and 100 determined from patient responses to a series of statements about beliefs, confidence and self-assessed knowledge, which can then be subdivided into four levels of activation (Table 28) (Hibbard and Gilburt, 2014).
Table 28: Levels of patient activation

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1</td>
<td>Individuals tend to be passive and feel overwhelmed by managing their own health. They may not understand their role in the care process</td>
</tr>
<tr>
<td>Level 2</td>
<td>Individuals may lack the knowledge and confidence to manage their health</td>
</tr>
<tr>
<td>Level 3</td>
<td>Individuals appear to be taking action but may still lack the confidence and skill to support their behaviours</td>
</tr>
<tr>
<td>Level 4</td>
<td>Individuals have adopted many of the behaviours needed to support their health but may not be able to maintain them in the face of life stressor</td>
</tr>
</tbody>
</table>

Patient activation might have utility in an acute setting. The measure has been shown to be highly relevant to outcomes in people with mental health disorders (Green et al., 2010) making it appropriate for an acute setting with a high proportion of patients with dementia and delirium. Patients with higher activation have lower rates of hospitalisation and A&E attendances after controlling for disease severity and demographics (Begum et al., 2011, Greene and Hibbard, 2012), which may be important for vulnerable populations, such as patients with frailty or cognitive impairment, for whom the very act of hospitalisation has health consequences (Clegg et al., 2013, Connolly and O'Shea, 2013). Patients with low activation scores are more likely to be readmitted within 30 days of hospital discharge (Mitchell et al., 2014); in the current study 20% patients fell into this category. This is a key priority for acute organisations as a consequence of financial penalties associated with this performance indicator. Crucially, patient activation levels can change and are positively influenced by interventions (Hibbard and Gilburt, 2014), which provide opportunity for targeting interventions. Hospitals in North America are already using PAM to tailor the type and amount of support they provide to patients during their hospitalisation and in the post discharge period (Mitchell et al., 2014) and this may be viable in the UK.

Patient activation may be feasible to use in the acute setting but it is a relatively new concept in the UK and to date most studies have been conducted in the outpatient or community setting. With the priority for reducing impact of transitions of care between providers (secondary, primary and community), a measure that could follow the patient, with the
potential for monitoring individuals and enabling targeting of resource is attractive for the hypothesised impact on efficiency and efficacy of interventions. It would also provide a clinically based tool to assist physiotherapists with prioritisation of frequency of patient intervention and would be interesting to test further.

This study highlighted that patients with frailty or cognitive impairment had reduced engagement levels with physiotherapy resultant in minimal change in health status outcomes with physiotherapy. This highlights the importance and influence of regular contact with a physiotherapist whilst in hospital, something not supported in the current model of physiotherapy service provision. The current frequency of physiotherapy intervention at the study site may in fact be a contributory factor in the time taken to engage patients with physiotherapy at each session. The physiotherapy service model at the study site should be designed to enable physiotherapists to identify whether patients are more or less engaged with physiotherapy and rehabilitation and this should determine the frequency of intervention to these patients. A further level of explanation was revealed to be the impact of the engagement of the patient on the mode of the physiotherapy session in terms of proportions of discourse as opposed to physical activity interventions. This data were not collected as part of this study and would warrant further exploration.

6.3 Interprofessional working for rehabilitation

The priority status of rehabilitation activities on the ward and interprofessional working relationships within the clinical setting triggered reactions in both physiotherapists and patients. The relationship and influence of the physiotherapist within the medically led MDT affected the prioritisation of physiotherapy intervention to patients. The attention given by the MDT to rehabilitation activities in light of competing demands on their time and ward culture impacted on patients with regard to undertaking activity.
Rehabilitation of functional ability requires more than therapist intervention and represents both a philosophy and process, which requires the shared commitment and inter-professionalism of the MDT (Kneafsey, Clifford and Greenfield, 2013). Inter-professionalism, the process by which professionals from different disciplines collaborate is thus essential for an integrated and cohesive approach to rehabilitation (D'Amour and Oandasan, 2005). In this study interprofessional working influenced patient rehabilitation in two ways; the influence of the MDT and in particular the medical consultant on the physiotherapists decision-making and secondly the attention paid by the MDT, in particular the nursing staff, to rehabilitation activities such as mobility.

6.3.1 Influence on physiotherapist prioritisation

Physiotherapists prioritised interventions as a result of staffing availability (section 6.1.1). Although physiotherapists identified themselves as part of the MDT, the medical professionals within the MDT influenced the criteria physiotherapists used for prioritisation, both whether a patient received physiotherapy and also the content of the physiotherapy session. Thus, assessment and re-assessment interventions were prioritised over physical activity intervention in order to have up-to-date information for the members of the MDT, particularly the Consultant medical staff. Assessment and re-assessment are the series of subjective questions and objective measures of the patient designed to gather information regarding physical ability (CSP, 2012). Physiotherapists desired to be seen as credible to the medically led MDT and perceived that having up-to-date information about patient function was important to enable the Consultant to make decisions about appropriate discharge destination and support service requirements (section 5.2.2.1). Physiotherapists also reported that MDT decisions made at MDM meetings regarding patients’ discharge dates influenced them with regards to patients’ priority to receive physiotherapy intervention at all. These aspects of physiotherapists working within the MDT have not to the author’s knowledge been reported in the literature related to physiotherapy. Physiotherapists also
perceived a mismatch between physiotherapist preference to continue rehabilitation and medical decisions to discharge patients.

Professions and professionalism and their role in service delivery have existed since the inception of the NHS in 1948, if not before, and these elements persist (Baxter and Brumfitt, 2008). The term profession in healthcare has traditionally meant that members have a high degree of expertise, professional knowledge and standards, autonomy and dominance over other groups (Legare, et al., 2011, Southon and Braithwaite, 1998) Successful interprofessional working requires that professional knowledge is shared to create not just shared knowledge but shared understanding (Jeffery, Maes and Bratton-Jeffery, 2005) and thus to achieve productive communication, professionals must be familiar with each other's expertise, roles and responsibilities and put aside their inclination towards their own profession and find common interprofessional territory (D'Amour and Oandasan, 2005, Legare et al., 2011). Also know as the blurring of professional boundaries, this has been an aspiration since the NHS Plan (GB. DH, 2000). However, the professional differences identified in this study have also been reported elsewhere in the UK, providing little evidence of role boundary blurring but instead the continuation of role specificity (Baxter and Brumfitt, 2015) and furthermore distinctions drawn, as in the current study, between medical versus rehabilitative priorities (Baxter and Brumfitt, 2015). The macro level individual professional bodies arrangement perpetuates professional specificity through championing elements such as values, rules and culture influencing professionals and professional working relationships and thus the success of interprofessional working (Legare, et al., 2011).

As the most established and dominant of the healthcare professions (Crinson, 2009), the medical Consultant assumes the role of decision-maker (Baxter and Brumfitt, 2015). At the study site pressure to discharge patients is ever-present for all team members but patients' length of stay is published monthly against named medical Consultants. The MDT on the
older person's unit comprises representation from nursing, physiotherapy, occupational therapy, pharmacy and social work but is ultimately led by the medical profession. Medical colleagues might value acute rehabilitation, although this was not investigated in this study, but their day-to-day priorities for the MDT are probably aligned instead with medical-stabilisation and safe repatriation of their patients beyond the acute trust environment and to minimise hospital length of stay (LOS) (Wissendorff Ekdahl et al., 2012).

In this case physiotherapists wanted to be credible to their medical colleagues resultant in use of physiotherapy time to assess and re-assess patients. The high number of physiotherapists in-training on the Older Persons’ Unit (OPU) may provide explanation for study findings. Data showed that nearly all patients, (96%) in the study sample, received the majority of their interventions from physiotherapy staff graded at bands 3 - 6. Physiotherapy staff in-training rotate on and off the unit at 18-week or 6-month intervals dependent on grade and this might affect their level of speciality knowledge and skill, the opportunity to form inter-professional relationships with the MDT and their own feelings of credibility and perceived credibility by other professions. The current physiotherapy algorithm (appendix 2) directs intervention following assessment but cannot assist physiotherapist decision regarding whether re-assessment is required. It is not clear from this study whether the seniority of physiotherapy staff available for direct decision-making differentiated the decisions made both in terms of prioritisation of intervention and need to undertake regular re-assessment. Given the small numbers of senior staff in the physiotherapy team (n=1.5), they might not have been involved in direct decision-making, despite their purpose to influence decisions as permanent senior members of staff via their training and supervisory roles, although this was not highlighted in the focus group. Consequently, lack of experience and confidence of the physiotherapists might have affected the appropriateness of decision-making with regards to assessment and re-assessment.
Expert practice in physiotherapy has been proposed to involve a combination of knowledge, clinical reasoning, movement and virtues (Jensen et al., 2000), whilst expert practice when compared to novice has been shown to be separated by the ability to use time, develop frameworks, communicate, teach, and predict clinical outcomes (Jensen et al., 1992, Jensen et al., 2000). Physiotherapist personal beliefs and emotions also shape their attitudes and behaviours (Barron, Klaber Moffatt and Potter, 2007, Langridge, Rogers and Pope, 2015) and are relevant and important to consider in terms of how they impact upon the decision-making process. The decisions made regarding prioritisation of intervention and content of the intervention may be affected by the relatively junior skill mix of the physiotherapy team, who may be more susceptible to the influence and attitudes of medical Consultants. However, the influence of the MDT on decision-making of expert and novice physiotherapists and the implications for clinical practice has not been investigated in physiotherapists and would warrant further investigation as part of studying the beliefs and attitudes of healthcare professionals to rehabilitation.

6.3.2 Staff attention to patient activity

The lack of interprofessional support for rehabilitation activities outside of physiotherapy sessions was also highlighted in the study. The priority placed on rehabilitation activities on the ward and nursing staff attention to patient activity contributed to patient activity levels when physiotherapists were not present. Patients reported that they were not encouraged to mobilise by the nursing staff and there was a perception from physiotherapy staff and patients that lack of activity outside of physiotherapy sessions led to functional regression particularly over the weekend. Patients with frailty and cognitive impairment are particularly vulnerable to in-hospital deteriorations in physical function (Burrman et al., 2012) and these populations often require help with mobility and other functional tasks (Beveridge et al., 2015, Kneafsey, Clifford and Greenhill, 2013). Although patient activity levels were not directly observed, patients with cognitive impairment and frailty had few associations between physiotherapy and change in health status outcomes indicating a lack of positive effect of
physiotherapy. The lack of practice of rehabilitation activities to consolidate gains with physiotherapy may provide additional explanation of these outcomes.

Increasing physical activity has been shown to be safe (Said et al., 2012) and has the potential to improve patient functional and mobility outcomes as a result of the effect of practice on psychological and physiological factors (Wade, 2011). Yet there are no national standards for physical function or physical activity, although recent national guidance suggests that mobility should be promoted (GB. DH, 2014, Oliver, Foot and Humphries, 2014). This macro level lack of priority for rehabilitation activities may explain why observational studies have demonstrated that low activity levels are endemic, globally, in hospitalised older adults (Brown et al., 2009, Cattanach et al., 2014, Edmonds and Smith, 2014, Fisher et al., 2011b). Nursing staff have been proposed as the primary health care professional responsible for promoting independence in ADL and functional mobility in older adults (Resnick, 2004). Studies of nursing interventions to support mobility to date have reported positive outcomes using the implementation of progressive mobility protocols and care plans (Padula, Hughes and Baumhover, 2009), assisted function-focused interventions (Resnick et al., 2011) strength and balance exercises (de Morton et al., 2007, Mudge et al., 2008, Mangione, Miller and Naughton, 2010) and structured walking programmes (Dakin et al., 2010). However, whilst the 24-hours a day, 7-days a week, presence of the nursing team would appear to be advantageous to the rehabilitation of patients, the findings in this study and others is that in reality nursing teams may be marginal to the rehabilitation process (Kearney and Lever, 2010, Kneafsey, Clifford and Greenhill, 2013).

There may be significant barriers, which prevent nurses from promoting hospitalised patients’ mobility (Boltz, Capezuti and Shabbat, 2011) such as lack of time (Kneafsey, Clifford and Greenhill, 2013), inadequate staffing (Clarke, 2014), skills (Brown et al., 2007, Gillies, MacDonald, and Maclsaac, 2008) and interdisciplinary collaboration (King 2012). Nurses
have been reported to prioritise technical care, monitoring and direct care over rehabilitation techniques for two reasons, related to time and risk (Clarke, 2014). Rehabilitative techniques take longer and the technical care activities are perceived as essential to maintain patient safety (Clarke, 2014). Thus, patients may not be encouraged to mobilise by nursing staff because of a need to prioritise other aspects of care to prevent harm, such as giving of medications (Boltz, Capezuti and Shabbat, 2011), pressure area care (Kneafsey, Clifford and Greenhill, 2013), a fear of not meeting organizational priorities such as minimising patient falls (Boltz, Capezuti and Shabbat, 2011, Brown et al., 2007,) or nursing staff fear of themselves sustaining musculoskeletal injury (Kneasfey, Clifford and Greenfield, 2014). A risk averse approach to falls prevention can lead to loss of patient autonomy and physical activity (Oliver 2007) whereas promotion of physical function has been shown to reduce falls (Schoenfelder and Rubenstein, 2004).

All healthcare workers should be encouraged to balance risk assessment and management with patients’ needs for movement and mobility to prevent functional abilities from being lost (Kneafsey, Clifford and Greenhill, 2014). A change to the workplace culture at the study site with regards to the balance of rehabilitation activities and other essential healthcare activities is required.

6.3.3 Creating a rehabilitative workplace culture

Creating and sustaining a rehabilitative workplace culture, with shared values and regard of rehabilitation as a collective enterprise is important (Clarke, 2014) and requires organisational commitment (Boltz, Capezuti and Shabbat, 2011) so that all staff feel that they have the authority to make decisions about patient activity. Challenges are reported as differences in how nurses and therapists understand and provide rehabilitation together with contextual constraints of separate leadership, management and working patterns (Clark,
2014) and the perception of physiotherapists as experts (Boltz, Capezuti and Shabbat, 2011, Kneafsey, Clifford and Greenhill, 2013). Interprofessional working requires that a competitive approach is relinquished for one of collaboration between healthcare professionals (D’Amour and Oandasan, 2005). With the recent proposal to differentiate generalist and specialist skills for medical, nursing and AHP roles (Royal College of Physicians, 2014), there is an urgent need to define what these terms mean in order to clarify roles with regard to rehabilitative activities (Legare, et al., 2011). Clarification of roles and joined up education in rehabilitation that does not perpetuate the professional divide into expert therapists and inexpert nurses (Clarke, 2014) would be enablers for interprofessional working to the rehabilitation benefit of patients.

Increasing physical activity is a safe, simple, non-invasive intervention with the potential to improve mobility outcomes (Said et al., 2012) regardless of whether the activity is self-directed by the patient or supported by staff. An increased focus on physical activity whilst in hospital is required to encourage patients to actively preserve function and independence. Moreover, this should be targeted to those especially vulnerable to inactivity with lower levels of physical activity, poor physical fitness and multiple co-morbidities (Brovold et al., 2014) such as patients with frailty or cognitive impairment (Beverdige et al., 2015). However, the current study suggests that firstly the priority of rehabilitation within the interprofessional team must be addressed. Given the well-established knowledge regarding lack of activity in hospitalised older adults (Brown et al., 2009, Fisher et al., 2011b) and the importance of practice to consolidate functional gains made with physiotherapy (King et al., 2013) further study investigating this area may be beneficial as well as the more practical considerations such the availability of nursing, physiotherapy and other staff (Boltz et al., 2014, Brown et al., 2011, So and Pierluissi, 2012).
There is little collaborative research in this area and further investigation is required to understand staff attitudes and beliefs regarding rehabilitation in the local context, as a basis for implementation strategies (Brown et al., 2009). It may be that no radical change is necessary and that clarification to reinforce patient activity as a priority for all staff is all that is required. Conversely other factors, such as competing priorities and staffing levels, may mean alternative strategies are necessary. Formal structured sessions of activity to increase patient activity on the ward outside of physiotherapy sessions, consideration of alternative personnel to support activity, such as volunteers or carers or a need to re-conceptualise hospital-induced mobility from a patient safety standpoint as a means of preventing patient harm (Kneafsey, Clifford and Greenhill, 2014) are potential options but these require further investigation inclusive of all staff and patients.

6.4 Summary

In this study, the consequences of organisational commitment to physiotherapy service provision, patient presentation and interprofessional working for rehabilitation on specific actions employed by the physiotherapists, nurses and patients have materialised. The potential for these factors to trigger change in the dose of physiotherapy and independent patient activity and thereby contribute to changes in patient health status during hospital admission have been revealed. The use of RE in this study has resulted in the emergence of important elements about context and stakeholder actions, which all contribute to the impact of physiotherapy on medically unwell older adults admitted to hospital. Thus, the use of this methodology has proved valuable in understanding the influence of context on both physiotherapist and patient choices and effects of these interactions on outcomes.

6.5 Realistic evaluation is a valuable methodology

Realistic evaluation is a nascent but emerging methodology in health services research (Burton et al., 2014), especially for investigating clinical interventions (Marchal et al., 2012),
and to date has not been used in the study of physiotherapy. Realistic evaluation is a theory-based methodology and therefore is an appropriate methodology to support the current ambition with physiotherapy and rehabilitation (Whyte, 2008). RE seeks to build an explanatory model to illuminate why and how an intervention works (Pawson, 2013). In the current study RE has proven well suited to investigating the complexity of physiotherapy and has produced rich findings (Noyes et al., 2013) to enable propositions in terms of what works for stakeholders, how and in what circumstances. In the current study the key stakeholders were patients and staff, thus crucially, the methodology is both patient-centred (NHS England, 2013a) and staff-engaged (Ham, 2014). These are both key drivers for health service provision in the current climate and ultimately for efficacious healthcare interventions. Outcomes of this RE have highlighted potential benefits for stakeholders and the organisation since understanding why physiotherapy works or doesn’t work for patients offers the potential to appropriately target physiotherapy interventions (Pawson and Manzano-Santaella, 2012).

The starting point for this study was the development of theories about the impact of physiotherapy on medically unwell older adults, to allow testing. Theory is important. Theories allow for the formation of hypotheses, predictions about the implications of a particular theory in phenomena of interest (Whyte, 2008) that allows for testing and refinement of the theory and so clinically allows for modifications of treatment interventions (Whyte, 2014). Thus, theory is both derived from observations and informs further understanding of what is observed (Frank, 2013). Theory is vital to physiotherapy in terms of intervention effectiveness, patient safety, models of service provision and resource allocation to both research and service and has become prominent in physiotherapy and rehabilitation over the past decade (Whyte, 2008). Despite this the literature review highlighted a paucity of theory in studies to date, limiting translation to local clinical practice. The findings of this study suggest that current physiotherapy practice is not targeted in a theoretical way, which may not optimise patient outcomes.
The findings of this study therefore, contribute to the underpinning theory of physiotherapy, but not unexpectedly, given the acknowledged complexity of both intervention and system (section 3.2), the original theories require modification in order to formulate better specified context-mechanism-outcome (CMO) configurations (Pawson and Tilley, 1997). The new theories can contribute to the development of middle range theories regarding physiotherapy to acutely unwell older adults. Middle range theories are theories that are general enough to be applied across a number of cases and to therefore enable development of a generation of new hypotheses to be developed for testing (Wong et al., 2013b). This is valuable since although physiotherapy interventions are, and should be, individualised to the patient, identified commonalities in terms of outcome patterns of subgroups of patients enable service models to be more responsive. The RE methodology has allowed the emergence of the influence of service, interprofessional and patient factors on staff and patient reactions related to outcomes and the conclusion that the physiotherapy model of service provision needs to be more responsive to patient and organisational requirements than it is currently. The value of RE in the current study is the explanatory depth of what works for whom, how and in what circumstances to inform the local physiotherapy service model.

As a theory based evaluation methodology in which derivation of theories is compulsory, the use of RE in the current study is complimentary to the vision, within physiotherapy and rehabilitation, of a theoretical basis (Dijkers et al., 2014, Whyte 2008, Whyte et al., 2014). There is other recent work in theory development in physiotherapy; a theory-driven classification of rehabilitation treatments (RTT) (Hart et al., 2014). The theory in this model is developed utilising tripartite analysis; the object of the treatment (target), the ingredients of the intervention and the mechanisms of action. There are similarities between RE and RTT. Firstly, both highlight the crucial nature of mechanism of action and suggest that a similar emphasis on the importance of theory has emerged in the rehabilitation literature (Whyte, 2008). Secondly, both ascribe to a stratification of reality (Whyte, 2014). Finally, both have roots in the development of programme theory in the programme evaluation field and support
the idea of cumulation in order to understand unifying principles of treatment efficacy, rather than individual studies that result in knowledge one treatment at a time (Dijkers et al., 2014). However, the RTT model is still currently in development and consequently, by the authors’ admission, is not practically useful at this time (Whyte et al., 2014). My study has shown that RE, developed for evaluation in the world of social programmes, is a practically useful methodology to evaluate physiotherapy interventions.

Realistic evaluation moves the evaluation process away from one off studies and linearity, with the associated limitations of generalisability, and actively encourages investigators to use the results of one study in conjunction with results of other studies, which may or may not be RE studies. This is referred to as cumulation and is a matter of increasing understanding of how the results of all forms of research in the intervention of interest are woven into the production of further theories for testing (Pawson, 2013). For example, evidence of cumulation is provided by Pawson himself in the development of an abstract model of a pathway of behavioural change from an array of literature investigating the impact of social programmes.(Pawson, 2013). He then went further in the cumulation journey and “re-used the platform” (page131) within healthcare, specifically in the domain of clinical interventions. In the current study I have re-used part of the platform specifically in the investigation of physiotherapy interventions to hospitalised older medical patients. In turn, the current study findings can contribute to the cumulation of the impact of physiotherapy intervention to medically unwell older adults,

“......in order to deepen, specify, focus or formalise the understanding of, mechanisms and outcome patterns”

(Pawson, 2013 page 116)

Whilst not perpetuating the Cartesian divide between head and body there is a dualism to be recognised regarding the impact of physiotherapy and healthcare interventions; that of the
psychological and physiological mechanisms that impact on patient health status outcomes. Realistic evaluation allows theory development in the psychological domain only but there are other proponents of theory development within rehabilitation that propose to address physiological mechanisms (Whyte et al., 2014). Only time will tell if it is possible to have a unifying theory of physiotherapy or rehabilitation or whether there is a need for a plurality of theory development and evaluation methodologies. In the meantime RE has proved a valuable methodology in contributing to the understanding why physiotherapy might impact on older adults admitted to hospital. The new theories proposed require further refinement, testing across different locations and cumulation with data from other investigations.

6.6 Summary

Two decades ago it was suggested that acute care physiotherapists were experiencing dramatic changes in the financing of health and population demographics (Curtis and Martin, 1993). In the current healthcare environment clinical managers continue to experience challenges to the resourcing of services and an ever-ageing population. Physiotherapists need a way of targeting physiotherapy resources that is clinically efficacious since improved functional outcomes for patients in terms of mobility and self-care ability are associated with increased independence and a greater probability of living in the community (Stretton et al., 2006). To achieve this ambition it is vital that physiotherapists know what works for whom and critically how and in what circumstances, in terms of their interventions to any given population. RE is a nascent methodology for examining clinical interventions (Marchal et al., 2012) and to date has not been used in the study of physiotherapy interventions. In this study the use of RE has provided added value in terms of the emergence of a deeper level of explanation and understanding regarding the impact of physiotherapy on medically unwell older adults.
The theories I developed *a priori* have been confirmed, falsified or required modification based on the findings of this study. Study patients were functionally dependent and received a statistically similar amount and frequency of physiotherapy intervention; that is there was equality in access to physiotherapy. However, although the sample as a group did improve in measures of health status during the hospital stay, these improvements were not associated with time to first intervention, amount or frequency of physiotherapy interventions. On subgroup analysis however, some moderate and large, clinically meaningful associations between physiotherapy intervention metrics and change in health status outcomes were revealed in the cognitively intact and non-frail groups only. Thus, although there was equality in physiotherapy service provision to patients there appeared to be inequity in change in patient health status over the hospital stay.

The use of RE, this study has highlighted the importance of context in relation to physiotherapy interventions delivered in the ward setting. Specifically, the consequences of organisational commitment to physiotherapy service provision, interprofessional working for rehabilitation and patient presentation have been shown to change the processes by which physiotherapy intervention produces an outcome (Wong *et al.*, 2013b). Individual, interpersonal and institutional contextual factors have triggered specific reactions from physiotherapists, MDT staff and patients to contribute to outcomes observed.

Organisational commitment to physiotherapy service provision dictated the presence of the physiotherapists on the ward. This triggered reactions physiotherapists and patients identified as the mechanisms of prioritisation and trust respectively. Prioritisation determined the amount and frequency of physiotherapy intervention and in the current study this level of physiotherapy intervention was not associated with positive impact on change in health status outcomes. The presence of the physiotherapists also elicited a reaction in patients and
increased the confidence of patients to undertake activity as a result of the trust patients placed in the physiotherapists to ensure the activity was safe.

Patients’ clinical presentation in terms of presence of frailty or cognitive impairment has been shown to influence patient engagement with physiotherapy to impact on the mode of physiotherapy intervention. Physiotherapists need to identify those patients that require more frequent physiotherapy to minimise the time taken to engage with the patient and thus increase the likelihood of a positive change in health status outcomes as a result of a higher dose of physical activity. Patient activation may provide a pragmatic method for identification patients’ engagement and thus targeting intervention but it is unknown whether the tool is sensitive enough to discriminate between hospitalised patients. This would need to be tested but potentially provides a means of identifying patients requiring regular intervention and thus it could contribute valuable information to physiotherapists to inform decision-making about frequency of intervention.

An unplanned finding in the study was the influence of the interprofessional working relationships with in the MDT on the actions of physiotherapists and patients. The interpersonal relationship between the medical consultant and the physiotherapy staff has been shown to influence the prioritisation process in terms of decisions to provide intervention and content of intervention and thus influence outcomes. The nursing staff attention to patient activity emerged as a contributing factor to patient activity levels on the wards when physiotherapists were not present although observational data were not obtained to corroborate this finding. Thus, the impact of physiotherapy is also contingent on the priority of rehabilitation activities by other healthcare professionals in the ward setting. Further work is required to understand staff attitudes to rehabilitation to inform strategies to increase patient activity.
The identification of patients who will do well with rehabilitation has lacked a strong evidence base (Singh et al., 2012a) and it remains unclear to what extent rehabilitation dose or natural recovery affects changes in functional status for hospitalised patients (Mallinson et al., 2014). If physiotherapy is to produce consistent improvement in outcomes in medically unwell older adults admitted to hospital, identifying factors that predict rehabilitation success is an important focus (Denkinger et al., 2010). Within this study only one period of testing took place but nonetheless study findings contribute to both the knowledge base and further explanatory theory development in this area. The revised theories, presented as refined CMO configurations (section 5.3), now require further refinement and testing to generate better understanding of the context-mechanism-outcome relationships. Realistic evaluation may not be the only useful methodology in the study of physiotherapy interventions but the use of RE has resulted in findings that contribute to knowledge base regarding what works for whom and why with regard to physiotherapy intervention to medically unwell older adults.

“The end result will be partial knowledge about partial achievements we can make in the delivery and targeting of [...] interventions – quite an achievement.”

(Pawson, 2003 page 112)
Chapter 7 Conclusion

This chapter concludes the thesis. It presents a summary of this study into the impact of physiotherapy interventions to medically unwell adults in a large, urban NHS teaching trust. The impact in question constituted the degree to which physiotherapy was successful in producing positive effect on measures of patient health status but sought a greater depth of understanding by asking for how, for whom and in what circumstances physiotherapy was successful? Insights into the influences of individual stakeholders, interpersonal relations and institutional setting on the actions of patients and staff, to trigger outcomes were revealed by the study. The study findings are presented and the key insights offered by this work proposed. The implications of the findings for clinical practice are then discussed with recommendations for further areas of study based on the findings and the strengths and limitations of the study are considered. The chapter concludes with a summary.

The goal of any clinical service provision is to ensure that the patients receive a high quality service. Maturing public attitude means that clinical services including physiotherapy must be more responsive to patients’ needs (Rowe and Calnan, 2006). A high quality service must therefore be further defined in terms of patient outcomes, not just the volume of services delivered (Porter, 2010). However, the relationship between patient outcomes and physiotherapy intervention is not assured and is instead non-specific, routine and assumed since the evidence from studies to date provides inconsistent outcomes. The complexity of the intervention, patient cohort and healthcare environment may provide insight into this lack of clarity. The aim of the study was to investigate the impact of physiotherapy on medically unwell older adults admitted to hospital, specifically:

1. To determine whether physiotherapy works or doesn’t work for medically unwell older adults admitted to the study site in terms of a positive effect on health status and hospital outcomes:
a. Whether amount, frequency and time to first physiotherapy intervention differ between subgroups of medically unwell adults admitted to the study site?

b. Whether change in health status measures (admission and discharge) and hospital performance measures differ between subgroups of medically unwell adults admitted to the study site?

c. Whether change in health status measures (admission and discharge) and hospital LOS are associated with the amount, frequency and time to first physiotherapy interventions? In addition, whether this differs between the defined subgroups of medically unwell adults admitted to the study site?

2. To understand the patient and staff perspectives of how physiotherapy works or doesn’t work for patients, how and in what circumstances?

   a. To explore the underlying physiotherapist and patient actions that influence the effect of physiotherapy interventions in practice

   b. To understand how contextual factors combine with physiotherapist and patient actions to enable or constrain physiotherapy in achieving a positive effect on health status.

Realistic evaluation (RE) provided an appropriate methodology to answer the research questions. The study followed the RE cycle (Pawson and Tilley, 1997). Theory development informed by the literature review and researcher experience (phase 1, section 3.4) was followed by stakeholder engagement to development hypotheses for testing (phase 2, section 4.1.2). During the observation phase (phase 3, section 4.2) data related to hospital performance, physiotherapy intervention and patient health status were collected over a 2-month period and informed qualitative data collection, which occurred in the subsequent 2-month period. These latter data comprised the narrative reports of patients and physiotherapy staff captured utilising semi-structured interviews. Descriptive statistics and framework analysis were used to analysis the quantitative and qualitative data respectively.

Patients in the sample were functionally dependent and had a substantial lack of balance confidence on admission. The amount, frequency and time to first intervention were not statistically different between the defined subgroups. Changes in health status outcomes
were in general not significantly different between groups with the exception of gait velocity in the cognitively unimpaired and non-frail subgroups and dominant grip strength in the frail subgroup. Importantly, improvements in health status measures on discharge were not associated with physiotherapy intervention. Associations between physiotherapy intervention measures and health status outcomes representing a positive effect of physiotherapy were only present in the unimpaired subgroups and provided an insight into what worked and didn’t work with regards to the impact of physiotherapy intervention in the patient sample. The staff and patient perspective provided explanatory information regarding what worked, for whom, how and in what circumstance in terms of insight into the influence of context on staff and patients’ choices and behaviours to explain outcomes.

This is one of the first studies to use RE in the evaluation of physiotherapy. The use of RE has allowed specific insights, which contribute to development of theoretical explanations regarding the impact of physiotherapy in medically unwell older adults. Important elements have emerged about physiotherapy presence in the clinical setting, patient characteristics in terms of frailty and cognitive impairment and interprofessional working for rehabilitation in the acute ward setting. These individual, interpersonal and institutional contexts triggered a range of reactions in patients, physiotherapists and MDT staff to impact on patient health status outcomes at the study site. Clinicians and managers need to be aware of the contextual conditions and stakeholder actions, which are likely to influence the success or failure of physiotherapy. This includes the organisational and interprofessional commitment to physiotherapy and rehabilitation for medically unwell older adults.

### 7.1 Implications for practice

Older adults admitted to hospital have traditionally been treated as a homogenous group for service delivery (Parke and Chappell, 2010) and at the study site physiotherapy interventions are delivered commensurate with this practice. In this study the organisational commitment
to the physiotherapy service determined the physiotherapy presence on the ward and this triggered the process of prioritisation by the physiotherapists to govern physiotherapy delivery to patients. All patients received a statistically similar amount and frequency of physiotherapy intervention. The findings of this study provide evidence that patients should not be considered as a homogenous group in that their responses to physiotherapy interventions are not uniform. Thus, current physiotherapy provision is not meeting the needs of all patients. Allocation of physiotherapy services is equal to patients admitted to the Older Persons’ Unit (OPU) but has no theoretical basis; physiotherapists prioritise patients to receive intervention based on historic criteria and the need to provide up-to-date information and appear credible to the MDT, particularly the medical Consultant. The requirement to provide up to date information and appear credible to the MDT also influenced the content of the physiotherapy interventions. Specifically assessment and re-assessment were prioritised over physical interventions. Although, not established in this study, the grade mix of the team, mostly junior and unqualified staff, is proposed provide some insight into this outcome.

The current study has shown that patients differ in their engagement in physical activity, both within and outside of physiotherapy sessions, and this should be accounted for when determining physiotherapy service allocation and by the wider MDT. Results demonstrated that identified subgroups of patients present with different elements of physical and cognitive function. Despite favourable evidence that physical therapy interventions can positively impact on patients with cognitive impairment and frailty (Poynter et al., 2011, Weening-Dijksterhuis, 2011) physiotherapy did not work for these groups of patients in the context of this study. Sub-analysis indicated that patients with limited resources (cognitively impaired and frail subgroups) demonstrated sub-optimal levels of engagement with physiotherapy due to a lack of trust and motivation affecting the mode of intervention. The minimal associations found, between physiotherapy and change in health status measures for these subgroups of patients, suggests that this factor should be considered when determining physiotherapy provision. In comparison, the moderate to large associations found between physiotherapy
interventions and change in health status measures in the unimpaired subgroups, suggest that these might represent groups of patients for whom the current physiotherapy intervention is of a sufficient level to achieve positive outcomes. I conclude that the minimal associations between physiotherapy intervention and health status measures in the impaired subgroups suggest that current physiotherapy provision is not meeting patient needs. A redesign of local physiotherapy provision is indicated and offers an opportunity to evaluate change in practice for the subgroups identified.

There are still unknowns in relation to the physiological impact of exercise. Nevertheless to realise any motor improvements, thresholds of physical activity have to be breached. Minimum thresholds are as yet unknown, as is the magnitude of dose of exercise required to affect physical or bio-psychosocial changes. It is nonetheless logical that in order to achieve potential benefits, practice of physical activity is desirable. This requires not only the engagement of the patient in both physiotherapy and in physical activity in the ward environment but also concurrently, the attention of the wider MDT to patient activity. The priority of rehabilitation activities and in particular patient activity on the ward requires the engagement and attention of all healthcare staff, not just physiotherapists in order to achieve health status gains for patients.

7.1.1 Recommendations for clinical practice

There is a potential tension in making recommendations for local change in clinical practice and recommending areas for further research. For research studies to be robustly designed, executed and analysed takes time whilst the need to provide best clinical practice is an immediate concern to clinicians. Although cumulation is an aspiration of RE (Pawson, 2013), one of the advantages of RE is that it is undertaken in the naturalistic clinical setting and findings are thus immediately relevant to the local context. It is therefore appropriate to
propose recommendations for clinical practice at the study site as a result of the current study findings in addition to proposing areas for further study.

Population risk stratification is a supported strategy in delivery of services ranging from health promotion, to shared care, to disease specific management (Goodwin et al., 2010, Roland and Abel, 2012). A recent King’s Fund report suggested that risk stratification systems should exist for identifying and targeting evidence-based care for older adults (Oliver, Foot and Humphries, 2014). Stratification represents a pragmatic, needs-based approach with the aim of providing the best care with limited resources by appropriately targeting interventions. Currently there is no clinical needs-based targeting with respect to physiotherapy provision to medically unwell older adults at the study site. However, stratification of patients or targeting of clinical intervention raises ethical issues of rationing interventions. The physiotherapists' narrative provided insight into staff aspirations to provide physiotherapy on a daily basis. Yet there is currently no evidence regarding the appropriate dose of physical activity to medically unwell older adults. It is therefore likely that this staff perspective is founded on a mythical service ideal, that physiotherapy is good for the health of patients, rather than an evidence-based one (Banks and Gallagher, 2009) and provides at least an equal ethical dilemma. The findings of this study, that the current service provision is equal across patients regardless of patient presentation, are open to ethical debate of inequity given the concurrent findings of influence of patient presentation in terms of frailty or cognitive impairment on health status changes during hospital stay. Offering consistent, needs-based targeting of physiotherapy resources allows for an outcome driven, more equitable service but is not what is currently being provided locally. The study findings provide a basis with which to change the local physiotherapy service. One goal is for physiotherapists to include an element of their assessment of patients that allows targeting of interventions. In the short term this could be identifying frail and cognitively impaired patients but in the longer term this might involve use of patient activation, or other clinical identifiers.
The importance of patient confidence to undertake physical activity on the ward was highlighted during the study. The devastatingly low amount of patient activity, in particular walking, in the acute hospital setting is well documented in the literature (Brown et al., 2007, Fisher et al., 2011b). In the acute hospital setting this is perhaps reflective of the priority of the MDT on medical management rather than rehabilitation and the potential increased risk of falls and the subsequent adverse health consequences in this patient population. Therefore, an attempt to change this in culture requires engagement with the MDT regarding increasing the priority of rehabilitation activities for patients including physical activity on the ward. This might include environmental enhancement, providing the opportunities for purposeful activity for example as walking to a specific environment for meals and the use of non-professional personnel such as volunteers or carers.

The qualitative study findings suggest that physiotherapists spend a large proportion of their time assessing and re-assessing patients rather than supervising physical activity. This may be a consequence of the relative junior and transient nature of the team as well as the medical-focus of the decision-making related to the patient pathway. This does not reflect the wider rehabilitation context and requires further enquiry with the staff and potentially further education and supervision. It may also be opportune to discuss with the medical team regarding their information requirements for MDT meetings. It could be unrealistic to expect staff in training to have the knowledge and experience to synthesise the plurality of information related to a complex patient cohort and to appropriately communicate this to the wider MDT. There might be alternative, more effective models of using the limited senior staff resource such as the medical consultant model.

7.2 Implications for further research

It is acknowledged that the findings of any RE result in partial knowledge (Pawson, 2013), as is often the outcome of evaluations in the clinical setting (Rycroft-Malone, 2012) and thus my
study findings raise questions for further study based on the revised theories. It has been identified throughout this thesis that the dose of physiotherapy required to manifest physiological and psychological changes in medically unwell older adults is unknown but is affected service provision elements (amount and frequency) and content elements (mode and intensity). The provision of a 7-day physiotherapy service to the wards would increase the presence of physiotherapists but the added value of such services remains unproven. The resourcing of such a project may make it prohibitive in the short term and it may be more appropriate to investigate this as part of 7-day services for all support services. Physiotherapists identified that the content of the physiotherapy sessions in terms of physical and non-physical activities varied with patient presentations of frailty and cognitive impairment. This has not previously been tested. It is conceivable it might have relevance to change in patient health status measures and would be valuable information, which might have utility to inform the dosing of physiotherapy.

Patient activation provides a useful tool for targeting interventions and has not been investigated in the acute setting. A supposition is that the four patient activation levels might be too broad to allow differentiation between medically unwell older patients with the result that the majority of patients will be classified within one level (level 1). However, this is speculative and requires testing with the aim of differentiating between patients to enable targeting of specific interventions, including physiotherapy, in the acute setting.

There has been much debate about patient activity whilst in hospital (Brown et al., 2009, Fisher et al., 2011b). The literature review highlighted barriers and motivators to undertaking exercise, mobility and rehabilitation whilst in hospital (Atwal et al., 2007, Brown et al., 2007, So and Pierluissi, 2012). These studies have treated hospitalised older adults as a homogenous group. However, investigating how activity is influenced by patient characteristics, such as the presence or absence of cognitive impairment, in the acute setting
is now indicated. Additionally, factors that limit activity have been reported, however it is unknown what factors positively effect patient activity levels in an acute ward setting and factors such as opportunities for purposeful activity or environmental enhancement warrant further investigation. Finally, patients reported that they were not encouraged to mobilise on the ward when the physiotherapists were not present. Investigating the attitudes and beliefs to members of the MDT might provide additional understanding of the low activity levels on the OPU and signpost areas for change.

7.3 Summary of recommendations for practice and research

The study findings contribute to the knowledge regarding the impact of physiotherapy in medically unwell older adults admitted to hospital. The preceding sections have described implications for practice and suggestions for changing practice in addition to describing possible future research studies based on the proposed middle range theories, and summarised in Table 29 and Table 30.
### Table 29: Recommendations for clinical practice

<table>
<thead>
<tr>
<th>Issue</th>
<th>Recommendation</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physiotherapy provision is not theoretically targeted on the older persons unit</td>
<td>An adjustment in terms of physiotherapist prioritisation. Patients’ requirements in terms of regularity of physiotherapy intervention should be identified and incorporated into the prioritisation process</td>
<td>Identify a suitable tool to assess patient engagement. Target physiotherapy frequency based on engagement. Monitor patient health status outcomes</td>
</tr>
<tr>
<td>Physiotherapists spend a significant amount of time assessing and re-assessing patients rather than engaging in physical activity</td>
<td>Clarification and MDT agreement of the objective of patient admission to include medical and rehabilitation priorities Physiotherapy intervention should be focussed on physical intervention strategies as well as to continue to inform MDT decision-making</td>
<td>Seek to understand the competence and confidence of a largely junior/unqualified workforce in relation to clinical decision-making and best use of limited senior resource Share the outcome of the study with Medical Consultant leads and identify consistencies of information required to inform MDT decision-making recognising the importance of the rehabilitation</td>
</tr>
<tr>
<td>Patients are not physically active on the wards outside of physiotherapy sessions</td>
<td>Requires a cultural shift, for ward-based staff, from risk aversion to encouraging safe physical activity</td>
<td>Assess patient confidence in undertaking independent mobility Investigate the deployment of unqualified/volunteer staff and planned activity sessions Work with the ward MDT to create an environment conducive for patients to undertake safe purposeful physical activity Work with senior nursing and medical staff regarding organisational policy on patient activity</td>
</tr>
</tbody>
</table>

### Table 30: Recommendations for further research

<table>
<thead>
<tr>
<th>Issue/hypothesis</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>The content of physiotherapy intervention is impacted by patient clinical presentation</td>
<td>Develop a taxonomy of physiotherapy interventions Descriptive cohort study</td>
</tr>
<tr>
<td>There is a lack of research into the utility of patient activation levels in the acute setting</td>
<td>Descriptive cohort study of patient activation levels on admission and discharge</td>
</tr>
<tr>
<td>Patient activity levels in the ward environment are influenced by patient presentation</td>
<td>Mixed methods study Use of observation and/or accelerometer Understand the patient and staff perspective of why patients are active/not active and in what circumstances patients might be more physically active on the ward</td>
</tr>
<tr>
<td>To investigate the attitudes and beliefs of healthcare professionals regarding patient physical activity on the OPU</td>
<td>Investigate appropriate qualitative methodology</td>
</tr>
</tbody>
</table>
7.4 Strengths and limitations of the study

The strengths of this study include an original contribution to the understanding of the impact of physiotherapy in medically unwell older adults but, as with all studies, the current study has limitations. Pawson reminds us:

“There is no such thing as a perfect empirical study, realist or otherwise”

(Pawson and Manzano-Santaella, 2012 page 189)

A key strength of this study was the novel use of RE methodology in the clinical setting that included developing theories of why physiotherapy might impact in this cohort of patients and obtaining the patient and the staff perspective to understand why physiotherapy might work or not work for this group. This methodology has not been used to investigate physiotherapy interventions previously.

One of the limitations of RE is that, whilst suited to studying complexity, paradoxically, it can feel like endless convolutions of interventions, situations in which they are embedded, the ways that change might be engendered, the multiple stakeholders and their myriad responses (Pawson, 2012). Firstly, it is impossible to consider all aspects of an intervention, all the factors, which might influence the action of an intervention. This is acknowledged in recent literature, which proposes a complexity checklist to those intending to undertake an RE, with the recommendation that they spend time considering how each factor in the checklist applies to the intervention under investigation (Pawson, 2013). Following which, since it is impossible to study everything, the factors to be studied should be prioritised. It is intuitively beneficial if this process includes more than one investigator and bias or flawed thinking may have been inherent in this aspect of the current study. A research team would be advantageous in this process of any RE study to minimise these limitations (Pawson, 2013). However, the study design mitigated against researcher bias, Phase 2 of this evaluation allowed for preliminary testing of my theories and opportunities for stakeholders to confirm, falsify or modify my suppositions.
Other methodological challenges included difficulties in differentiating between mechanisms and outcomes e.g. patient confidence. Other authors have reported difficulties in differentiating mechanisms from interventions (Marchal et al., 2010) and mechanisms from (Byng, 2005). There is also a lack of practical guidance for some elements of the RE process, for example analysis of qualitative data, integration of quantitative and qualitative findings, which have also been reported by others (Pawson and Manzano-Santaella, 2012 page 189). Realistic evaluation is time consuming and resources are required to do a robust study (Rycroft-Malone et al., 2010) and I would concur with this.

The definition and measurement of frailty is not agreed in the literature, I elected to use a pragmatic approach (Sydall et al., 2003) but this might have been over or under sensitive in determining frailty in the sample and influenced outcomes. Other pragmatic approaches have been described, for example, the use of gait velocity (Studenski et al., 2011). However, this latter study was conducted on community dwelling adults and would have severely limited the number of patients that could have been assessed for frailty, given the proportion of non-ambulant patients in the study sample.

The study included performance based and self-report measures; the two approaches have been reported as having a complementary but distinct role in assessing physical functioning (Stretton et al., 2006). The investigator captured all study measures, adding to the robustness of the data collected. However, BI has been criticised as a tool (Denkinger et al., 2010) but as previously discussed there is no single measure that is able to capture the gamut of abilities in older adults and the inclusion of gait velocity provided sensitive measure for functionally able patients. CONFbal is a patient reported measure that by definition excluded those with severe cognitive impairment. The measures were selected based on best evidence that they were sensitive to physiotherapy interventions but there are a myriad
of other measures to capture function and confidence and use of these instead of those selected might have elicited different results.

The study was a descriptive study and not powered to demonstrate causality, as understood in positivist terms, with regards to the impact of physiotherapy intervention on patient outcomes. However, in terms of generative causation as supported by a realist perspective, I have provided an explanatory account of how the contextual factors that emerged from the study influence physiotherapist, MDT staff and patient actions and how these stakeholder choices consequently affect outcomes. As with all studies that involve complexity (section 3.2), there may also have been confounding variables that could have influenced the results. However, the purpose of RE is to confirm, falsify or modify theories into middle range theories for further testing; this would include the powering of studies where it was appropriate for the methodology.

The study included interviews of patients and carers whilst they were on the acute ward, this is novel in relation to investigating physiotherapy intervention in this population. The challenges of interviewing older adults in the acute setting have been reported (Berkman et al., 2001) and I experienced similar challenges. Timely access to patients was difficult as I was not based on the ward, I needed to agree a time with the patient but the vagaries of ward life would mean that when I returned the patient was away from the ward, with other medical staff, unwell or asleep. Timely access to proxies was even more challenging since I had to rely on ward staff to let me know when they were visiting and hope that this was a time that I could return to the ward to discuss the interview with them. Once the interview commenced there were often interruptions either because the patient needed personal care or from other medical staff. It is vital that the voice of patients is taken into account in evaluating and designing services (Ham, 2014); the number of patients and proxies interviewed in this study was smaller than anticipated but nonetheless provides valuable
insight. My inexperience as an interviewer may also have influenced the qualitative data obtained from patients and staff. To mitigate this I practised my interview technique and reviewed my first interview transcript with my supervisors, thus I was able to learn and amend my style based on this feedback.

Finally, the main strength of this study is the contribution that the findings make to cumulation, accumulation of insights, about how physiotherapy intervention works or doesn’t work for older adults admitted to hospital, how and in what circumstances.

### 7.5 Summary

This study has provided a unique understanding of the impact of physiotherapy interventions on medically unwell older adults admitted to hospital. This has allowed transition from the original study hypotheses to deeper explanatory theories regarding why physiotherapy works for some patients on the older persons’ unit and not others. These revised theories incorporate the elements of context that emerged during the study; physiotherapy presence, patient characteristics and priority of rehabilitation in the ward culture. These contextual elements influenced the actions of stakeholders in physiotherapy and wider rehabilitation activities to impact on patient health status outcomes. Investigations into the physiological impact of physiotherapy interventions are on-going but this evaluation provides important knowledge regarding the actions of physiotherapists, MDT staff and patients with physical activity both as part of a physiotherapy intervention and outside of this.

Further study would provide additional information to support this but on a pragmatic level there are changes to physiotherapy service provision that can occur immediately. Some recommendations relate to the practical aspect of delivery of the physiotherapy service to older adults at the study site. A key recommendation is that patients should not be treated as one homogenous group. There are subgroups of patients who have different psychosocial
needs that can be identified to allow physiotherapy resources to be targeted to positively influence change in health status measures in all patients. The results of the study provide a basis for this but there may be other tools such as patient activation that could be of benefit in this domain. Another aspect for clinical practice relates to the wider MDT and culture of physical activity on the ward. It is important to identify the patients that need support to be active and create an environment that encourages safe activity and the personnel that could support this.

The findings of this study show that physiotherapy provision to older adults admitted to hospital at the study site is a prioritised service. The process of prioritisation is undertaken by the physiotherapists and influenced by service resourcing and requirements of the MDT. In respect of change in health status outcomes, the current physiotherapy provision works for patients that are non-frail and cognitively unimpaired but not for those patients presenting with frailty and cognitive impairment. The influence of physical and cognitive impairments on motivation, trust and consequently engagement with physiotherapy provides explanation for these findings. This lack of engagement affects both the content of individual physiotherapy sessions and patient activity in the ward environment. I have suggested changes to the model of physiotherapy service provision at the locale and considerations for further research based on the findings of this study. However, the revised theories need to be tested across different sites to further develop theories regarding the impact of rehabilitation of medically unwell older adults nationally.
References

Academy of Medical Royal Colleges (2013) Seven Day Consultant Present Care: Implementation Considerations. London: Academy of Medical Royal Colleges.


Cardiff and Vale Health Board (2009) 'Extended day and seven day physiotherapy service in acute medicine'. Available at: http://www.evidence.nhs.uk/qualityandproductivity (Accessed: 29th June 2012)


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Covinsky, K. E., Pierluissi, E. and Johnston, C. B. (2011) 'Hospitalization-associated disability: "She was probably able to ambulate, but I'm not sure"', *Jama*, 306(16), pp. 1782-93.


English, C., Bernhardt, J. and Hillier, S. (2014) 'Circuit class therapy and 7-day-week therapy increase physiotherapy time, but not patient activity early results from the CIRCIT trial', Stroke, 45(10), pp. 3002-3007.


Guy's and St Thomas' NHS Foundation Trust (2013b) *Policy of Consent to Examination or Treatment*. London: Guy's and St Thomas' NHS Foundation Trust.


NHS England (2013b) *How to ensure the right people, with the right skills, are in the right place at the right time: A guide to nursing, midwifery and care staffing capacity and capability*. London: NHS England.


SPSS Inc. 'Chicago, IL, USA'.


STROBE (2008) 'STROBE statement--checklist of items that should be included in reports of observational studies (STROBE initiative)'. (Accessed: 19th January 2014)


Appendices

Appendix 1: Search strategy

1. "7-day" OR "6-day" OR "seven day" OR "six day" OR "weekend" OR "Saturday" OR "Sunday" OR extended OR intensity OR intensive OR additional OR augmented.ti,ab; 99887 results
2. exp INPATIENTS/; 54391 results.
3. "medical inpatient".ti,ab; 203 results.
4. exp AGED, HOSPITALIZED/; 0 results.
5. 2 OR 3 OR 4; 54479 results.
6. exp AGED, 80 AND OVER/ OR exp REHABILITATION, GERIATRIC/; 0 results.
7. "old".ti,ab; 122372 results.
8. elder*.ti,ab; 45796 results.
9. exp FRAIL ELDERLY/; 122372 results.
10. exp REHABILITATION, GERIATRIC/; 0 results.
11. 6 OR 7 OR 8 OR 9 OR 10; 157220 results.
12. exp RESISTANCE TRAINING/ OR exp THERAPEUTIC EXERCISE/; 26076 results.
13. strength*.ti,ab; 37339 results.
14. train*.ti,ab; 83688 results.
15. exp PHYSICAL THERAPY/; 68116 results.
16. physiother*.ti,ab; 10118 results.
17. exp REHABILITATION/; 142829 results.
18. rehabilitat*.ti,ab; 45950 results.
19. exp WALKING/; 12790 results.
20. ambulat*.ti,ab; 12048 results.
21. exp GAIT TRAINING/; 1034 results.
22. 12 OR 13 OR 14 OR 15 OR 16 OR 17 OR 18 OR 19 OR 20 OR 21; 278333 results.
23. exp TREATMENT OUTCOMES/; 119323 results.
24. (function AND outcome*).ti,ab; 3 results.
25. "gait velocity".ti,ab; 313 results.
26. "gait speed".ti,ab; 766 results.
27. mobility.ti,ab; 10235 results.
28. "Barthel Index".ti,ab; 1318 results.
29. exp GRIP STRENGTH/; 2894 results.
30. "grip strength".ti,ab; 1371 results.
31. "confidence". ti,ab; 212 results
32. "self-efficacy".ti,ab; 557 results.
33. "fear of falling".ti,ab; 388 results.
34. exp ACTIVITIES OF DAILY LIVING/; 29292 results.
35. "activities of daily living".ti,ab; 6109 results.
36. "six met" walk test".ti,ab; 1 results.
37. 6MWT.ti,ab; 405 results.
38. 10MWT.ti,ab; 29 results.
39. "10 met" walk test".ti,ab; 49 results.
40. exp LENGTH OF STAY/; 15782 results.
41. "length of stay".ti,ab; 7697 results.
42. 23 OR 24 OR 25 OR 26 OR 27 OR 28 OR 29 OR 30 OR 31 OR 32 OR 33 OR 34 OR 35 OR 36 OR 37 OR 38 OR 39 OR 40 OR 41; 176115 results.
43. 1. AND 5 AND 11 AND 22 AND 42; 725 results.
44. exp STROKE/; 31229 results.
45"stroke".ti,ab; 33700 results.
46. 42 OR 43; 42987 results.
47. 41 NOT 44; 557 results.
48. 41 NOT 44; 557 results.
Appendix 2: Algorithm of Physiotherapy Interventions

### Problem

**Pulmonary Dysfunction**
- Implied communication, short-term memory loss, osteoporosis.
- Impaired gait, balance, coordination and function
- Including strength, functional impairment, and 3-dimensional walking
- Risk factors: Age over 63 years, bedridden, immobile

### Measures

**Outcome**

**Gait Speed**
- Complete 6m Timed Walk for all ambulatory patients.
- High risk of falls: OTAGO exercises (see Skelton and Dinan, 1999).
- Low: 0.54 m/s, Moderate: 0.45 m/s, High: 1.24 m/s

**Pain**
- 2 to 3 Target: 02 equipment, increased work of breathing.

**Acute Cognitive Dysfunction**
- Impaired memory, decreased attention, increased risk of falls.

**Risk Factors**
- Age: Over 65 years
- Gender: Female
- History of falls
- Use of medications
- Use of corticosteroids

**Treatment Options**

**Physical Activity**
- Exercise programme: should include gait, balance, coordination, and function
- Include strengtheningapiro (30 minutes of moderate-intensity, 3 days per week)
- Total of 60 minutes exercise in 3-6 months period

**Balance**
- Fall pathway if STRATIFY ≥ 2

**Strength**
- Exercise programme: should include gait, balance, coordination, and function
- Include strengthening (30 minutes of moderate-intensity, 3 days per week)
- Total of 60 minutes exercise in 3-6 months period

### Common Considerations for Older Adults:

- Impaired communication, short-term memory loss, osteoporosis.
- Risk factors: Age over 63 years, bedridden, immobile

### Treatment Options

**Physical Activity**
- Exercise programme: should include gait, balance, coordination, and function
- Include strengthening (30 minutes of moderate-intensity, 3 days per week)
- Total of 60 minutes exercise in 3-6 months period

**Balance**
- Fall pathway if STRATIFY ≥ 2

**Strength**
- Exercise programme: should include gait, balance, coordination, and function
- Include strengthening (30 minutes of moderate-intensity, 3 days per week)
- Total of 60 minutes exercise in 3-6 months period

### Gait Dysfunction

**Physical Activity**
- Exercise programme: should include gait, balance, coordination, and function
- Include strengthening (30 minutes of moderate-intensity, 3 days per week)
- Total of 60 minutes exercise in 3-6 months period

**Balance**
- Fall pathway if STRATIFY ≥ 2

**Strength**
- Exercise programme: should include gait, balance, coordination, and function
- Include strengthening (30 minutes of moderate-intensity, 3 days per week)
- Total of 60 minutes exercise in 3-6 months period

### Pulmonary Dysfunction

**Physical Activity**
- Exercise programme: should include gait, balance, coordination, and function
- Include strengthening (30 minutes of moderate-intensity, 3 days per week)
- Total of 60 minutes exercise in 3-6 months period

**Balance**
- Fall pathway if STRATIFY ≥ 2

**Strength**
- Exercise programme: should include gait, balance, coordination, and function
- Include strengthening (30 minutes of moderate-intensity, 3 days per week)
- Total of 60 minutes exercise in 3-6 months period

### Outcome

**Pain**
- 2 to 3 Target: 02 equipment, increased work of breathing.

**Acute Cognitive Dysfunction**
- Impaired memory, decreased attention, increased risk of falls.

**Risk Factors**
- Age: Over 65 years
- Gender: Female
- History of falls
- Use of medications
- Use of corticosteroids

**Treatment Options**

**Physical Activity**
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**Strength**
- Exercise programme: should include gait, balance, coordination, and function
- Include strengthening (30 minutes of moderate-intensity, 3 days per week)
- Total of 60 minutes exercise in 3-6 months period
Appendix 3: Phase 2 staff information sheet

On headed paper

**An Evaluation of Physiotherapy Services**

A service evaluation to explore the views and experiences of staff providing care to older adults during an inpatient stay

**Participant Information Sheet - staff**

**Introduction**

I am a doctoral student and I would like to invite you to take part in a physiotherapy service evaluation. Before you decide, it is important for you to understand why the evaluation is being done and what it will involve for you. Please take time to read the following information carefully and discuss it with friends and colleagues if you wish. Take time to decide whether or not you wish to take part.

**What is the purpose of the study?**

To find out more about the views and experiences of staff who provide services to acutely unwell older patients and in particular their thoughts regarding how physiotherapy interventions may impact on patients and hospital outcomes.

**Why have I been invited to take part in the study?**

We are asking staff who are, by virtue of their job role, involved in the provision of care to acutely unwell older adults to help with this evaluation.

**Do I have to take part?**

No, you do not have to participate. It is up to you to decide whether or not to take part. If you do decide to take part, you will have this information sheet to keep and you will be asked to sign a consent form. You can withdraw from the study at any time and without giving a reason.

**What will happen to me if I take part?**

You will be asked to have a discussion with a researcher at a convenient time to you. The researcher will ask questions about your individual experiences of caring for acutely unwell older patients and invite you to comment on some theories that the researcher will propose with regard to physiotherapy interventions. You will also be invited to present examples of where physiotherapy has/has not worked with patients.

The discussion will take place in a quiet and private room on the ward. It will last no longer than 60 minutes and will be audiotaped. Refreshments will be provided during the discussion and you will be free to leave at any stage during the discussion if you wish.

**What will I have to do?**

If you would like to take part please either complete the attached reply slip and return to the address provided or alternatively please contact the evaluator by email: jacky.jones@gstt.nhs.uk or telephone 020 7188 6627 if you are interested in participating.
The researcher will contact you by email or telephone within a few days if you are agreeable to confirm the time and date for the interview.

**What are the possible disadvantages or risks of taking part?**
We do not think there are any disadvantages or risks to you by taking part in this evaluation, apart from the time you would spend in attending the interview.

**What are the possible benefits of taking part?**
You may not benefit directly but it is hoped that the information we get from this evaluation will help us to learn how to improve the service we deliver to patients.

**What happens when the research study stops?**
When the study stops the information collected will be used to identify improvements to patient care. All participants in the study will be offered a summary of the findings, which will be available in spring 2015.

**What if there is a problem?**
Any complaint or concern about any aspect of the way you have been dealt with during the course of the study will be addressed.

Please contact: Dr Wendy Knibb, Senior Lecturer, School of Health and Social Care, Duke of Kent Building, University of Surrey, Guildford, Surrey. GU2 7TE
Email: wendy.knibb@surrey.ac.uk
Tel: 01483 68 4631

**Will my taking part in the study be kept confidential?**
Yes. All of the information you give will be anonymised so that those reading reports from the evaluation will not know who has contributed to it. The audiotapes will be transcribed word for word into a computer document; the audiotapes will then be erased. Data will be stored securely in accordance with the Data Protection Act 1998 for 10 years at which point it will be destroyed.

**Contact details of researcher and, where appropriate supervisor?**
Jacky Jones, Physiotherapy Department, St Thomas’ Hospital, Westminster Bridge Road, London, SE1 7EH.
Email: jacky.jones@gstt.nhs.uk
Tel: 020 7188 6627

**Supervisors**
Dr Wendy Knibb, Senior Lecturer, School of Health and Social Care, Duke of Kent Building, University of Surrey, Guildford, Surrey. GU2 7TE. Email: wendy.knibb@surrey.ac.uk
Who is organising and funding the research?
Jacky Jones, Physiotherapy Department, St Thomas' Hospital, Westminster Bridge Road, London, SE1 7EH.
Email: jacky.jones@gstt.nhs.uk.

Who has reviewed the project?
The study has been reviewed by the research and development department of the trust and received a favourable opinion from the University of Surrey Ethics Committee.

Thank you for taking the time to read this Information Sheet.

REPLY SLIP
To: Jacky Jones
Physiotherapy Department, 3rd Floor Lambeth Wing
St Thomas' Hospital, Westminster Bridge Road, London SE1 7EH.

I would like to participate in the study: An evaluation of Physiotherapy Services

Name .................................................................

Preferred contact details:
.................................................................
.................................................................
Appendix 4: Phase 2 patient information sheet

On headed paper

An Evaluation of Physiotherapy Services

A service evaluation to explore the views and experiences of patients who have received physiotherapy during an inpatient stay

Participant Information Sheet – patients

Introduction
I am a doctoral student and I would like to invite you to take part in a physiotherapy service evaluation. Before you decide, it is important for you to understand why the evaluation is being done and what it will involve for you. Please take time to read the following information carefully and discuss it with friends, relatives and your medical team if you wish. Take time to decide whether or not you wish to take part.

What is the purpose of the study?
This study seeks to find out more about the views and experiences of patients and carers of patients who have received physiotherapy during an inpatient stay at this hospital. In particular we would like to find out about how patients feel that undertaking physiotherapy affects them.

Why have I been invited to take part in the study?
We are asking patients and carers of patients who have received physiotherapy input as a part of an inpatient stay to help with this evaluation. This will help us to better understand the patients’ perspective of the impact of physiotherapy interventions.

Then as staff information Appendix 1
Appendix 5: Patient/carer of patient consent form

On headed paper

An Evaluation of a Physiotherapy Service

Consent Form – Patients/Carers of Patients

• I the undersigned voluntarily agree to take part in the study: A Realistic Evaluation of Physiotherapy 7-day working on an Older Persons Unit

• I have read and understood the Information Sheet provided. I have been given a full explanation by the investigators of the nature, purpose, location and likely duration of the study, and of what I will be expected to do. I have been advised about any discomfort and possible ill-effects on my health and well-being which may result. I have been given the opportunity to ask questions on all aspects of the study and have understood the advice and information given as a result.

• I agree to comply with any instruction given to me during the study and to co-operate fully with the investigators. I shall inform them immediately if I suffer any deterioration of any kind in my health or well-being, or experience any unexpected or unusual symptoms.

• I consent to my personal data, as outlined in the accompanying information sheet, being used for this study and other research. I understand that all personal data relating to volunteers is held and processed in the strictest confidence, and in accordance with the Data Protection Act (1998).

• I understand that I am free to withdraw from the study at any time without needing to justify my decision and without prejudice to my care

• I confirm that I have read and understood the above and freely consent to participating in this study. I have been given adequate time to consider my participation and agree to comply with the instructions and restrictions of the study.

Name of volunteer [BLOCK CAPITALS] ........................................................
Signed .............................................................................................
Date ...........................................................

Name of witness (where appropriate) [BLOCK CAPITALS] ........................................................
Signed .............................................................................................
Date ...........................................................

Name of researcher/person taking consent [BLOCK CAPITALS] ........................................................
Signed .............................................................................................
Date ...........................................................
Appendix 6: Staff consent form

On headed paper

An Evaluation of a Physiotherapy Service

Consent Form – Staff

• I the undersigned voluntarily agree to take part in the study: A Realistic Evaluation of Physiotherapy 7-day working on an Older Persons Unit

• I have read and understood the Information Sheet provided. I have been given a full explanation by the investigators of the nature, purpose, location and likely duration of the study, and of what I will be expected to do. I have been advised about any discomfort and possible ill-effects on my health and well-being which may result. I have been given the opportunity to ask questions on all aspects of the study and have understood the advice and information given as a result.

• I agree to comply with any instruction given to me during the study and to co-operate fully with the investigators. I shall inform them immediately if I suffer any deterioration of any kind in my health or well-being, or experience any unexpected or unusual symptoms.

• I consent to my personal data, as outlined in the accompanying information sheet, being used for this study and other research. I understand that all personal data relating to volunteers is held and processed in the strictest confidence, and in accordance with the Data Protection Act (1998).

• I understand that I am free to withdraw from the study at any time without needing to justify my decision and without prejudice.

• I confirm that I have read and understood the above and freely consent to participating in this study. I have been given adequate time to consider my participation and agree to comply with the instructions and restrictions of the study.

Name of volunteer (BLOCK CAPITALS) ........................................................................

Signed .........................................................................................................................

Date ..............................................................................................................................

Name of witness (where appropriate) (BLOCK CAPITALS) .............................................

Signed .........................................................................................................................

Date ..............................................................................................................................

Name of researcher/person taking consent (BLOCK CAPITALS) .....................................

Signed .........................................................................................................................

Date ..............................................................................................................................
Appendix 7: Phase 2 discussion schedule

Aim

- To gain confirmation or rejection of tentative theories related to the impact of physiotherapy interventions on patients/carers of patients to allow refinement of the theories and development of hypotheses for testing

Objectives

- To present tentative theories regarding the impact of physiotherapy intervention
- To encourage the interviewee to use examples that present successes and failures (outcomes) in relation to physiotherapy interventions
- To capture panel members’ thinking regarding the possible impact of physiotherapy interventions on patients (what might/might not work for the patient)

Discussion Overview

<table>
<thead>
<tr>
<th>Introduction and background</th>
<th>15 minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purpose of the interview, description of physiotherapy service model.</td>
<td>15 minutes</td>
</tr>
<tr>
<td>Presentation of theories</td>
<td>15 minutes</td>
</tr>
<tr>
<td>Discuss theories in light of interviewee experiences of physiotherapy interventions</td>
<td>25 minutes</td>
</tr>
<tr>
<td>What does the interviewee consider might work/not work for patients receiving physiotherapy? Encourage use of examples.</td>
<td>25 minutes</td>
</tr>
<tr>
<td>Possible areas may include impact on carry over from treatment sessions, impact on patient confidence, ability to have sessions when carers/relatives are present, other</td>
<td>25 minutes</td>
</tr>
<tr>
<td>What determines whether physiotherapy work or doesn’t work for patients?</td>
<td>25 minutes</td>
</tr>
<tr>
<td>Possible areas may include: patient presentation, service, availability</td>
<td>25 minutes</td>
</tr>
<tr>
<td>Thank and close</td>
<td>5 minutes</td>
</tr>
<tr>
<td>Total time</td>
<td>45 minutes</td>
</tr>
</tbody>
</table>
Appendix 8: Six-metre timed walk protocol

Use an agreed single stopwatch for timings

Start approximately 1m from the line

Ask patient to walk at comfortable pace

Do not use further verbal encouragement

Time between 1st foot fall beyond 0 marker and 1st footfall beyond last marker for consistency

If the patient's foot has not fully crossed the line, it is the next footfall which will count as the patient having crossed the line.

Do not use visual encouragement e.g. timer/examiner should not walk just ahead of person in case it "paces" the subject

Do not use tactile encouragement other than for risk management

If risk of falling etc is observed be specific about which tests you choose to abandon or repeat - report sensible and consistent rest periods if repeat (e.g. decrease in Borg to set level if out-of-breath/anxious, or wait until patients feels comfortable on another ordinal scale)
Appendix 9: Barthel index

### Barthel Index of Activities of Daily Living

**Instructions:** Choose the scoring point for the statement that most closely corresponds to the patient’s current level of ability for each of the following 10 items. Record actual, not potential, functioning. Information can be obtained from the patient’s self-report, from a separate party who is familiar with the patient's abilities (such as a relative), or from observation. Refer to the Guidelines section on the following page for detailed information on scoring and interpretation.

#### The Barthel Index

<table>
<thead>
<tr>
<th>Item</th>
<th>Scoring</th>
<th>Patient’s Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bowels</td>
<td>0 = incontinent (or needs to be given enemata) 1 = occasional accident (once/week) 2 = continent</td>
<td></td>
</tr>
<tr>
<td>Bladder</td>
<td>0 = incontinent, or catheterized and unable to manage 1 = occasional accident (max. once per 24 hours) 2 = continent (for over 7 days)</td>
<td></td>
</tr>
<tr>
<td>Grooming</td>
<td>0 = needs help with personal care 1 = independent face/hair/teeth/shaving (implements provided)</td>
<td></td>
</tr>
<tr>
<td>Toilet use</td>
<td>0 = dependent 1 = needs some help, but can do something alone 2 = independent (on and off, dressing, wiping)</td>
<td></td>
</tr>
<tr>
<td>Feeding</td>
<td>0 = unable 1 = needs help cutting, spreading butter, etc. 2 = independent (food provided within reach)</td>
<td></td>
</tr>
<tr>
<td>Transfer</td>
<td>0 = unable – no sitting balance 1 = major help (one or two people, physical), can sit 2 = minor help (verbal or physical) 3 = independent</td>
<td></td>
</tr>
<tr>
<td>Mobility</td>
<td>0 = immobile 1 = wheelchair independent, including corners, etc. 2 = walks with help of one person (verbal or physical) 3 = independent (but may use any aid, e.g., stick)</td>
<td></td>
</tr>
<tr>
<td>Dressing</td>
<td>0 = dependent 1 = needs help, but can do about half unaided 2 = independent (including buttons, zips, laces, etc.)</td>
<td></td>
</tr>
<tr>
<td>Stairs</td>
<td>0 = unable 1 = needs help (verbal, physical, carrying aid) 2 = independent up and down</td>
<td></td>
</tr>
<tr>
<td>Bathing</td>
<td>0 = dependent 1 = independent (or in shower)</td>
<td></td>
</tr>
</tbody>
</table>

(Collin et al., 1988)

### Scoring:

Sum the patient’s scores for each item. Total possible scores range from 0 – 20, with lower scores indicating increased disability. If used to measure improvement after rehabilitation, changes of more than two points in the total score reflect a probable genuine change, and change on one item from fully dependent to independent is also likely to be reliable.

### Sources:
Appendix 10: Southampton protocol for grip strength measurement

(Roberts et al., 2011).

Record hand dominance – ask patient or observe.

Sit the participant comfortably in a standard chair with legs, back support and fixed arms.
Use the same chair for every measurement.

Ask them to rest their forearms on the arms of the chair with their wrist just over the end of the arm of the chair—wrist in a neutral position, thumb facing upwards.

Demonstrate how to use the handgrip dynamometer to show that gripping very tightly registers the best score.

Position the hand so that the thumb is round one side of the handle and the four fingers are around the other side. The instrument should feel comfortable in the hand. Alter the position of the handle if necessary.

The observer should rest the base of the dynamometer on the palm of their hand as the subject holds the dynamometer. The aim of this is to support the weight of the dynamometer (to negate the effect of gravity on peak strength), but care should be taken not to restrict its movement.

Encourage the participant to squeeze as long and as tightly as possible or until the needle stops rising. Once the needle stops rising the participant can be instructed to stop squeezing.

Read grip strength in kilograms from the outside dial and record the result to the nearest 0.5 kg on the data entry form.

Do two further measurements to give three readings in total.

The best of the three grip strength measurements is used in statistical analyses so as to encourage the subjects to get as high a score as possible.
Appendix 11: CONFbal questionnaire

CONFbal Questionnaire

Please rate your confidence while performing the activity described without assistance from another person.

*How confident are you that you can........*

<table>
<thead>
<tr>
<th></th>
<th>Not Confident (3)</th>
<th>Slightly Confident (2)</th>
<th>Confident (1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sit down on a chair without losing your balance?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Get up out of a chair without losing your balance?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Pick up something from the floor without losing your balance, not holding on to any support?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Stand unsupported for about 5 minutes without losing your balance?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Walk without support for about 10 yards indoors without losing your balance?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Walk up a gentle slope indoors without losing your balance, using your usual walking aid if necessary?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Walk down a gentle slope indoors without losing your balance, using your usual walking aid if necessary?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Walk over an uneven pavement without losing your balance, using your usual walking aid if necessary?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Go downstairs indoors, without using the handrail, without losing your balance?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Go upstairs indoors, without using the handrail, without losing your balance?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Score
Appendix 12: CONFbal protocol

(Simpson et al., 2009)

This should be undertaken through interview with the patient; the tool is not validated for self-administration.

Each question is printed in large type on one page of a booklet, together with the three possible responses.

Pages are presented to the patient one at a time.

To verify comprehension, respondents read the instructions and then the individual questions aloud. If mistakes are made, the interviewer asks for the item to be read again.

Respondents point to their chosen response and the interviewer circles the corresponding value on his record sheet.

Respondents do not see the record sheet or the numerical value of their responses.

If the patients wish to engage the interviewer in conversation before making their response choices. The response is ‘I have to record just one of these three answers’.

Items 9 (going downstairs without using the handrail) and 10 (going upstairs without using the handrail) can also pose difficulties as people with walking problems are used to holding on to handrails. Strategies to overcome these difficulties are to ask the patient to think about some stairs they know well (e.g. in their home, the hospital or inside a familiar local building), and then to imagine themselves standing at the top or the bottom of these stairs before making their confidence rating.

The 10 CONFbal item score can be summed to produce a unit of analysis.

A decrease of 3 or more points between the first and second measurements can be considered a true improvement.
Appendix 13: Guidance on Charlson index scoring

For acute conditions, only count if they are currently active (ie MI, Any tumour, Leukaemia, Lymphoma, Metastatic solid tumour). For all conditions, the guidance below is based on the descriptions provided in the Appendix of Charlson et al., (pp275-383)

Assumptions: (necessary due to insufficient details on methodology in original article, or due to incomplete documentation of PMH)

Assume type 2 DM to be diet-controlled unless stated otherwise (likewise if "DM" is recorded or "Diabetes")
Cognitive deficits defined as AMT <8 or MMSE < 25 (consistent with Rachel Ritchie's project)
If patient has Dementia recorded as a diagnosis, then do not also score them for MMSE/AMT deficits
If patients have more than one condition in the same category, or multiple events (eg CVA x3, or Asthma and LTOT), then only record as one event
If patient has metastatic disease, then score this as only 6 (ie do not score an additional 2 for the primary tumour as well)

<table>
<thead>
<tr>
<th>Condition</th>
<th>Score</th>
<th>Include</th>
<th>Exclude</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Myocardial Infarct</td>
<td>1</td>
<td>Acute MI</td>
<td>Old MI's</td>
<td></td>
</tr>
<tr>
<td>Congestive Heart Failure</td>
<td></td>
<td>CCF, CHD, IHD, CVD</td>
<td>AF, Arrhythmias, Hypertension, Angina</td>
<td></td>
</tr>
<tr>
<td>Peripheral Vascular Disease</td>
<td>1</td>
<td>Intermittent claudication, distal by-pass surgery (eg fem-pop), gangrene</td>
<td>CABG, SVD</td>
<td></td>
</tr>
<tr>
<td>Cerebrovascular Disease</td>
<td>1</td>
<td>Current/old CVA's, TIA's</td>
<td>SVD</td>
<td></td>
</tr>
<tr>
<td>Dementia</td>
<td>1</td>
<td>Documented diagnoses of any type of dementia, chronic cognitive deficits (eg MMSE&lt;25, AMT&lt;8)</td>
<td>Delirium</td>
<td>See notes in assumptions</td>
</tr>
<tr>
<td>Chronic Pulmonary Disease</td>
<td>1</td>
<td>COPD, Asthma, LTOT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connective Tissue Disease</td>
<td>1</td>
<td>CTD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ulcer Disease</td>
<td>1</td>
<td>Peptic ulcers</td>
<td>Peripheral ulcers, cellulitis, pressure areas</td>
<td></td>
</tr>
<tr>
<td>Mild liver disease</td>
<td>1</td>
<td>Documented liver disease</td>
<td>Moderate/severe liver disease</td>
<td>Recorded as mild, unless documented as moderate/severe</td>
</tr>
<tr>
<td>Diabetes</td>
<td>1</td>
<td>All types of insulin dependent diabetes, eg Type 1, Type 2,</td>
<td>If it is diet-controlled (ie not using insulin)</td>
<td>See notes in assumptions</td>
</tr>
<tr>
<td>Hemiplegia</td>
<td>2</td>
<td>Hemiplegia's caused by any condition</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderate/Severe Renal Disease</td>
<td>2</td>
<td>On dialysis, previous kidney transplant, stage 4-5 renal failure, end-stage renal disease</td>
<td>Stage 1-3 renal disease (ie not needing dialysis), AKI, acute kidney injury</td>
<td></td>
</tr>
<tr>
<td>Diabetes with end organ damage</td>
<td>2</td>
<td>If retinopathy, neuropathy or nephropathy (eg CKD, ESRF) also present</td>
<td>AKI</td>
<td></td>
</tr>
<tr>
<td>Any tumour</td>
<td>2</td>
<td>Any tumour present</td>
<td>If patient has met's, score 6 – see higher category</td>
<td></td>
</tr>
<tr>
<td>Leukaemia</td>
<td>2</td>
<td>All leukaemias</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lymphoma</td>
<td>2</td>
<td>All lymphomas, Hodgkins', myeloma</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderate/Severe liver disease</td>
<td>3</td>
<td>Only if documented as Moderate or Severe</td>
<td>Otherwise, record as Mild</td>
<td></td>
</tr>
<tr>
<td>Metastatic solid tumour</td>
<td>6</td>
<td>Documented as having metastases anywhere</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AIDS</td>
<td>6</td>
<td>AIDS, &quot;probable&quot; AIDS</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix 14: 4A test

(MacLullich, Ryan and Cash, 2011)

The 4AT Test: screening instrument for cognitive impairment and delirium

<table>
<thead>
<tr>
<th>Label</th>
<th>Date:</th>
<th>Time:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient name:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Date of birth:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient number:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**[1] ALERTNESS**

This includes patients who may be markedly drowsy (eg. difficult to rouse and/or obviously sleepy during assessment) or agitated/hyperactive. Observe the patient, if asleep, attempt to wake with speech or gentle touch on shoulder. Ask the patient to state their name and address to assist rating.

- Normal (fully alert, but not agitated, throughout assessment): 0
- Mild sleepiness for <10 seconds after waking, then normal: 0
- Clearly abnormal: 4

**[2] AMT4**

Age, date of birth, place (name of the hospital or building), current year.

- No mistakes: 0
- 1 mistake: 1
- 2 or more mistakes/untestable: 2

**[3] ATTENTION**

Ask the patient: “Please tell me the months of the year in backwards order, starting at December.”

To assist initial understanding one prompt of “what is the month before December?” is permitted.

- Months of the year backwards:
  - Achieves 7 months or more correctly: 0
  - Starts but scores < 7 months / refuses to start: 1
  - Untestable (cannot start because unwell, drowsy, inattentive): 2

**[4] ACUTE CHANGE OR FLUCTUATING COURSE**

Evidence of significant change or fluctuation in: alertness, cognition, other mental function (eg. paranoia, hallucinations) arising over the last 2 weeks and still evident in last 24hrs

- No: 0
- Yes: 4

**4AT SCORE**

4 or above: possible delirium +/- cognitive impairment
1-3: possible cognitive impairment
0: delirium or cognitive impairment unlikely (but delirium still possible if [4] information incomplete)

**GUIDANCE NOTES**

The 4AT is a screening instrument designed for rapid and sensitive initial assessment of cognitive impairment and delirium. A score of 4 or more suggests delirium but is not diagnostic: more detailed assessment of mental status may be required to reach a diagnosis. A score of 1-3 suggests cognitive impairment and more detailed cognitive testing and informant history-taking are required. Items 1-3 are rated solely on observation of the patient at the time of assessment. Item 4 requires information from one or more source(s), eg. your own knowledge of the patient, other staff who know the patient (eg. ward nurses), GP letter, case notes, carers. The tester should take account of communication difficulties (hearing impairment, dysphasia, lack of common language) when carrying out the test and interpreting the score.

Alertness: Altered level of alertness is very likely to be delirium in general hospital settings. If the patient shows significant altered alertness during the bedside assessment, score 4 for this item. AMT4 (Abbreviated Mental Test - 4): This score can be extracted from items in the full AMT if done immediately before. Acute Change or Fluctuating Course: Fluctuation can occur without delirium in some cases of dementia, but marked fluctuation usually indicates delirium. To help elicit any hallucinations and/or paranoid thoughts ask the patient questions such as, “Are you concerned about anything going on here?”, “Do you feel frightened by anything or anyone?” “Have you been seeing or hearing anything unusual?”. In general hospital settings psychotic symptoms most often reflect delirium rather than functional psychosis (such as schizophrenia).
Appendix 15: Phase 3 patient interview schedule

Aim

- To gain confirmation or rejection of hypotheses (CMO configurations) related to the impact of physiotherapy interventions on patients to contribute to the development of theories.

Objectives

- To capture patient's/carer's thinking regarding the impact of physiotherapy interventions that affect them (what is it that works for the patient)
- To explore patient's/carer's thinking around the situations in which physiotherapy has/has not worked for the patient.
- To encourage the patient/carer to use examples that present successes and failures (outcomes) in relation to physiotherapy interventions

<table>
<thead>
<tr>
<th>Introduction</th>
<th>5 mins</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present circumstances/Nature of reason for being in hospital - if patient is comfortable to share</td>
<td>5 mins</td>
</tr>
<tr>
<td>Do they remember being seen by a physiotherapist?</td>
<td></td>
</tr>
<tr>
<td>Amount of physiotherapy intervention</td>
<td>15 mins</td>
</tr>
<tr>
<td>How often did they have physiotherapy intervention?</td>
<td></td>
</tr>
<tr>
<td>Were there any gaps in seeing the physiotherapist?</td>
<td></td>
</tr>
<tr>
<td>What do they think about the amount of physiotherapy that they received?</td>
<td></td>
</tr>
<tr>
<td>How often would they prefer to see a physiotherapist?</td>
<td></td>
</tr>
<tr>
<td>Why?</td>
<td></td>
</tr>
<tr>
<td>Encourage use of examples</td>
<td></td>
</tr>
<tr>
<td>Content of physiotherapy interventions</td>
<td>15 mins</td>
</tr>
<tr>
<td>What can they remember of the sessions they have had with the physiotherapist</td>
<td></td>
</tr>
<tr>
<td>Details of the intervention</td>
<td></td>
</tr>
<tr>
<td>What aspects of PT did they like/did they find helpful?</td>
<td></td>
</tr>
<tr>
<td>Why/how did it make a difference for them?</td>
<td></td>
</tr>
<tr>
<td>What aspects did they not like/were not helpful</td>
<td></td>
</tr>
<tr>
<td>Why?</td>
<td></td>
</tr>
<tr>
<td>Encourage use of examples</td>
<td></td>
</tr>
<tr>
<td>Thank and close</td>
<td>5 mins</td>
</tr>
<tr>
<td>Total time</td>
<td>45 mins</td>
</tr>
</tbody>
</table>
Appendix 16: Phase 3 focus group interview schedule

Physiotherapy Service Evaluation Focus Group
Date: 16th October
Time: 13.00
Venue: Seminar room
Facilitator: JJ
Observer: GT

Schedule

Arrival – welcome, refreshment, seating

Scene setting
Personal introduction
Outline of research topic/background to study/how findings will be used
Roles – facilitator/observer/participants

Ground rules
No right or wrong answers – people should feel free to say what they think
Don’t wait to be invited to speak but try not to speak over each other
Aim is to hear as many different thoughts as possible
Confidentiality

TURN ON TAPE RECORDER
Introduction from the group participants
Name and previous experience of working with older adults

Introduce opening topic

- How often do patients have physiotherapy intervention?

Continue discussion

- Amount of physiotherapy intervention
- What determines how much physiotherapy a patient receives?
- Resources/days of service provision?
- Patient presentation?
- Patient motivation/engagement/ability?
- Other?

What is the impact of any gaps in PT interventions on patients/other staff?

- Encourage use of examples

Content of physiotherapy interventions

- What types PT interventions have they used with older adults?
- What determines their choice of interventions with a patient?
- In their experience how do they think the interventions work/do not work for patients?

Encourage use of examples

Introduce final topic
What do you think could improve the physiotherapy service provided the patients on the unit?

Conclude

- Anything that we’ve left out or that people feel that they haven’t had a chance to say?

Thanks

- Usefulness of discussion
- Reiterate confidentiality

**SWITCH OFF TAPE RECORDER**

Answer any follow up queries

**END**
Appendix 17: Phase 3 staff information sheet

On headed paper
An Evaluation of Physiotherapy Services

A service evaluation to explore the views and experiences of staff providing care to older adults during an inpatient stay

Participant Information Sheet - staff

Introduction
I am a doctoral student and I would like to invite you to take part in a physiotherapy service evaluation. Before you decide, it is important for you to understand why the evaluation is being done and what it will involve for you. Please take time to read the following information carefully and discuss it with friends and colleagues if you wish. Take time to decide whether or not you wish to take part.

What is the purpose of the study?
To find out more about the views and experiences of staff who provide services to acutely unwell older patients and in particular their thoughts regarding how physiotherapy interventions may impact on patients and hospital outcomes.

Why have I been invited to take part in the study?
We are asking staff who are, by virtue of their job role, involved in the provision of care to acutely unwell older adults to help with this evaluation.

Do I have to take part?
No, you do not have to participate. It is up to you to decide whether or not to take part. If you do decide to take part, you will have this information sheet to keep and you will be asked to sign a consent form. You can withdraw from the study at any time and without giving a reason.

What will happen to me if I take part?
You will be invited to attend a focus group with other physiotherapy staff working in older adults. The researcher will ask questions about your individual experiences of caring for acutely unwell older patients and invite you to comment on some theories that the researcher will propose with regard to physiotherapy interventions. You will also be invited to present examples of where physiotherapy has/has not worked with patients.

The discussion will take place in a quiet and private room. It will last no longer than 75 minutes and will be audio-taped. Refreshments will be provided during the discussion and you will be free to leave at any stage during the discussion if you wish.

What will I have to do?
If you would like to take part please either complete the attached reply slip and return to the address provided or alternatively please contact the evaluator by email: jacky.jones@gstt.nhs.uk or telephone 020 7188 6627 if you are interested in participating. The researcher will contact you by email or telephone within a few days if you are agreeable to confirm the time and date for the focus group.

What are the possible disadvantages or risks of taking part?
We do not think there are any disadvantages or risks to you by taking part in this evaluation, apart from the time you would spend in attending the interview.

What are the possible benefits of taking part?
You may not benefit directly but it is hoped that the information we get from this evaluation will help us to learn how to improve the service we deliver to patients.

What happens when the research study stops?
When the study stops the information collected will be used to identify improvements to patient care. All participants in the study will be offered a summary of the findings, which will be available in spring 2014.

What if there is a problem?
Any complaint or concern about any aspect of the way you have been dealt with during the course of the study will be addressed.

Please contact: Dr Wendy Knibb, Senior Lecturer, School of Health and Social Care, Duke of Kent Building, University of Surrey, Guildford, Surrey. GU2 7TE
Email: wendy.knibb@surrey.ac.uk Tel: 01483 68 4631

Will my taking part in the study be kept confidential?
Yes. All of the information you give will be anonymised so that those reading reports from the evaluation will not know who has contributed to it. The audiotapes will be transcribed word for word into a computer document; the audiotapes will then be erased.

Data will be stored securely in accordance with the Data Protection Act 1998 for 10 years at which point it will be destroyed.

Contact details of researcher and, where appropriate supervisor?
Jacky Jones, Physiotherapy Department, St Thomas’ Hospital, Westminster Bridge Road, London, SE1 7EH.
Email: jacky.jones@gstt.nhs.uk, Tel: 020 7188 6627

Supervisors
Dr Wendy Knibb, Senior Lecturer, School of Health and Social Care, Duke of Kent Building, University of Surrey, Guildford, Surrey. GU2 7TE. Email: wendy.knibb@surrey.ac.uk
Professor Sara Faithfull, Professor of Cancer Nursing Practice, School of Health and Social Care, Duke of Kent Building, University of Surrey, Guildford, Surrey. GU2 7TE
Email: s.faithfull@surrey.ac.uk

Who is organising and funding the research?
Jacky Jones, Physiotherapy Department, St Thomas’ Hospital, Westminster Bridge Road, London, SE1 7EH. Email: jacky.jones@gstt.nhs.uk.

Who has reviewed the project?
The study has been reviewed by the research and development department of the trust and received a favourable opinion from the University of Surrey Ethics Committee.

Thank you for taking the time to read this Information Sheet.

REPLY SLIP
To: Jacky Jones
Physiotherapy Department,
3rd Floor Lambeth Wing
St Thomas' Hospital,
Westminster Bridge Road,
London SE1 7EH.

An evaluation of Physiotherapy Services

I would like to participate in this study.

Name ...............................................................
Preferred contact details:
........................................................................
........................................................................
Appendix 18: Phase 3 patient information sheets

On headed paper
An Evaluation of Physiotherapy Services

A service evaluation to explore the views and experiences of patients and carers of patients receiving physiotherapy during an inpatient stay

Participant Information Sheet – patients/carers

Introduction
I am a doctoral student and I would like to invite you to take part in a physiotherapy service evaluation. Before you decide, it is important for you to understand why the evaluation is being done and what it will involve for you. Please take time to read the following information carefully and discuss it with friends, relatives and your medical team if you wish. Take time to decide whether or not you wish to take part.

What is the purpose of the study?
This study seeks to find out more about the views and experiences of patients and carers of patients who have received physiotherapy during an inpatient stay at this hospital. In particular we would like to find out about how patients feel that undertaking physiotherapy affects them.

Why have I been invited to take part in the study?
We are asking patients and carers of patients who have received physiotherapy input as a part of their inpatient admission to help with this evaluation. This will help us to better understand the patients' perspective of the impact of physiotherapy interventions.

Do I have to take part?
No, you do not have to participate. It is up to you to decide whether or not to take part. If you do decide to take part, you will have this information sheet to keep and you will be asked to sign a consent form. You can withdraw from the study at any time and without giving a reason. This will not affect the care you receive in any way.

What will happen to me if I take part?
You will be asked to contribute to a discussion with the evaluator. The evaluator will ask questions about your individual experiences of physiotherapy, if your experience varied over the course of the day or week and what you think the impact of physiotherapy was on you or the person you care for personally.

The discussion will take place in a quiet and private room on the ward. It will last no longer than 45 minutes and will be audio-taped. Refreshments will be provided during the discussion and you will be free to leave at any stage during the discussion if you wish.
What will I have to do?
If you would like to take part please complete the attached reply slip and give to your ward physiotherapist, the evaluator will then come and discuss with you the best day and time to talk to you.

What are the possible disadvantages or risks of taking part?
Occasionally, people may get upset talking about their illness and their experiences whilst in hospital.

If you find the discussion distressing, the interview can be terminated at any time and the Matron on duty for the Older Person’s Unit will be informed so that she and the nursing staff can provide you with the support to recover.

Contact details: Darlene Romero/Susan Wood
Matrons Older Person’s Unit
Mark Ward. 9th Floor, North Wing, St. Thomas’ Hospital
Tel: 020 7188 7188 x51166

What are the possible benefits of taking part?
You may not benefit directly but it is hoped that the information we get from this evaluation will help us to learn how to improve the physiotherapy service we deliver to patient admitted to the older persons unit in the future.

What happens when the research study stops?
When the study stops the information collected will be used to identify improvements to patient care. All participants in the study will be offered a summary of the findings which will be available in spring 2015.

What if there is a problem?
Any complaint or concern about any aspect of the way you have been dealt with during the course of the study will be addressed.

Please contact: Patient Advice and Liaison Service (PALS), Knowledge and Information Centre (KIC), Ground floor, North Wing, St Thomas’ Hospital, Westminster Bridge Road, London, SE1 7EH.
Email: pals@gstt.nhs.uk, Tel: 020 7188 8801 or 020 7188 8803.

Will my taking part in the study be kept confidential?
Yes. All of the information you give will be anonymised so that those reading reports from the evaluation will not know who has contributed to it. The audiotapes used to record the interviews will be transcribed word for word into a computer document; the audiotapes will then be erased.

Data will be stored securely in accordance with the Data Protection Act 1998 for 10 years at which point it will be destroyed.
Contact details of researcher and, where appropriate supervisor?
Jacky Jones, Physiotherapy Department, St Thomas’ Hospital, Westminster Bridge Road, London, SE1 7EH.
Email: jacky.jones@gstt.nhs.uk, Tel: 020 7188 6627

Supervisors
Dr Wendy Knibb, Senior Lecturer, School of Health and Social Care, Duke of Kent Building, University of Surrey, Guildford, Surrey. GU2 7TE. Email: wendy.knibb@surrey.ac.uk

Professor Sara Faithfull, Professor of Cancer Nursing Practice, School of Health and Social Care, Duke of Kent Building, University of Surrey, Guildford, Surrey. GU2 7TE. Email: s.faithfull@surrey.ac.uk

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Who has reviewed the project?
The study has been reviewed by the research and development department of the hospital and received a favourable opinion from the University of Surrey Ethics Committee.

Thank you for taking the time to read this Information Sheet.

---------------------------------------------------------------------------------------------------

REPLY SLIP
To: Jacky Jones, Physiotherapy Department, 3rd Floor Lambeth Wing, St Thomas’ Hospital, Westminster Bridge Road, London SE1 7EH.

An evaluation of Physiotherapy Services

I would like to participate in this study.

Name ............................................................................................................
Preferred contact details:
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....................................................................................................................
## Correlations among physiotherapy intervention metrics and patient outcomes in sample patients

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* Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).

PT: Physiotherapy Time; Mins: Minutes; Freq.: Frequency of physiotherapy intervention; Hosp. LOS: Hospital length of stay; mBI: Modified Barthel Index; Dom GS: Dominant grip strength.
Correlations among physiotherapy intervention metrics and patient outcomes in cognitively unimpaired patients.

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Correlations among physiotherapy intervention metrics and patient outcomes in cognitively impaired patients.

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* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).
PT: Physiotherapy; Mins: Minutes; Freq.: frequency of physiotherapy intervention; Hosp. LOS: Hospital length of stay; mBI: modified Barthel index; Dom.GS: Dominant grip strength.
Correlations among physiotherapy intervention metrics and patient outcomes in frail patients

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<th>N</th>
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* Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).
PT: Physiotherapy; Mins: Minutes; Freq.: frequency of physiotherapy intervention; Hosp. LOS: Hospital length of stay; mBI: modified Barthel index; Dom.GS: Dominant grip strength.

Correlations among physiotherapy intervention metrics and patient outcomes in non-frail patients

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<td>0.120</td>
<td>0.325</td>
<td>-0.079</td>
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<tr>
<td></td>
<td>mBI change</td>
<td>Coefficient</td>
<td>Sig. (2-tailed)</td>
<td>N</td>
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<td>-0.84</td>
<td>0.813</td>
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<td>Dom GS Change</td>
<td>Coefficient</td>
<td>Sig. (2-tailed)</td>
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<td>0.303</td>
<td>0.010</td>
<td>0.241</td>
<td>0.120</td>
<td>0.325</td>
<td>-0.079</td>
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</tbody>
</table>

* Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).
PT: Physiotherapy; Mins: Minutes; Freq.: frequency of physiotherapy intervention; Hosp. LOS: Hospital length of stay; mBI: modified Barthel index; Dom.GS: Dominant grip strength.
Appendix 20: Section of patient interview transcript

P7 transcript 12th November 2013

JJ: To start, can you tell me a bit about why you are in hospital on Henry ward?
P7: Because erm, originally I was admitted to the observation ward because of the backlog of people in A&E, they moved us up. They moved me out at 6 o’clock one evening. I don’t remember much about the first few days on Sarah Swift my notes will tell you how long I was there because I’ve a fractured pelvis of the rami and it was so painful and they didn’t move me much.

JJ: And have you seen the physiotherapist whilst you’ve been on the ward?
P7: I’ve seen [name of physio] and he, he’s a nice young man and he very keen to get me moving, that made two of us because I don’t want to stay in the hospital. He’s got me to the shower he got me erm sitting on the commode, he gave me my self-respect back in other words. This was important because I’m not the sort of person who wants to be bed bathed and bedpans and it’s uncomfortable and he gave me back first and foremost my self-respect. There’s three of us getting up in this bay and I think it’s a pity the table’s there. I’ve talked to the nursing staff and they’re agreeable, that we get up at least at teatime and sit around the table, it wouldn’t require any more work they could bring the tea pot, fill up our cups and things like this and we could have our cake there but I thought it would be interesting to get us talking to one another instead of shouting across the bay and better in a way for the physios because we’d be sitting up behaving normally.

JJ: And so you said that physiotherapy helped you get your self-respect back
P7: Oh indeed, yes

JJ: How has physiotherapy done that?
P7: Well I’m able to get out of bed instead of having a bed pan which is very uncomfortable, ‘cos I’m a very bony person at the best of times and the nurses brought me a commode so that I could sit on it and I was able to sit in the armchair and be comfortable. When you’re thin your bones rub, your elbows catch and not to mention your bottom and also it’s more comfortable, that was it, I didn’t feel that I needed so many pills, you know they used to give me oral morphia at night and that gave me nightmares which was good because that meant I could move, I’ve needed less once he [physio] could start getting me up.

JJ: What has changed in you that you were able to walk to the toilet which you weren’t able to do when you came into hospital.
P7: Well the bed to the toilet, erm didn’t come when, I didn’t walk it at first, I went in the chair and, what do you call those little wheelie things?

JJ: A frame?
P7: A frame, yes a little one, yes and I think it was the Weds night and the Thurs that I was able to go to the loo on my own, that was great but I’m not washing on my own.
JJ: And why haven’t you been able to go to the toilet before this? What’s stopped you?

P7: What stopped me was we had the long weekend, we had Saturday, Sunday and Monday and that made quite a lot of difference you know because although they’d just got me up and sitting in the armchair and sitting on the commode, the nurses didn’t feel that I could do any more and I do understand that erm he [the physio] told them what I could do and the five paces to my chair and um what else? And my confidence was having a shower, to be wheeled out by one of the nurses or whatever, and to sit under the shower and be clean and have somebody wash my back.

JJ: So the nurses over that long weekend weren’t comfortable to do any more with you that what the physios said?

P7: No the physio had said and I agreed with him but it was a pity it was the long weekend you know.

JJ: How did not having physiotherapy make a difference to you?

P7: Well it did, definitely, definitely. I didn’t expect it but it was hard on the Monday you know? It wasn’t anybody’s fault it was just the bank holiday.

JJ: Why was it hard on the Monday for you?

P7: Well, I was feeling better in myself, I’d managed to stop the oral morphine and I was having less of the drugs during the day and in fact I didn’t have anything during the day by Monday and it was painful but it was enough that you could manage and I really wanted to, I did walk round the bed and got told off for doing it but I did hold onto the bed.

JJ: How did they tell you off?

P7: Well, they said you know should you do it without the physio and I said no I’ll sit down but I walked from the commode up to the chair and things like this but I would have liked to have been taught how to do it, this is it because I’d never fractured a bone before and when it’s between your legs it’s very awkward you know?

JJ: How was knowing what you could and couldn’t do a factor for you?

P7: Yes, definitely, I didn’t want to do anything silly that was it, I did say to the nurses haven’t you got a sheet of paper what I could do next, to which they said, no, no.

JJ: What were you worried would happen if you did this silly thing?

P7: No, no I wasn’t going to do anything you know I just.... I wasn’t really worried about anything I felt that the nurses had their work and the physios their work. And really they work very well as a team, very well, they came across very well. But they worked with the nurses well and did tell the
nurses you know what I could do and couldn’t and they wrote it down and put it above my bed next to lactose intolerance.

JJ: So when [physio name] arrived on the Tuesday, how did that make you feel?

P7: Pleased because I knew that I would do something new he didn’t stop where we were, there was always a next thing and he would say ‘now’ and we did it.

JJ: We’ve talked about the fact that you didn’t have any physiotherapy over the weekend, how did that make a difference in what you were able to do after the weekend?

P7: Well, he was the sort of person, I think he really wanted to be a sports person and I said to him early on you know; imagine I’m Rooney and I’ve got to get up and score the goals you know, you do it you know and he did. He would say come on you can take another step, you can do another thing, he held the carrot always in front of me and that was good because I wanted to be out.

JJ: Some patients have described physiotherapists as motivating, is that how you feel or not?

P7: Yeah, that’s it, all the time.

JJ: Why was it motivating?

P7: He gave me great encouragement, this was the great thing um and yes I think, you see I felt safe with him just as I do in the balance class when they get me to fall forwards or backwards I feel safe because I trust them and I trusted Sean you know he’d say come on do this and I would do it.

JJ: Why did you trust him?

P7: The reason you trust any professional, he knew his job. And Sean and I sort of ‘clicked’ because I was saying what’s next, what’s next and he was a professional and he always acted professionally.

JJ: And when you achieved something, how did that feel for you?

P7: Well really I admired Sean I’d say to him you know, you’ve done a great job because he did. When he knew that I was going on the Thursday evening, I hadn’t been up and down stairs and he found a colleague, he said, don’t let them take you and he walked me on my little thingy to the stairs and then made me go up and down with his colleague.

JJ: And what did that mean for you?

P7: Well you know because I’ve got one of these houses, ours is Edwardian but most are Victorian you know and three bedrooms and what is it 13 steps and 4 steps and the other way 7 steps you know and I knew that I wanted to do the stairs and I didn’t want to come down on my bum which one of the nurses had suggested, no I was going to walk up and I was going to walk down.
JJ: How would you have felt having to do it on your bottom?

P7: I've had a fall since due to my balance and I fell backwards and I've certainly got a bruise on my bottom there and you know it makes you realise that you don't want to do things I still do things the proper way. It's about dignity and your self-respect and things like this.

JJ: So let me take you back to your activity over the weekend, you talked to me about trusting Sean when you were doing things with him?

P7: Oh yes, oh yes. But one thing I think would help motivate people to get out of bed is having a table that you could all sit round because they didn't get out of bed,

JJ: Why would it motivate them?

P7: If they got up to have their tea there they might stay a bit longer, I think they stayed in bed too long.

JJ: When you were with Sean you did some walking, what else did you do with him?

P7: Exercises and I had this I know on Sarah Swift, they were keen that I moved my feet so that I wouldn’t get DVTs but I’m warfarin so there wasn’t much chance of that.

JJ: And what did the exercises do for you do you think?

P7: I think they make you feel better, they help the blood flow, like me and my balance, I try and lead a normal life because the more normal life you have the less you feel sorry for yourself. It’s not good for you, you know I get up, put the slap on, not much but you know get dressed because I work in Westminster cathedral so you have to look half way decent. I think you need your dignity too, you know when you’re in bed lying in those dreadful gowns even though they’re better than they were as soon as I could I got my own in, you know and Sean, Sean always looked pleased to see you, an aged crone like myself, he’d come up to me and say “Hello Dora, how are you” you know and it really was genuine, I can’t speak too highly of him, he was so patient.

JJ: So the exercises made you feel better?

P7: Oh of course they gave me dignity because I could do things.

JJ: Some patients have said that exercises made them feel stronger. Is that what you felt or not?

P7: Definitely, yep. My muscles up here [indicating thighs] went to pot when I was in and I was in less than a fortnight but the exercises helped to bring it back. The physios on Henry ward were very dedicated you now, they’ come in and some of the old ladies weren’t very nice to them, you know “Oh it hurts if I do this” you know and I’d say look you’re going to better, “well it’s comfortable here they would say” you know.
Appendix 21: Section of staff focus group transcript

Staff focus group transcript 16th October 2013

Facilitator: JJ
Observer: GT
Group: HS (Band 8 PT)
        RH (Band 7 PT)
        RC (Band 7 PT)
        CE (Band 6 PT)
        RM (Band 5 PT)
        CK (Band 3 PTA)

JJ: Thank you all for coming today. To start off I’d like to ask you whether you feel that the patients admitted to the older person’s unit are receiving enough physiotherapy for them to meet their goals?

CK: They could get more

JJ: Why is it that they don’t get it at the moment?

CK: It is I think down to staffing. Staffing yes um so we need to prioritise that’s why.

JJ: What do others think about what CK has said?

HS: I think I agree with what CK’s just said around the amount of input and that is around staffing I think and we could provide our patients, particularly our patients who come in and are double handed rehab patients that we can’t spend as much time with because the level of dependency has gone up on the unit therefore there are more double rehab patients that need our time and sometimes that’s difficult to find that time and give them enough rehab. I think we could be doing more rehab if we had the resources to, to do that particularly with the double rehabs.

RH: I don’t think it’s necessarily the quality or the length of the individual sessions. I think it’s more the regularity of the sessions and like the frequency of the sessions. There’s a definite frustration that, like you said you might only get to see them three times a week then perhaps they’re not progressing at the same kind of level that they would if we were able to see them more regularly because of the increase in the requirements of the patients you’re having to spread that out through the week rather than seeing them perhaps in the morning and afternoon or 5-days a week or 7-days a week. You’re kind of spreading that resource more thinly because the patients need more on an individual basis.

HS: And I think what we work really hard on, on the unit is trying, and we rely on our physio assistants to deliver much of the single rehab work and much of that single
rehab work is about preventing functional decline. So patients may well be at their baseline but what we don’t want is to see a deterioration whilst they’re in hospital so we work really hard at trying to get our physio assistants to do that aspect of the rehab which is the bulk of the activity but then if we pull them across into the double rehab because the double rehab is growing then there is a knock on effect on the prevention of functional decline of the patients. Which is what we’re really working hard at trying to prevent.

CS: So if we had 7-day working so we could see patients even twice a day. So that’s another advantage so the timing and the staffing level with 7-day working so we could see the patients twice a day.

CE: So I think the frailty of the population that we have up here as well, so that means that their exercise tolerance is, is generally very poor and so they can’t do an hour, an hour and a half session a couple of time a week, what they need is half an hour a couple of times a day or 15 minutes couple of times a day. Um, rather than these big long sessions that they don’t get that often, they just can’t tolerate it. It’s not true for all of them but it is for a lot of the frail patients.

RH: I think RM, you had a really good point about that, in that by the time you’ve got a patient that perhaps needs some personal hygiene or needs something doing before the rehab session can start as such. By the time you’ve done that and by the time you’ve got them to the gym you do end up doing perhaps an hour long session because of the time it takes to get them here and get them back whereas they would benefit more from smaller chunks of that throughout the day.

CE: So it’s timing, patient’s being ready for rehab and having scheduled time. Often the patient’s in bed or needs changing so we change them ‘cos we’re not going to leave them like that before the rehab sessions. But then you’ve take a lot of your time and also the patient’s quite exhausted by the time you start the rehab session so you don’t get the benefit that you’d want.

RC: And the other useful thing about having a greater number of staff and a more consistent service over the 7-days is the, with this population some of treatment is quite opportunistic; it’s not necessarily a 9 o’clock slot or a 10 o’clock slot. Having a greater number of people that can pop in or check in and kind of strike while the iron’s hot with a patient, be that something very, very functional or, that would enhance the amount of input we could have with them and I think that’s one of the things that I kind of feel with the 7-day approach that you had the chance to go back and you know, dip in and out and you know perhaps go back to someone who you’d gone to at 10 o’clock and hadn’t been able to see them normally that patient would get a contact but because you had capacity to pop back in at 3 you might actually be able to make some progress with that patient on the day.

JJ: What do you think it means for the patient if you can’t pop back or give them their little sessions each day as I think RH said they may then wait another day or two days before they’re seen again?
CS: Physically, definitely so we’ve built up the relationship with the patient and I can talk about myself so the treatment is more efficient if you can build up this relationship with the patient so the trust is increasing. It’s a huge, huge point.

JJ: If you see them on a regular basis you build up trust with them?

CS: Definitely and then through this the treatment and er, how would I say, treatment is more efficient and the patient in him or herself can be more willing to do so we can motivate better and there’s good relationship with us and that really helps.

HS: I think I echo that in terms of it’s important to build a rapport and the only way to get to that rapport and building that rapport is trust. You see a patient and then you can’t see them and that almost damages some aspects of the trust, the relationship building that you’re trying to achieve and that can then, like Csaba said, affect the way that someone might engage with you because of those breaks and then here we are we’re left in a situation where it’s difficult for a patient to engage with us because of all these breaches of trust and rapport building. So I think that’s the consistent approach that will affect the patient’s wellbeing really and their ability to do the best that they can possibly do.

JJ: If you’re having to start that relationship again each time because you’re not seeing them on a regular basis what other consequences are there?

CK: You can engage a patient if you’ve got the trust. So in 7-day working you can see at least 5 days a week or every day just to engage must faster because you’ve got the trust there. So the patient knows you, trusts you and so the whole process is much shorter and I think smoother.

HS: I agree. We can’t achieve without things like patient experience, their length of stay because we can’t get to see them all the time. And also it’s not that efficient if we’re going to a patient and spending 10 minutes and then we have to come away and then we go back again and the same thing so there’s probably an hour or so probably more on the ground each day trying to facilitate and how much time that takes to do that and it goes back to what Ria was saying there’s more opportunities to dip in and out when you’ve got more staff available to do that but obviously keep going back and forward is time consuming.

RH: And also from a functional carry over point of you exactly like you were saying if you’ve got that rapport with the patient and you’re seeing them consistently, you’re working towards those goals and the whole system works in a kind of smoother more efficient way exactly like Csaba said and you’re, they know what goals you’re working towards, you know what goals they’re working towards and it just smoothly runs and you’re regularly reviewing it with that patient and consistently following it through particularly with this patient population you, if you miss that day or you miss that afternoon and then it’s the next day, that gap makes a huge difference to their carry over and you do kind of take a step back before you can take a step forward, literally. And that does have an impact on not only their experience of their hospital stay but also their trust in that session, what they perceive as what they’re going to benefit
from that session. I think if they don’t see that consistent progression going forward, perhaps going home or whatever their goal is then you lose that rapport completely and the whole thing just takes a much longer time and is less efficient all round.

JJ: You mentioned functional carry over?

RH: Yeah. And you do notice that difference when you go and see a patient and you might say ‘hi, I’m RH the physio’ and they say ‘oh yes I remember we did this yesterday’ or ‘I did this’ and you’re instantly then in to go that’s what we’re going to do, we’re going to take it from there. It makes such a difference rather than they might remember that they saw me three days ago, they can’t remember what we did and if they’ve got worse or better since then and then you have to start again, which take time.

RM: I think as well sometimes when you’ve had a good session and you’ve achieved a certain thing that day, often I’ll talk to the patient and say Ok I’ll come and see you tomorrow and we’ll do this and tomorrow if there’s more new patients and by the time you’ve got through those and seen some other priority people you might not see them that day as promised and it might be the next day and they don’t complain about it but it doesn’t mean that they’re not registering the fact that we weren’t there when we said we were going to be there. So it’s almost like over promising even with good intentions but just the way things go sometimes it’s hard to follow through on those promises and that can affect that trust relationship
## Appendix 22: Section of framework analysis patient interviews

<table>
<thead>
<tr>
<th>Personal interactions (3.1)</th>
<th>Elements/dimensions identified</th>
<th>Categories/codes</th>
<th>Categories summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>P6</td>
<td>As we get older or even if we're young we have waste away, we deteriorate our body so we need this kind of thing (physio)…….so all these things like getting out of bed (if I were not doing the physiotherapy I think I would feel worse or just go down (64)</td>
<td>As get older, waste away so need physio to stop feeling worse or go downhill</td>
<td>Belief in the effect of PT</td>
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<tr>
<td>P7</td>
<td>He gave me great encouragement, this was the great thing um and (122)…he held the carrot always in front of me and that was good because I wanted to be out (133)</td>
<td>Given encouragement. Held a carrot</td>
<td>Encouragement from PT</td>
</tr>
<tr>
<td>P7</td>
<td>I feel safe because I trust them and I trusted (physio) you know he'd say come on do this and I would do it (123) Well the reason you trust any professional, he knew his job (128)</td>
<td>Felt safe because trusted the physio because felt that physio knew their job</td>
<td>Trust in PT</td>
</tr>
<tr>
<td>P5</td>
<td>Well the next time I say to myself well you've done it before, just get up and do it you know? And I don't take no notice I just get up and do what I want to do. And I do it and feel good about myself and then I can keep doing it if you know? Getting better each day, you know? (130)</td>
<td>If have done it before, can do it again. Then feel good about myself and then I can keep going. Getting better each day</td>
<td>Patient motivation personal achievement</td>
</tr>
<tr>
<td>P8</td>
<td>I suppose to get on, to get on so that you can do things on your own (59)</td>
<td>To be able to do things on your own</td>
<td>Patient motivation personal achievement</td>
</tr>
<tr>
<td>P4</td>
<td>Encouragement from PT motivates patient to do more, until your legs hurt you and you say I've got to go back (309) Makes all the difference having the PT there, do things you wouldn't do on your own (139)</td>
<td>Encouragement from PT. Makes all the difference having the PT there, do things you wouldn't do on your own</td>
<td>Encouragement from PT</td>
</tr>
<tr>
<td>P4</td>
<td>I think it would be good to have a little walk ermm you see I had a walk this morning and oh they praised me. And I felt good in myself because I felt that I was good in walking this morning (247)</td>
<td>Praise from physiotherapists felt good because was good in walking</td>
<td>Encouragement from PT</td>
</tr>
</tbody>
</table>

*Note: The table above contains a summary of the personal interactions and the elements/dimensions identified during patient interviews, categorized and summarized according to the framework analysis.*
Research Log

The research log provides an overview of the processes and timelines involved in the research project as it developed over the four years of study. It describes the question development, literature review and overview of the research project process highlighting the importance of others in the successful delivery of the project, and concludes with a summary.

Research Question Development

The commencement of a course of study at doctorate level is at once daunting and exciting. The aim of the research project is to make an original contribution to knowledge in the researchers own field of practice to which the development of an appropriate research question is critical. The development of the research question progressed in parallel with the development of the researcher. The first 18 months of study provided a structure to focus my development through taught aspects of study and summative assignments in subjects such as policy, politics and power, advanced research methods, service development and leadership in healthcare. These modules provided the opportunity to critically appraise and synthesise clinical practice and theory and critically to be able to present and justify the arguments for scrutiny by others.

Concurrent with the taught aspects of the course I was encouraged, in my supervision sessions, to read widely in the literature regarding my area of interest; the impact of physiotherapy to older adults admitted to hospital, in order to hone my question. This work formed the basis of the literature review (Chapter 2). Concurrently discussions with key stakeholders at the study site provided invaluable expertise and challenge in refinement of the research question.
Literature review

The literature review is described in the research thesis (Part 1, Chapter 2). Time was spent on refining the exclusion criteria in order to appropriately focus the review and thus identify gaps pertinent to the intervention and population of interest. For example the term hospital can include provision of services to an acute population or a sub-acute population such as rehabilitation or intermediate care dependent on global location. The studies in the literature review encompassed numerous global settings, this highlighted that physiotherapy is not an international term. Consequently, surrogate words for physiotherapy were identified as ‘physical therapy’, ‘exercise’ and ‘rehabilitation’ and were included in the search.

The literature review critically evaluated the representative literature with the aim of underpinning and justifying the research through clarification of areas that were less well understood such has the influence of patient on the outcome of physiotherapy intervention. The culmination of the literature review was a summary of the representative literature, which supported the validity of the research questions for study.

Study design

The literature review provided an overview of the knowledge base and also included a review of study designs. A crucial stage in the project was the selection of an appropriate design methodology with which to appropriately answer the research questions. The literature review provided evidence that the commonly used study designs were not ideally suited for investigation into physiotherapy in a complex acute inpatient environment. Some time was taken in discussing in supervision sessions the nature of the study and a key moment in the project progression was the agreement that the study was a service evaluation. This led the researcher to investigate possible theoretical frameworks to underpin the evaluation. After
consideration the Realistic Evaluation framework was determined to provide the most appropriate methodology to answer my research questions.

The use of realistic evaluation methodology presented challenges. It was unfamiliar to me and had not been used in the field of physiotherapy evaluation to my knowledge. This required me to undertake extensive reading and critical thinking to ensure that I understood the methodology and to determine that it was an appropriate methodology with which to investigate my questions. The more reading into the subject I undertook the more I was convinced that this was a methodology to meet my study requirements. There were however, a number uncertainties and decision making points along the way and these continued throughout the data collection and write up phases. For example whilst the originators of realistic evaluation provide detail regarding some aspects of the evaluation in other phases the requisite processes are less well described and in some instances opaque. This required re-visiting the literature and periods of critical thinking to ensure that I made decisions that were in keeping with the ethos of the methodology. The uncertainties are described in more detail in the conclusion of the thesis (Chapter 7).

**Project process**

The course requires significant project management skills over the course of the 4 years and to this end supervision sessions are vital to plan and co-ordinate the project. Supervision sessions commenced at the beginning of the four-year period of study and the expertise of my supervisors was critical to successful completion of the course of study and the research project. Other input was also critical to the success of my project especially the clinicians’ contribution, in various guises and at various stages of the study (appendix 1), and the opportunity to attend relevant internal and external courses of study (appendix 2). The clinical and academic perspectives were not always in harmony and required good communication on my part to manage expectations and deliverables on both sides.
The supervision sessions included discussion and challenge at all stages of the question development, research process and write up; sessions became more focused as the research project progressed. A summary of supervisory meetings, their and agreed objectives set at each meeting is demonstrated in appendix 3.

Following the literature review, research question development, selection of appropriate methodology and study design, ethical approval was sought from both the study site and the university ethics committee in January 2013. Changes and delays to the project were experienced at this point and highlighted the challenges of undertaking research in the naturalistic setting. Initial thoughts for the study centred on evaluation of a new 7-day physiotherapy service to the older persons’ unit in comparison with the existing 5-day service. Funding had been approved, a model of service provision developed and assurance from the general manager received. However, unexpectedly the general manager left the trust and the new incumbent required different, unachievable assurances regarding the impact of the 7-day service. More specifically that the project provided a return on investment of a reduction of hospital length of stay for the patients in question, ultimately to result in a reduction of the Directorate bed stock. I was unable to guarantee this and funding for the 7-day physiotherapy service was withdrawn in February 2013. In discussion with supervisors, and at this point having a more in-depth understanding of the requirements and challenges of the methodology of choice, the value of understanding the impact of the physiotherapy in the current service model was agreed to have considerable value. The project continued with the original first phase of the project, that of evaluation of the impact of the 5-day physiotherapy service.

Data collection was a particularly challenging phase of the project and was undertaken whilst continuing in my role at the study site. The older person’s unit is located in a different wing of the hospital to the sites I am required to visit in my substantive role. Data collection took
place from July 2013 until November 2013 on the wards of the Older Persons Unit and on average required a minimum of half a day Monday to Friday. Data collection required considerable organisation to keep track of admission and discharge dates so as to undertake the study measures. The inclusion criteria of undertaking study measures within 48 hours of admission highlighted the number of patients admitted to the unit on a Friday and Saturday. Interviews with patients were another challenging part of the data collection phase. The ward physiotherapists would identify suitable patients for interview but patients and/or their carers were often not available when I was present on the wards, which required significant, time intensive trips to and from the wards, often with the outcome that no data was collected. This is reflected in the number of interviews that were undertaken in the study. By contrast the organisation of the focus group with the physiotherapy staff was more straight forward but required excellent facilitation skills to keep the discussion focussed.

Quantitative and qualitative data analysis occurred between September 2013 and January 2014. This required significant support of a statistician for the quantitative data analysis and I was fortunate that the study site has excellent links with the local university. The analysis of the qualitative data was new to me and required in-depth reading and discussion with supervisors to identify the appropriate method prior to ethical review. Analysis of the realistic interviews is one of the processes not described within the original realistic evaluation text and consequently numerous methods have been utilised in the literature. The framework analysis of the transcripts was at times frustrating and uncomfortable as I questioned my synthesis of the data and analytic decisions. The process was also simultaneously thought provoking and motivating and as I progressed in the analysis I began to gain insight into the patient and physiotherapist perspective of why and how physiotherapy might or might not work for this patient cohort.
The first draft of the thesis was submitted in September 2014 and amendments made following feedback from supervisors. During the period between submission of the first and final drafts the research log, the overview of integration of knowledge, research and practice paper and clinical academic paper were written. These and the final draft of the thesis were submitted in November 2014.

**Summary**

The successful completion of the research project was a journey and a collaborative process that required leadership, persistence, flexibility and honest self-reflection on the part of the researcher in conjunction with support, generosity of expertise and time from supervisors and work colleagues. It required positive and honest communication from all actors both at the study site and with supervisors.
## Appendix 1 – Key people

<table>
<thead>
<tr>
<th>Title</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Director of Therapies</td>
<td>Financial and study leave support</td>
</tr>
<tr>
<td>Consultant Geriatrician</td>
<td>Advice and support at project initiation</td>
</tr>
<tr>
<td>Senior Consultant Physiotherapist</td>
<td>Advice and support throughout the project</td>
</tr>
<tr>
<td>Clinical Lead Physiotherapists</td>
<td>Advice and support throughout the project. Proof reading thesis</td>
</tr>
<tr>
<td>Clinical Specialist Physiotherapist</td>
<td>Assistance with co-ordination of data collection</td>
</tr>
<tr>
<td>Physiotherapists on Older Persons’ Unit</td>
<td>Identification of patients for interview</td>
</tr>
<tr>
<td></td>
<td>Participation in focus group.</td>
</tr>
<tr>
<td>Statistician</td>
<td>Statistical advice and support</td>
</tr>
<tr>
<td>Consultant Health Psychologist</td>
<td>Advice and support regarding patient behaviour</td>
</tr>
</tbody>
</table>
## Appendix 2 – Relevant course attendance

<table>
<thead>
<tr>
<th>Course/Conference/workshop</th>
<th>Date</th>
<th>Outcomes</th>
</tr>
</thead>
</table>
| Cass Business School Leadership Development                    | Jan - Aug 2011 | Understanding of my strengths and weaknesses as a leader  
Individual coaching sessions invaluable for being comfortable with these but at the same time looking for opportunities to develop.  
Understanding of ambiguity and strategies to manage this is the health sector |
| Chartered Society of Physiotherapy conference                  | Oct 2011      | Presentation of local data regarding implementation of 7-day physiotherapy service to respiratory services at St Thomas’ hospital  
Networking opportunity                                                                                                                     |
| National Institute for Health and Clinical Excellence (NICE) seven day working stakeholder scoping workshop | November 2012 | Understanding of the wider political agenda  
Networking opportunity                                                                                                                                                                                 |
| All mixed up? Using mixed methodology to evaluate complex interventions | Feb 2013 | Understanding of mixed method research and its scope in health services research (HSR)  
Understanding of the advantages and limitations of mixed methods research in HSR  
Understanding of complexity  
Challenges in developing and evaluating complex interventions                                                                                          |
| Qualitative data analysis                                      | Feb 2013      | Understanding of the key approaches to analysing qualitative data  
Understand the use of coding  
Application of coding and thematic analysis to data                                                                                                    |
| British Geriatric Society Autumn Conference                    | November 2013 | Poster presentation  
Opportunity to attend presentations relevant to my study presented by experts in the field  
Networking opportunity                                                                                                                                                                           |
| Westminster Health Forum: Improving care services for older people, integration, personalisation and access | May 2014      | Understanding opportunities for reconfiguring services to meet the challenges of an ageing population.  
Delivering patient-centred services and maintaining independence.                                                                                                                                   |
| Exercise: The most promising intervention to prevent of delay cognitive decline, dementia and frailty in older adults. | October 2014  | Opportunity to hear key opinion leaders  
Overview of current evidence                                                                                                                                                                                    |
### Appendix 3 – Supervision record example

<table>
<thead>
<tr>
<th>Date</th>
<th>Discussion</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 2013</td>
<td>Problems with changes to funding of 7-day service and impact on data collection Options – pros and cons Charity application – expression of interest submitted</td>
<td>Submit charity bid Carry on with Phase 2 interviews and 5-day data collection as planned Population description at Kings</td>
</tr>
<tr>
<td>June 2013</td>
<td>Supervision and annual review Reviews first Phase 2 interview and explored framework analysis – consideration of theoretical framework re process/outcomes Explored alternatives if 7-day didn’t occur and how this would affect the project</td>
<td>Continue Phase 2 interview analysis Continue quantitative data collection Decision to focus project on 5-day physiotherapy service and consider 7-day in the future if funding is forthcoming</td>
</tr>
<tr>
<td>July 2013</td>
<td>Revised framework data from initial interviews - do not over analyse Discussion of outcomes emerging from interviews and how this links with Pawson and Tilley Quantitative data collection nearing end</td>
<td>Review qualitative data outcomes Finish 8 week quantitative data capture Consider how to collapse qualitative data outcomes</td>
</tr>
<tr>
<td>September 2013</td>
<td>Looked at comments re revising aims and objectives. May add qualitative 7-day data if funding granted. Reviewed revised CMO configurations Discussed the importance of impact and qualitative data and aligning impact and mechanism Number of interviews with patients and staff</td>
<td>Await charity report on outcome of 7-day working submission. Revise interview questions Configure a sample of quantitative data into SPSS – variable labels Undertake 2-3 patient interviews Consider focus group for physiotherapists and other staff</td>
</tr>
<tr>
<td>October 2013</td>
<td>Interview feedback in relation to research questions and outcomes Need to develop probes and look at language flow of the interviews Ask for examples from interviewee Consideration of schedule for focus group – open questions and controversial issues</td>
<td>Continue with interviews Focus group 16/10/13 Complete data entry in November Describe sample Define missing data</td>
</tr>
<tr>
<td>Date</td>
<td>Discussion</td>
<td>Actions</td>
</tr>
<tr>
<td>------------</td>
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</tr>
<tr>
<td>November 2013</td>
<td>Review of focus group – discussed hierarchy, Band 8 to Band 3. Focus in the discussion on 7-day working – would make the service better Flexibility of service provision would provide continuity for patients and small amounts of intervention. of elderly patients, building trust and therapeutic relationship Lack of use of facilities Multidisciplinary culture – team meetings, empowerments of PTs</td>
<td>Data analysis – analyse focus group and send analysis framework to SF and WK. Then analyse patient interviews</td>
</tr>
<tr>
<td>December 2013</td>
<td>Focus group data analysis fed back to supervisors by email Week off over Christmas</td>
<td>Further levels of abstraction needed</td>
</tr>
<tr>
<td>January 2014</td>
<td>Went through data from focus group; talked through outcomes and emerging theory Look at research questions and stick to them – not all data will be included in write up but still of interest Discussed self-efficacy and possibilities of other theories i.e. trans-theoretical and theory of planned behaviour</td>
<td>Analyse patient data – use outcomes of focus group as a start for categories for patient analysis. Consider how to write up data and flow – consider findings and order – diagram Pick out key messages of study for next supervision Quantitative data analysis first draft</td>
</tr>
<tr>
<td>February 2014</td>
<td>Looked at descriptive stats and initial thoughts re clinical significance of population Discussion around headings and subheadings for thesis including how theory threads conceptual framework, mid-range theories and self-efficacy might be interwoven</td>
<td>Complete quantitative analysis Write up methodology/methods Future step – write up findings</td>
</tr>
<tr>
<td>March 2014</td>
<td>Reviewed and refined aims and objectives – focus on words from realistic evaluation. Looked at data and discussed and content Discussion of dosing, new ways of working, triage and which patient group should physiotherapy focus on</td>
<td>Explore strength associations in quantitative data and decide what is most likely to impact – consider dependent variable, ?multiple regression See statistician Finish methodology draft</td>
</tr>
<tr>
<td>May 2014</td>
<td>Feedback on methodology and method chapters Good first drafts, small amendments and changes proposed Discussion of the sample size and link between hypotheses</td>
<td>Go back to statistician in relation to power of the study and review multi-regression models Look at and revise order of hypotheses in light of above and primary outcome Complete first draft of findings</td>
</tr>
<tr>
<td>Date</td>
<td>Discussion</td>
<td>Actions</td>
</tr>
<tr>
<td>---------</td>
<td>---------------------------------------------------------------------------</td>
<td>----------------------------------------------</td>
</tr>
</tbody>
</table>
| July 2014 | Explored literature review  
High level of critical analysis but repetitious – need to find and ways to summarise.  
Consider related policies  
Consider theoretical basis of rehabilitation and how to address in thesis  
Explored realist evaluation | Move onto discussion and first draft of discussion – think about key messages and how to address.  
Highlight originality and innovations  
Propose recommendations |
| Sept 2014 | Feedback on findings chapter and need to define health status, patient characteristics and physiotherapy interventions  
Looked at discussion and reviewed model | Revise findings and discussion  
Submit full first draft |
| Oct 2014 | Review first draft  
Discussed definition of ‘impact’ and how this works across the thesis as there are currently inconsistencies in the definition  
Consider more controversy and debate in the discussion/conclusion in relation to rehabilitation.  
Consider literature review for paper | Revise introduction, discussion and conclusion  
Submit exam entry form  
Complete research log and overview piece  
Begin paper |

**Overview of the integration of knowledge, research and practice**

**Introduction**

This chapter describes my professional and personal development, over the four years of doctoral studies in terms of the integration of knowledge, research and practice gained in that learning experience. My personal and professional development during the course occurred in parallel as I acquired new knowledge, skills and experience.

**Background**

The post I hold is a senior position within the trust, responsible for the management and leadership of 230 physiotherapists and support staff and an annual budget of £9.2 million. The position requires advanced leadership and management skills but whilst these skills are intuitive they are rarely defined and subject to change. Business and clinical development opportunities are available but the doctorate course offered opportunities to develop in
domains not traditionally associated with a clinical role for example consideration of philosophical paradigms and advanced research methods.

**Personal development**

The aim of the study journey is development of the student and during the four-year period I changed and developed in both my thinking and confidence in my thinking. At the beginning and throughout the course of study the student is in a position of instability, which I found to be both exciting and unnerving. This flux is best described utilising the novice to expert paradigm originally developed in pilots (Dreyfus, 1982) and subsequently applied to nursing (Benner, 2000). The Dreyfus model posits that a student passes through 5 levels of proficiency during skill acquisition, novice to expert through advanced beginner, competent and proficient levels.

In my healthcare role I am an experienced clinician and manager with significant experiential and formal post-graduate training. At the commencement of the course I was proficient in some domains such as leadership and organisational change but in other domains, such as research, I was novice; moreover, during the four years I had to constantly transition from a leadership role to that of a student and back again. This was challenging and provided some explanation for the gamete of emotions I passed through during the period of study; enthusiasm, inspiration, de-moralisation, daunted, overwhelmed, uncomfortable, apprehension, stimulation.

The taught elements of the doctoral study provided both personal and professional development through knowledge and skill acquisition and all challenged preconceived thoughts and beliefs and led to my development in critical thinking and critical appraisal. The summative assignments provided feedback as to my development in various domains. The communities of practice module highlighted the breadth of philosophical paradigms and encouraged critical analysis, interpretation, argument synthesis and debating skills. This and
the service evaluation module directly influenced the consideration of less common methodologies for my study. The advanced research methods course provided the foundation for the project development and operational considerations as well as key knowledge regarding data analysis. Policy, politics and power module and leadership modules elicited an understanding of the wider strategic and political agenda within healthcare and the importance of leadership in influence and achievement of ambitions.

The communities of practice in particular highlighted the importance of a philosophical stance for clinicians and researchers. After further reading into realistic evaluation and realism, the tenets of a stratified reality, emergence and generative mechanisms resonated with me. In particular, the influence of individuals and the structures and culture of society on the mechanisms of action triggered by an intervention. Thus, I changed over the course of study from a predominantly reductionist perspective, in common with many healthcare professionals, to one of realism and pragmatism.

The various discussions at university during lectures, supervision sessions and presentations highlighted alternative ways of thinking and demonstrated cultural and professional influences on healthcare discourse. As the research journey progressed I changed and developed novel thoughts and new ways of thinking. Furthermore, over the course of the study the in-depth knowledge and skills acquired in a number of domains enhanced my personal feelings of credibility and thus I acquired a more assertive communication style in discussions and meetings with professional and managerial colleagues both within and outside of the organisation. Development of verbal communication skills, ability to actively participate in debate and discussion, present arguments, persuade and deal with criticism were all enhanced.
Skill acquisition

I had to acquire a number of skills over the course of the study; critical thinking, critical analysis, research project management, data analysis and influencing skills. The conscious competence-learning matrix (Burch, 1970) (appendix 1) provides one model to explain skill acquisition for my progression from novice through the subsequent levels of skill acquisition towards expert practice. The conscious competence theory matrix is a model, which offers an explanation of the process and stages of learning a new skill (or behaviour, ability, technique, etc.). In more recent adapted versions a fifth stage or level is sometimes added, although there is no single definitive five-stage model (Figure 1).

In some areas such as research I started with a beginner’s mind. The taught elements of the course allowed me to identify my own incompetence and thus to begin to develop competence. In other areas such as leadership I was more advanced. The matrix provides a description of how I was able to progress in individual skill development. Progression from stage to stage was often accompanied by a feeling of illumination, as things ‘clicked’ into place and I began to feel less novice and more proficient over the course of the study. The progression was not uni-directional and I moved backwards and forwards between novice, advanced beginner and competence levels and thus, revisited conscious incompetence, making discoveries of gaps in my knowledge and skills. Often I would become discouraged but the support of supervisors and others helped me find the incentive to continue. On going training, supervision, mentoring and self-study were crucial in the progression to proficiency through conscious competence in skills and knowledge.

One example of a fifth element added to the model is by Taylor (2007) (Figure 1). For me this element of reflective competence was crucial. Mature practice involves a reflective competence, a mature recognition that one is inevitably ignorant of many things one does not know. Repeatedly, therefore I continuously rediscovered my beginner’s mind throughout the
doctoral course but became more comfortable in this process and welcomed the opportunity for further development.

Key aspects of personal development:

- Credibility
- Confidence
- Influencing skills
- Critical thinking and appraisal skills
- Reflexivity
- Move from reductionist to pragmatic realist
- Comfortable in revisiting incompetence and the opportunities offered for ongoing development

Figure 1: Model of skill acquisition adapted from (Benner, 2000) and (Taylor, 2007)
Professional Development

The NHS has entered a fourth year of unprecedented financial challenge; no increase in funding in real terms coupled with increasing demands (The King's Fund, 2014a) and thus unparalleled need to close the financial gap through more efficient and effective use of the constrained budget (The King's Fund, 2014b). After seemingly withstanding such austerity since 2010, current evidence suggests that NHS finances are starting to come under severe financial pressure (Nuffield Trust, 2014). However, the crisis is not associated with financial performance alone but encompasses professional ethics, compassionate care, evidence-based practice and efficient use of resources (Moffatt, Martin and Timmons, 2014). The productively rhetoric was achievement of savings whilst improving the quality of services. However, the recent egregious failings of the NHS (NHS England, 2013) have demonstrated the depth of the current crisis. This is the challenge facing me and others as a professional and clinical leaders in the current NHS.

The policy review and service development projects contributed to overall to my professional development, specifically in relation to my role as a leader of the physiotherapy profession in the wider political healthcare arena and the power relations that exist herein. The policy review assignment was particularly thought provoking in the realisation that, the nascent health care professions such as nursing and physiotherapy face a challenge. In attempting to demonstrate their ability to take on extended roles and blur the boundaries between professions, they limit the ability to be seen as a profession. The service evaluation module made me cognisant of methodologies more appropriate to the study of physiotherapy than the ubiquitous controlled trial methodologies and started the journey to realistic enlightenment. As my knowledge, critical analysis and synthesis skills developed I became more confident in my professional role particularly in the multi-disciplinary arena.
Thus, throughout the taught elements of the course; politics, policy and power, research methods and leadership and service evaluation I expanded the boundaries of my knowledge. Extensive reading, critical appraisal and thinking were essential to develop my knowledge. This reading in particular highlighted the importance of a theoretical basis for my study and the importance of theory as a starting point for testing to gain new knowledge regarding the impact of interventions and service design. This knowledge is essential for leaders to enable them to make decisions about the appropriate allocation of valuable resources. Importantly, theory needs to be generated from the practical world that is from the practices of experts in the field (Benner, 2000).

The history of the profession was interesting and provided for me regarding the challenges that face the profession currently and in particular the bio-medical focus of the physiotherapy research to date. The taught course and self-study enabled me to increase my knowledge of research methodology and project design in quantitative, qualitative and mixed methods domains. This knowledge also helped me critically appraise various forms of research as well as to seek collaboration with colleagues to consider research-based improvements for care at a professional and inter-professional level. The development of the methodology from a biomedical comparative study to a realistic evaluation was one of the most satisfying aspects of the study and required extensive reading, critical thinking and discussion with supervisors and other experience researchers. In addition, the project resulted in an expansion of my knowledge of the physiological impact of aging and the effect of rehabilitation on older adults, which has contributed to the effectiveness of my clinical practice.

Like nursing, physiotherapy practice, both individual and collective, faces challenges to develop or decline (Benner, 2000).

“What one cannot do is be beyond experience, or be responsible for what has not yet been encountered in practice”
Development must come with robust evaluation of current and new practices, which requires staff to have the requisite academic ability. The simultaneous challenge is that some physiotherapy staff, including leaders of the profession, do not accept that increasing the academic profile of the profession is a good thing and prefer instead focus on the caring and doing aspect of the profession. Change will require a change in the culture of the profession, which will in turn require strong professional leadership and role models. The course has enabled me to grow in confidence and rather than despair about the situation I feel positive about my professional identity and that I can make an active contribution to the profession going forward.

Key aspects of professional development:

- Understanding the politics and power relationships at organisational and national levels.
- Enhanced leadership skills.
- Importance of developing theoretical underpinning of the profession.
- Importance of utilising robust research to inform models of service delivery to maximise productivity and simultaneously improving service quality for patients.

Conclusion

In summary, completing a doctoral course of study has opened up my professional and personal horizons. I have developed clinical, research and leadership knowledge and skills and new insight into my preferences both personally and professionally. It also demonstrated to me my persistence and resilience over the course of the study. The programme has given me confidence to undertake and implement quality research and to share my knowledge and embrace critical feedback and discussion. The course has added to an existing portfolio of clinical, managerial and leadership knowledge and skills and has resulted in a shift of
personal attitudes and critical analytic skills. The course of doctoral study is on some ways an individual achievement, it has required hours of study, critical thinking and reflection along with determination, resilience, tenacity, prioritisation and organisational skills. But it is also far from an individual achievement and not possible without the support of key individuals (research log appendix 2). In particular, the expertise, support and advice of supervisors is critical.

Finally the course has resulted in increased confidence to design, undertake and implement high quality research in physiotherapy and the confidence to write and publish my findings and well as to support others. It has also made me more well-equipped and therefore more powerful to anticipate, influence and lead change in an ever-changing world and more prepared to question my own practice and that of others. This not only enhanced my personal performance and job satisfaction but also enabled me to be a role model for the local and wider physiotherapy workforce.
References


NHS England (2013) How to ensure the right people, with the right skills, are in the right place at the right time: A guide to nursing, midwifery and care staffing capacity and capability. London: NHS England.


## Appendix 1 – Conscious Competence Model of Skill Acquisition

### Competence

<table>
<thead>
<tr>
<th>3) Conscious competence</th>
</tr>
</thead>
<tbody>
<tr>
<td>- The person achieves 'conscious competence' in a skill when they can perform it reliably at will</td>
</tr>
<tr>
<td>- the person will need to concentrate and think in order to perform the skill</td>
</tr>
<tr>
<td>- the person can perform the skill without assistance</td>
</tr>
<tr>
<td>- the person will not reliably perform the skill unless thinking about it - the skill is not yet 'second nature' or 'automatic'</td>
</tr>
<tr>
<td>- the person should be able to demonstrate the skill to another, but is unlikely to be able to teach it well to another person</td>
</tr>
<tr>
<td>- the person should ideally continue to practise the new skill, and if appropriate commit to becoming 'unconsciously competent' at the new skill</td>
</tr>
<tr>
<td>- practise is the single most effective way to move from stage 3 to 4</td>
</tr>
</tbody>
</table>

### Incompetence

<table>
<thead>
<tr>
<th>2) Conscious incompetence</th>
</tr>
</thead>
<tbody>
<tr>
<td>- the person becomes aware of the existence and relevance of the skill</td>
</tr>
<tr>
<td>- the person is therefore also aware of their deficiency in this area, ideally by attempting or trying to use the skill</td>
</tr>
<tr>
<td>- the person realises that by improving their skill or ability in this area their effectiveness will improve</td>
</tr>
<tr>
<td>- ideally the person has a measure of the extent of their deficiency in the relevant skill, and a measure of what level of skill is required for their own competence</td>
</tr>
<tr>
<td>- the person ideally makes a commitment to learn and practice the new skill, and to move to the 'conscious competence' stage</td>
</tr>
</tbody>
</table>

### Unconscious

<table>
<thead>
<tr>
<th>4) Unconscious competence</th>
</tr>
</thead>
<tbody>
<tr>
<td>- the skill becomes so practised that it enters the unconscious parts of the brain - it becomes 'second nature'</td>
</tr>
<tr>
<td>- common examples are driving, sports activities, typing, manual dexterity tasks, listening and communicating</td>
</tr>
<tr>
<td>- it becomes possible for certain skills to be performed while doing something else, for example, knitting while reading a book</td>
</tr>
<tr>
<td>- the person might now be able to teach others in the skill concerned, although after some time of being unconsciously competent the person might actually have difficulty in explaining exactly how they do it - the skill has become largely instinctual</td>
</tr>
<tr>
<td>- this arguably gives rise to the need for long-standing unconscious competence to be checked periodically against new standards</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1) Unconscious incompetence</th>
</tr>
</thead>
<tbody>
<tr>
<td>- the person is not aware of the existence or relevance of the skill area</td>
</tr>
<tr>
<td>- the person is not aware that they have a particular deficiency in the area concerned</td>
</tr>
<tr>
<td>- the person might deny the relevance or usefulness of the new skill</td>
</tr>
<tr>
<td>- the person must become conscious of their incompetence before development of the new skill or learning can begin</td>
</tr>
<tr>
<td>- the aim of the trainee or learner and the trainer or teacher is to move the person into the 'conscious competence' stage, by demonstrating the skill or ability and the benefit that it will bring to the person's effectiveness</td>
</tr>
</tbody>
</table>

(Bruce, 1970)