Title: Co-location of health and leisure to promote physical activity: A realist synthesis

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Candidate Declaration

I hereby declare that:

1. I have not been enrolled for another award of the University, or other academic or professional organisation, whilst undertaking my research degree.

2. None of the material contained in the thesis has been used in any other submission for an academic award.

3. I am aware of and understand the University's policy on plagiarism and certify that this thesis is my own work. The use of all published or other sources of material consulted have been properly and fully acknowledged.

4. The work undertaken towards the thesis has been conducted in accordance with the SHU Principles of Integrity in Research and the SHU Research Ethics Policy.

5. The word count of the thesis is 68, 556

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Abstract

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To address the burden of non-communicable chronic disease (NCDs), many initiatives focus on increasing physical activity (PA) through healthcare. In Sheffield, as part of a London 2012 Olympic Legacy programme, the National Centre for Sport and Exercise Medicine - National Health Service (NHS) clinics were co-located within leisure centres. The aim was to promote PA as prevention and treatment option in healthcare and to bring care out of hospitals and into the community. Although policy calls for co-location of healthcare in alternate settings, there is little evidence that leisure centres might represent a suitable environment. It is unknown what impact delivering healthcare in leisure centres might have on promotion of PA within those services. This research seeks to understand how, why, for whom and under what circumstances co-location of healthcare with leisure works (or does not work).

This research was grounded in realist methodology in two phases. In Phase 1, initial programme theories were developed through a realist review of academic, grey and policy literature on co-location. Initial rough programme theories from the realist review were subsequently 'tested' and 'refined' using data from semi-structured realist interviews with stakeholders involved in development of the co-location model in Sheffield. Phase 1 ended with nine theories regarding how, why, for whom and in what circumstances co-locating health and leisure services might work (or not).

In Phase 2, theories were tested through semi-structured interviews with ten healthcare professionals and ten patients across four clinical services based in the co-located sites. Subsequently, five refined programme theories emerged. These theories suggest that colocation works best for patients with NCDs who are motivated but need support. Colocation of health and leisure works best for HCPs that are active, knowledgeable about PA and make time to discuss PA with patients.

Co-location of health and leisure creates a salutogenic environment which enables patients and HCPs to become active. Enabling contexts include aligned business models, shared clinical and PA scheduling and teamwork between HCPs and exercise professionals. Logistical challenges and individual motivations serve as barriers to co-location working to promote PA. Co-location, under the right conditions has the potential to result in promotion of PA through healthcare and more individuals with NCDs becoming physically active.

Published Work from Thesis

Abstracts published

- GRINVALDS, Natalie and COPELAND, Robert (2018). The development of a theory of change for the co-location of NHS clinics within leisure centres to place physical activity at the heart of the NHS. Journal of Physical Activity & Health, 15 (10), S238S238.

Abstracts submitted to conferences and accepted

- Abstract accepted at the International Society of Physical Activity and Health (ISPAH)

  Congress October 2018 and presented as ePoster.

- Abstract presented at The Yorkshire and Humber Physical Activity Knowledge Exchange (YoHPAKE) 2019.

- Abstract submitted to Sport and Innovation Conference is 2-3 October 2019 in Budapest, Hungary and accepted. Was not able to attend due to short notice and limited funding.

- Abstract submitted and accepted to *Sports, Medicine and Health Summit* in Hamburg, Germany October 2020 but was postponed to April 2020 due to the COVID-19 pandemic *What works for whom, under what circumstances and why for the co-location of health and leisure to increase physical activity (PA)? A realist review and evaluation.*

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Glossary of terms

For the purposes of this report and PhD the following definitions apply.

- **Active:** For the purposes of this report, *active,* is defined as meeting the UK Physical Activity Guidelines of 150 minutes moderate intensity PA or 75 minutes per week of vigorous intensity PA

- **Clinical commissioning group (CCG**): CCGs commission most health services, including emergency care, elective hospital care, maternity services, and community and mental health services. During the completion of this PhD, CCGs were established. Note: On July 1, 2022, CCGs were abolished, and Integrated care systems (ICS) were established.

- **Co-location:** to locate or be located in jointly or together intentionally, as two or more groups; to share or designate to share the same place.

- **Exercise:** "is a subcategory of physical activity that is planned, structured, repetitive, and aims to improve or maintain one or more components of physical fitness." (WHO, 2018)

- **Exercise is Medicine (EIM):** Exercise as Medicine, Exercise is Medicine® (EIM), a global health initiative managed by the American College of Sports Medicine (ACSM), encourages primary care physicians and other health care providers to include physical activity when designing treatment plans and to refer patients to evidencebased exercise programs and qualified exercise professionals

- **Exercise referral (ER):** "Exercise Referral is a specific and formalised programme whereby a medical professional refers a patient to a fitness programme, often based within the community. It is not the same as a 'recommendation' to exercise. A formal agreement will exist between the referrer and the exercise project. Usually (though not exclusively) run by local authority leisure centres, they will typically ensure a 12-week supervised programme of physical activity tailored to suit the needs of the referrer and the referred client, with a view to improving their state of health." (REP, 2018).

- **Health care professional (HCP)**: a professionally trained medical individual delivering medical care to patients

- **Inactive**: For the purposes of this report, *inactive*, will be defined as not meeting the UK Physical Activity Guidelines

- **Leisure time physical activity (LTPA):** physical activity participation in leisure time, for example: walking, dancing, gardening, hiking, swimming

- **Mechanism:**)"A mechanism is not a variable but an account of the behaviour and interrelationships of the processes that are responsible for the change. A mechanism is thus a theory; a mechanism is a theory of what causes changes in individual behaviour (Pawson & Tilley, 1997)

- **Moderate intensity physical activity** causes adults to feel warmer, breathe harder and the heart beats faster, with the example of brisk walking being the easiest to recognize

- **MoveMore Plan:** Sheffield's Physical Activity strategy which aims to make Sheffield the most active city in the UK by 2020

- **Musculoskeletal (MSK)**: affecting the muscles, ligaments, tendons, bones and joints

- **NHS:** National Health Service (UK)

- **NCSEM**: National Centre for Sport and Exercise Medicine

- **One-stop shop**: A one-stop shop brings together a range of several public services under the same roof such as healthcare and leisure (OECD, 2020; Places Leisure, 2017). One-stop shops should be used as a means to improve service delivery, reduce transaction costs, and improve societal welfare (OECD, 2020).

- **Physical activity (PA)**: For the purpose of this research physical activity is defined as "any bodily movement produced by skeletal muscles that requires energy expenditure. The term "physical activity" should not be confused with "exercise". "Exercise" is a subcategory of physical activity that is planned, structured, repetitive, and aims to improve or maintain one or more components of physical fitness. Beyond exercise, any other physical activity that is done during leisure time, for transport to get to and from places, or as part of a person's work, has a health benefit. Further, both moderate- and vigorous-intensity physical activity improve health" (WHO, 2018).

- **Physical inactivity:** An insufficient physical activity level to meet present physical activity recommendations; less than 30 minutes weekly of moderate intensity physical activity

- **Sedentary behaviour:** time spent in behaviours in the sitting, lying down, or reclined position (such as sitting, driving a car, and watching television) that require low energy expenditure (i.e., 1.5 METs) (Tremblay, et al., 2017).

- **Sport:** An activity involving physical exertion and skill in which an individual or team competes against another or others for entertainment or for a job. Sport can be a subcategory of physical activity

- **UK Physical activity guidelines for adults (16-64 years)** (UK CMO, 2019)
  For good physical and mental health, adults should aim to be physically active every day. Any activity is better than none, and more is better.
    - Adults should do activities to develop or maintain strength in the major muscle groups, such as heavy gardening, carrying heavy shopping, or

resistance exercise. Muscle strengthening activities should be done on at least two days a week, but any strengthening activity is better than none.

- Each week, adults should accumulate at least 150 minutes (2 1/2 hours) of moderate intensity activity (such as brisk walking or cycling); or 75 minutes of vigorous intensity activity (such as running); or even shorter durations of very vigorous intensity activity (such as sprinting or stair climbing); or a combination of moderate, vigorous and very vigorous intensity activity.
- Adults should aim to minimise the amount of time spent being sedentary, and when physically possible should break up long periods of inactivity with at least light physical activity.

- **Vigorous intensity physical activity** causes adults to get warm quickly, breathe much harder, perspire and find it difficult to maintain a conversation.

Department of Health (DH) (2011). Fact sheet 4: adults (19-64 years). Retrieved from https://www.gov.uk/government/publications/uk-physical-activity-guidelines

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Outline of thesis

This thesis contains eight chapters.

- Chapter one presents background on the topic and introduction to the research. This includes an exploration of the epidemiological burden of PA and approaches used to address the burden of inactivity. The role of physical activity in healthcare, including exercise referral and the development of a co-location model in Sheffield are discussed.
- Chapter two provides an overview of the realist philosophy of science, realist methodology and the methods used in the two phases of the research.
- Chapter three presents a realist review of existing examples of co-location of healthcare and leisure. The methods used to conduct the review and the resulting themes are explained.
- Chapter four presents the findings from realist evaluation interviews used to test the themes developed in the realist review. This chapter details the methods, ethical approvals, and resulting themes.
- Chapter five presents the initial rough program theories (IRPTs). The narrative covers the processes used to develop the IRPTs from the realist review, realist evaluation and middle range theory (MRT).
- Chapter six presents the interviews with HCPs and patients, which were used to test the IRPTs developed in the realist review.
- Chapter seven presents IRPTs developed in the realist review.
- Chapter eight presents the final five refined programme theories that explore the model of co-location of healthcare and leisure. These theories are considered in the

wider context of the extant literature. This chapter also presents the conclusions, strengths and weakness, and implications for future research.

See Figure 1.0 below for a visual representation of the thesis structure.

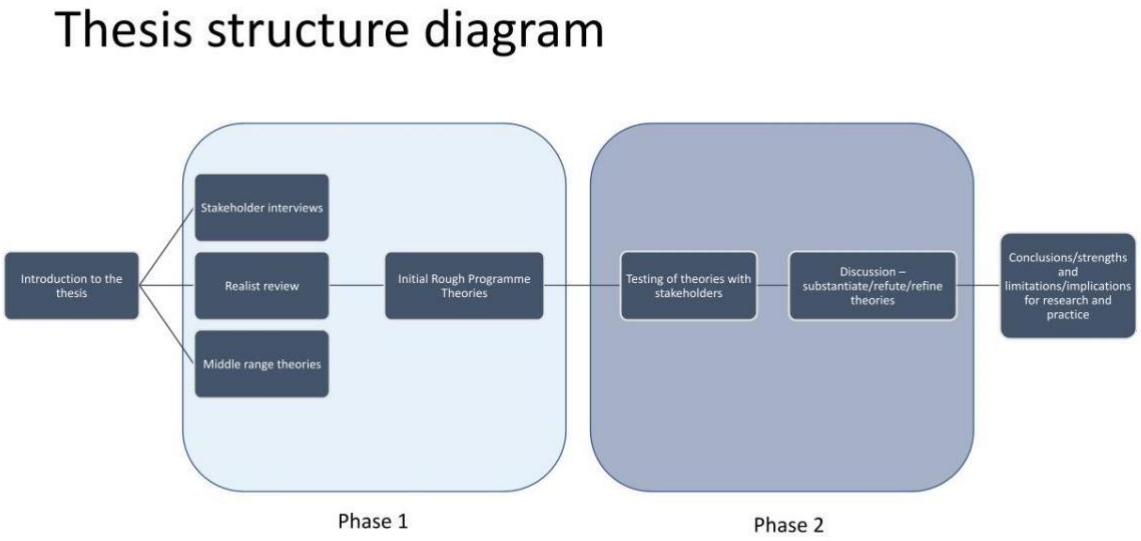

Figure 1.0 Thesis structure diagram

Chapter 1: Introduction

1.1 Chapter introduction

This research aims to build programme theory to understand how, for whom and in what circumstances, the co-location of health services and leisure facilities works (or not) to promote physical activity (PA) as part of routine NHS care. The chapter begins with a summary of health, social and economic benefits of PA, current PA behaviour worldwide and considers the inequalities and healthcare consequences associated with a lack of PA. The current policy context of PA promotion in the UK is presented followed by a review of current approaches to the use of PA as therapy in health care, including exercise referral schemes (ERS) and brief interventions. The concept of 'co-location of health and leisure' is defined and the formation of the National Centre for Sport and Exercise Medicine (NCSEM) in Sheffield and the associated co-location model is described. The NCSEM provides the physical context for this research (Petticrew, 2011). This chapter concludes with presentation of the research aims and objectives.

1.2 Background to the research

1.2.1 Health benefits of physical activity

There is widespread recognition across a variety of sectors of the benefits of maintaining a physically active lifestyle. The dose-response relationship between physical activity (Warburton & Bredin, 2017) and the prevention of premature mortality and NCDs (Lee et al., 2012; Pedersen & Saltin, 2015; Posadzki et al., 2020) confirms that any PA is good, and more is better.

There are numerous benefits of PA in the prevention and management of both physical and mental health conditions (McNally, 2015) and no “dose” or threshold is too small to result in health benefits (Posadzki et al., 2020). Furthermore, the relationship between PA and health benefits is curvilinear, which means that there are large benefits of increasing PA for those that are the least active (Kohl, 2001; Warburton & Bredin, 2017). Benefits of PA include prevention of non-communicable chronic disease (NCD) ((cardiovascular disease (Nystoriak & Bhatnagar, 2018), diabetes (Thent et al., 2013) and cancer (McTiernan, 2008) (Anderson & Durstine, 2019; Lee et al., 2012)). A growing body of research illustrates the benefits of both acute and habitual PA for psychological health, even at levels below the public health recommendations (Mandolesi et al., 2018). Regular PA (specifically aerobic exercise) can result structural and functional changes in the brain (Basso & Suzuki, 2017; Colcombe & Kramer, 2003; De Moor et al., 2006; Douw et al., 2014), which lead to improved cognitive functioning, increased sense of wellbeing, mood and emotional state (Biddle et al., 2011; Mandolesi et al., 2018). Regular PA can help to manage cognitive and neurological disorders and counteract age-related cognitive decline (Chieffi et al., 2017; Fernandes et al., 2017). Being physically active can help reduce the risk of depression; there are significant mental health benefits from reaching levels of PA even at levels below the public health guidelines (Pearce et al., 2022).

Staying physically active can help older aged adults remain independent and mobile for longer (Musich et al., 2017; Taylor, 2014; Turner et al., 2017; Vogel et al., 2009). Furthermore, a recent consensus statement from the Faculty of Sport and Exercise Medicine (FSEM) (and The Physical Activity for Health Research Centre, University of Edinburgh) on the risks of PA concludes that for adults living with one or more stable long term conditions (LTCs), although risk is perceived to be high, the benefits of PA outweigh the associated risks

(Reid et al., 2022). Additionally, this statement emphasises the need for clear, consistent messaging around safety of PA for those with LTCs and person-centered conversations to help HCPs affect meaningful behaviour change to become physically active for this population (Reid et al., 2022).

1.2.2 Economic and social benefits of physical activity

Increasing PA has numerous social and economic benefits. Increasing the number of people meeting physical activity guidelines could save the NHS £18 billion per year nationally (McNally, 2015) and £450 million per year at Clinical Commissioning Group (CCG) level (Foster & Townsend, 2016). Investment in PA and sport in the UK has a social and economic return on investment of £3.91 for every £1 spend (Sport England, 2020). PA participation can help improve life satisfaction, improve educational attainment, increase earnings, reduce crime, enhance social capital, reduce social isolation, create job opportunities and promote workplace productivity (Department of Health, 2016). PA can lead to increased wellbeing, cognitive function, quality of life, mental health and reduce inequalities and discrimination (World Health Organisation, 2018). Yet evidence suggests that lack of PA leads to poor mental and physical health and social isolation (Burtscher et al., 2020).

Physical inactivity is costly to the global healthcare system; conservative estimates total $53.8 billion, with an additional $13.7 billion in productivity loss and $13.4 million disability adjusted life years (DALYs) (Ding et al., 2016). In the UK, direct ill-health costs resulting from insufficient PA total £0.7 billion annually (Heron et al., 2019); indirect costs are estimated as close to £20 billion (All Party Commission on Physical Activity, 2014).

1.2.3 Physical activity guidelines

In the UK, the Chief Medical Officers' present Physical Activity Guidelines (UK CMO, 2019) recommend that adults (ages 19-64) participate in at least 150 minutes of moderate intensity or 75 minutes vigorous aerobic physical activity (PA) per week as well as engaging in muscle, strength and balance exercise on at least two days per week (UK CMO, 2019). These guidelines also reflect those issued by the World Health Organisation (WHO) (Bull et al., 2020).

For the first time, the 2020 WHO Guidelines for Physical Activity and Sedentary Behaviour provided recommendations on the association between sedentary behaviour and health outcomes (Bull et al., 2020). In addition, these guidelines provide recommendations for women that are pregnant and post-partum, individuals with disabilities and for chronic conditions. The guidelines for children under five years of age have been updated (Bull et al., 2020; World Health Organisation, 2018).

Despite the benefits of PA, globally 1 in 4 adults do not meet the WHO global PA guidelines (World Health Organisation, 2018) and in the UK, only 64% of men and 61% of women meet the recommendations (Sport England, 2020a). Encouragingly, between 2013 and 2015 in the UK, there was a statistically significant 1% increase in the proportion of the population across local areas achieving the recommended 150 minutes of moderate intensity physical activity each week (Sport England, 2020a). In 2011, the UK PA guidelines were updated to include recommendations for twice weekly muscle strengthening, balance and coordination exercises, yet policy efforts remained focused on aerobic exercise (Strain et al., 2016). Strength training is important in maintaining bone density and muscle mass and can help to prevent falls and help individuals maintain functional independence (Strain et al., 2016). However, the number of adults meeting the guidelines for muscle strengthening activities is

estimated to be even lower, partly due to differences in how muscle strengthening activities are defined (Sandercock et al., 2022). PA rates in the UK were the highest in decades prior the development of the coronavirus pandemic, however, due to the strict lockdowns in the UK which required the closure of leisure centres, limits on outdoor leisure PA and organised sport from March 2020 (ongoing at time of publication), there was a rapid decline in PA rates (Sport England, 2020c). The strictest COVID-19 pandemic lockdown limited individuals to one dose of outdoor exercise alone or with someone in the individual's household (Cabinet Office, 2021).

1.2.2 Burden of disease related to insufficient physical activity

Insufficient physical activity is one of the greatest risk factors for NCDs worldwide and is a contributing factor for over 35 different health conditions (Booth et al., 2012; Guthold et al., 2018). Worldwide, NCDs account for 71% of total deaths (World Health Organisation, 2017) and 89% of total deaths in the UK (WHO, 2014). Insufficient PA is one of the top ten risk factors for poor health in the UK (Foster & Townsend, 2016). Elimination of physical inactivity (activity level insufficient to meet current PA guidelines) globally has the potential to remove up to 10% of the major NCDs as well as reduce all-cause mortality rates by an estimated 6-10% (Lee et al., 2012).

1.2.3 Health and physical activity inequality

Inequalities in society and the economy are directly related to inequalities in health outcomes (Lago et al., 2018; Marmot, 2020) and this follows a social gradient. The lower an individual's social position, the worse their health (Marmot et al., 2010) with rates of NCDs higher in areas of greater deprivation (Marmot et al., 2010). In real terms these inequalities mean an individual from the most deprived communities spends 17 years more in poor

health than those from the least deprived and die approximately 10 years earlier (Marmot et al., 2010; McNally, 2015). A social gradient also exists in PA participation, with higher socioeconomic status (SES) groups, reporting more frequent leisure time PA (LTPA) than lower SES groups (Stalsberg & Pedersen, 2018). Adults in lower SES groups face several barriers to participation in PA that are underpinned by lower social capital and cohesion (Sport England, 2018). These include lack of leisure time and motivation, lack of money, poor access to transport and having a disability or NCD (Rawal et al., 2020).

Insufficient psychosocial resources (such as lack of instrumental support) in some SES groups can lead to differences in physical activity behaviour (Lindström et al., 2001). In addition, having lower levels of health literacy is associated with lower levels of PA (Buja et al., 2020). PA interventions often require individual agency and health literacy which tends to be lower in lower socioeconomic areas (Buja et al., 2020). This highlights a need to address health inequalities and the wider social determinants of health as part of any attempt to increase PA at a population level. Working with disadvantaged communities to provide resources can help to improve these inequalities (National Institute for Health and Care Excellence (NICE), 2016) and this has been the focus of recent policy approaches to promote physical activity.

1.2.4 Physical Activity Policy context in the UK

Several policy documents in the UK underline the necessity for a preventative approach to addressing NCDs in the UK. In 2014, Public Health England launched “Everybody active, everyday” (Public Health England, n.d.), a PA focused policy document aiming to promote increasing PA in the population through four workstreams:

1. Active society: creating a social movement
2. Moving professionals: activating networks of expertise

3. Active environments: creating the right spaces
4. Moving at scale: scaling up interventions that make us active

Public Health England's (PHE) "Everybody Active, Everyday" stressed the importance intersectoral collaboration to tackle inactivity and called for a stronger focus on addressing inequalities (PHE, 2014). This message was echoed in the UK Government's "Sporting Future" in 2015, which highlighted the potential of investing in multi-use and co-located facilities (HM Government, 2015). "Prevention Better Than Cure" from the UK Department of Health and Social Care expressed the importance of PA in prevention of NCDs and increasing healthy life expectancy (Department of Health and Social Care, 2018). The aim of this plan was to improve healthy life expectancy by 2035 so that individuals are enjoying an additional five quality years of life through a multisectoral approach (Department of Health and Social Care, 2018). These documents emphasise the need for the UK government to invest in a preventative, multisectoral approach to preventable lifestyle behaviours, promoting PA as a key tool to address the growing burden of NCDs. The Five Year Forward View (NHS, 2014) laid out a plan for long term sustainability of the NHS through the prevention of NCDs. This plan stressed the need to focus on behaviour change and modifiable lifestyle factors which contribute the NCDs, such as nutrition and PA. Moreover, the Five Year Forward View called for the integration of health and social care, the creation of "multi-care specialty providers" and joined up "primary and acute care systems (NHS, 2014). These calls of integrating sectors and services are relevant to the co-location models discussion in this thesis.

1.2.5 The role of sport and exercise in medicine

The use of exercise in the field of health promotion and disease prevention is not a *new* concept. For example, exercise appears in ancient, medieval and renaissance medical literature (Berryman, 2010) and Plato is quoted in this regard,

> *"Lack of activity destroys the good condition of every human being, while movement and methodical physical exercise save and preserve it." -Plato.*

It was not until the 1950's however that the relationship between PA and the reduction of cardiovascular disease was demonstrated underlining its potential role in medicine. The seminal study of Jerry Morris and colleagues compared the health of London bus drivers (who were mostly sedentary) with conductors (who were more active) (Morris & Crawford, 1958; Paffenbarger et al., 2001). Morris found that the conductors were less likely to develop coronary heart disease (CHD) than the bus drivers because they were more physically active during their work (Morris & Crawford, 1958). Morris & Crawford discovered the association between occupational PA and reduced risk of chronic disease.

In the 21st century, numerous calls have been made for the standardisation of PA within healthcare to reduce chronic disease globally and within the UK (Bowen et al., 2018) by organisations including the UK Government, PHE, Department of Health and Social Care, and Sport England.

1.2.6 Existing approaches to the use of PA as therapy

In addition to its role as a preventative strategy for NCD's, PA has a major role to play in the treatment of health conditions. Indeed, the benefits of PA as therapy for numerous conditions is widely recognised (McNally, 2015). Studies have demonstrated that PA can help in the treatment of type 2 diabetes (Thent et al., 2013), cardiovascular disease (Nystoriak &

Bhatnagar, 2018), osteoarthritis (Villafañe, 2018), cancer (McTiernan, 2008), and some mental health disorders (Smith and Merwin, 2021). Additionally, PA is beneficial across the life stages including childhood, before, during and after pregnancy (Dipietro et al., 2019), and in later adulthood (Taylor, 2014). Many attempts have been made to embed PA into usual healthcare as treatment (Speake et al., 2016). In 2005, the field of sports and exercise medicine (SEM) became recognised as a new specialism within the NHS (Cullen, 2010). Whilst SEM consultants are well placed to promote and integrate PA within the healthcare system, barriers prevent SEM consultants having a consistent role in promotion of PA across the healthcare; barriers include lack of awareness of the specialty from other HCPs and no clearly defined identity role for the SEM professional (Vishnubala et al., 2020).

1.2.6.1 Exercise referral

One method of utilising PA to address NCDs in healthcare in the UK that is well-established is exercise referral schemes (ERS) (NICE, 2014). Typically, ERS have focused on the prescription of exercise to tackle a specific health condition. General practitioners (GPs) (or other healthcare professionals (HCPs)) can refer at- risk patients to participate in a structured exercise intervention in a community leisure centre or gym, usually for a 12-week duration. Historically, referrals to such schemes have come from primary care practices (PCPs), however, there is growing recognition of the role of allied health professionals, such as physiotherapists and nurses and in the promotion of PA (F Lobelo et al., 2014; Tulloch et al., 2006).

There is also variability in how ERS are implemented and inconsistency in the quality of research to evaluate the impact on health, quality of life and PA outcomes (Dugdill et al., 2005). There needs to be a greater emphasis on evaluation and standardised data collection (Wade et al., 2020). Some research shows that ERS result in statistically significant increases

in PA, but these increases are not necessarily clinically meaningful (Wade et al., 2020). ERS lack evidence of cost-effectiveness, being more expensive compared to usual care, with 17 people needing to participate for one to become moderately active (N. H. Williams et al., 2007).

The variable success of ERS can be linked to limited patient uptake of referral (Dugdill et al., 2005; N. H. Williams et al., 2007) and poor participant adherence to schemes (Pavey et al., 2012). Indeed, Dugdill et al. (2007) found that less than 46% of patients adhered to an ERS scheme for the full 12-14 weeks. In a systematic review, rates of adherence were even lower: 12-42% (N. H. Williams et al., 2007). Those referred from cardiac and practice nurses were more likely adhere (Dugdill, et al., 2007) and a recent review of schemes in the UK, suggests that adherence increases with age and with ERS that are longer in terms of length of support (Rowley et al., 2018). This is also supported by Campbell, et al., (2012), who reported older patients and those referred for cardiac reasons were more likely adhere to programmes and therefore increase PA. Reasons for limited adherence include patients' perceived barriers such as: knowledge, affordability and accessibility, costs of gym memberships and classes, inconvenient location, and incompatible timing of exercise sessions (Leemrijse et al., 2015; F. Morgan et al., 2016).

Not only do barriers exist which prevent *uptake* and *adherence* to ERS by patients, but also initial *referral* of *patients* by HCPs out of the NHS to other venues. Barriers exist at multiple socioecological levels which prevent referral to exercise in the first instance (Auyoung et al., 2016). At the organisational level barriers include primary care physicians/practice (insufficient cost/reimbursement for PA counselling) and community-based organizations and worksites (insufficient prioritisation of PA resources). At the provider/HCP level, barriers include lack of time, skills, provider reimbursement and reach to at-risk patients. HCPs

knowledge, attitudes and confidence when discussing PA with patients also can affect the success of ERS (Felipe Lobelo & de Quevedo, 2016). At the patient level, barriers to uptake and adherence include insufficient time, insufficient resources and insufficient social support (Auyoung et al., 2016; N. H. Williams et al., 2007), poor body image, lack of selfefficacy, poor time management. Other barriers to patient adherence include issues with the exercise scheme such as intimidating environments, poor supervision, and inconvenient opening hours (N. H. Williams et al., 2007). The numerous barriers to traditional ERS highlight a need to explore alternative solutions to supporting patients to become active and creating different environments to help overcome these barriers. Bringing together healthcare services with PA opportunities in a model of 'co-location' might offer a potential solution to overcoming some of the accessibility and convenience barriers of ERS. The promotion of exercise by HCPs might happen more naturally in co-located healthcare and leisure environment that is purposefully designed for PA promotion, compared to an isolated clinical, but few studies provide definitive evidence at this time of effectiveness of co-located settings in PA promotion.

1.2.6.2 Brief interventions to promote PA as part of healthcare services

In the 2017 report, *Tackling NCDs: 'best buys' and other recommended interventions for the prevention and control of noncommunicable diseases,* the World Health Organisation recommended implementation of PA counselling and referral as part of routine primary health care services through the use of a brief intervention (WHO, 2017). Although there is no universally accepted definition, the UK, brief interventions, or brief advice is defined by NICE as:

> *"Verbal advice, discussion, negotiation or encouragement, with or without written or other support or follow-up. It can vary from basic advice to a more extended, individually focused discussion"* (NICE, 2013).

Brief interventions are shown to be a cost-effective approach (WHO, 2017) for increasing short term, self-reported PA (Lamming et al., 2017). Whilst brief intervention through discussion and referral with patients has been recommended as a cost-effective method of promoting PA through primary care, considerable uncertainty remains as to the feasibility, acceptability and effectiveness on increasing self-reported PA levels long term (Lamming et al., 2017). There is wide variability in the characteristics and implementation of brief interventions (Lamming et al., 2017). Additionally, the current length of brief interventions as recommended in the UK appears to be too long to be delivered in a standard primary care practice appointment (Lamming et al., 2017). Patient PA levels are not assessed routinely as part of clinical appointments nor are brief interventions employed regularly (Lowe et al., 2017). Indeed, the frequency of PA promotion in healthcare has shown to be inconsistent and variable across settings (Barnes, 2018). In addition, Lowe, et al found that physiotherapists (n=514) had limited knowledge of PA guidelines (16%) and did not consistently signpost patients to further support (Lowe et al., 2017). HCPs express barriers which prevent them from making signposting, referring and promoting PA to patients such as lack of time, perceived lack of knowledge, confidence and organisational support (Lobelo & de Quevedo, 2016; Lowe et al., 2017). A co-located health and leisure environment could potentially make it easier to signpost and refer patients to PA because the leisure centre is located in the same setting as healthcare, eliminating some of the barriers that HCPs suggest preventing them from doing so. A co-located environment could also provide the

opportunity for champions of PA promotion to support those that do not feel as confident and knowledgeable.

The Moving Healthcare Professionals programme (MHPP) addresses some of the challenges with the delivery of brief advice in primary care by integrating PA into medical curriculum and changing culture around HCP promotion of PA (Brannan et al., 2019). The MHPP whole system educational approach was developed to educate and empower HCPs to embed PA counselling and implement effective PA behaviour change into usual primary care practice (Brannan et al., 2019). This programme consists of a comprehensive PA educational curriculum consisting of peer "Clinical Champions" delivering undergraduate, postgraduate and continuing professional development for primary care professionals (Brannan et al., 2019). MHPP is one attempt at addressing HCPs perceived lack of knowledge and confidence in promoting PA to patients in the clinical setting, but it does not eliminate all of the barriers, such as those on the environmental level.

Whilst brief interventions show potential at least in the short term, to increase self-reported PA (Lamming et al., 2017), it is important to consider the impact of the environment to change behaviour, particularly the interaction between the individual and the environment.

There is a gap which exists between an individual's intention and subsequent behaviour. This intention-behaviour gap explains why individuals fail to turn intention into action (Faires, 2016). For example, a HCP may intend to promote PA to a patient, or a patient may intend to become physically active after a conversation with a HCP but fail to turn this intention into behaviour. Variables which help to illuminate this intention-behaviour gap include elements such as (1) motivation, (2) trigger, (3) response, (4) capacity and (5) process (Faries, 2016). An environmental change might help close this gap for HCPs through

co-location by triggering a response via the environmental cue of the co-located health and leisure facility and enhancing capacity to act (Faries, 2016).

There is a case for further exploration of the relationship between the trigger of the environmental cue on the intention-behaviour gap. In order to effectively promote PA long term, "the ideal strategy would use several theory-based proven approaches that which target the individual and environmental levels" (Pinter-Wollman et al., 2018).

1.2.6.3 Co-location and health

The extant evidence suggests that the promotion of PA in a healthcare context is undermined by a number of factors including; limited HCP referral (Lowe et al., 2017) poor patient adherence (F. Morgan et al., 2016; Toby Pavey et al., 2012; Rowley et al., 2018) and high dropout rates. This highlights the need for an alternative solution for the promotion of PA within healthcare.

One possible solution to address the shortcomings of the current approaches to PA promotion within health care, is to bring healthcare services and PA opportunities together through a model of physical co-location. Physical co-location of these two entities might help promote PA behaviour at the individual, organisational and environmental level by simultaneously providing opportunities to be active and making these opportunities visible to patients and HCPs. This has the potential to increase awareness of PA options and make it easier for HCPs to signpost to PA support located within the leisure centre (Leotta et al., 2011). This approach is consistent with policy agendas. In 2016, ukactive called for a £1 billion investment into the regeneration of leisure centres, which could combine several services such as GP clinics, library and police services into "wellness hubs" (Ukactive, 2018). These "wellness hubs," also referred to as "one-stop shops" bring together multiple services,

such as health and leisure in the same physical location (OECD, 2020; Places Leisure, 2017; Ukactive, 2018). The aim of these "one-stop shops" would be to empower individuals to self-manage their health and ultimately help prevent NCDs (Speake et al., 2016). "One-stop shops" or "wellness hubs" have the potential to reduce utilisation of acute services, such as accident and emergency services (A & E), eliciting a cost savings for the NHS and resulting in an approximately 30 % saving in construction and operating costs (Ukactive, 2018). What's more, co-locating health and leisure might result in increased leisure facility usage, resulting in increases in PA (Sport England, 2016). Moreover, there is evidence to suggest that collaboration between healthcare professionals such as physiotherapists and GPs in a shared setting to promote and prescribe PA has the potential to be affordable and cost-effective to the overall health care system (A. Y. M. Jones et al., 2007a). This occurs through prevention and maintenance of illness which would otherwise be treated by more costly, acute or long-term services (A. Y. M. Jones et al., 2007b; Leotta et al., 2011; Matheson et al., 2013). This evidence suggests that co-location has the potential to be beneficial not only to the health of the population, but also the economy.

Whilst co-location of healthcare and leisure hold potential for improving health outcomes, there is a lack of theory underpinning the value of co-location or evidence to show how it might work, for whom, under what circumstances and why (Imison et al., 2008; C. Jones et al., 2020; Leotta et al., 2011; Olsen & Warren, 2011).

1.2.7 The Olympic Legacy and Sheffield

Co-location of healthcare and leisure to promote PA has been established in Sheffield, UK, as part of the 2012 Olympic legacy. This legacy aimed that health services would harness physical activity for prevention, treatment and management of long term conditions (London: Department of Health, 2014). The vision would be partly delivered through the

establishment of a National Centre for Sport and Exercise Medicine (NCSEM). The NCSEM would bring together universities, healthcare trusts, local authorities and private and voluntary sector organisations, clustered around three regional hubs (London, East Midlands and Sheffield), to improve the health and wellbeing of the nation through Sport, Exercise and Physical Activity. £10million funding from Department of Health and Social Care helped establish a physical infrastructure to house each consortia See Figure 2.0). The NCSEM now takes a leadership role in coordinating and connecting academics and research across 5 core themes: (1) Physical Activity in Disease Prevention, (2) Physical Activity in Chronic Disease Treatment, (3) Sports Injuries and Musculoskeletal Health, (4) Mental Health and Wellbeing, and (5) Performance Health (*National Centre for Sport and Exercise Medicine*, 2020).

1.2.8 The National Centre for Sport and Exercise Medicine (NCSEM) Sheffield and the Co-Location Model

Each of the NCSEM consortia had different strengths. In Sheffield, the NCSEM was focused on the promotion of PA at a population level, adopting a systems approach. This was manifest in the "Move More" strategy (Copeland, 2014) which aimed to make Sheffield the most active city in the UK by 2020. As part of the Move More plan, clinical services, HCPs, PA opportunities and researchers were co-located in three community-based leisure centres across the city (Copeland, 2014). The three co-located sites were chosen because of their location within areas of higher-than-average deprivation, high incidence of NCD, proximity to green space and geographical spread across the city – thereby enhancing access to a broad as possible population. The intention was that these facilities would serve individuals in those communities and address health inequalities and accessibility issues (Copeland, R., Hart, O., 2015).

The aim of the co-location model was to embed PA as a treatment option within NHS services (Copeland, R., Hart, O., 2015; Tew et al., 2012), redevelop MSK services around patient outcomes and to bring care closer to patients, in their communities (Speake et al., 2016). It was also the intention for these co-located centres to normalise PA and enhance patient empowerment and self-management through the creation of facilities that change the culture of health and care delivery. The co-location of community health care services or care provided by allied health professionals and/or specialist practitioners alongside leisure opportunities is also novel, examples of health/leisure co-location only tend to occur in primary care settings (Copeland, R., Hart, O., 2015). Where they exist, these centres either embed exercise interventions in mental health care (Lederman et al., 2017; Leotta et al., 2011; Martin et al., 2014), deliver a diabetes service in a gym (in the context of a private health care system) (Lederman et al., 2017; Leotta et al., 2011; Martin et al., 2014), or provide PA counselling in general practice (Lederman et al., 2017; Leotta et al., 2011; Martin et al., 2014). As part of this PhD programme, a scoping review was conducted to search for existing models of co-location of community health services and leisure. No evidence or theory was found to explain the mechanisms by which coo-location of healthcare and leisure might result in promotion of PA.

1.2.9 A Description of the NCSEM Sheffield co-located sites and a "typical" patient journey

To provide context to the research and the co-located sites studied in this PhD, a description and photographs of the co-located sites are provided below, followed by a description of a typical "patient journey" is described below.

1.2.9.1 Description of the co-located NCSEM sites in Sheffield-Graves, Concord and Thorncliffe

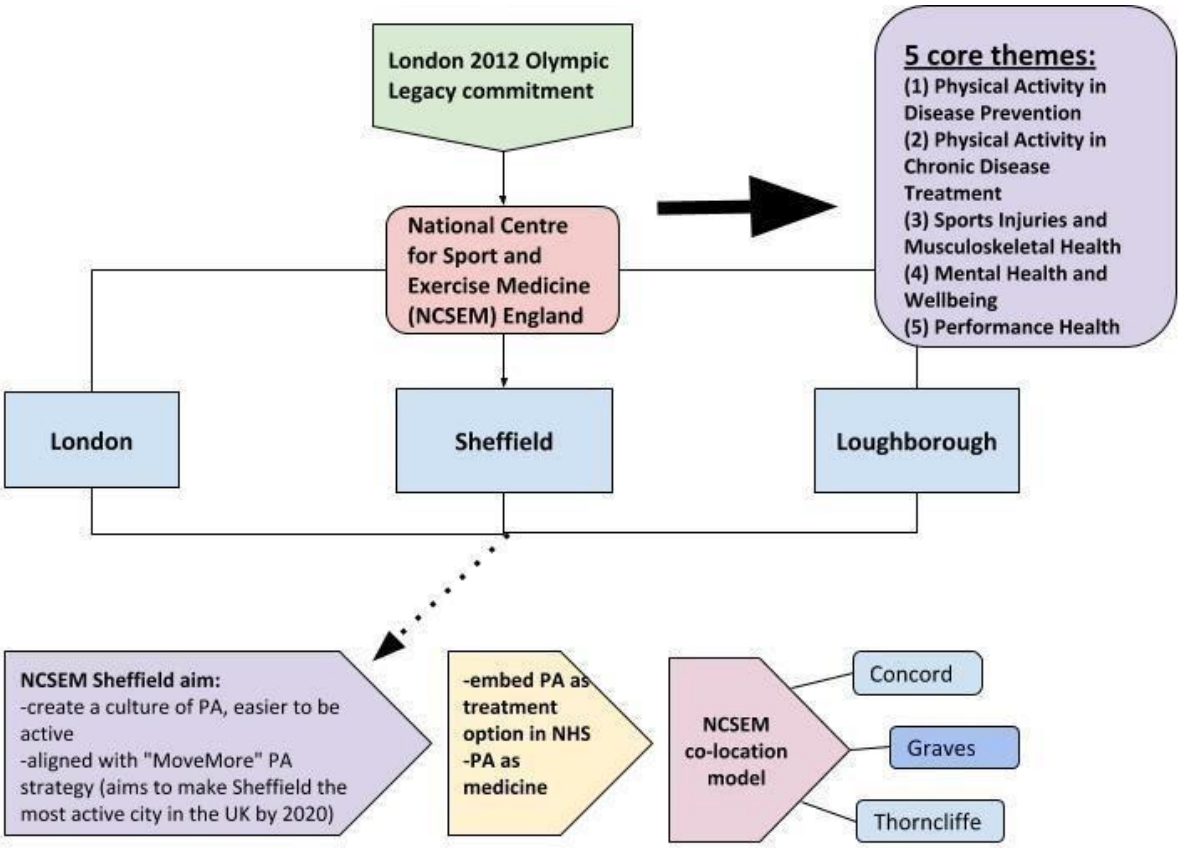

Figure 2.0 The National Centre for Sport and Exercise Medicine (NCSEM) model of colocation in Sheffield

The co-location model has been established in three NCSEM facilities across Sheffield (Graves, Thorncliffe and Concord). The three co-located sites were chosen because of their location within areas of higher-than-average deprivation, high incidence of NCDs, proximity to green space and geographical spread across the city, thereby, enhancing access to a broad as possible population. (See Figure 3.0 for an Indices of Multiple Deprivation Map

(IMD) map of Sheffield with the three co-located sites identified. On this map, the three sites are mapped against IMD scores).

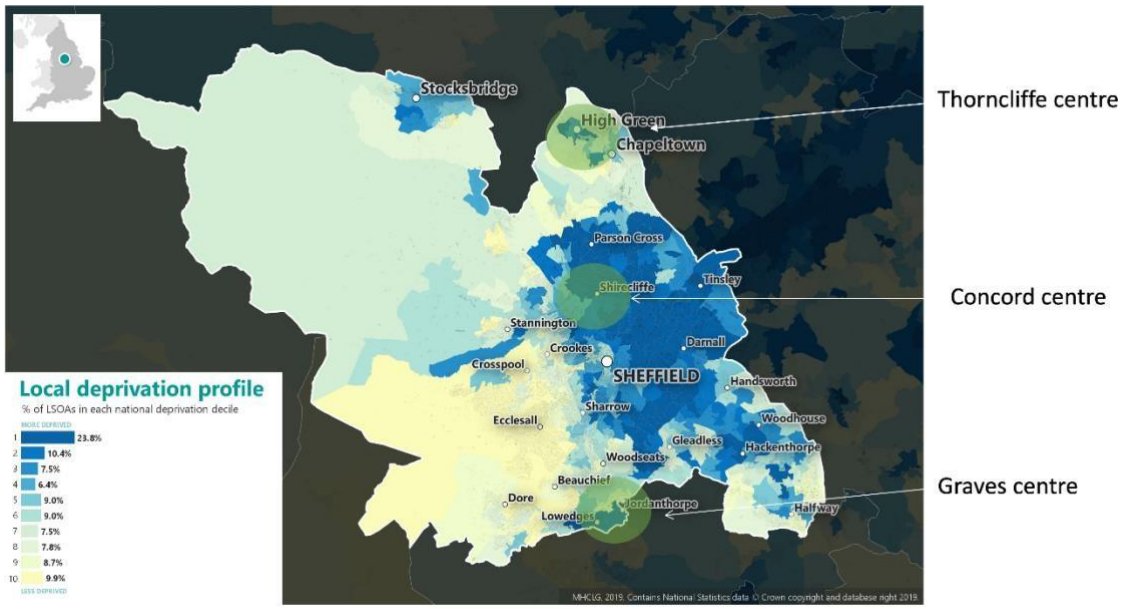

Figure 3.0 Indices of multiple deprivation map (IMD) map of Sheffield with Graves, Concord and Thorncliffe

The intention was that these facilities would serve individuals in those communities and address health inequalities and accessibility issues (Copeland, R., Hart, O., 2015). The three NCSEM Sheffield facilities were newly developed or redeveloped with existing facilities. All three sites carry the Move More branding and signage prominently displayed on the exterior and the inside of the buildings. All three facilities have been developed with attention paid to the physical environment by making these sites brightly painted, open and well-lit. Priming strategies are in place in the facilities using signage, case studies and other environmental features such as prominent placement of accessible stairs. In addition, staff and patients have access to free parking and HCPs and staff at the facilities have free leisure centre

membership. These features aim to help normalise a discussion around PA during the healthcare appointment. A brief description of each centre is as follows.

Graves is located Southeast of the city and serves the surrounding communities of Batemoor, Jordanthorpe and Low Edges. Graves is the most developed of the three colocation sites and has the most facilities (See images below of Graves exterior and interior). It is considered the headquarters of the three sites and is the most integrated facility. It houses 21 clinic rooms, procedure rooms, a physiology lab for health care professionals and researchers to conduct cardiorespiratory testing, as well as group therapy/patient education rooms. The leisure facilities contain a 6-lane swimming pool and learner pool, 150 station fitness suite, gymnastics hall, trampolining suite and indoor/outdoor tennis courts.

Additionally, a plan was put in place to make staff wellbeing a high priority at the three sites. Another aim was to have fully networked IT systems, places for staff meetings and shared reception points for both the leisure facility staff and the clinical staff. When a patient enters the Graves facility, they are greeted by a large, open and bright space. There is a floor to ceiling glass window which looks into the swimming pool on their left, reception and stairs to the front and the cafe and clinical waiting area off to the right. The clinic waiting area is the same as the seating area for the cafe. There is brightly lit and open stair access, which has been developed with signage encouraging usage. At Graves, although the reception is integrated, there are different receptionists for the leisure facility and the clinical area. The hope when these facilities were created was a seamless integration, however, due to the number of clients/customers at Graves, it was necessary to have separate receptionists.

Image 1.0 The exterior of Graves leisure centre

When looking into the facility through the windows, passers-by can see individuals participating in physical activity in the pool and gym.

Image 2.0 Graves interior combine reception and seating area for leisure centre guests and NHS clinics patients.

There is a cyclical open design with a good use of natural light.

Image 3.0 Graves interior pool

When walking into the leisure centre, immediately on one's left the pool is visible through a pane of glass. This glass wall is part of the seamless nature of the building design. Individuals of all ages and athletic abilities can be seen at various times of day swimming and participating in aquatics classes.

Image 4.0 Upstairs gym at Graves

This is the upstairs gym at Graves. It is bright, open and attractive with a wide variety of equipment. When exercising upstairs, one can observe looking out windows at passers-by.

Image 5.0 Concord leisure centre entrance

The entrance to the leisure centre is separate to the clinical entrance. Although it is possible to walk through the building to get to the leisure centre from the clinical area, one does not walk past the leisure centre to see people being physically active in the same way that is possible in Graves with seamless boundaries between both areas.

Image 6.0 Concord waiting area and clinics

Concord was the first of the three centres to open, in February 2015 and is not as integrated as it was developed with two separate entrances (one for the clinic and one for the leisure centre). This was a building constraint not a design intention as the clinical facility was created from disused football changing rooms. Concord is in Shiregreen and was developed as adjunct to an existing leisure facility, serving Shiregreen and Brightside neighbourhoods. The leisure centre already had a developed exercise referral programme. The NCSEM facilities at the site include 7 clinic rooms, a podiatry workshop, treatment rooms, training area, meeting rooms, staff rooms and showers and access to the leisure facility which contains a 6-lane swimming pool, large fitness site and specialist exercise referral gym.

Image 7.0 Thorncliffe leisure centre

Thorncliffe was newly built in the North of the city on the High Green recreation ground. It is similar to size to the Concord facility. Thorncliffe opened in early 2016 and includes 6 clinical rooms, podiatry workshop, training area/meeting room, staff rooms and showers and access to the leisure facility which contains a 6-lane swimming pool, large fitness site and dance studio. Thorncliffe does not contain a separate area for administrative NHS staff.

1.2.9.1.2 The NCSEM clinics

Over 140 clinics run per week at Graves from various NHS providers including MSK physiotherapy, Diabetes, Rheumatology, Podiatry, staff physiotherapy, chronic pain, incontinence and Improving Access to Psychological Therapies (IAPT). There are also 6 HCP led group exercise sessions and 3 education/training sessions weekly. Sixty-eight clinics per week are held at Concord in similar specialties. Concord also has 5 weekly education sessions in Diabetes, weight management, mental health and physiotherapy. At time of writing this thesis, Thorncliffe had Physioworks & Podiatry on Thursdays due to the COVID19 pandemic, in operation approximately 50 hours per week. Diabetes & IAPT changed their

operations to digital. In total, approximately 100,000 appointments are held per year across the three sites.

1.2.9.2 A “typical” patient journey

An important feature unique to co-location in Sheffield is the patient journey prior to their appointment to after their participation in a PA opportunity within the centres. It is important to detail the journey as it provides insight into contextual factors which allow colocation to work (or not). An MSK/PhysioWorks patient journey is provided as an example, as this service accounts for most of the appointments across the three sites and shares similarities with other condition patient pathways. The journey and treatment differ depending upon the patient’s condition(s) and clinical appointment they are attending.

At the start of the journey, the patient receives a text message to log into the appointment booking website for Sheffield MSK services known as, “My Pathway” to book an appointment or receive a traditional referral letter from their general practitioner (GP). Patients that book their appointment online are asked to complete the EQ-5D form which is a standardised 5-dimensional instrument used to assess the quality of life (EuroQol, n.d.). Patients receiving a traditional referral letter are given the EQ -5D assessment at their first appointment. Next, the patient receives a letter explaining the time of the appointment as well as a leaflet with a section discussing the potential involvement of PA in their treatment pathway. The patient can choose one of the three sites to attend (Patients can also choose non-NCSEM sites). When a patient arrives at reception for an NHS appointment, they are directed to the relevant waiting area by reception staff.

As part of the clinical appointment, the HCP ideally asks the patient about their PA behaviour. If the patient and HCP decide at the end of the appointment that the patient is interested or

ready to become more physically active, there are different pathways into physical activity that can be followed (The following 5 routes are aspirational and might not be consistently happening, yet this is the aim):

1. The HCP can take the patient into the gym or PA lab as part of their appointment
2. The HCP refers patient to the Move More website which highlights various community opportunities for PA and general information around PA
3. The HCP can take the patient out to reception to obtain more general information about PA at the specific leisure centre
4. The HCP can refer the patient to an NHS led PA course (usually condition-focused such as “chronic pain”)
5. The HCP initiates a Sheffield Physical Activity Referral Scheme (SPARS) referral (SPARS is a 12-week supported condition-specific PA referral scheme based in Sheffield). After referral, the patient will then have a choice of venues to attend. The patient may pay an upfront cost or fee each session. These fees can range from £55 for 12 weeks to £4.25 per session. Following the 12-week programme many venues offer discounted leisure centre memberships).

If the patient chooses option 2 and would like more information, at Graves, a PA advisor (which is a membership advisor) will explain what the leisure centre offers and show them around the facility if desired. At Concord and Thorncliffe, a receptionist will talk with the patient about the offers. The patient can choose one or more routes, for example a patient may attend an NHS-led class and also receive a SPARS referral.

1.3 Summary

Physical activity is associated with numerous health, social and economic benefits across the lifespan. Despite this, large proportions of the population in the UK, particularly those from lower SES communities are insufficiently active to derive benefit. The outcome of population-level inactivity places huge pressure on health and care services, driven by burgeoning NCD. Policies such as, “Everybody Active Everyday,” (Public Health England, 2014) “Five Year Forward View,” (NHS, 2014; NHS England, 2017) and “Health Matters:
Health matters: physical activity - prevention and management of long term conditions,
(PHE, 2020) have pushed for a greater role for healthcare in directly tackling inactivity, yet interventions to date have resulted in mixed effectiveness (Rowley et al., 2018; M. Wade et al., 2019; Wade et al., 2020). Exercise referral and brief counselling are two of several approaches that incorporate PA into healthcare but are limited in terms of uptake and adherence (F. Morgan et al., 2016; TG Pavey et al., 2011) due to intimidating environments, inadequate supervision, and inconvenient access (N. H. Williams et al., 2007;
Buckley et al., 2020; James et al., 2017; Lion et al., 2019; Pettitt & Joy, 2019; M. Wade et al., 2020). The distance to point of access, timing and costs of the scheme are also issues reported to effect the impact of these interventions (F. Morgan et al., 2016). One way of overcoming these barriers would be to bring health and PA opportunities together by co-locating them in purpose-built facilities. Indeed, a co-location model could reduce barriers to PA, lead to patient empowerment and self-management as well as HCP promotion of PA. There are a small number of examples of where co-location of services has been delivered (Leotta et al., 2011; Olsen & Warren, 2011; Speake et al., 2016; Ukactive, 2018; P. Williams, 2012) and there is a growing policy and advocacy agenda in support of co-location, (Ukactive, 2018) however, no existing evidence or theory explains how the co-location of health clinics and leisure opportunities might work to promote PA, for whom and under what circumstances.

Additionally, there is no existing quantitative data measuring outcomes and impact of colocation. Given the scale of the impact of inactivity and the potential for co-location to address key barriers to access, further research exploring these models is warranted.

1.4 Research aims and objectives

The primary aim of this research was to develop refined programme theories to help explain the key contexts and mechanisms of why, how, for whom and under what circumstances the co-location of health clinics and leisure opportunities is expected to work (or not) to promote PA. These programme theories were developed through two phases of the PhD.

Primary research question: How and in what ways (if at all) does the co-location of health and leisure centres work to promote physical activity, for whom, under what circumstances and why?

Phase 1: Development of initial rough programme theories (IRPTs)

- Objectives: To develop IRPTs to explain the co-location model.
- Methods: The first phase consisted of three parts which were iteratively combined to develop the IRPTs: (1) realist review of the academic and grey literature on colocation, health and PA (2) interviews with NCSEM stakeholders (3) Use of existing middle range theory (MRT) to develop IRPTs.

Phase 2: Theory Testing

- Objectives: To test IRPTs to produce refined programme theories.
- Methods: Theory testing in different contexts using semi-structured realist interviews with patients and HCPs that have attended clinics or work at Graves and Concord leisure centres.

Chapter 2. Methodology

2.1 Chapter introduction

Chapter 2 presents the rationale for choosing a realist approach and an explanation of the philosophy and methodology. The methodology of this PhD research is explained prior to the review chapter in this thesis because it informs the development of all subsequent chapters. First, the rationale for use of a realist approach is explained, followed by an explanation of realist ontology and epistemology, realist causation and discussion of complexity. Next, the processes used to address the research questions are presented, including programme theory development and an explanation of the framework that will be used for the presentation of theories, concluding with a chapter summary.

2.2 Rationale for realist approach

There are several reasons for choosing a realist approach to this PHD research. Firstly, there are no existing theories to date to explain how co-locating healthcare clinics within leisure centres is expected to work, for whom, under what circumstances, why and how (at the time of writing this thesis). It is important to understand and to illustrate how co-location is working (or not), why, how and for whom, so that further implementation of co-located facilities in other localities meets the needs of the population and is successful in improving PA outcomes. A realist approach allows for the examination of the influence of contextual differences, which is crucial to implementing interventions successfully in other settings. Awareness of contextual factors (including but not limited: to perceptions, worldviews, motives, goals and values of stakeholders) is imperative as these factors will influence the subsequent 'firing' (or not) of a particular mechanism (Coles et al., 2020). Realist evaluation is appropriate for evaluating new initiatives or programmes that seem to work, but 'where,

how and for whom' is not yet understood (Westhorp, 2014). This fits with the NCSEM colocation model, which lacks a theoretical and empirical basis and understanding, but there is anecdotal evidence of how it might be working.

Secondly, co-locating healthcare clinics with leisure centres in order to promote PA is a *complex intervention*. *Complexity* recognises that an intervention has multiple interacting components, such as behaviours of stakeholders and organisations involved in the intervention and variety of outcomes depending upon how the intervention is implemented (Craig et al., 2008).

Realist philosophy of science provides an ontological and epistemological framework suited to exploring complex interventions amidst a complex social reality (Pawson et al., 2005b) by clearly linking context to outcomes (Wong, 2018). Realist approaches have also been used to evaluate other complex interventions (Bertotti et al., 2018; Willis et al., 2018). Third, realist methodology is theory-driven and allows for explanation of the underlying causal processes and the contexts in which they may operate, using "programme theory" to explain mechanisms. (Mechanisms are the "underlying entities, processes, or structures which operate in particular contexts to generate outcomes of interest" (Astbury & Leeuw, 2010)). Traditional review methods such as systematic reviews and meta-analyses tend to have a focus on linear causal pathways without determining underlying causal processes that are crucial to understand for programme theory development (Kelly et al., 2010). In contrast, realist research takes an explanatory rather than descriptive focus and seeks to understand *what* "makes programmes work" and *how* they work (or not) (Pawson et al., 2005b).

Additionally, realist methodology acknowledges the impact of contextual differences and assumes that nothing works the same everywhere, or for everyone (Westhorp, 2014). The success, or otherwise, of the co-located sites in Sheffield, may be due to the stakeholders

involved, the communities which are served, the design or business models of the sites or a multitude of other factors which should be considered alongside the basic premise of colocation. It is important to acknowledge the impact of such factors as they can explain partially why/why not an intervention works in one context and not another. Awareness of these contextual factors helps to develop transferable theory of how the intervention is working or not.

The selection of a realist approach thus informed the development of research aims and objectives (See 1.4 Research aims and objectives) (Pawson et al., 2005b) for this PhD and provided a methodological framework. The following is a discussion of the aspects of philosophy used in this PhD research.

2.2.1 Ontological depth

Realist philosophy posits that there is ontological depth, meaning that reality is stratified and events that can be observed are produced by generative forces which may not be immediately observable (Bhaskar, 2008; Pawson & Tilley, 1997). A conversation between a HCP and patient about PA might later result in a patient becoming physically active. This behaviour change might not be immediate, but instead be the result of several encounters with the leisure centre for clinical appointments before the patient becomes physically active. Causal powers do not lie in the actual events that occur (for example the patient attending an appointment at a co-located site) but instead lie in the organisational structures and social relations which make up the open social system (Kazi, 2003). One action results in another because of the action's place in the entire social system; they are embedded. An outcome of a programme is the result of multiple causes. These actions occur as a result of numerous interactions, transactions and structures throughout the different

layers of reality (Kazi, 2003). Numerous interactions took place from the intial conversation between the HCP and patient and the patient becoming physically active.

2.2.2 Epistemology

It is important to understand epistemology as a researcher because it shapes how the research project is framed. Epistemology explores the ways of knowing, knowledge creation, application and explains why it has the features it does (Rescher, 2003). Epistemology concerns how one might accrue knowledge to answer a research question. In realist research, knowledge accrual is never final, but instead results in refinements and improvements upon existing knowledge. Thus,

> *"empirical observation is the imperfect vehicle of sociological inquiry that attempts to access real causes and mechanisms by hypothesizing actual processes based on observed outcomes*" (Aviles & Reed, 2017).

Therefore, the goal of the realist researcher is not only to explain, but also to improve upon existing explanation (Kazi, 2003). Knowledge in realist research consists of causal explanations in the form of theories, which can never be fully proven, only further refined and improved upon.

Realist epistemology specifically posits that there is no final truth to knowledge, but it is possible for it to be *improved and refined* (Gill Westhorp et al., 2011). Thus, throughout this PhD, theories were developed and refined, but not definitively, as they will be subject to further improvement as knowledge is gleaned from future research.

2.3. Generative causation and complexity

Realist methodology is underpinned by generative causation which focuses on contexts, mechanisms and their outcomes, postulating that causal relationships between context and

outcome only occur when triggered by a *generative* mechanism (Pawson, 2008). Realist explanation depends on identifying these causal mechanisms, *how* they work to cause outcomes, discovering *if they have been activated* and *under what conditions* (Sayer, 2000). This is in contrast to successionist causation which looks simply for regularities amongst a sequence of events, whilst generative causation examines how the causal association happens and how the outcome pattern is generated (Stern et al., 2012). Successionist causation asks, "does X result in Y," whilst generative causation (Figure 4.0) asks, "what is it about X that results in Y?" (Pawson, 2008). Generative causation explains *how* a programme works, which allows for examination of the contextual factors and differences in implementation of the co-located sites which result in mechanisms 'firing' (or not), ultimately leading to outcomes. Generative forces produced as a result of the initial PA conversation between the HCP and patient later result in an observable event of the patient becoming physically active (for example, attending a structured ERS, attending the gym on their own or walking regularly).

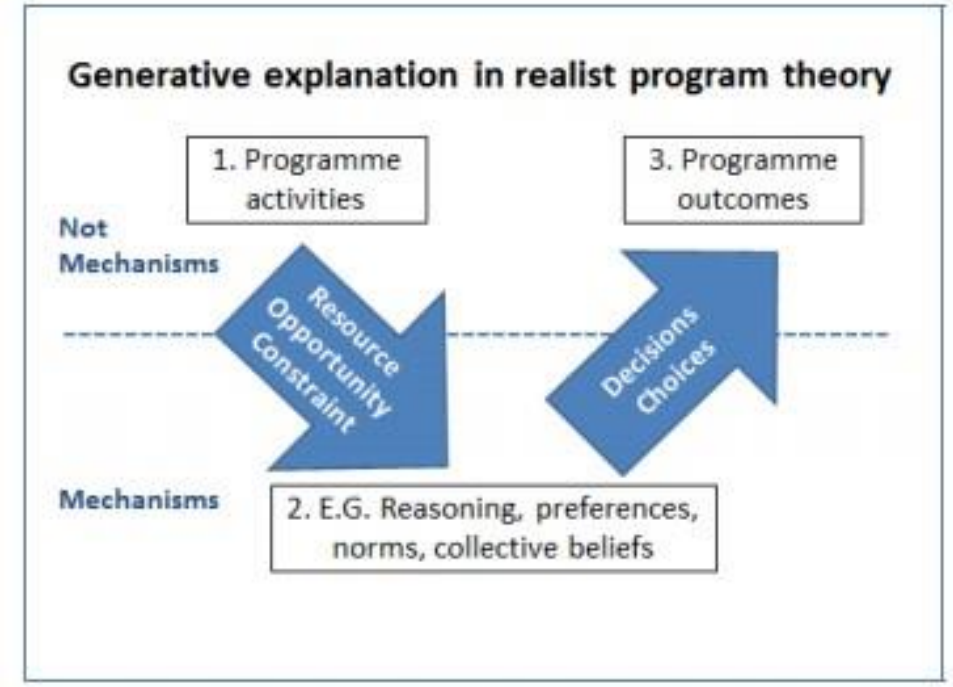

Figure 4.0 Generative explanation in realist program theory (Wong et al., 2013)

Realist research has the utility of examining 'what makes programmes work' to understand how a programme or intervention might need to be adapted to other contexts. (For this PhD research, the co-location of healthcare and leisure is considered an *intervention,* but in keeping with realist evaluation, theories shall be referred to as *programme* theories). *Programmes* are a 'hypothesis about social betterment' with an underlying set of assumptions or theory of how they are supposed to work (Pawson & Tilley, 2004); they may also be termed an intervention or policy. Understanding how or why an outcome occurs is essential to understanding how to adapt a programme to a specific context (Emmel et al., 2019). As co-located settings are implemented into three unique contexts within Sheffield and there is a call to establish further co-located sites, it is essential to understand what aspects of co-location are essential for effective implementation.

Complexity is a construct important to the application of realist methodology used in this research. The co-location of healthcare with leisure is considered a *complex intervention* as there are a "number of interacting components, number of behaviours required by those

delivering or receiving the intervention, number of groups or organisational levels targeted by the intervention and number and variability of outcomes and degree of flexibility or tailoring of the intervention permitted" (Craig et al., 2008). When evaluating complex interventions, it is important to ascertain whether they work in everyday practice and how they are working, considering the programmes active ingredients and their effects (Craig et al., 2008). Being able to answer these questions is key to understanding how to apply interventions more effectively and across different settings (Craig et al., 2008). Complex interventions require a different type of analysis than more discrete interventions. Realist research recognises the complexity of programmes and interventions and that they are introduced within a complex social reality (Pawson, 2013), thus, making it a useful approach for this PhD research.

Complexity recognises that *programmes are active and open.* In reality, the co-located sites are an open intervention, meaning that participants have a choice in how to respond to the resources on offer (Pawson & Tilley, 1997). The programme's intended effects operate through the volition and reasoning of the participant. For example, a HCP may refer a patient to a PA opportunity, but it is up to the individual patient as to their response to that referral, thus affecting whether or not the outcome occurs. The intervention may also be considered an *open system,* meaning that they do not exist in a vacuum and cannot be kept constant, nor isolated from external conditions. Interventions are subject to influence from numerous outside forces including but not limited to societal structures, organisational initiatives, personnel moves, physical and technological shifts and intra-and interprogramme interaction (Pawson & Tilley, 1997). In the context of co-location, outside factors which have an impact on the intervention include organisational aspects of the NHS, economic factors, information systems, changes within local healthcare commissioning and interaction

between and within PA/ERS within Sheffield. The concepts of active interventions and open systems are important to acknowledge in realist research and have played a role in development of the research methods and analysis of the results (See Chapters 3-8).

2.4 Programmes

2.4.1 Programmes are theories

Every programme, intervention or social initiative has a theoretical basis, whether or not that theory is made explicit during the programme's development (Pawson & Tilley, 1997). The main task of a realist researcher, therefore, is to open this metaphorical 'black box,' unearth, develop and refine these theories (Pawson & Tilley, 1997). At the outset of this PhD research there was no explicit theory to explain how co-location of healthcare within leisure centres works (or not) to promote PA. The aim of the PhD was therefore to develop these programme theories, addressing complexity and behaviour at multiple levels of influence, to make explicit the underlying causal mechanisms of what makes co-location of healthcare and leisure is working (or not). By making explicit these underlying causal mechanisms, one can begin to understand what it is about a programme which is working or not (Pawson & Tilley, 1997). Additionally, as there have been numerous calls for more effective strategies to address the growing burden of NCDs and inactivity, it is important to evaluate whether or not existing approaches such as co-location of healthcare and leisure are effective and what aspects are working well, in order to implement further co-located sites more effectively. Making these theories explicit are therefore an important step in effective design and future evaluation of co-located sites.

Finally, it is accepted in realist research that social programmes do not work everywhere and for everyone under all circumstances, but that elements of programme theory are

transferable (Emmel et al., 2018). The refined set of theories developed from this PhD research are neither finite, definitive, nor infallible, but aim to provide the best explanation available at the time of this publication, in the form of transferable theories to explain how co-location of healthcare clinics with leisure centres is working (or not) to promote PA.

2.4.2 Programmes are embedded

Programmes (and their actors) are embedded into an existing social reality. This means that a programme will work differently in different circumstances and situations (Pawson & Tilley, 1997). Co-location of healthcare and leisure across Sheffield may result in different outcomes because of the different context in which they are situated . There are four levels of context to consider when examining how the existing social structures affect the intervention outcome. Pawson describes 'Four I's': i) individual capacities ii) interpersonal relationships iii) institutional iv) infrastructural (Pawson & Tilley, 1997). A necessity of realist evaluation is to consider how these different layers of the social reality affect how the programme is working (or not) (Pawson & Tilley, 1997). These correspond to the important contexts in previous literature (see Introduction Section 1.1 for more detail on these contexts).

In the context of this PhD research, the following are examples of Pawson's 'Four I's':

1. **Individual**: a patient's psychological readiness to participate in PA; a HCP's knowledge and confidence discussing PA with a patient.
2. **Interpersonal**: relationships created between the HCP and patient
3. **Institutional**: Service or organisational level cultural norms and prioritisation of discussing PA with patients.
4. **Infrastructural**: Polices, legislation and funding at the government level supporting

2.5 Essential Concepts in Understanding Realist Theory

2.5.1 Context Mechanism Outcome Configuration

Theories are traditionally employed to express causation in realist research, using the Context-Mechanism-Outcome configuration (CMOc) (Wong et al., 2016). Context is usually but is not limited to factors at the institutional, infrastructural, interpersonal and individual levels (Pawson & Tilley, 1997). Mechanisms can include available resources and human reasoning. Outcomes are the effect of the mechanism firing (or not) in the context (Pawson & Tilley, 1997). Mechanisms thus operate within contexts resulting in (or not resulting in) a particular outcome. The CMO configuration is depicted commonly as a rugby ball shape to denote realist causality (Figure 5.0). CMO configurations are expressed in multiple ways, most commonly as C+M=O (Pawson & Tilley, 1997).

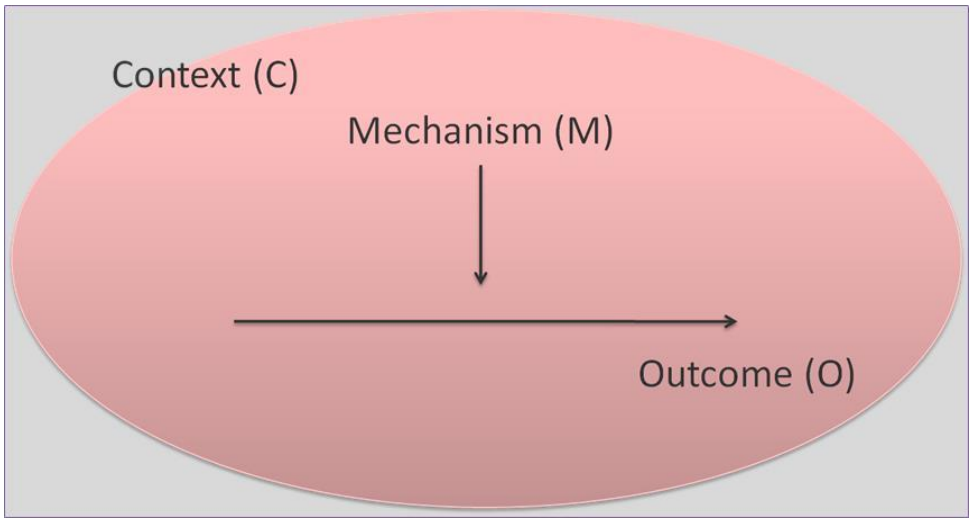

Figure 5.0 Context, mechanism, outcome configuration (Pawson and Tilley, 1997)

CMOcs are considered the accepted nomenclature amongst realist researchers for the expression of realist programme theory (Wong et al., 2016). Despite this, CMOc development has proven challenging to numerous researchers, specifically the task of

conceptualising the mechanism and differentiating between contexts and mechanisms

(Dalkin et al., 2015; Emmel et al., 2019; Marchal et al., 2012). In addition, it can be difficult to distinguish mechanism from the programme or intervention (Dalkin et al., 2015) and at different levels of social structure (Westhorp, in Emmel et al-book 2019). Mechanisms that occur distally along the causal chain could become contexts that later become mechanisms closer to the point of evaluation (Shaw et al., 2018). Depending on the point of analytic focus along the causal chain, the causes of outcomes could be classed as contexts or mechanisms (Shaw et al., 2018). Shaw et al. (2018) use the example of a *policy*, which can be classed as part of the *context* if occurring more distally along the causal chain from the point of analysis or as a *mechanism* if occurring closer to the outcome of interest. By using CMOcs only, it is possible to risk only lists of contexts, mechanisms and outcomes and lose the interconnected relationship between the three.

2.5.2 Framework for Reporting Theories

In this thesis, programme theories were expressed in early stages of development as prose, then as IRPTs and final programme theories (PTs). For the reasons highlighted above, and because of a desire to show causal relationships at different levels of social structure, it was impractical to define discrete contexts, mechanisms, and outcomes. It was important that the research still led to theories that were realist in nature which meant expressing explanations of change that corresponded to the deeper, underlying and invisible powers and liabilities and the contexts in which these produced outcomes. IF-THEN-BECAUSE statements were utilised. IF-THEN-BECAUSE statements are explained below (Box 2.0). IF represents the *context or conditions,* THEN represents the *outcome*, and BECAUSE represents the *explanation – attending to mechanisms at different social levels..*

Box 2.0 Example IF-THEN...statement representing CMO configuration

IF a healthcare clinic is co-located with a leisure facility, **THEN** HCPs will be more likely to discuss PA with patients **BECAUSE** exercise and physical activity will be more salient in their minds.

By using IF-THEN-BECAUSE statements, it makes the finalised theories more understandable and useful to those who are not familiar with realist methodology and those involved in the implementation of co-located sites, HCPs and policymakers.

2.6 Programme theory development

The next part of this chapter on realist methodology presents the process of developing and refining theories to explain how co-location of NHS healthcare clinics with the leisure centre environment works to promote PA (or not), under what circumstances and why. An overview of the research methods, design and phases will be presented.

2.6.1 Iterative and cyclical research design

Realist evaluation aims to develop deeper and ever refined explanations of what works for whom, under what circumstances and why (Pawson & Tilley, 1997; Sayer, 2000). This necessitates a research approach that is reflexive, reflective, iterative and cyclical. This PhD research utilised the processes of retroduction and abduction to develop testable theories. Retroduction refers to the process of developing hypotheses from similar circumstances or interventions (Kazi, 2003) and uses both inductive and deductive reasoning. Induction means to look for patterns within data in order to develop theory (Given, 2012). Deduction means to start with theory and test propositions to see whether or not what is predicted occurs (Greenhalgh et al., 2017). Abduction means to develop hypotheses about

circumstances for which there is no theory, using existing data or drawing inference to the best current explanation (Levin-Rozalis, 2000). The various modes of inference relate to the iterative cyclical design, because in order to develop the theories, one must move back and forth between these different modes. This means that as data is collected, the understanding and interpretation of the theories in question can change.

2.6.2 Methods

The research question was addressed through two realist phases (see Figure 6). The purpose of Phase 1 of this PhD research was to develop IRPTs to be tested in Phase 2.

Phase 1 consisted of a realist review, purposive search for existing middle range theory (MRT), and interviews with NCSEM stakeholders. Initial theories were developed through a realist review/synthesis. MRT was used to provide further structure and refinement to initial theories. Interviews with NCSEM stakeholders were conducted to test and refine theories further.

The purpose of Phase 2 was to further test and refine the initial theories developed in Phase 1. This was conducted through a realist evaluation. These theories were tested through interviews with HCPs working at, and patients attending, NCSEM co-located clinics. These phases are described briefly below with further detail provided in subsequent chapters.

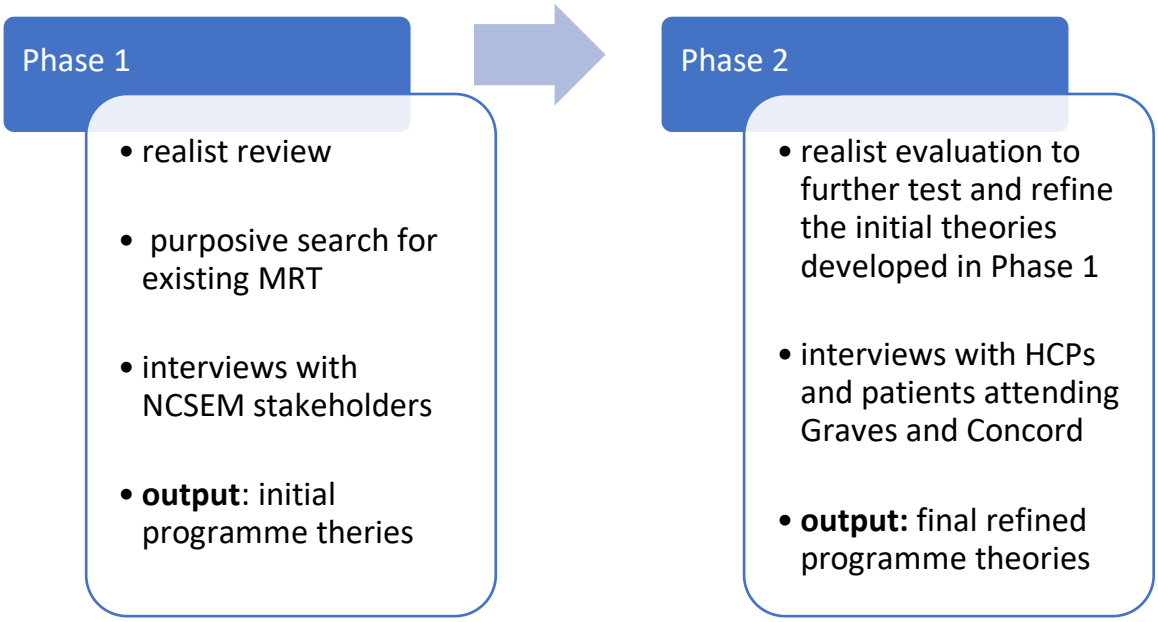

Figure 6.0 Research design

2.6.3 Phase 1: Realist review/synthesis

Phase 1 began with a realist review. The aim of the realist review was to develop initial programme theories to understand how, for whom, under what circumstances and why, the co-location of healthcare and leisure centres is working (or not) to promote PA. The purpose of developing initial theories at this stage to was to focus the research and to facilitate an effective realist evaluation. (The term "realist review/synthesis" is often used synonymously with "review;" for the purposes of this PhD the terminology *review* will be used). Realist review allows for inferences to be drawn from broad topic areas and diverse methods and methodologies. This is particularly appropriate here as there the underlying theory to explain how co-locating healthcare within leisure centres is expected to work, for whom and under what circumstances has not been made explicit. The realist review is detailed in Chapter 3.

2.6.4.1 Phase 1: NCSEM Stakeholder Interviews

The second component of Phase 1 consisted of a realist evaluation using interviews with NCSEM stakeholders to test emergent themes developed from the realist review. This phase is explained in greater detail in Chapter 4.

2.6.4.2 Phase 1: Middle range theory

The third component of Phase 1 consisted of a purposive search for Middle range theory (MRT). MRT was used to inform theory development in combination with the realist review and NCSEM stakeholder interviews (described below in 2.7.4.2). MRTs are described as theories which

> *"lie between the minor but necessary working hypotheses that evolve in abundance during day-to-day research and the all-inclusive systematic efforts to develop a unified theory that will explain all the observed uniformities of social behaviour, social organisation and social change"* (Merton, 1968).

MRT can be used to guide empirical testing in realist evaluation by providing a scaffold of existing relevant models, theories and frameworks. MRT can highlight key concepts that may be influential to programme development and helps to form an explanatory structure to initial theories that emerge from the data (Shearn et al., 2017). Building programme theory solely from tacit theories found in the literature or from stakeholder interviews without reference to Middle Range Theory (MRT) can be problematic for several reasons including rediscovering what is already established, generating an overabundance of candidate theories or developing theory that is unstructured (Pawson, 2013; Shearn et al., 2017). Chapter 5 describes the process undertaken to identify MRT relevant to this study.

2.6.4.3 Phase 2: Realist evaluation to test and refine initial rough theories

Phase 2 of this PhD consisted of a realist evaluation which tested and refined theories developed in Phase 1. Interviews were conducted with patients who attended clinics and healthcare professionals (HCPs) that worked at Graves or Concord Leisure Centres. The objective of this phase was to test theories to produce refined programme theories.

2.7 Chapter summary

This chapter provided an overview the realist philosophy of science, realist methodology and methods used to direct this PhD research. The two phases used to direct the research as well as the theory presentation frameworks were also described. These specific phases and methods and results are detailed in subsequent chapters. The next chapter explains the realist review of existing literature completed during Phase 1.

Chapter 3. Phase 1: Defining co-location of health, leisure, and physical activity: realist review

3.1 Chapter introduction

Chapter 3 presents a realist review exploring the co-location of healthcare and leisure. The review was necessary to define the concept of co-location of healthcare and leisure (Shearn et al., 2017). A realist review was chosen as there were no existing theories (at the time of this research) explaining how the co-location of healthcare and leisure centres is expected to work to promote PA. Whilst there were no theories explaining co-location of healthcare and leisure at the time of this review it was important to conduct a realist review to discover what evidence (or nuggets of wisdom) existed in the literature to *contribute* to initial theory building (Pawson, 2008; Shearn et al., 2017). It was important to develop initial theory ideas from the literature *prior* to testing with stakeholders to prevent finding what is already known from the data (Shearn et al., 2017) (See Section 2.2 for further explanation on the rationale for using a realist approach).

Additionally, the review was intended to gather evidence to inform the development of initial theories (presented in Chapter 5) about how co-location might facilitate PA outcomes such as conversations between HCPs and patients about PA, referrals to PA and increased patient PA levels.

3.2 Aims of the realist review

The aim of the realist review was to gather evidence from existing from academic and grey literature to contribute to the development of initial rough programme theories (IRPTs) to understand how, for whom, under what circumstances and why, the co-location of healthcare and leisure centres is working (or not) to promote PA.

3.3 Methods

An initial scoping search was conducted to identify existing examples of co-located community and allied health professionals and/or specialist healthcare professionals (as opposed to GPs or primary care practice nurses) with leisure centres. Examples of "wellness hubs" and "healthy lifestyle centres" were found in the UK as well as literature on colocation of GP practices and/or other services within non-leisure settings. Initial scoping searches indicated that there were few examples of healthcare and leisure co-location, so the search was broadened (See Table 1.0). There was little cohesivity amongst the results in terms of document type, study type, intervention type, model of co-location, or population served. Furthermore, because co-location of healthcare services and leisure lacked definition as a concept in its own right, it was necessary to search the literature more broadly, allowing for inclusion of studies that reported on PA referral, delivery, promotion, uptake and opportunities in various healthcare settings, from diverse methodologies.

3.3.1 Search strategy

A broad search strategy (Table 1.0) was developed to identify literature about health, PA and leisure co-location. The review adhered to the RAMESES guidelines (Wong et al., 2013). RAMESES are reporting standards developed for realist syntheses and meta-narrative reviews (Wong et al., 2013). Key concepts were developed from the initial search statement and used to establish search terms, which included: "co-location," "integration",

"collaboration", "embed", "integrated", "health", "leisure", "fitness", "PA", "exercise", "clinics", "GP" surgery", "hub", and "medical centre". Additional terms were included from initial scoping and the researcher's own knowledge of PA and healthcare obtained through education and experience. MEDLINE and CINAHL indexes were used to identify other

potential subject headings. Several searches were piloted before the final search took place which led to the inclusion of other synonyms of keywords not otherwise identified.

Table 1.0 Search strategy

	Key Concept: "Health clinic*"	**Key Concept: "Leisure centre*"**	**Key Concept: "co-located"**
Synonyms Use 'OR	"health clinic*"	"leisure centre"	"co-locat*"
	"healthcare setting*"	"physical activity"	"embed*"
	"Health service*"	Exercise	Hub
	"GP surger*"	Gym	integrat*
	"GP practice"	"Fitness facility"	"One-stop shop*"
	"Medical centre'" / "medical center'"	"Fitness centre" / "fitness center"	collaborat*
	"Health centre" / "health center"	"sport* centre"/ "sport* center"	
	"NHS clinic*"		
	"wellness centre"/"wellness center"		

3.3.2 Inclusion/Exclusion criteria for database search

The following inclusion and exclusion criteria were used for the database search. No exclusions were made based on article type or study design.

Inclusion criteria:

- Topic: Studies were included which focused on health services or clinics and leisure facilities which have been structurally co-located. Other relevant papers on colocated health services or embedding PA within healthcare were included, such as policy documents and grey literature.
- Study type: Sources included evidence reviews, opinion papers, white papers and primary studies.

- Dates: No start date for the inclusion of studies. Health events such as the development of the National Health Service (NHS) and World Health Organisation (WHO) (1948) and policies such as the Five-Year Forward View (NHS, 2014) suggested that results would take place within the 20th century. There is also evidence to suggest a resurgence in the presence of physical activity in health policy in the latter half of the twentieth century (Mansfield & Piggin, 2016).
- Geography: Only studies which have taken place in high income countries were included as it was necessary to consider differences in the issues that these healthcare systems face. Different healthcare systems will have different implications and effects on the delivery of potential co-located health and leisure models.
- Language: Only papers in English or English language translation were included.

Exclusion criteria:

- Topic: Studies which were not focused on health services or clinics and leisure facilities which have been structurally co-located or other relevant papers on colocated health services
- Study type: No exclusions.
- Dates: No exclusions based solely on date.
- Geography: Studies from low and middle income countries.
- Language: Papers published in languages other than English.

3.3.3 Search processes

See Appendix 1 for a table detailing the search processes used. Initially a brief scoping search was conducted to search for existing literature, policy and other documents on colocation of

healthcare and leisure, using Google and Google Scholar search engines as well as governmental, organisation, voluntary websites in health, physical activity and colocation. Next, an academic database search was conducted, utilising academic databases in health, sport and medical subjects. These databases included: MEDLINE, CINAHL, SportDiscus, SCOPUS and PsychInfo. The results of the academic database search included any documents related to barriers and facilitators of sport and health collaboration, opinion papers on physical activity approaches, physical activity interventions and strategies as well as policy recommendations. The search was run after several trials searching abstract, title and subject terms on 25/04/2018 and retrieved after removal of duplicates. Results are shown in Figure 7.0 (PRISMA Flow Diagram). Results from each database were as follows: MEDLINE (199), CINAHL (146), SportDiscus (27), PsychInfo (110), Scopus (1698). The results were uploaded into Mendeley as well as to (2150 results) Excel for title and abstract screening. After removal of duplicates, 1789 were left. After title screening, 72 results were left. After application of the inclusion/exclusion criteria, 33 documents were left for full-text review. Finally, a search was conducted to include grey literature and policy documents from government, organisation and policy websites and included sport, physical activity, health and design information. (These are detailed in Appendix 1). Finally, 6 documents were included from the grey literature to bring the total to 39 documents for inclusion in the review. Initial screening was performed following piloting with one PhD supervisor (KS) of 10 papers to ensure clarity on inclusion criteria. Six documents from grey literature were also included based on stakeholder suggestions and searching relevant body, policy and government websites and Google.

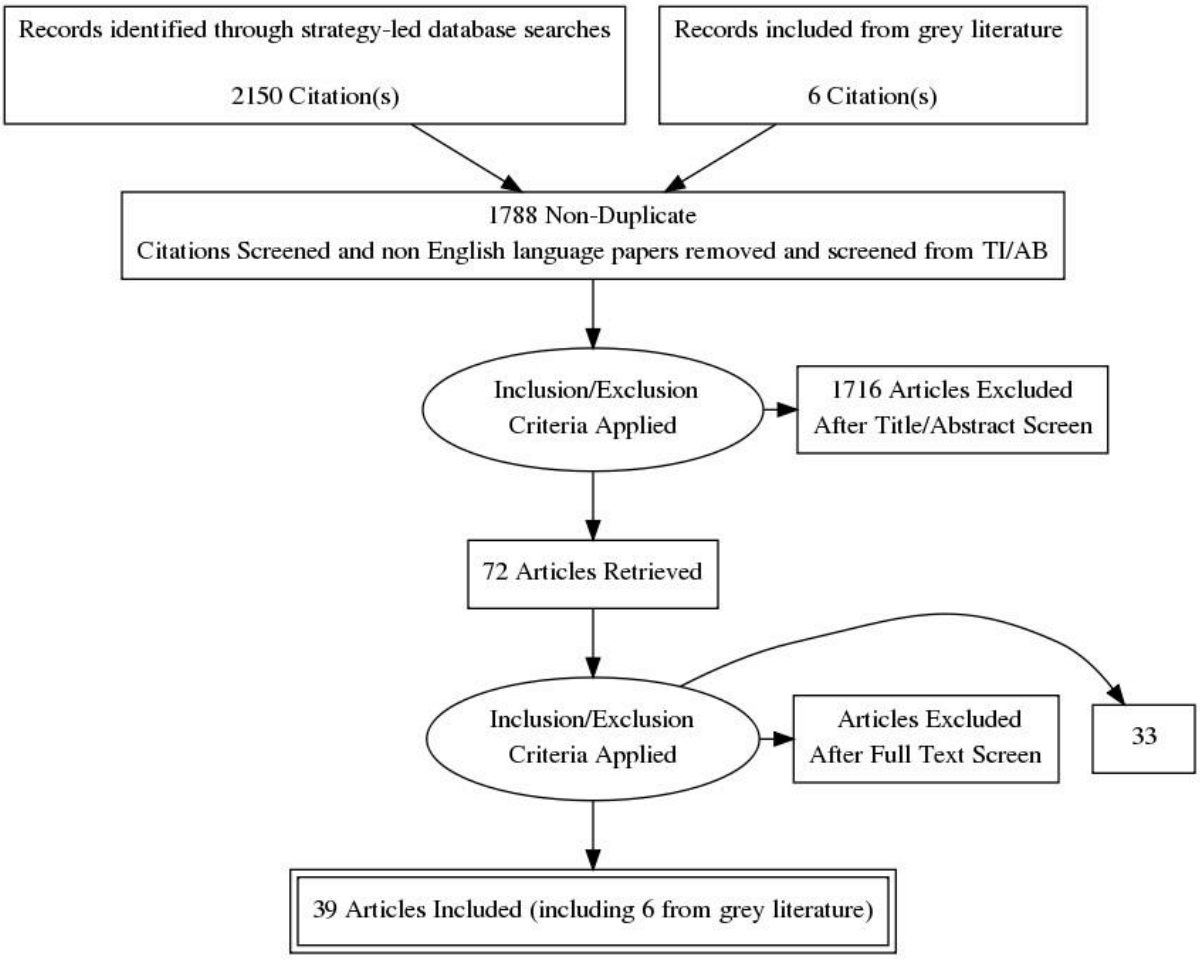

Figure 7.0 PRISMA Flow Diagram

A summary of the data is presented in Table 2.0. Only one result from the academic database search specifically described co-location of healthcare in a leisure centre (Leotta et al., 2011). Leotta et al. (2011) provided a narrative account of a diabetes centre co-located with a gym in Giarre, Sicily. This paper, whilst mostly descriptive, provided insights into initial theme development. Theories were inferred from papers that related to the colocation of PA and health, as well as relating to PA in healthcare.

3.3.4 Data extraction and appraisal

Data extraction followed an iterative process in keeping with realist methodology (Pawson et al., 2005; Wong et al., 2013). Data was extracted to Excel and causal relationships were inferred and re-described as themes based on how the data might contribute to an understanding of how co-location is working (or not) The data was appraised and extracted

using a template modelled on a previous realist review (Williams et al., 2017). The template allowed for the inclusion of literature from various methodologies and subjects. Information was noted about the document type, source, aims, intervention, design and outcome. Where possible, contextual factors, mechanisms and postulated theory were described or inferred from the source. Additionally, in keeping with realist methodology, documents were appraised for relevance, or the ability to contribute to theory development and refinement of how co-location of leisure and clinical services "works or doesn't work" to promote PA (Pawson et al., 2005). The literature was also appraised for rigour, which was assessed based on the credibility of the methods used to generate the evidence, rather than quality appraisal of the study, as even poorly designed studies can contain "nuggets of wisdom" (Pawson, 2004).

3.4 Results

3.4.1 Initial Themes

After selecting and appraising the documents, nineteen themes of how co-location works to promote PA were synthesised from the findings (Appendix 2). Data was extracted, coded to a theme and then written out in narrative format to develop an explanatory theme related to co-location of healthcare and leisure to promote PA. These themes were used to develop an initial set of theories to guide the next component of Phase 1, consisting of interviews with NCSEM stakeholders. The themes used to develop the IRPTs are described below, with the IRPTs presented in Chapter 5. Table 2 presents background information of each study that contributed to the initial themes. Twelve themes most focused on answering the research question are described below.

The 12 remaining themes were prioritised based on their ability to contribute to answering the research question "what works for whom, under what circumstances and why for the co-location of healthcare and leisure to promote PA?"

With consideration of the various levels of influence on behaviour that are often described within whole system approaches (Bagnall et al., 2019), resulting themes were then mapped against one of four levels of social strata: Infrastructural, institutional, interpersonal and individual (Pawson & Tilley, 2004) (See Figure 8). Inferences were then made as to how the results might be applied to the Sheffield co-location model. Themes were then used to develop initial theories, written as “IF, THEN, BECAUSE” statements, explaining the underlying causal mechanisms of co-location of healthcare and leisure to promote PA (Pawson & Tilley, 2004).

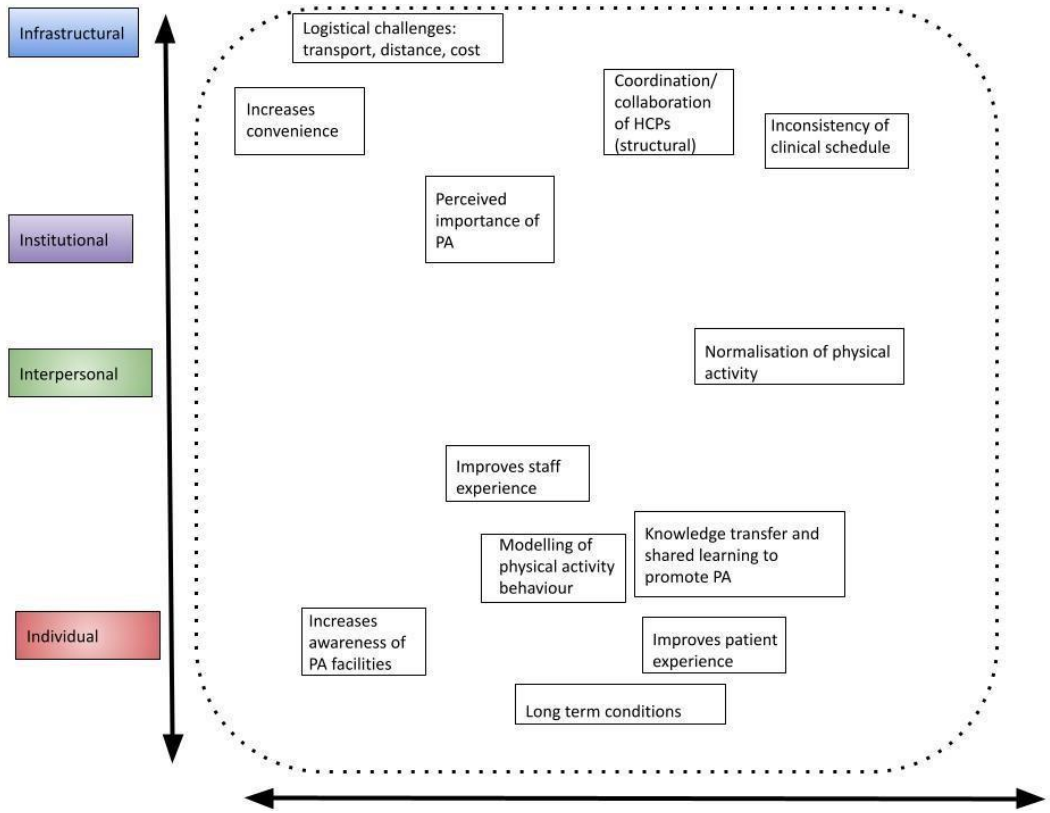

Figure 8.0 Initial rough programme theory (IRPTS) mapped according to Pawson's 4 I's

Table 2.0 Data from realist review and background of the review results contributing to themes

	Study type	Background	Source contribution	Specific theory theme
Barrett, E. M., Hussey, J., & Darker, C. D. (2017). Feasibility of a physical activity pathway for Irish primary care physiotherapy services. Physiotherapy, 103(1), 106-112.	Modified Delphi approach	To establish consensus on a physical activity pathway suitable for use by physiotherapists in Irish primary care. The physical activity pathway "Let's Get Moving" was examined to agree recruitment criteria and seek consensus on component parts.	background information on physiotherapy and exercise referral	logistical challenges
Berdine, H. J., & O'Neil, C. K. (2007). Development and implementation of a pharmacist-managed university-based wellness center. Journal of the American Pharmacists Association, 47(3), 390-397.	case report	Report on development and implementation of a pharmacist managed wellness center based on campus within a school of pharmacy,	combining two disciplines of health through colocation can improve patient health outcomes through increased referrals to other health providers	coordination and collaboration (structural) increases convenience

Boehler, C. E., Milton, K. E., Bull, F. C., & FoxRushby, J. A. (2011). The cost of changing physical activity behaviour: evidence from a" physical activity pathway" in the primary care setting. BMC public health, 11(1), 370.	quantitative study	Time driven variant of activitybased costing, audit data through EMIS and a survey of practice managers provided patient-level cost data for 411 screened individuals	background information on pa in healthcare	increases awareness of PA facilities
Börjesson, M. (2013). Physical activity in the hospital setting.	scoping study/review	Expert paper reporting evidence for different methods to increase the level of PA in patients, barriers to the implementation of PA in the hospital setting and potential solutions.	rich data to inform theory building	logistical challenges

Candib, L. M. (2013). A more holistic approach needed to physical activity access for all/silva et al. Respond. American journal of public health, 103(6), E3.	expert opinion/recommendations	Opinion letter recommendations to Silva et al. to strengthen the project design: 1-placing a follow-up call or an e-mail to all individuals issued a referral to determine whether they had visited the YMCA or not and providing counseling to those that did not use their referral. 2-individuals who opted into the membership could have undergone a brief orientation (e.g., gym tour, brief assessment, goal setting) and been assigned a peer accountability partner or "gym buddy" as part of their initial intake process.	background information and theory building	normalising PA modelling awareness of PA opportunities logistical challenges
Carson, S. R., Carr, C., Kohler, G., Edwards, L., Gibson, R., & Sampalli, T. (2014). A novel	literature review and formative/ongoing evaluation	A community-based health promotion model in Canada that uses population health promotion approaches to reduce the impact of	rich data to inform theory building about 'what works' to create	long term conditions

community-based model to enhance health promotion, risk factor management and chronic disease prevention. Healthcare quarterly (Toronto, Ont.), 17(3), 48-54.		chronic conditions-the model acknowledges the influence of the social and environmental determinants of health and emphasizes the importance of creating supportive community environments for health (policy level context); free programming, community client-based, whole person approach, interprofessional, accessible, behaviour change (intervention/organisational level context)	supportive community environments for health	
Dietz, W. H., Solomon, L. S., Pronk, N., Ziegenhorn, S. K., Standish, M., Longjohn, M. M., ... & Sanchez, E. J. (2015). An integrated framework for the prevention and treatment of obesity and its related chronic diseases. Health Affairs, 34(9), 1456-1463.	expert opinion/recommendations	A new iteration of the Chronic Care Model that integrates clinical and community systems to address chronic diseases The delivery of care for obesity requires the integration of providers of that care and the integration of health care delivery systems and community services	insight on integrated care systems in the community	coordination and collaboration (structural) increase convenience increases awareness logistical challenges

Fortney, L., Rakel, D., Rindfleisch, J. A., & Mallory, J. (2010). Introduction to integrative primary care: the health-oriented clinic. Primary Care: Clinics in Office Practice, 37(1), 1-12.	expert opinion/recommendations	Objective: describe key ingredients of integrative medicine and propose models and suggestions that can be implemented on the clinical level as well as the philosophical level that can help inform primary care design, lead to increased patient satisfaction, lower health care cost and promote prevention over treatment.	background information and expert recommendations on integrative care to inspire theory building	improved patient experience
Hodgson, M. H., McCulloch, H. P., & Fox, K. R. (2011). The experiences of people with severe and enduring mental illness engaged in a physical activity programme integrated into the mental health service. Mental health and physical activity, 4(1), 2329.	qualitative study	One-one semi-structured interviews to identify factors influencing adherence to an activity programme and the perceived effects of PA on wellbeing in people with severe and enduring mental illness (SEMI)	example of pa programme integrated into health service for specific condition	long term conditions

Hopkins, J. M. (2013). A more holistic approach needed to physical activity access for all. American journal of public health, 103(6), e3.	opinion paper	Letter to editor in response to Silva, et al. (2012) calling for the holistic integration of public health and primary care to provide PA opportunities for community health patients	background information	increases convenience increases awareness of PA facilities
Jones, A. Y. M., Chan, D. F. Y., Fu, S. N., Ngai, S. P. C., & Ho, S. Y. K. (2007). Exercise prescription-a pilot collaboration between medical practitioners and physiotherapists. Hong Kong Practitioner.	one-group, pre-/post-test design study	This article reports the success of collaboration between medical practitioners and physiotherapists in exercise prescription They concluded that collaborative efforts by medical practitioners and physiotherapists could effectively promote primary health care and should be widely adopted in the community.	data to inform theory building about collaboration in a healthcare and gym setting	coordination and collaboration (structural)
Jones, R., Van den Bruel, A., Gerada, C., Hamilton, W., Kendrick, T., & Watt, G. (2015). What should integrated care look like...? Br J Gen Pract, 65(632), 149-151.	expert recommendations	Description by five health experts on what integrated care should look like for children, older people, people with cancer, mental health problems, and patients with multimorbidity.	hcp opinions on integrative care preferences for different conditions	coordination and collaboration (structural)

Karusisi, N., Thomas, F., Méline, J., & Chaix, B. (2013). Spatial accessibility to specific sport facilities and corresponding sport practice: the RECORD Study. International Journal of Behavioural Nutrition and Physical Activity, 10(1), 48.	quantitative study	Study of spatial accessibility and likelihood of attendance to specific sport facilities. Data from the RECORD Study involving 7290 participants recruited in 2007–2008, aged 30–79 years, and residing in the Paris metropolitan area were analysed. Associations between the spatial accessibility to sport facilities and the practice of the corresponding sports were assessed using multilevel logistic regression after adjusting for individual and contextual characteristics	rich data to inform theory building about how colocation could ameliorate logistical challenges	logistical challenges
Karwalajtys, T., & Kaczorowski, J. (2010). An integrated approach to preventing cardiovascular disease: community-based approaches, health system initiatives, and public health policy. Risk management and healthcare policy, 3, 39.	literature review and opinion paper	Recommendations for multi-level integrated approach to CVD risk prevention and management	expert recommendations	increases convenience long term conditions social support

Kemper, K. J., Dirkse, D., Eadie, D., & Pennington, M. (2007). What do clinicians want? Interest in integrative health services at a North Carolina academic medical center. BMC complementary and alternative medicine, 7(1), 5.	qualitative study	Cross-sectional online survey about referrals and recommendations made in the past year and interest in therapies if they were to be offered at the medical center in the future	background on integrative care services and colocation	patient experience increases convenience
Kligler, B., Bair, M. J., Banerjea, R., DeBar, L., Ezeji-Okoye, S., Lisi, A., ... & Cherkin, D. C. (2018). Clinical Policy Recommendations from the VHA State-of-the-Art Conference on Non-Pharmacological Approaches to Chronic Musculoskeletal Pain. Journal of general internal medicine, 1-8.	expert opinion/recommendations	Clinical policy recommendations emphasizing multimodal care with rigorous evaluation grounded in team-based approaches to test integrated models of delivery and stepped-care approaches; and working to address socioeconomic and cultural barriers	clinical policy recommendations	increases convenience coordination and collaboration

Lederman, O., Suetani, S., Stanton, R., Chapman, J., Korman, N., Rosenbaum, S., ... & Siskind, D. (2017). Embedding exercise interventions as routine mental health care: implementation strategies in residential, inpatient and community settings. Australasian Psychiatry, 25(5), 451455.	scoping study/review	Report on key components of successful exercise interventions embedded into residential, inpatient and community mental health care in Australia.	rich data to inform theory building	long term conditions
Leemrijse, C. J., De Bakker, D. H., Ooms, L., & Veenhof, C. (2015). Collaboration of general practitioners and exercise providers in promotion of physical activity a written survey among general practitioners. BMC family practice, 16(1), 96.	cross-sectional survey	A study reporting on a written questionnaire about PA promotion sent to a representative random sample of Dutch GPs.	rich data to inform theory building	coordination/collaboration of health and PA professionals (structural) improves patient experience long term conditions

Leenaars, K. E. F., Smit, E., Wagemakers, A., Molleman, G. R. M., & Koelen, M. A. (2015). Facilitators and barriers in the collaboration between the primary care and the sport sector in order to promote physical activity: a systematic literature review. Preventive medicine, 81, 460-478.	systematic review	Review to identify collaborative initiatives between the primary care and sport sector in order to promote PA.	rich data to inform theory building	coordination/collaboration of health and PA professionals (structural) increases awareness of PA facilities

Leotta, C., Fedele, V., Schifilliti, C., Ingegnosi, C., Savoca, G., Cucinotta, L., & Strauss, K. (2011). Movement in health: Housing a diabetes centre within a gym (and vice versa). Journal of diabetes, 3(4), 273-277.	formative evaluation	Narrative about a diabetes centre purposely co-located with a gym in Sicily.	rich data to inspire theory building; most similar representative example of co-location to the NCSEM model	perceived importance increases awareness of PA facilities coordination/collaboration of health and PA professionals (structural) normalises PA behaviour modelling physical activity behaviour
Martin, B. W., Padlina, O., Martin-Diener, E., Bize, R., Cornuz, J., & Kahlmeier, S. (2014). Physical activity promotion in the health care setting in Switzerland. Schweizerische Zeitschrift für Sportmedizin und Sporttraumatologie, 62(2), 19-22.	review	Review of physical activity integration into primary care in Switzerland Setting: integrated physical activity into primary care in Switzerland	background information on pa in healthcare setting	increases convenience

Matheson, G. O., Klügl, M., Engebretsen, L., Bendiksen, F., Blair, S. N., Börjesson, M., ... & Khan, K. M. (2013). Prevention and management of non-communicable disease: the IOC consensus statement, Lausanne 2013. Sports Medicine, 43(11), 10751088.	expert opinion/recommendations	Summary of results of a consensus meeting on NCD prevention sponsored by the International Olympic Committee (IOC) in April 2013 -strategy for the prevention and management of chronic disease that includes the following: 1. Focus on behavioural change as the core component of all clinical programs for the prevention and management of chronic disease. 2. Establish actual centres to design, implement, study, and improve preventive programs for chronic disease. 3. Use human-centered design in the creation of prevention programs with an inclination to action, rapid prototyping and multiple iterations. 4. Extend the knowledge and skills of Sports and Exercise Medicine (SEM) professionals to build new programs for the prevention and treatment of chronic disease focused on physical activity, diet and lifestyle.	expert opinion/recommendations and background information	coordination and collaboration (structural) increases awareness perceived importance

		5. Mobilize resources and leverage networks to scale and distribute programs of prevention.		
McIntosh, N., Fix, G. M., Allsup, K., Charns, M., McDannold, S., Manning, K., & Forman, D. E. (2017). A Qualitative Study of Participation in Cardiac Rehabilitation Programs in an Integrated Health Care System. Military medicine, 182(9-10), e1757-e1763.	qualitative study	Qualitative study to identify contextual factors that influence patient participation in CR	rich data to inform theory building	logistical challenges long term conditions inconsistency of the clinical schedule logistical challenges

Moe, R. H., Grotle, M., Kjeken, I., Olsen, I. C., Mowinckel, P., Haavardsholm, E. A., ... & Uhlig, T. (2016). Effectiveness of an integrated multidisciplinary osteoarthritis outpatient program versus outpatient clinic as usual: a randomized controlled trial. The Journal of rheumatology, 43(2), 411-418.	randomised control trial (RCT)	RCT of an integrated osteoarthritis outpatient programme versus outpatient care as usual	rick data to inform theory building	improves patient experience

Morris, M. (Ed.). (2006). Integrating planning and public health: tools and strategies to create healthy places.	case report	Examination of collaborations between planners and public health professionals committed to building healthy communities. It outlines the five strategic points of intervention at which planners and public health professionals can coordinate their efforts: visioning and goal setting, plans and planning, implementation tools, site design and development, and public facility siting and capital spending. Case studies illustrate the specific tools — including health impact assessments — used in such collaborations. The report also examines the role of universal design in creating healthy communities	background information on planning and design through co-location to foster pa	perceived importance increases awareness of PA facilities
Murphy, S., Raisanen, L., Moore, G., Edwards, R. T., Linck, P., Williams, N., ... & Moore, L. (2010). A pragmatic randomised controlled trial of the Welsh National Exercise Referral Scheme: protocol for trial and integrated economic and process evaluation. BMC Public Health, 10(1), 352.	study protocol for mixed methods randomised controlled trial	Study protocol for mixed methods randomised controlled trial, with nested economic and process evaluations. A nested process evaluation examined how the initiative was implemented, gained an in-depth understanding of the views of providers and users, and facilitated interpretation of outcome effects.	background information on exercise referral	long term conditions

Olsen, K. D., & Warren, B. A. (2011). Integrating health and health care. ACSM's Health & Fitness Journal, 15(4), 29-34.	case study/report	Case report on the Mayo Clinic Dan Abraham Healthy Living Centre explaining their approach to integration of the health/fitness and healthcare team and how this approach can aid in disease management and prevention.	rich data to inform theory building	improves staff experience
Ribera, A. P., McKenna, J., & Riddoch, C. (2006). Physical activity promotion in general practices of Barcelona: a case study. Health education research, 21(4), 538-548.	qualitative study	Objective: to generate explanations for the lack of integration of physical activity (PA) promotion in general practices of Barcelona, the capital of Catalonia Theoretical approach: This explanatory study adopted a qualitative approach, based on three techniques; focus groups (n = 3), semi-structured (n = 25) and short individual interviews (n = 5).	background information; support for community based PA approaches	increases convenience logistical challenges increases awareness

Seidman, M. D., & van Grinsven, G. (2013). Complementary and integrative treatments: integrative care centres and hospitals: one centre's perspective. Otolaryngologic Clinics of North America, 46(3), 485-497.	descriptive paper	Descriptive article about one complementary medicine-focused integrative care centre	background information on integrative and complementary care	coordination and collaboration (structural)
Speake, H., Copeland, R. J., Till, S. H., Breckon, J. D., Haake, S., & Hart, O. (2016). Embedding physical activity in the heart of the NHS: the need for a whole-system approach. Sports Medicine, 46(7), 939946.	expert recommendations	plans detailing the co-location of NHS clinics with leisure centres in Sheffield.	rich data to inform theory building, background information, expert opinion and recommendations	perceived importance increases awareness of PA improved staff experience coordination and collaboration(structural)

Taylor, A. H., EversonHock, E. S., & Ussher, M. (2010). Integrating the promotion of physical activity within a smoking cessation programme: Findings from collaborative action research in UK Stop Smoking Services. BMC health services research, 10(1), 317.	collaborative action research study	Objective: Within the framework of collaborative action research, the aim was to explore the feasibility of developing and embedding physical activity promotion as a smoking cessation aid Collaboration with advisors was key in ensuring that a feasible intervention was developed as an aid to smoking cessation. There is scope to further develop tailored support to increasing physical activity and smoking cessation, mediated through changes in perceptions about the benefits of, and confidence to do physical activity.	information to inform theory building	increases convenience coordination and collaboration (structural) perceived importance
Williams, P. M. (2012). Integration of health and social care: a case of √ learning and knowledge management. Health & social care in the community, 20(5), 550560.	qualitative study	Qualitative study on integration of health and social care as an exercise in learning and knowledge management; collaborative culture was key for learning and knowledge management; co-location of facilities, joint appointments, trust and interpersonal relationships were seen important for tacit knowledge exchange.	rich data to inform theory building on co-location	perceived importance knowledge transfer and shared learning increases convenience

Whitelaw, S., Topping, C., McCoy, M., & Turpie, L. (2017). Promoting integration within the public health domain of physical activity promotion: Insights from a UK case study. Journal of Integrated Care, 25(3), 174-185.	case study	Research method: A quality improvement (QI) methodology was deployed, comprising three elements: a diagnostic tool that assessed strategic and practice positions; a half-day workshop that brought senior leaders together for to reflect this evidence; and a structured process that sought to generate proposals for future integrated action	data to inform theory building	coordination and collaboration (structural) improved staff experience
Grey Literature				
Copeland, R., Hart, O., and Till. S. (2015). National Centre for Sport and Exercise Medicine (NCSEM). Community MSK: a hub and spoke model.	expert recommendations	Expert recommendations calling for embedding PA into healthcare. Presentation of case study of colocation in Sheffield	background information and rich data to inform theory building	increases convenience
(Department for Digital, Culture, Media & Sport, 2015). The government's sport strategy Sporting Future: A New Strategy for an Active Nation	working paper	UK government's sport strategy: Sporting Future		increases convenience normalising PA

(Design Council, 2009). Report: Sustainable Places for Health and Well-being	report	Design Council report on what sustainable places for health and wellbeing 'look like'	background information on building design	increases convenience increases awareness of PA facilities
(Project for Public Spaces, 2016). The Case for Healthy Places	working paper	Working paper and case studies of 'healthy places'	theory building	increases convenience increases awareness of PA facilities
(Sinclair, 2017). Building Connections: co-locating advice services in GPs and job centres	paper included from the grey literature	An evaluation report of the colocation of advice centres in general practices and job centres	rich data to inform theory building and other example of co-location	increases convenience knowledge transfer and shared learning
(UK Active, 2018). Empowering communities: An assessment of capital investment into community wellness hubs	case examples and evaluation of community wellness hubs including NCSEM co-location model in Sheffield	An assessment of capital investment into community wellness hubs	background information and rich data to inform theory building	increases convenience coordination and collaboration perceived importance increases awareness normalising PA modelling

3.4.2 Overview of source contribution

The 39 sources listed above contribute to background information on the topics of exercise referral, integration of healthcare, co-location, place-making, healthcare design and PA. All of the sources contribute to theory-building in some way. Some sources provide data which speak to contextual and mechanistic elements of the described themes. The sources are from different countries, disciplines, healthcare systems, sectors and of different methodologies which made it challenging to compare the findings (if any) from each source.

There are interrelationships between the expert opinions and recommendation papers calling for reducing barriers to PA opportunities, integration of services, embedding PA into healthcare and reducing chronic disease through PA.

3.4.3 Themes supporting co-location of healthcare and leisure as a means to enable PA promotion

The themes (described in greater detail below) include:

1. Increases convenience
2. Perceived importance of PA
3. Knowledge transfer and shared learning to promote PA
4. Coordination/collaboration of health and PA professionals (structural)
5. Normalises PA behaviour
6. Modelling PA behaviour
7. Improves patient experience

8. Improves staff experience
9. Increases awareness of PA facilities
10. Long term conditions
11. Inconsistency of the clinical schedule
12. Logistical challenges

1. Increases convenience

Several of the findings suggested that co-location of healthcare and leisure would increase convenience for service users (Hopkins, 2013; Karwalajtys & Kaczorowski, 2010; Dietz, et al., 2015; Kliger, et al., 2015; Leemrijse, et al., 2015; Seidman & van Grinsven, 2013; Berdine & O'Neli, 2007; Moe, et al., 2016; Taylor, et al., 2010; Williams, et al., 2012; Ribera, et al., 2006; Martin et al., 2014; Kemper, et al., 2007; ukactive, 2018; Copeland, et al., 2015;

Sinclair, 2015; Department for Digital, Culture, Media & Sport, 2015; Design Council, 2009).

This theory theme was noted in the case study of two integrated services (a mental health service and a multidisciplinary care group) (P. M. Williams, 2012a) a report on development and implementation of a pharmacist-managed wellness centre (based on campus within a school of pharmacy) (Berdine & O'Neil, 2007), review of physical activity integration into primary care in Switzerland (Martin, et al., 2014) and an evaluation report of the co-location of advice centres in general practices and job centres (Sinclair, 2017).

Sinclair (2017) concluded (in an evaluation report of the co-location of advice centres in general practices and job centres) that key rationale of integration was to provide a *single point of access* for service users. *"People engage more with co-located services than with services which require them to travel, even small distances, to attend"* and referral and

engagement rates were higher in embedded co-located sites. Additionally, the "immediacy" of the PA opportunities that the leisure centre provides could facilitate referrals by providing patients the opportunity to participate as soon as they have been primed by a conversation with the HCP (Sinclair, 2017). A "one-stop" shop lay-out, unique to colocation, could also make it easier for HCPs to prescribe and refer to PA because the leisure centre and gym is in the same location, thus keeping PA in the forefront of HCPs cognitive awareness (Copeland, R., Hart, O., 2015; Ukactive, 2018).

It may be concluded that co-location of health and leisure services would work to increase physical activity promotion by increasing convenience for the user and health care practitioner.

2. Perceived importance of PA

Several studies suggest that the co-location of healthcare with leisure increases the perceived importance of PA for both HCPs and patients (Leotta, et al., 2011; Matheson, et al., 2013; Morris, 2006; Speake et al., 2016; Taylor, et al., 2010; UK Active, 2018, Williams, 2012). In the Williams' (2012) case study, the two integrated services were purposely co-located together in the same facility (rather than using an existing facility). The NCSEM facilities have also been purposely co-located, therefore, the inference of this theme is that this purpose-built co-location raises the profile of PA in patients and HCPs, which may make it more likely that HCPs will promote PA and patients will participate in PA opportunities. Part of this profile raising is the intention behind purpose-built co-location. In the case of the NCSEM model, specifically Graves, one service wasn't merely tacked onto another service, the healthcare clinics and leisure facilities were co-located intentionally, recognising the merit of each service equally.

With this in mind, co-location of health and leisure services might work to promote the perceived importance of PA. Purposely building and co-locating services may raise the profile, thus, enabling easier promotion and referral of PA (Leotta et al., 2011; Speake et al., 2016).

3. Knowledge transfer and shared learning to promote PA

Two studies suggest that the co-location of healthcare with leisure promotes knowledge transfer and shared learning to promote PA (Williams, 2012; Sinclair, 2017). In Williams (2012) case study, the integration of health and social care through co-location of facilities as well as trust and interpersonal factors help to facilitate knowledge transfer and shared learning. Sinclair's (2017) evaluation of advice centres co-located with GP practices suggested that putting two services together could result in knowledge transfer and shared learning on an administrative basis.

Learning through informal interactions is preferential to traditional desk-based structured learning (P. Williams, 2012). Whilst co-location is helpful, it does not solely determine whether different professional groups share knowledge. Tacit knowledge exchange is a key factor for integration; it is facilitated through informal interactions which co-location allows (P M Williams, 2012). Designing spaces that co-locate healthcare and leisure services could therefore enable and enhance the shared understanding, value and referral of PA by allowing for informal interactions to occur between HCPs and exercise professionals (Speake et al., 2016). It is inferred that through these informal interactions, tacit knowledge could be shared around the benefits of PA promotion, discussion and referrals (Copeland, R., Hart, O., 2015). In addition, HCPs and exercise professionals could share advice about "what works" to promote PA amongst patients. Knowledge transfer and shared learning is important for

co-location to work to promote PA because then HCPs and exercise professionals will share knowledge regarding patients and best practices to promote PA. Physical co-location enables knowledge transfer and shared learning to work to promote PA. Therefore, colocation of healthcare and leisure may work to facilitate knowledge transfer and shared learning to promote PA.

4. Coordination/collaboration of health and PA professionals (structural) Several studies suggest that the co-location of healthcare with leisure increases coordination/collaboration of health and PA professionals (structural) (Leotta et al., 2011; Leemrijse et al., 2015; (Leenaars et al., 2015). In Leotta, et al.'s work, their co-located centre allowed for "fluidity and integration" between the gym and healthcare facilities which fostered a collaborative multidisciplinary approach (Leotta et al., 2011). Leemrijse et al's (Leemrijse et al., 2015) found that GPs participating in a formal alliance with other HCPs made more exercise referrals than colleagues not in a formal alliance. Developing strong formal alliances and referral pathways with community organisations also promotes PA and healthy lifestyles (Leenaars(Leenaars et al., 2015). (*Alliances* in health promotion can be defined as, "a collaboration between two or more parties that pursue a set of agreed goals for health promotion." (Gillies, 1998, p. 100). When HCPs are uncertain of PA opportunities and feel unsure of PA opportunities and "uncomfortable" with the exercise professionals, this can prevent the HCP from making referrals to PA (Leenaars et al., 2015). Co-location may facilitate collaboration by creating structural linkages and referral pathways between the healthcare and leisure (Leotta et al., 2011; Lobelo et al., 2014b). The mechanism described above is that if HCPs and exercise providers collaborate, HCPs may become more

knowledgeable about PA promotion, opportunities and referral pathways and this collaboration could lead to increase PA referral (Leenaars et al., 2015).

5. Normalises PA behaviour

Research suggests that the co-location of healthcare with leisure normalises PA behaviour (Cabdib, et al., 2013; Department for Digital, Culture, Media & Sport, 2015; Leotta et al., 2011; Uk active, 2018). A co-located diabetes centre and gym described by Leotta, et al. (2017) achieved "fluidity and integration of medical care with gym facilities" with "purposeful blurring of the border of the two." The facility and services within in it are designed so that patients see staff and other patients (like themselves) participating in the same exercises, thus normalising PA (Leotta et al., 2011). This would not occur in a traditional clinical setting without gym facilities. Co-location of healthcare and leisure facilitates normalisation of PA because patients that might not ordinarily be exposed to the leisure centre environment are exposed to people being physically active when they attend their clinical appointment. Over time, attending healthcare appointments in a leisure centre setting could serve to change norms of PA in the minds of patients. The hypothesis is that patients who attend healthcare settings co-located with leisure facilities will be more likely to view participation of PA in the healthcare setting as normal. Furthermore, in the leisure centre environment, patients will see others "like them" being physically active and this may encourage physical activity through peer modelling of PA behaviours and increasing belief in the patient's own ability to perform the desired behaviour.

If there are seamless boundaries between the healthcare and leisure facilities, then the patient may be more likely to see the behaviour as normal.

6. Modelling PA behaviour

Several studies suggest that the co-location of healthcare allows for patients to experience modelling of PA behaviour by both staff and other patients (Candib, et al., 2013; Leotta, et al., 2011; ukactive, 2018). In the M.O.V.I.S. co-located diabetes centre, staff are able to participate in PA in the same gym as patients; "staff teach by doing" (Leotta et al., 2011), therefore, modelling PA behaviour to patients that are observing them in the gym at the same time. This idea can be applied to the NCSEM co-location model as leisure centre staff and HCPs working in Graves and Concord can use the gym for free. A patient in Graves or Concord could be exercising in the gym at the same time as a HCP or leisure centre staff member, thus, modelling healthy behaviour to the patient. It could be inferred from this that if the patient at Graves or Concord sees the gym staff and HCPs participating in PA whilst they are in the gym, the staff may appear as aspirational figures to the patients. In addition, patients may observe other patients which are of similar health status participating in PA in the co-located environment. Previous research shows self-efficacy can be influenced through modelling behaviour (Bandura, 1986, p. 400) and that if an individual observes someone being physically active could help build the patients self-efficacy, making them more likely to begin and maintain PA behaviour. This hypothesis is subject to individual differences in psychology and motivation, however, as some individuals are not motivated by individuals that seem aspirational or interesting, such as sports figures (Biddle & Mutrie, 2008). In fact, for some individuals, observing others with fitness levels that seem “unattainable” or “out of reach” may discourage PA behaviour (Biddle & Mutrie, 2008). Older adults referred to PA may feel discouraged seeing younger vigorous exercisers (Biddle, Fox and Edmunds, 1994; Fox et al., 1997; as cited in Biddle and Mutrie, 2008). Thus, the theme of modelling to promote PA in the co-located environment is subject to individual

differences in motivation. To summarise, it is hypothesised that the co-location of health and leisure would work to promote modelling of PA behaviour to patients from both staff and other patients which would in turn work to increase PA participation.

7. Improves patient experience

Several studies sugest that co-location of healthcare and lesiure improves patient experience (Leemrijse et al., 2015; Moe et al., 2016) and that when patients have a better healthcare experience, they will be more likely to self-manage their health, adhere to HCP recommendations and have better healthcare outcomes. A positive healthcare experience for patients could facilitate more GP referrals to PA (Leemrijse et al., 2015). Moe, et al. (2016) found that patients receiving care through an integrated multidisciplinary model were more satisfied with their care and reported higher levels of self-efficacy than those receiving usual care. Self-efficacy is a mediator for increased PA behaviour(Bauman et al., 2012).

In the NCSEM Hub and Spoke document, Copeland et al. (2015) describe the co-located leisure and health clinics as “a healthy environment for both staff and patients alike” with opportunity to develop skills, knowledge and confidence to self-manage PA levels, thereby improving their health outcomes and quality of life. It is hypothesised that if patients are more satisfied with their care, they may be more receptive to messages about PA from their HCP. They may experience an increase in self-efficacy from the integrated care environment because of the resources that this environment provides (Moe, et al., 2016). In addition, patients might perceive less barriers to PA in this environment and more likely to take up subsequent opportunities to be active (such as exercise referral).

It may be concluded, therefore, that co-location of health and leisure services would work to improve patient experience and in turn increasing patient participation in PA opportunities.

8. Improves staff experience

Several studies suggest that co-location of healthcare and leisure may work to improve staff experience in the co-located environment (Olsen & Warren, 2007; Speake et al., 2016; Whitelaw, et al., 2017). One example of improved staff experience through co-location is the Dan Abraham Healthy Living Centre (DAHLC) which was developed to offer onsite health and wellness services at the Mayo Clinic (Olsen & Warren, 2011). In the DAHLC, there is a seamless integration of health and healthcare, designed to improve employee health. The aim of the centre development was to expand the workplace fitness offerings and include a broader focus on areas such as nutrition, stress, and sleep for staff. The centre also aimed to enhance integration of health and healthcare for the wellbeing of Mayo Clinic staff (Olsen & Warren, 2011). Care and attention were paid to architectural elements such as natural light, social spaces, green spaces, private areas and accessibility to improve staff experience. All Mayo Clinic employees can use the centre's research programmes, cafe, and meeting areas. Initial development focus groups identified barriers to staff gym attendance such as perceived lack of time, intimidation, childcare availability, parking, and cost (Olsen & Warren, 2011). The facilities were designed to attract staff are "non-traditional exercisers." Membership fees were set low to make the facilities more accessible and gym staff were told at staff meetings that they would be new members of healthcare team to build a sense of integration between healthcare and gym staff, with the value that integration of staff into the healthcare team is vital for treating the whole person. By providing opportunities for PA and giving staff permission to engage, the organisation is making it easier for staff to be active, therefore, bringing value to the staff member and the organisation. These

opportunities would not be provided in a traditional clinical environment; therefore, it could mean that through co-location, HCPs will be more likely to promote PA to patients because they participate and value PA in this environment (Olsen & Warren, 2011). Enabling staff to engage in positive health behaviours at work through the integration of fitness into health and giving them permission to do so is also likely to enhance staff experience. Data from the review suggests that co-location of health and leisure could improve staff experience.

Speake et al. (2016) described how embedding PA into healthcare through a whole systems, multi-level approach can improve staff working experience, improved staff PA levels, increase in active travel and reduction in perceived barriers to participation in PA.

9. Increases awareness of PA facilities

Several studies suggest that co-location of healthcare and leisure may work to increase awareness of PA opportunities (Copeland, R., Hart, O., 2015; Leemrijse et al., 2015; Leenaars et al., 2015). Leemrijse et al. (2015) found that insufficient knowledge of local PA opportunities was a reason for GPs not referring patients to a local exercise facility. Leenaars et al. (Leenaars et al., 2015) report that facilitators for referral schemes included better understanding and awareness of services available to patients. Copeland, et al.'s (Copeland, R., Hart, O., 2015) vision for the co-located centres in Sheffield was "a seamless transition from specialist secondary and community care clinics embedded within leisure facilities to exercise referral at the same venue, where patients just go "down the corridor to meet their exercise instructor and start their programme." The hypothesis that this generates is that if clinics are co-located with leisure centres, then this may facilitate patient and HCP awareness of PA opportunities, making them more likely to engage (Copeland, R., Hart, O., 2015; Leenaars et al., 2015; Leotta et al., 2011). Because the clinic is in the setting of the

leisure facility, discussing PA with patients in this environment is more contextually relevant than having similar discussions in a hospital setting. The inference is that patients and HCP create a different psychological contract about what treatment (and the role that PA might play in it) might involve in clinical settings compared to the leisure centre environment (Copeland, R., Hart, O., 2015)(Copeland, individual correspondence, 2018). This could, therefore, result in increased referrals to PA, improved health outcomes long term for patients and reduced utilisation of healthcare services. Thus, co-location might be important in increasing HCP awareness and subsequent patient participation in PA opportunities.

10. Long term conditions

Several studies suggest that co-location of healthcare and leisure may work to help those with long term conditions to take part in PA opportunities (Leemrijse et al., 2015; (McIntosh et al., 2017).

Long term conditions, irrespective of the specific condition, were reported by over one-third of GPs as a barrier to referring patients to PA (Leemrijse et al., 2015). Fear of exercise, specifically concerns about increasing cardiac risks, was reported by patients and HCPs (McIntosh et al., 2017). Patients reported feeling safer if monitored during exercise in the cardiac rehabilitation environment and therefore more likely to participate (McIntosh et al., 2017). Co-located facilities might enhance feelings of safety for the patient given the proximity of HCPs. At the same time, co-location might also provide assurances to HCPs that patients can safely exercise as they can ‘check-in’ on them and speak to exercise professionals to establish confidence in programming.

3.1.4.3 Themes that do not support co-location to enable PA promotion

This section explains themes from the realist review which do not support the co-location of healthcare and leisure to promote PA.

11. Inconsistency of the clinical schedule

McIntosh et al., (2017) found that inconsistency of the clinical schedule may hinder full colocation of healthcare and leisure may work to increase PA. A key barrier to participation in the CR programme in an integrated care facility in the US was instability or inconsistency of the clinical schedule (McIntosh et al., 2017). This inconsistency of the clinical schedule could affect patient participation at the co-located facilities. Instability of the clinical schedule, particularly in the context of the NHS and professional working patterns (for example, appointments set around the HCPs working pattern and not the patients schedule) could mean that patients might not have their appointments in a co-located facility every time, instead having their appointment in the traditional hospital setting. This could result in colocation not working as intended to promote PA behaviour development and maintenance. When factors such as instability outweigh the benefits of attending a co-located facility, a patient may choose to attend appointments that are available first, which may not happen at a co-located facility. This would result in the patient not receiving the potential PA benefit that co-location provides. Co-location might not work as intended because of contextual factors such as healthcare system structure and professional working patterns (i.e., set around the consultant's working pattern and not the patients)(Lorig et al., 1989). According to data from the literature review, inconsistency of the clinical schedule appears to be a barrier that needs to be overcome in order for co-location to work to promote PA.

12. Logistical challenges

Several studies suggest that logistical challenges may act as a barrier to co-location of healthcare and leisure (Barrett, et al., 2017; Börjesson, 2013; Dietz, et al., 2015; Karusisi et al., 2013; Ribera, et al., 2006). This theory theme was noted in Dietz, et al. (2015) integrated framework for the prevention and treatment of obesity and its related chronic diseases: a clinical intervention in a community setting in a leisure centre. The communication systems and data monitoring modelled how communication *could* occur between social and clinical systems, yet logistical challenges with data sharing between clinical and community settings prevented full co-location in practice (Dietz, et al., 2015). Börjesson et al. (Börjesson, 2013) in their review on PA promotion in the hospital setting in Sweden describe logistical problems which serve as barriers to physical activity prescription (PAP) in the hospital setting. Barriers described include short stay of patients, lack of transfer from hospitals to follow up care and lack of fitness facilities for patients in the hospital setting. McIntosh (2017) suggest that logistical challenges such as transport, distance and cost are barriers to patient participation in Cardiac Rehabilitation (CR).

Logistical challenges might be a barrier to some patients accessing the facilities consistently and preventing co-location from having the intended effect of promoting and instilling PA behaviour. Patients routinely describe lack of transportation poses a significant barrier to accessing services (McIntosh et al., 2017) and programmes close to home enhance the likelihood of patients attending their appointments (McIntosh et al., 2017). The importance of proximity is reinforced by Karusisi et al. (Karusisi et al., 2013) in their study of spatial accessibility and likelihood of attendance to specific sport facilities. Karusisi and colleagues suggest that spatial accessibility might play a role in participation of certain sports, but "accessibility is a multi-dimensional concept that integrates educational, financial, and

geographical aspects and therefore strategies to increase participation in sport activities should improve the spatial and financial access to specific facilities, but also address educational disparities in sport practice" (Karusisi et al., 2013, pp. 72).

"Health-supportive programming and activities are successful when they are well located, easily accessible, and connected to other activities that attract people" (Project for Public Places, 2016) and the NCSEM model in Sheffield intentionally located health and leisure in areas of deprivation with the aim of overcoming barriers to access (the assumption was made that users of the services would be local given the high incidence of NCDs in the surrounding community). However, these centres may not reach the local target populations. Data in this review substantiates this decision and is likely to support attendance (McIntosh et al., 2017). Proximity of access seems particularly relevant in low SES areas given lack of access to a car, and/or the costs of accessing public transport without assistance could be prohibitive leading to non-attendance. Indeed, CR non-participation has been shown to occur when disincentives (financial) to participation outweigh perception of the benefits (benefit to health) (McIntosh et al., 2017). This tension is captured by McIntosh et al. (McIntosh et al., 2017) who described the challenges that exist between those who choose not to participate in a CR programme and those that do. The model proposes that when barriers to attendance (logistical challenges: transport, distance, cost) outweigh benefits, non-attendance will result (McIntosh et al., 2017). Therefore, logistical challenges need to be overcome for full co-location to work to promote PA opportunities.

Table 3.0 presents barriers and facilitators of patient attendance at a co-located facility.

Table 3.0 Tension between co-located clinic attendance factors

Tension between co-located clinic attendance factor	
Barriers = Non-attendance	**Facilitators = Attendance**
● Lack of or transport ● Accessibility and distance ● Cost of attendance, fuel, transportation	● Ease of transport ● Facility nearby and easily accessible ● Inexpensive (not a cost burden) to attend and participate at facility

3.4 Chapter conclusion

This chapter described the findings of a realist review exploring the extant evidence for the co-location of health and leisure as it pertains to the promotion of PA. The evidence pointed to several themes that ether support or inhibit the promotion of PA. Themes which support co-location include increasing convenience, awareness and perceived importance, normalising, modelling, improved staff and patient experience, long term conditions, knowledge transfer and shared learning and coordination and collaboration. Themes that hinder co-location include logistical challenges and inconsistency of the clinical schedule.

Evidence appeared to strongly support that co-location of healthcare and leisure could work to increase convenience, perceived importance and awareness of PA, improve staff and patient experience and normalise PA for those patients that would not otherwise be exposed in a traditional clinical setting. There are gaps in information regarding for whom and under what circumstances co-location works to increase convenience of PA opportunities. It is important to understand if co-location increases convenience for those that live in nearby low SES communities (or not). Gaps in the data remain as for whom and

under what circumstances co-location works to increase awareness of PA opportunities; it is important to understand whether co-location works better to increase awareness for patients and HCPs of certain clinical conditions, health status, PA level (prior and current) and postcodes. Whilst co-location appears to improve patient and staff experience, more explanation is needed to determine if this is enough to change PA behaviour. In addition, it is important to tease apart whether patient and HCP experience is wholly more positive simply because they are in a salutogenically designed community environment and/or because they have the opportunity to be physically active in this setting, which they would not be able to in a clinical setting. It is important to understand if HCP experience is improved because they can have a more meaningful role in this environment or because they have amenities which they would not in a clinical environment (parking, brightly lit, open environment, free gym membership, colleague support).

More information is needed to explain the following themes: modelling PA behaviour, long term conditions, logistical challenges, inconsistency of the clinical schedule, coordination and collaboration and knowledge transfer and shared learning. Co-location appears in theory to enable coordination and collaboration as well as knowledge transfer and shared learning, yet it is not clear from the data if this happens in a co-located healthcare and leisure setting and to what extent context influences this translation.

Context is clearly vital in understanding the value of the co-location of healthcare and leisure in the promotion of PA. With this in mind, the following chapter presents data from a series of semi-structured interviews conducted with stakeholders in Sheffield that were involved in developing the co-located model, including professionals currently working in

and experiencing the models. Data from these interviews will be used to refine the themes presented here and help build programmes theories.

Chapter 4. Phase 1: NCSEM Stakeholder Interviews

4.1 Chapter introduction

Chapter 4 presents the aim and objectives, methods, results and conclusions of the NCSEM stakeholder interviews. Realist semi-structured interviews were conducted with NCSEM stakeholders who were instrumental in the development of the co-location model in Sheffield. These interviews were conducted in order to refine, refute and confirm the themes developed from the realist review described in Chapter 3. (See section 2.6.4.1 for more detail into the methods used).

4.2 Aims, objectives and research questions

4.2.1 Aims: The aims of the interviews was to explore NCSEM stakeholder perspectives to understand the rationale behind the initial formation of the co-location model *and* to test initial themes gleaned from the realist review (Manzano, 2016). This was crucial to inform the continued theory development and to understand why the model was developed and its anticipated impacts on PA.

4.2.2 Objective: The objective of these interviews was to conduct qualitative realist interviews with a convenience sample of the NCSEM co-location model stakeholder group to contribute to initial rough programme theory development of the co-location of leisure and health services.

4.2.3 Research Questions

1. What are the perspectives of the NCSEM stakeholders with regards to formation of the co-location of leisure centres with NHS clinics to increase and promote PA?

2. What were the NCSEM stakeholders' ideas about the underlying processes that they thought would contribute to increased PA, and why, when they developed colocated leisure centres with NHS clinical services?

4.3 Methodology and methods

4.3.1 Realist interviews to refine, refute or confirm initial rough programme development theories (IRPTs)

Qualitative research seeks to make visible participant experiences, thoughts and attitudes. Interviews are best suited to explore these thoughts, attitudes and experiences through dialogue between the researcher and participants (DeJonckheere & Vaughn, 2019). Interviews in realist evaluation are used to explore propositions that will be tested and refined in further research (Manzano, 2016). Realist interviews are both structured and unstructured and are distinguished from other semi-structured interviews by the use of concepts such as "teacher-learner" cycles and conceptual refinement (Pawson, 1996) (See Figure 9.0). This "teacher-learner" cycle is used for the purposes of theory gleaning and refinement (Pawson, 1996; Manzano, 2016). In realist interviews, the researcher's theory about the subject matter of the interview is placed before the interviewee to be confirmed, refuted and further refined through an iterative and cyclical process (Pawson, 1996). Conceptual refinement occurs when participants offer a formal description of their own thoughts on the researcher's theory as well as an explanation of their reasoning (Pawson, 1996). This is an important process within the realist interview as it allows the researcher to understand whether or not the participant shares the same understanding of a particular concept or theory.

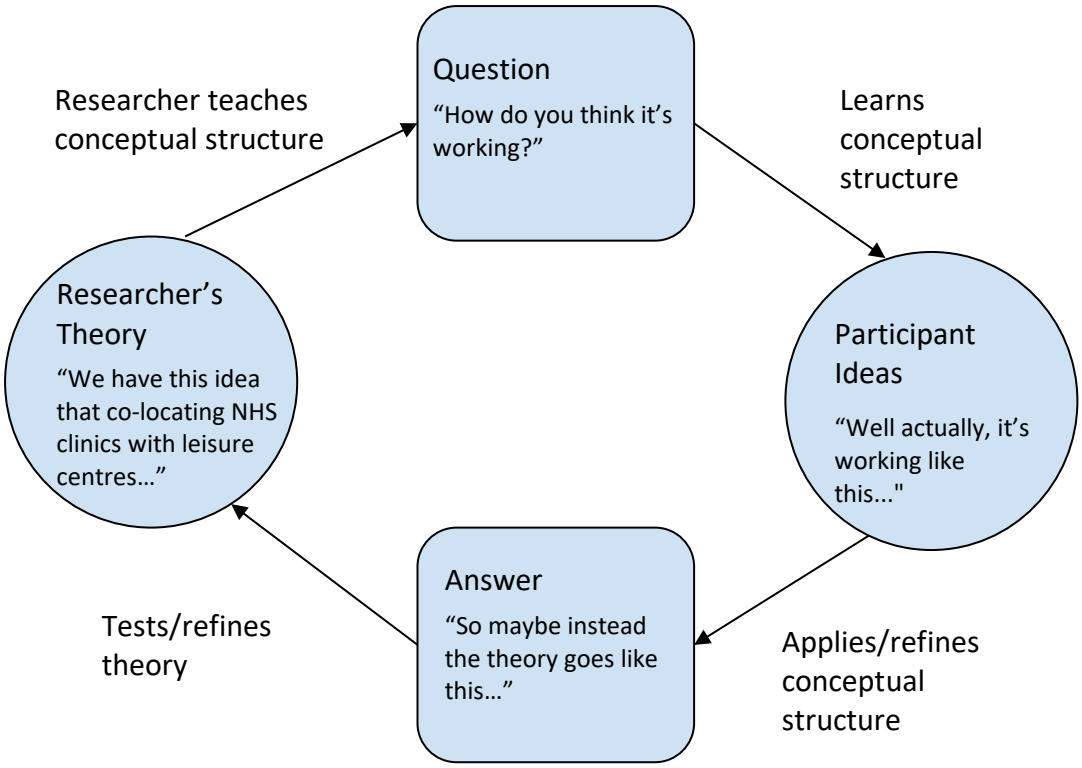

Figure 9.0 Teacher-learner cycle (Adapted from Pawson, 1996)

4.3.2 Sampling

Interviews were conducted with a convenience sample of a multidisciplinary group of stakeholders from the NCSEM initial capital co-location model group. Nine (out of 12) stakeholders comprising the original group of professionals involved in development of the co-location model were invited to participate. The participants were all male from different professional backgrounds and vocations. Whilst the stakeholders worked in a variety of sectors in sport, physical activity and health, a limitation is that they were all male and of similar ages and socioeconomic status. This was the natural makeup of this stakeholder group, but it is important to note that there are gender differences in motivation and experience of PA (Ashford et al., 1993; Ulseth, 2008). The stakeholders' gender could have an influence on how they experienced and reflected on co-location of healthcare and leisure. Additionally, the stakeholders did not directly experience the sites as a patient or

HCP but were instead making an informed decision on how and why they thought colocation would work (or not) for patients and HCPs.

An initial contact with each stakeholder regarding the interview was sent on behalf of the PhD student by the Director of Studies (RC), who had been part of the initial stakeholder group. Following the initial contact by RC, participants were sent an email by the PhD student with an invitation to participate, a participant information sheet and consent form (Appendix 4). Participants were contacted again after at least 24 hours to follow up. Eight of the stakeholders agreed to participate in interviews. Table 4.0 presents the characteristics of the participants.

Table 4.0 Participant characteristics

Stakeholder	**Role**
1	Project manager
2	Primary care general practitioner (GP)
3	Teaching hospitals NHS estates executive
4	Operations executive
5	United Kingdom (UK) University Head of Sport and Physical Activity
6	Leisure venues executive
7	Consultant rheumatologist
8	Former hospital CEO

4.3.3 Data collection

The interviews took place in July and August 2018. Interviews were conducted face-to-face or via telephone based on the participants' preferences. Face-to-face interviews took place at Sheffield Hallam University or at the participant's place of work.

4.3.4 Interview Schedule

The full interview schedule is included in Appendix 6. In the first part of the interviews, NCSEM Stakeholders were asked about their perspectives on what the initial co-location model was trying to achieve, their involvement with the board (how, why and when they became involved), their experiences with the development of the model and their perception of whether the model is working as intended (how, why, for which population(s) and under what circumstances).

Initial themes developed from the realist review were tested within the second part of the interview (Manzano, 2016). These themes were placed before the participant on large pieces of paper (See Appendix 6: Interview Schedule for full list of initial themes tested). Participants were given an example of each theme and asked if and how it related to their experiences, beliefs, and knowledge about how the NCSEM co-location model is working (or not). Some participants did not feel that their experiences or knowledge in their sector of work was related to a particular theme therefore, it was not discussed.

4.3.5 Analysis

Interviews were recorded with a digital voice recorder, transcribed and pseudonymised by the lead researcher. Transcripts were uploaded to QSR-NVivo version 11. NVivo software is useful for managing large quantities of data and creating framework matrices to compare

within and between cases. NVivo enhances transparency in qualitative analysis and has been used previously in realist evaluation (Dalkin and Forster, 2015). Use of NVivo allowed for examination of each participant's response to a particular IRPT and to illustrate the relationship between each case and IRPT.

Data were analysed using framework analysis (Ritchie & Spencer, 1994). Framework analysis has been used in previous realist evaluations to test and refine theory (Brand, et al., 2018; Handley, 2017; McHugh et al., 2015). It is an appropriate method of analysis when there are a prior themes (in this case IRPTs from the realist review) and is appropriate for interviews where there are large volumes of data (Ritchie and Spencer, 1994).

The key stages of framework analysis and how they were applied to the interview analysis are explained below (Ritchie & Spencer, 1994).

1. Familiarisation with the interview
2. Developing the analytical framework
3. Applying and indexing analytical framework
4. Mapping and charting data into framework matrix
5. Interpreting data

1. Familiarisation

Familiarisation is the first phase of framework analysis. This phase involves listening to audio recordings, reading transcripts and studying observational notes. The transcripts were first read thoroughly by the lead researcher and were reviewed in line with the study objectives and IRPTs developed from the realist review. Reflective notes were taken. Any additional themes not already developed from the realist review were also noted.

2. Developing the analytical framework

The step involves developing a framework to "sift and sort" the collected data using a priori issues as well as emergent themes (Ritchie & Spencer, 1994). The analytical framework was developed utilising the IRPTs that were "inspired" from the realist review, the original research aims and emergent recurring themes within the transcripts. The IRPTs were charted in columns (codes) with each interview participant charted in rows (cases) to analyse the association between participant and IRPT. Additionally, in line with the realist methodology aim of understanding "what works best for whom under what circumstances and why," this question was added as a theme column.

3. Applying and indexing analytical framework

"Indexing" or applying the analytical framework is the next step and consists of making judgements about the significance of the interview transcripts and annotating the text according to the analytic framework (Bryman & Burgess, 1994). The use of NVivo was especially useful at this stage to facilitate the application of the framework.

4. Mapping and charting data into framework matrix

A framework matrix was created within Nvivo, and coded text was reviewed in line with the analytical framework. The framework matrix helped to summarise and provide structure to the data. Each cell of the framework matrix contained coded summarised text.

5. Interpreting data

In this stage, the data was mapped and interpreted in various formats to investigate how the IRPTs related to each other. Various methods were used to chart the interview results using the charting functions in NVivo, Google Drawings, Microsoft Word and by hand with pen and paper. First, a diagram was drawn by hand on a large piece of paper to help make sense of the relationships between the IRPTs. This initial drawing positioned the IRPTs across socioecological levels, using "Pawson's 4 I's" (Pawson & Tilley, 1997). This drawing supported initial analysis by helping to make sense of the data both spatially and temporally. Additionally, charting the data in this way helped to visually illustrate context, mechanisms and outcomes. Next, a mind map was made using drawing functions in Google (see Appendix 2: initial theme mapping). This method was used as another way to make sense of the relationships between the IRPTs and where they were situated across the sociological levels. Other methods to help make sense of the data were used, including a "word cloud" (in NVivo) and Google Drawings.

4.3.6 Ethics and governance

Ethical approval was obtained through Sheffield Hallam University Research Ethics Committee (SHUREC) to conduct interviews. See Appendix 5 for copies of ethical documentation.

4.3.7 Consent

Participants were asked to sign two consent forms (Appendix 3). Participants were made aware of their right to withdraw from the study in the participant information sheet (Appendix 4). The participants were given two weeks after the interview took place to withdraw their information.

4.38 Data Management

Audio recordings of the interviews and the transcripts were stored on the Sheffield Hallam University secure drive. Paper copies of consent forms were securely stored in a drawer in Chestnut Court, Sheffield Hallam University Collegiate Campus. Data will be stored for a minimum of 10 years (See Appendix 7 for Data Management Plan).

4.4 Results

4.4.1 NCSEM stakeholder interview themes

As the research was conducted iteratively, the 18 themes presented below represent a combination of themes inspired by the realist review and additional themes not included in the realist review (See Chapter 3) but generated inductively from the interviews.

The themes are categorised into various socioecological levels utilising Pawson's "Four I's," a variation on the socioecological model (Pawson, 1997). Whilst theories may fall into more than one level, or between levels, for the purposes of this study the researcher's best judgement was used to situate each theory pragmatically into just one level.

4.4.1.2 Infrastructural

1. Increases convenience to overcome logistical challenges (transport, distance & cost)

In theory, co-locating NHS clinics within leisure centres in deprived communities should provide individuals in those communities with opportunities to participate in PA. However, barriers could outweigh the opportunities to be physically active. Co-location, therefore, may only increase convenience for the people who live close by and can afford to attend the leisure centre. Additionally, for an individual with long term conditions that must rely on public transport, this could pose an even greater barrier, as they may have health conditions

which limit their mobility. The current operational model of the NHS means that patients are referred from postcodes across the city and beyond, so for many patients the usual logistical barriers of healthcare access persist. Therefore, it is hypothesised that *co-location works best for those who live nearby*.

Participant 1:

> "We can make a referral to the other side...so then you're still coming up with the barrier of them accessing the facility, possibly with long term conditions...it's not a panacea, it's not going to solve all the problems. And for those people that are close to Site 1 and have their appointment at Site 1 …and want to do some facility-based activity, it would probably work really well."

Participant 3 described how co-locating healthcare with leisure intentionally, instead of merely co-locating healthcare with any other service (such as a GP clinic with a library), could increase accessibility and convenience for the patient.

> "The difficulty is with what you described there [i.e., co-location of clinics within a library], going to the library and reading is hugely beneficial for all sorts of reasons, it's not going to create a big physical activity environment. Whereas, what I think was envisioned here was 'let's make sure that we have the physical activity environment to make it easily accessible to these people you are accessing the colocated model and then have the clinical activity next to it to refer them into it.'"

Thus, for co-location to work as intended to promote PA, it is important that clinics are built purposely with leisure centres or facilities which are designed to promote PA. Site 1 clinics were purposely co-located with a leisure centre, with clinics and leisure centre visitors

sharing the same entrance. The co-location of Site 1 makes it easy to notice the leisure centre and individuals participating in physical activity. In contrast, Site 2 clinics were built onto the opposite side of an existing leisure centre. There are two separate entrances. Although one could walk from the leisure centre entrance to the clinics and vice versa, the leisure centre is not immediately visible when attending a clinical appointment.

2. Inconsistency of clinical schedule

Consistent exposure to PA opportunities was an intended outcome of the co-located health and leisure models. It was hoped that patients would attend co-located clinics for each appointment (rather than traditional clinical settings) and that consistent exposure to PA would contribute to participation and the development of PA habits over time. In practice, inconsistency of clinical schedules may mean that patients do not have appointments at a co-located site for every appointment. HCPs work across the city in sites which are both colocated and not co-located, and the first available appointment may therefore not be at a co-located site:

> Participant 1:
>
> *"The patient wants to know how quickly can I get seen? 'I'm going to choose the appointment that is quickest for me, not necessarily the most convenient"*

Contrary to this, Participant 3 suggested that appointments are offered to patients based on the clinic that they need to attend and when the HCP is working at that site, as HCPs may often work at multiple sites. This means that patients *will* be offered appointments based first on the location of the clinic and the HCP that they need to see.

> Participant 3*:*

"When a patient accesses an NHS service, they can choose which facility they want to use… based on where that clinician is running that facility. They run multiple clinics…So, they go on to the "choose and book" system and let's say that Dr. A is running his sports medicine clinic at either on a Tuesday at Site 1, on a Thursday at Site 2… They get to choose which one they go to. You might think 'well actually I will go to the one that is closest to my house.' So, I might live in Jordanthorpe, which is a stone's throw away from Site 1, but I look on the list and I can get into Site 1 in three weeks' time and that's when the next available appointment is. Or I could go to Site 2 on Tuesday…So that 30-minute journey, the fact that I have to wait another three weeks, I'm going to go to Site 2. "

There are multiple factors which influence where a patient attends their appointment. For some patients, waiting time for appointments could override the distance to travel. For other patients, distance to travel and convenience may be more important factors in choosing where to book an appointment.

If inconsistency in the clinical schedule does exist and patients are not offered appointments at the same location with the same HCP every time, at least patients now have more options and choice in where they go for their appointments than before.

To enable co-location to work as intended to promote PA, it may be important that patients consistently have their appointments in a co-located facility every time with the same HCP. However, patients may choose the appointment that is most convenient for them in terms of transportation/distance to travel and availability of appointment.

4.4.1.3 Institutional

3. Purpose built (perceived importance)

This theme reflects data that suggests that purpose-built co-location of healthcare with leisure facilities with leisure centres could raise the perceived importance of PA in both the minds of patients and HCPs. This is because the clinics are built purposefully with the leisure centre and the opportunity to refer to PA is immediately available within the facilities. This potentially raises the profile and salience of PA in the minds of both patients and HCPs.

Participant 3:

"Building something specifically for that purpose [physical activity] shows how important something is... tangible evidence of the commitment of the city to take the model forward. Whereas if you were trying to shoehorn these services into a building that's already created that's old and antiquated, it doesn't have the same iconic status that we were trying to achieve… committing to the vision."

Thus, for co-location to work as intended to promote PA, it is important that clinics are built purposely with leisure centres or facilities which are designed to promote PA. Site 1 clinics were purposely co-located with a leisure centre, with clinics and leisure centre visitors sharing the same entrance. The co-location of Site 1 makes it easy to notice the leisure centre and individuals participating in physical activity. In contrast, Site 2 clinics were built onto the opposite side of an existing leisure centre. There are two separate entrances. Although one could walk from the leisure centre entrance to the clinics and vice versa, the leisure centre is not immediately visible when attending a clinical appointment. Physical activity is not made salient in Site 2 in the same was as Site 1 because of its purpose-built design. This hypothesis was further explored in phase 2 interviews with patients and HCPs.

4. Integrated care environment of co-location

Co-location of healthcare and leisure was intended by NCSEM stakeholders to create an integrated care environment.

> Participant 4:
>
> *"Co-location helps you to see the link between specialty or disciplines that you might not normally associate with healthcare such as physical activity and health trainers with diabetes."*

This integrated care environment was intended to create a seamless transition between clinics and the leisure centre. One intention of this seamless transition was to reduce barriers, such as lack of awareness of facilities, for patients being referred to PA. An integrated care environment could result in greater patient satisfaction because the barriers normally faced accessing PA opportunities could be eliminated or reduced in this integrated environment.

NCSEM stakeholders visited other co-located sites across the UK which informed their decision making about the models' design in Sheffield.

> Participant 3*:*
>
> *"… we went and had a look at a facility at [Northwestern city] and...it was quite good but not quite what we wanted, there was still clear segregation...they had like a GP practice sports centre, and they had a library, and they had a swimming pool and various other things.... the GP hub seemed a bit out of it. And what we are trying to do with our facilities is like integrate them…"*

The degree of integration appears to be an important factor in how co-location works to promote PA, with full integration appearing to be essential. Participants described differences in integration of co-located sites. For example, whilst a GP clinic co-located with a leisure centre might be physically connected, the two entities were operating separately and not seen as fully integrated in the descriptions of participants, in contrast with Graves leisure centre, where the boundaries are seamless between leisure and clinical areas.

In phase 2 of the research, it was important to explore the degree of integration between site 1 and site 2.

5. Proximity of resources, single point of access, "one-stop" shop

Co-location of healthcare and leisure facilitates *proximity of resources* for patients and staff. This single point of access "one-stop" shop makes it easier for HCPs to refer to PA and for patients to access PA opportunities. In addition, this "one-stop shop" or single point of access could create a broader, more holistic focus on well-being from the patient's point of view, rather than a mindset of only treating illness (pathogenesis).

Participant 5:

"…it encourages that holistic approach, so with a 'one stop shop'…you're going to spend longer, you're going to think about the broader aspects of health...so if you're going purely for a diabetes thing you might focus on the diabetes medication or whatever your expertise might be but a "one-stop shop" suggests that multiple different practitioners coming from different angles, it generates that more holistic approach which tends to focus more on your general well-being and kind of what

matters to me most at the heart, rather than simply what might be a focus on that particular disease area." Participant 7:

"…People that develop shopping centres do it for a reason. They do it because it works because people spend money and its co-location… we just made a shopping centre which has a one shop: your doctor, in one shop your physio, in one shop your fitness instructor, in another shop your swimming pool."

Additionally, the "one stop shop" that co-location creates provides patients and HCPs with "immediacy" to refer and access PA opportunities, as the gym is located "right there."

Participant 3:

"If you can be talking to someone, treating their condition …with physio, or drugs or whatever else you will do? Do you want to have a look at the facilities that we got? You could do a program through that or if you don't fancy that, there is a swimming pool down there, you could do a program.' It's there on the doorstep."

Creating proximity of resources through a "one stop shop" model appeared at this stage to be a key mechanism to facilitate PA in the context of co-location.

6. Coordination & collaboration of health and PA professionals (structural)

The hypothesis behind this theme developed the realist review data, is that if clinics are colocated with leisure centres, then both HCPs and exercise professionals are more likely to work together because they share the same working environment, facility, structures and work processes. The physical structure of the leisure centre with clinics and the gym located under the same roof, a centralised reception and information technology could be mechanisms which support collaboration. In turn this collaboration could facilitate increases

in PA because HCPs are able to share working processes with exercise professionals which are separate in a traditional clinical setting. The collaboration that the co-located environment could facilitate might make it easier for HCPs to make referrals to PA opportunities when they are collaborating with exercise professionals in the same environment.

Full structural collaboration appears to be a necessary mechanism for co-location to work as intended. In the early stages of implementation of the co-located sites, structural collaboration, particularly in terms of sharing financial and IT processes between the leisure and healthcare aspects proved to be difficult.

Participant 4*:*

> *"I think one of the things we found really challenging at the beginning was the information technology the IT infrastructure… the NHS is fraught with systems not talking to each other and just in Sheffield we had a primary care system and an acute system, and they weren't talking to each other, so we had to work about bringing them together. So, I think sharing of information is one aspect of it. But its finance is another aspect. We've all got competing challenges and competing budgets…."*

Full structural coordination and collaboration within the sites is perceived to be essential but appeared to be challenging, particularly within the early stages of co-locating. The main challenges discussed were issues with sharing the same structures and work processes due to NHS constraints regarding IT systems and patient record sharing. Having shared records, IT systems and budgets would make it easier to enable HCPs to collaborate with exercise professionals to make referrals to PA. Having shared records would allow for HCPs to monitor patient progress and exercise professionals to easily check a patient's health history

to appropriately plan a safe and effective PA programme. Having shared budgets would allow for easier referral to PA for patients that might not be able to afford PA opportunities. Having shared IT systems would allow HCPs to access leisure centre booking systems and processes which would allow them to book patients directly into PA sessions, thus allowing for easier referral into PA opportunities.

7. Affordability for patient, business model

Co-location of healthcare with leisure centres and providing discounted gym memberships in the facility, could result in greater affordability for the patient. In the early phases of the NCSEM model, patients that were referred to PA could purchase reduced-cost memberships and day passes to the gyms. The intention behind this was to eliminate costs which could prevent uptake and adherence to schemes and further gym attendance. In addition, if a patient was referred to and participated in PA at the same site and time of their clinical appointment this could eliminate barriers associated with travel-related costs.

Participant 1:

> *"Now there is a question about whether or not they go on to take memberships or there's an access challenge there, we've got discounted rates, and some free passes that we have organised all this sort of stuff that we've done to try to remove the financial barrier..."*

If patients are shown and internalise the benefits of PA by the HCP, then they might be more likely to prioritise the costs of a membership. A patient could only be exposed to the leisure centre in this co-located setting, therefore, even if patients do not use the leisure centre at the co-located sites, they are exposed to PA through their clinical appointment; this

opportunity would not occur at a traditional clinical setting. What's more, once shown to be active by their HCP through co-location, the patient may realise they can do so without the leisure centre and may not purchase a membership.

Participant 2:

> *"There are definitely some people for them which cost is a barrier. That is a very real thing in the current economic climate. People that even want to don't have the money to spare…. Once you have seen they benefit maybe you prioritise how you spend? For some people there will always be that issue that no matter how much they value it they just can't afford it. Well maybe then as part of it they realise that the benefits of exercise don't just have to be in a gym, so maybe they realise. 'well, I can walk so there are other things I can do to get exercise that doesn't involve paying to go to a gym it's fitting it into everyday life, isn't it?" ."*

Therefore, co-location of healthcare and leisure may only result in affordability for the patient in the context that the reduced cost is considered affordable for the patient and/or they believe and value the benefits of PA and are referred or voluntarily attend the leisure centre following their clinical appointment. This theme would only be supported in the context of the leisure centre which offers discounted memberships/passes and only for patients whereby the discount is considered affordable or a prioritised expense. Participants were not convinced that co-location resulted in affordability for the patient. Therefore, this theme was not substantiated by strong evidence from the interviews.

8. Social support of environment

Co-location of healthcare and leisure create a socially supportive environment which could encourage PA participation and adherence (Uchino, 2006). One unique feature of the NCSEM co-located models that may increase these interactions is the shared spaces between clinical and leisure services. Additionally, a waiting area for the healthcare also serves as a cafe seating area, where patients, HCPs, leisure centre customers and exercise professionals may sit and mingle. Social support has been linked to numerous health outcomes, including treatment adherence (Lorig, et al., 1989). The increase in spontaneous interactions between HCPs and leisure centre staff/customers could create an atmosphere of social support. Patients that fear that PA might cause them harm may feel especially supported in this environment where HCPs could theoretically provide reassurance if needed. In addition, whilst waiting for an appointment, patients may meet other patients like themselves who have become physically active. A patient may also meet other patients like themselves in a shared clinical appointment, group exercise class, or in the leisure centre. If relationships or friendships develop over time, this could result in a potential source of peer support. Social support could in turn increase that patients' self-efficacy and confidence to become (or remain) physically active (Anderson, et al., 2006).

Participant 5:

> *"From my experiences in sport … working at the group level, at the team level… social interaction, the social aspect of it is a massive part of it… if you can get people exercising in partners at least in part of the group I think that's as important for adherence. know it's not right for everybody...you get your outgoing people that would very much appreciate it and your isolated people won't, but again I do think it*

has a role to play and something that should be considered.…in the design of the facilities and how the delivery of physical activity works."

Social support is important in the leisure centre setting but was not seen to be a mechanism unique to health and leisure co-location, as social support can exist in the leisure centre environment which is not co-located. This theme will not be further refined based on the participants not explaining factors which were unique to co-location, but rather could be experienced in a standalone leisure centre. Based on the lead researcher's decision, in order to focus the review to factors unique to co-location this theme was not further refined.

9. Access to specialised exercise equipment

This theme posits that if patients are in a co-located facility with specialised exercise equipment that they would be more likely to participate in PA because of the access to the equipment whilst being under supervision or in the same facility where HCPs are working.

However, NCSEM stakeholders did not agree that access to specialised equipment was necessarily a draw for most patients:

Participant 6:

"I think it would depend on the individual. I think for some people if they were told that the only way, they could get access to [specialised exercise equipment} is if they were to go to this place then I think that it's going to make a difference. I am not sure generally that's going to make a difference."

Due to the lack of evidence which supports that this mechanism works, this theme was not further refined.

4.4.1.4 Interpersonal

10. Multidisciplinary approach

If clinics are co-located with leisure centres, then a multidisciplinary approach is created because of clinical access to leisure centre facilities and collaboration of different disciplines working together in the same space. This could have an impact on the perspectives and treatment priorities of a given illness or condition.

Participant 4:

"Co-location helps you to see the link between specialties or disciplines that you might not normally associated with health care such as physical activity and health trainers with diabetes." Participant 2:

"The pain clinic have co-located their services...they always have a bend towards getting people ... to move better and to think about how their physical activity impacts upon their condition and I think that they have really benefited from running their services up there because staff having shared along different lines of expertise. The physios and exercise instructors probably have a better understanding of what it means to address the specific needs of people with chronic pain. Probably the chronic pain experts have a much more holistic wider understanding of what they can offer in terms of exercise interventions…

Co-location of health and leisure may create a multidisciplinary approach to healthcare, fostering a link between disciplines and with PA that wouldn't be created in a traditional non-co-located healthcare environment, such as a hospital. A mechanism that facilitates this perspective is the "link" that is created from the physical co-location of health and leisure and between different healthcare disciplines.

11. Conversation in context

When a HCP has a conversation about PA with a patient or makes a PA referral within the co-located health and leisure setting, it is more appropriate to do so with the contextual conditions of the leisure centre setting. This theme proposes that HCPs will be more motivated to discuss PA in this setting because it is a leisure centre.

Participant 1:

"It gives us some confidence and it's more appropriate for patients to hear that message…you got the facilities that you can then be shown and are connected to."

For the patient, hearing the message that they should become physically active from their HCP in this environment makes more sense that in a traditional clinical or hospital setting.

Participant 6:

"If you are saying to a patient you need to be more physically active or the best way that you're going to recover from this condition is to take more exercise, then it's got to be easier to do it in an environment where is available on site. It may be for some people that they just need to walk more or get on a bike…they don't need to use the facility but that doesn't change the fact that the overall message of physical activity makes sense… whether you're arriving by public transport or by car and seeing other people that are dressed like they're going to be physically active because they want to be physically active has to have a positive impact."

The environment of the co-located leisure centre primes both HCPs and patients with the message of PA, normalising the idea that it will be a part of their healthcare experience.

Participant 7:

"Co-location model normalises PA for patients and staff."

Discussing PA with the patient in a clinic based within a leisure centre environment makes sense contextually, in contrast with having the same discussion within a traditional medical facility. The context of the leisure centre is important; however, the HCP still needs to have the intention to initiate a conversation about PA with the patient within the appointment.

12. Collaboration of health and exercise professionals (cultural)

In a co-located environment, cultural collaboration between HCPs and exercise professionals is more likely to happen than in traditional clinical settings because they are working in the same facility. The hypothesis of this theme is that over time, they might see themselves as sharing norms and values to promote health and PA habits in the patient. In addition, barriers are broken down that could exist in traditional isolated clinical settings. Some of these barriers include HCP's lack of knowledge of where to refer patients to PA opportunities and patient barriers such as transport, distance and cost to travel to PA referral sites.

HCPs that work in a co-located environment may see themselves as innovators, or early adopters, in terms of sharing culture with PA and exercise professionals. The cross-cultural sharing between HCPs and exercise professionals could help raise the perceived profile and credibility in the minds of patients. This, in turn could impact patients' level of engagement with PA, particularly in terms of delivering a message that is credible.

Participant 8:

> "… I mean exercise professionals are quite highly skilled…Cardiac rehab, for example, is an example of where level 4 is highly qualified, well trained, you understand the disease…. I think the good news about this is that leisure side of things,
>
> [International Venues] has been engaging these people and I think that they're respected by the clinicians. Both highly trained… We talked about doctors, but do exercise professionals have the same kind of credibility for patients? Do they believe what they say? You would hope that actually because they see them together that perhaps and then they will see them on their own, I presume, almost like a handover from the health professional to the exercise professional, that that, coming together and then seeing them on their own gives them a sense of credibility that actually patients respond to."

Patients and HCPs need to perceive the exercise professionals to be knowledgeable, credible and trustworthy for this type of cultural collaboration to occur. Thus, the context of the co-located clinic and leisure centre setting may facilitate cultural collaboration, but if shared culture and trust between HCPs, patients and exercise professionals, does not exist, collaboration to promote PA may not occur.

4.4.1.5 Individual

13. Motivation of patients to participate in PA

In co-located sites, patients are more likely to see others "like them" participating in PA than a typical gym environment, thus increasing social norms around PA. They would also have the opportunity to be supported by HCPs working in the same environment, which could in turn increase their motivation to participate in PA

Participant 1:

"...motivation of patients to exercise- that was very much about the psychological contract… if you are immersed in your environment and the environment reinforces some key messages and you see people like you...your social norms, they are likely to be more physically active."

Thus, in the context of the co-located health and leisure centre setting, patient motivation may increase when seeing others like themselves exercising. This would be dependent upon how the individual patient is motivated psychologically. For patients that have not been active before or experienced a lapse in PA, attending their appointment in a co-located environment could enhance patient motivation through the mechanism of observational learning, or modelling, which could drive the outcome of PA participation.

14. Long term conditions

If patients with long term conditions participate in PA in a co-located environment, knowing that HCPs are working in the same venue, they might be more likely to participate in PA because they reassured that they could do so safely in this environment, knowing that HCPs can provide treatment if they experience any adverse events. Additionally, HCPs may feel safer to refer patients to PA in this environment because they are more aware of the equipment, adaptions of the facility and the skills and knowledge exercise professionals working in the leisure centre.

Although in the last century, there has been a shift in mindset from prescribing rest for those with chronic conditions to the prescription of PA as treatment and accepted practice, due to emerging evidence (Felipe Lobelo et al., 2018) and shifting norms. Many HCPs,

however, do not prescribe PA due to fear of causing harm to the patient. Family members may also worry about the safety, however, when the HCP expresses the benefits of PA, this can serve as an incentive for the patient to participate (Felipe Lobelo & de Quevedo, 2016; McIntosh et al., 2017). Some clinics have shifted mindset around PA sooner than others, as evidenced with the pain management clinic.

Participant 2*:*

We had people with kidney disease which also have cardiovascular disease or diabetes, we saw them with their spouses and there was a really strong feeling of their spouses worrying about them doing exercise, like 'it's not safe for you to be here and actually it'll be much better for you to just rest and take it easy so we know the opposite is true, the bigger risk is in not being active, so once we get that, then I think it liberates them to feel, 'well actually I can cycle to work then, My partner is not at risk of suddenly dropping dead from a heart attack, my knees are not getting a lot worse…"

There appears to be a reticence amongst some, even highly experienced HCPs to prescribe PA to patients with long term conditions, with some HCPs worried more about causing harm to patients with reduced health, rather than viewing PA as beneficial to their recovery, focused more on risk instead benefit of PA. Additionally, some HCPs lack PA education in their university curriculum to adequately design tailor made programmes for patients, sticking only to already established screening criteria which may not be appropriate or relevant enough to all patients and those presenting with complex or comorbid conditions.

Participant 7:

"...there's this assumption and they're very, very defensive. They're not wanting to be brave.... a knee physio will feel very comfortable about recommending rehab for the knee but may not be as comfortable or may not have the time to look at something that affects the shoulder or the back and certainly would be very reticent about advising an overall physical activity programme for an individual's mental and physical well-being. And that's not because they're not good physios it's just because it's not part of their training… they don't necessarily recommend something that they don't understand the risks and physical activity promotion is viewed bizarrely as being risky.... "

It appears that HCPs do not feel comfortable discussing physical activity when it pertains to a condition that is outside of their realm of expertise. Overall, HCPs appear to have little if any PA training. In addition, they may perceive they lack time to discuss and refer to PA.

Participant 7:

"…there is this physical activity screening that people keep talking about as they were recommending something that's actually unhealthy and it's bananas... putting obstacle after obstacle after obstacle in the way and I think the reason that perhaps the physios in particular promoting physical activity enough is A) time and B) understanding and knowledge and part of that is defensive medicine"

Whilst co-location can offer additional reassurances and incentive to participate in PA for those with long term conditions, it is important that the HCP has the values, knowledge, skills to promote PA in the context of the co-located health and leisure facilities. Additionally, there must be enough time within the appointment to discuss PA. The HCP must feel confident that there are adequate resources to promote PA safely. In addition, the

patient must feel confident in the HCP, exercise professional and resources that the facility offers.

15. Patient experience

Patients might have a more positive experience than the traditional clinical appointment and potential referral to PA in the community because co-location eliminates barriers (such as travel and knowledge) between HCP and exercise provider/PA facilities. Additionally, colocation models as providing a better experience for patients in contrast to the traditional clinical setting, regardless of the site to which they were referred. The leisure centre environment promotes a holistic view of wellness, rather than treatment of illness.

Participant 2:

"…my expectation is that you are moving from a place of illness to a place of wellness, where people are being treated for illness to a place of wellness, where people are creating health so it's more of that Salutogenesis model versus pathogenesis model. Leisure, exercise, wellness centres, with their cafes, with their exercise facilities, it's a much more stimulating, positive experience, I would say, that at a hospital where you see people being wheeled around in wheelchairs with drips in their arms, and it's a whole different ethos isn't it?" Participant 3*:*

…the original vision, when we applied for the grant was just to build something on our [North] Hospital site, which is just a big acute hospital site. …very early on, everybody realised that's not really the sort of thing we want to do…building a facility with a swimming pool on the [North] Hospital site just didn't make any sense. "If I am honest, if we had done that it would have been a white elephant."

The context of the co-location of health and leisure may facilitate a positive experience for patients in contrast to traditional clinics and exercise referral because of the “seamless transition” that co-location provides between clinic and leisure centre. Patients that are willing to take more self-management approach may have a better experience than those that prefer the traditional clinical setting, but participants described that the co-located model has the potential to change perspective in the minds of patients.

16. Positive staff experience

This theme proposes that staff experience will be more positive in a co-located setting because they are enabled to engage in PA through working in a co-located environment. This in turn, would result in the HCPs relaying the message of PA to patents because they value the benefits of PA personally.

Additionally, features of the co-located environment such as easy parking, building design and gym memberships may play a role in making staff experience more positive. There was competition amongst initial HCPs to relocate to the sites because the new locations were seen to be more desirable setting to work.

> Participant 4:
>
> *"…I think that this was about their health and well-being as a member of staff. Not necessarily as being a deliverer of the service…these new modernised buildings, easy to get to, easy to find parking, had windows, so that sense of being at work with, that sense of...having a much better working environment.”*

Thus, in the context of the co-located health and leisure centre, staff may feel more valued because of benefits that the setting provides to their own health personally, not necessarily as a service deliverer.

17. Awareness of PA facilities

Because of the presence of leisure facilities on site, this could increase awareness of PA amongst HCPs because of the elimination of barriers, such as knowledge of where to refer patients to PA. The salience of the leisure centre being the location of the clinics with the gym merely a "walk down the hall" is the mechanism which facilitates this awareness.

> Participant 7:
>
> *"… it's much easier to say, "Have you thought about popping upstairs and having a chat with one of the PTs?," "have you had a leaflet about joining?" It's an easy conversation to have [in the co-located environment]."* Participant 2:
>
> *"… people sitting waiting for an appointment can see people going to the gym or a class or swimming or something like that. But it is all blended together…that's really important to say … the waiting area is all blended."*

Although awareness of PA facilities is enhanced through co-location, it is not enough to enable PA referrals. The HCP must feel knowledgeable, confident and motivated to refer patients to PA, and the patient must have the intention to act on the offer. This issue exists in traditional exercise referral, but co-location could increase the likelihood of referrals by nudging HCPs and patients through awareness of the environment and elimination of barriers to referral.

18. Buy-in from HCPs

This theme explains the importance of buy-in from HCPs to enable co-location of health and leisure to work as intended. It is necessary that HCPs buy-in to co-location and promotion of PA, so that the desired outcomes of promoting PA to patients and increasing PA referrals will result. Levels of buy-in could be variable between different services as a whole and between HCPs individually.

> Participant 1:
>
> *"I think across services, irrespective of the service, there are people willing to engage in this more so than others. There are clinicians, there are patients, there are leisure staff there are academics that are willing to engage in this and can see the bigger picture of this...and see how this will work more than others and that's the same anything and with all services, we've got champions, we've got early adopters, we've got people that get it...we've got people that go 'that's making a real difference, I can see the opportunities.'"*

Although buy-in appears to be a mechanism leading to the outcome of increased PA discussions and referrals, there is variance in the degree of buy-in will vary between amongst HCPs. This could affect how co-location works to promote the outcome of increased PA, with those with a greater degree of "buy-in" more likely to promote PA than those are less convinced of its merits.

4.4.2 Discussion

The phase 1 interviews with NCSEM stakeholders were conducted to test themes developed from the realist review (Chapter 3).

Following interviews with NCSEM stakeholders, 19 themes developed from the realist review explaining how co-location of health and leisure was expected to work were tested through realist interviews with NCSEM stakeholders. These themes include logistical challenges (transport, distance & cost) inconsistency of clinical schedule, affordability for the system, business model, purpose built (perceived importance), integrated care environment of co-location, proximity of resources, single point of access, “one-stop” shop, coordination & collaboration of health and PA professionals (structural), affordability for patient, business model, social support of environment, access to specialised exercise equipment, multidisciplinary approach, conversation in context, collaboration of health and exercise professionals (cultural), motivation of patients to participate in PA, long term conditions, patient experience, positive staff experience, awareness of PA facilities and buyin from HCPs.

18 theories emerged to explain co-location using the stakeholders’ perspectives. These themes include: logistical challenges (transport, distance & cost), inconsistency of clinical schedule, salutogenesis/holistic/prevention vs. treatment approach, co-location alone is not enough, purpose built (perceived importance), integrated care environment of co-location, proximity of resources, single point of access, “one-stop” shop, coordination & collaboration of health and pa professionals (structural), multidisciplinary approach, conversation in context, relationship between HCP and patient/ relationship of patient to care, long term conditions, patient experience, positive staff experience, and awareness of PA facilities. Themes which were not included in further refinement include: affordability for the system (business model), affordability for patient (business model), social support of environment, access to specialised exercise equipment, collaboration of health and exercise professionals

(cultural), motivation of patients to participate in pa and buy-in from hcps.
Table 5.0 presents themes developed in phase 1 of the research, organised using "Pawson's 4 I's" ecological framework. (See p. 44 for a detailed explanation of "Pawson's 4 I's Framework").

Whilst these interviews provided a more refined understanding of "how co-location is working or not," stakeholders were only able to provide evidence from their perspective on the themes, many of which deal with the experiences of the patients and HCPs; patients and HCPs could provide more refined responses to those themes as they attest to their experiences. The NCSEM stakeholders were, however, able to comment on how they anticipated co-location would work, speaking from their experiences of co-location. It must be acknowledged that there was little diversity amongst the stakeholders as they were all males and held leadership positions in their sector. They had substantial familiarity with the co-located models as they were stakeholders from pre-conception to post-implementation. True to realist methodology, it is best to interview stakeholders for initial theory gleaning, prior to interviewing service users (Greenhalgh, et al., 2019). Service users (defined in this study as patients and HCPs) are experts on the mechanisms of *how* a programme is working (or not).

The themes identified solely from the stakeholder interviews (*italicised*) were used to inform the selection of the middle range theory (MRT) in Chapter 5. (These include: salutogenesis/holistic/prevention vs. treatment approach, co-location alone is not enough and relationship between HCP and patient and patient to care).

Some themes were substantiated through evidence from the interviews, whilst others were not substantiated, thus, were not further refined (see Table 5, Column 4: themes not further

refined). Realist reviews often generate an abundance of themes which may not be relevant to the research question, thus it essential to prioritise those which are most relevant and can be managed within the constraints of the project (Wong et al., 2016). Furthermore, in keeping with realist methodology standards, it is essential to sufficiently focus the evaluation so that it can be managed within the constraints of the project (Wong et al., 2013, 2016). Themes which were not refined further were not substantiated through stakeholder interview data and were not seen to be specific enough to co-location of healthcare and leisure. For example, the theme, *social support of environment*, could be applied to non-co-located leisure, health or PA settings, and was not specific enough to address the question of how to promote PA within a co-located health and leisure environment.

Table 5.0 Themes developed in Phase 1

Structural Level (Pawson's 4 I's)	**Themes developed from realist review**	**Themes substantiated through stakeholder interviews**	**Themes which not further refined**
Infrastructural	Logistical challenges (transport, distance & cost) Inconsistency of clinical schedule Affordability for the system, business model	Logistical challenges (transport, distance & cost) Inconsistency of clinical schedule *Salutogenesis/Holistic/Prevention vs. Treatment Approach* *Co-location Alone Is Not Enough*	Affordability for the system, business model

Institutional	Purpose built (perceived importance) Integrated care environment of colocation Proximity of resources, single point of access, “one-stop” shop Coordination & collaboration of health and PA professionals (structural) Affordability for patient, business model	Purpose built (perceived importance) Integrated care environment of co-location Proximity of resources, single point of access, “onestop” shop Coordination & collaboration of health and PA professionals (structural)	Affordability for patient, business model Social support of environment Access to specialised exercise equipment

	Social support of environment Access to specialised exercise equipment		

Interpersonal	Multidisciplinary approach Conversation in context Collaboration of health and exercise professionals (cultural)	Multidisciplinary approach Conversation in context *Relationship between Healthcare professional (HCP) and patient and patient to care*	Collaboration of health and exercise professionals (cultural)
Individual	Motivation of patients to participate in PA Long term conditions Patient experience Positive staff experience Awareness of PA facilities Buy-in from HCPs	Long term conditions Patient experience Positive staff experience Awareness of PA facilities	Motivation of patients to participate in PA Buy-in from HCPs

4.5 Chapter conclusion

Data from the interviews showed indisputable support amongst NCSEM stakeholders for the promotion of PA in the co-located health and leisure centre setting, which was perhaps unsurprising, given their vested interests in sport, physical activity, health and leisure sectors. Some themes from the realist review were not refined further as they were not refuted by stakeholder interview data and not specific enough to co-location of healthcare and leisure. Additionally, in keeping with realist methodology, it was necessary to progressively focus the review, this essential to prioritise those themes which can most directly answer the research question (Wong et al., 2017).

The next chapter presents the IRPTs developed from the realist review, the NCSEM stakeholder theory-gleaning interviews and MRT review conducted in Phase 1 of this research. The review of MRT was conducted in order to continue to focus the review and to provide a scaffold for the existing themes and is the final component of phase 1 of this doctoral research.

Chapter 5. Initial Rough Programme Theories for Co-location of health and leisure to promote PA

5.1 Chapter introduction

This chapter presents the following the MRT review conducted in Phase 1 of this research and the IRPTs developed from the realist review. MRT is introduced in this chapter as a means of scaffolding and helping to create explanations for the IRPTs with already existing substantive theory. The process for selecting MRT is detailed and the shortlisted MRT are presented (See 2.6.4.2 Phase 1: Middle range theory, for further details on methodology and the use of MRT). This is followed by an explanation of the IRPT development process. Phase 1 IRPTs are presented next, ending with the chapter conclusion.

5.2 Middle range theory selection

As discussed in Chapter 2, MRTs are described as theories and models which:

> *"lie between the minor but necessary working hypotheses that evolve in abundance during day-to-day research and the all-inclusive systematic efforts to develop a unified theory that will explain all the observed uniformities of social behaviour, social organisation and social change"* (Merton, 1968).

MRT is used in realist evaluation to facilitate empirical testing in realist evaluation through creating a scaffold of existing theories, models and frameworks. MRT can be utilised to form an explanatory framework to situate initial theories that emerge from the data (Shearn et al., 2017).

By building programme theory solely from tacit theories found in the literature or from stakeholder interviews data without inclusion of Middle Range Theory (MRT), one can risk

rediscovering already established knowledge, generating an overabundance of candidate theories or developing unstructured theory (Pawson, 2013; Shearn et al., 2017).

MRT can be used primarily to guide empirical testing and can highlight key concepts that may be influential to programme development. This helps to form an explanatory structure to guide initial theories that emerge from the data (Shearn et al., 2017).

5.2.1 Methods to Search for MRT

This section explains the process used to search for existing MRT. The search strategy included the following five components:

(1) Review of the theories used by key researchers (those commonly cited) in physical activity, sport, health & organisational psychology, public health and behaviour change.

(2) Identification of MRT used in other realist research utilising a purposive search in the academic database Scopus using the following terms: “realist evaluation”, “realist synthesis”, “realist review”.

(3) Screening of results in accordance with their relevance to physical activity, sport, health & organisational psychology, public health and behaviour change.

(4) Use of the Theoretical Domains Framework (TDF). The TDF synthesises 33 different theories, models and frameworks of behaviour change into 14 domains which support the identification and selection of relevant determinants of health behaviour for targeting within interventions (Michie et al., 2011).

(5) Consultation and discussion of results with PhD supervisory team and colleagues Historically, there has been little guidance on how to judge MRT

suitability except for that which has been recently developed (Shearn, et al., 2017; see Table 6.0, p. 117). This paper aims to aid the selection of MRT which can inspire theory building. The criteria provides a means of scoring MRTs according to level of social strata, fit with general programme aims, utility and compatibility with realist notions of causation (Shearn, et al., 2017). This guidance was used to prioritise MRTs in addition to consultation with the supervisory team. Selected MRTs were then used to inform the IRPT development by adding explanatory value.

Table 6.0 Criteria for selecting abstract substantiated theories to support initial theory building (Shearn et al., 2017).

Criteria	Explanation	Scoring
Social strata	The layer within the social system that the theory relates to. That is, the extent to which the theory offers guidance for explaining phenomena at or between micro, meso or macro levels	0 = unstructured 1 = layer identified 2 = one or more layer identified and relations between them explained
Fit	The theory's potential fit with the general programme aims. That is, the extent to which the theory offers guidance for explaining the likely phenomena observed when looking at the transformation of services	0 = no fit 1 = likely partial fit 2 = likely full fit
Utility	The theory's simplicity. That is the extent to which the theory could be readily utilised as an inspirational tool for data collection / analysis.	0 = highly complex, hard to understand and apply 1 = complex but easy to understand and apply 2 = simple concepts easy to understand and apply

Compat-ability	The theory's compatibility with realist notions of causation. That is, the extent to which they offer	0 = limited or no compatibility with key tenets
	guidance for articulating underlying causal processes.	1 = compatibility with key tenets but not explicitly realist 2 = compatible and explicitly realist

5.2.1 Shortlisted MRT

The full results of the search (13 models, theories and frameworks) are presented in Appendix 9. After the application of Shearn et al's (2017) selection criteria, three theories were prioritised: Salutogenesis, COM-B and Theory of Planned Behaviour (TPB).

These existing theories were then used to provide a scaffold to guide empirical testing and theory development. The application of each theory (salutogenesis, COM-B and TPB) the topic and research question is described below. First a brief explanation of each theory is provided, followed by the researchers own theorising of how each model can be applied to the research question.

5.2.2 Salutogenesis

The salutogenic orientation was initially proposed (Antonovsky, 1996a) as providing a theoretical basis for the field of health promotion. Salutogenesis is considered a "broad stroke" approach to wellbeing and is useful for managing complexity in health conditions, specifically, complexity related to the physical environment (Mittelmark et al., 2016). Salutogenesis is a theory of health promotion that focuses on the factors which promote good health, rather than those that merely prevent disease (Antonovsky, 1996b).

Salutogenesis focuses on the continuum from disease to health, rather than simply illness and risk factors (Antonovsky, 1996a).

There are three concepts which comprise a sense of coherence (SOC))(the ability to comprehend the whole situation, and the capacity to use the resources available) (Antonovsky, 1996b, 1979). These include (1) comprehensibility: the extent to which one perceives events in life to make logical sense (2) manageability: the extent to an individual perceives they have the resources to cope with life's demands (3) meaningfulness: the extent to which perceives life to make sense (Antonovsky, 1996b, 1979).

Salutogenesis has been applied to the field of architecture and design more recently (Dilani, 2000; Dilani, 2007; Dilani, 2008). A framework developed by Heerwagen (Heerwagen, 1998), identifies the elements that salutogenic design should include: (1) social cohesion, both formal and informal meeting spaces; (2) personal control for regulating temperature, daylight, sound, private rooms; (3) restoration and relaxation with good lighting, access to nature, quiet rooms, and pleasant view (Dilani, 2005, 2009; Heerwagen, 1998). This existing framework explains how the elements of the co-located healthcare and leisure centres studied in this research are salutogenically designed, particularly Graves.

A traditional clinical setting such as a hospital is focused on treatment of disease and a dichotomous relationship between being 'sick' versus 'well (Fries, 2020).' A salutogenic healthcare approach focuses on health always being present to a greater or lesser degree at different stages and times in life (Bauer et al., 2020a).

Not only can salutogenesis be applied to building design, but also the healthcare delivered within these co-located environments. Salutogenesis offers an alternative to the pathogenic,

or biomedical model (which focuses on treating disease and the causes of ill-health rather than focusing on what promotes wellbeing) which has long dominated healthcare systems (Fries, 2020; D. T. Wade & Halligan, 2004). Indeed, the latest NHS Long-Term plan promotes a personalised care model, which is in line with a salutogenic approach (Howarth & Burns, 2019; NHS, 2019). A more salutogenic approach, focused on assets rather than deficits, through a personalised model of care could help address the growing chronic disease burden on the NHS (Howarth & Burns, 2019).

For the purposes of this PhD research, salutogenesis provides a theoretical framework to help understand how the co-located design of healthcare clinics into leisure centres might work to promote health. Specifically, this theory provides a lens to understand how the design elements of the leisure centre facilities and clinics such as lighting, space and colour (Golembiewski, 2016a; Schweitzer et al., 2004) and the care delivered within these leisure centres affects HCP promotion of and patient engagement PA opportunities.

5.2.2.1 Salutogenesis and co-location and co-location of healthcare and leisure to promote PA

After salutogenic theory was shortlisted, it was then applied to the topic of co-location of healthcare and leisure to promote PA. The theorising is as follows:

- A salutogenically designed co-located setting provides patients with **generalised resistance resources (GRR)** (these can be material, cognitive, emotional, physical, etc, on various levels: individual, primary group, subculture and society) to take charge of their health, giving patients a sense of **coherence (SOC)** (the ability to comprehend the whole situation, and the capacity to use the resources available).

- In the co-located healthcare and leisure setting, these GRRs include places, opportunities and equipment to be physically active (prominent staircase, gym, leisure centre, PA classes, SPARs referral scheme), places to socialise with other patients.
- In addition, salutogenesis is applied in this environment specifically to the architecture and design of the facilities. **Psychosocially supportive design** might shift away the locus of control from staff to patients and away from a medicalised model of care to a holistic model.
- The environment is more positive than the clinical setting, with brightly coloured, open design with shared spaces for both clinical appointments and for the leisure centre. The design elements such as use of natural lighting, windows to the outside world and to other parts of the leisure centre such as pool and gym all change the perception to a more health promotive rather than 'illness treating' environment.
- The seamless boundaries between the leisure centre and healthcare sectors may shift the mindset of the patient from being 'ill,' 'sick,' having treatment 'done to' them to a mindset of empowerment and management to take charge of their health. This design is unique to co-location and in contrast to the traditional NHS clinical setting of the hospital and GP surgery. In addition, the unique aspect of co-locating clinics with a leisure centre is the subliminal message of PA that this design can help to plant in patient and HCP minds, even if they choose not to engage with PA behaviour.
- Patients have choice at these sites regarding their care pathway. If support is given from HCPs in this environment the patients will have the resources available to them

(via physical activity opportunities, socialisation opportunities). This potentially increases patients' capacity to manage their care and find meaningfulness in life beyond their condition, by changing their health behaviour and becoming more physically active.

5.2.3 COM-B

COM-B was highly ranked using the selection criteria (Shearn et al., 2017). COM-B has been used to understand and explain health behaviours and plan PA interventions. The tenants of COM-B are Capability, Opportunity, Motivation and Behaviour (Michie et al., 2011). Capability includes physical and psychological capability as well as knowledge and skills to perform the target behaviour, in this case PA. Opportunity consists of all of the factors external to the individual which enable or hinder the behaviour, including the physical and social environment. Motivation recognises that human behaviour can be influenced (activated or inhibited) by both reflective and automatic mechanisms (Michie, et al., 2011). This includes any cognitive process which enhances or guides behaviour, including but not limited to conscious decision-making and goals, emotional, analytical and habitual aspects (Michie et al., 2011). The three interacting components of capability, opportunity and motivation collectively work to promote or hinder behaviour and can also be enhanced through participation in the target behaviour Figure 10.0).

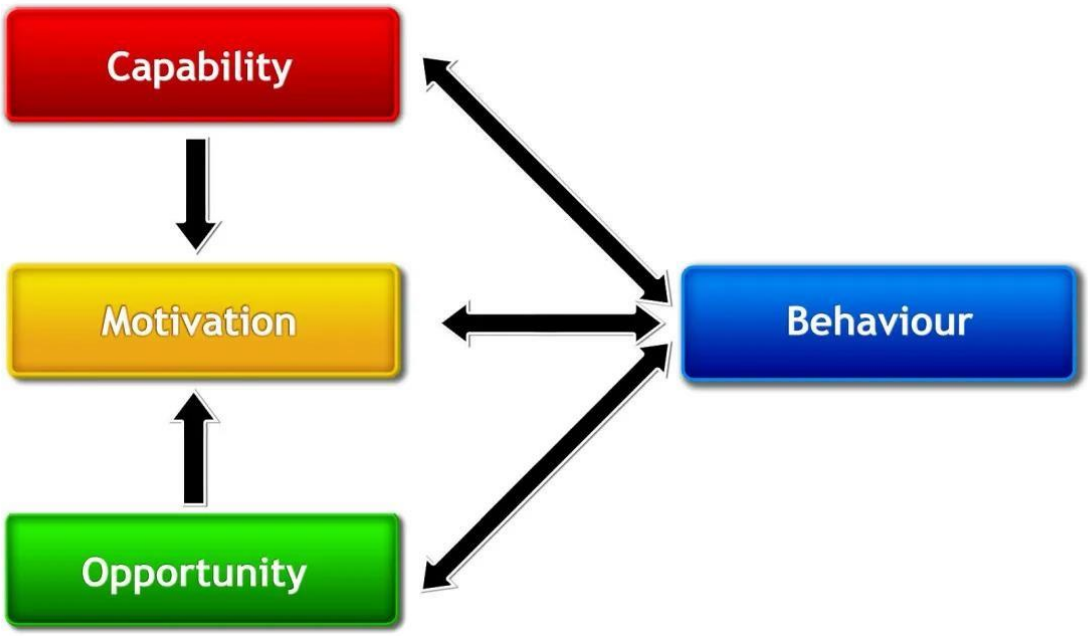

Figure 10.0 The COM-B Model

5.2.3.1 COM-B and the co-location of healthcare and leisure to promote PA

After COM-B was shortlisted, it was then applied to the topic of co-location of healthcare and leisure to promote PA. The theorising is as follows:

- Co-location provides patients with physical **opportunity** (environment, resources, location, cues (case studies, stair signage, etc)), social **opportunity** (conversation with HCP around PA, "bumping" into other patients in cafe discussing PA, etc), and affecting their automatic **motivation** to participate in PA.
- If the HCP has a conversation about PA with a patient in the context where the PA **opportunity** is immediately available to them this could give the patient the psychological **capability** and physical **capability** to overcome barriers (Leemrijse et al., 2015) and ould increase **motivation** of HCP to encourage patients to participate in PA; to have conversation about PA.

- If a patient is already motivated to become healthier and more physically active than the co-located environment would support their increased **motivation** by providing the **opportunity** (leisure centre, exercise professional).
- If the message about PA is delivered and tailored appropriately to patient and meets them at their level of motivation, knowledge, attitudes and beliefs then this could lead to increased motivation of patients to participate in PA, resulting in the patient participating in PA, leading to increased adherence and PA levels.

5.2.4 Theory of Planned Behaviour (TPB)

Theory of Planned Behaviour (TPB) (Ajzen, 1991) was selected from the TDF due to its fit with the research topic, target behaviour and ranking on Shearn et al.'s (2017) criteria for MRT selection. TPB was used to inform initial theorising.

TPB posits those individuals will choose the behaviour which is of the highest benefit and lowest cost (economically, materially, mentally, socially, etc.) to themselves. Behaviour follows an individual's intention to perform the given behaviour. This intention depends upon an individual's attitudes toward the target behaviour, perceived behavioural control (PBC) and social norms (Azjen, 1991). PBC and subjective norms are considered strong determinants of intention to participate in PA.

In a study examining TPB in the context of physical exercise, PBC was found to be the strongest predictor of intention to participate in PA (Neipp, et al., 2013). Consequently, it has been recommended that interventions seeking to increase PA should focus on increasing participants' perception of control to participate in PA, or the individual's belief that their behaviour, ability and perceived capacity is under their control (Neipp, et al.,

2013). In the co-located environment, participants perception of control could be increased simply by providing an opportunity to be active in the same setting as their clinical appointment, in an environment that they are already familiar with, thus removing the barrier of needing to find another leisure centre to attend.

The gym/leisure centre gives patients (as well as HCPs) an opportunity to "take control" of their health and shift the locus of control back to the patient through opportunities for selfmanagement. The co-located environment gives the patient the opportunity to be an active participant in their own care, in contrast to the traditional clinical setting, where they would not have the option to participate in PA opportunities.

The application of TPB to the co-located health, leisure and PA facilities is summarised in the box below, applied to patient participation in PA.

5.2.4.1 Theory of Planned Behaviour (TPB) and the co-location of healthcare and leisure to promote PA

After TPB was shortlisted, it was then applied to the topic of co-location of healthcare and leisure to promote PA. The theorising is as follows:

- Co-location of healthcare and leisure might influence normative beliefs, changing subjective norms, thus influencing intention to participate in PA, making it acceptable and even encouraged to participate in physical activity as a patient and HCP because people see others "like them" participating in PA
- Co-location of healthcare and leisure might increase perceived behavioural control (PBC) because it is eliminating perceived barriers of access to gym by providing immediate and proximal resources (a 'menu' of PA opportunities within the

colocated environment-such as taking them into the gym during appointment, referral

to SPARS scheme, or participation in a condition-focused class) to make it easier for patients to be physically active, this gives them a greater sense of control and choice over their own healthcare management, leading to potentially improved health outcomes (enabling)

- Which can lead to intention to participate in PA if the patient is sufficiently motivated and the "conversation" and cues to action take place at the right time.
- Patients that develop intention to participate in PA will be more likely to participate in PA, develop habit and improve health long term

5.2.4.5 Discussion of MRT selection

The previous section presented the MRT review conducted in Phase 1 of this research. The purpose of including MRT, the search processes used, the prioritised theories as well as the application of the theories to the research question were presented. This section presents a brief discussion to summarise the rationale for the inclusion of the above described theories (Salutogenesis, COM-B and TPB).

Firstly, a search was conducted to identify theories, models and frameworks used by key researchers in sport PA, public health, behaviour change and psychology. A search in Scopus was then conducted to identify MRT used in other realist research. Next, results were screened in accordance with their relevance to physical activity, sport, health & organisational psychology, public health and behaviour change. The TDF was then used to support the identification and selection of relevant determinants of health behaviour for

targeting within interventions (Michie et al., 2011). Finally, the lead researcher discussed findings with the PhD supervisory team and colleagues.

In order to prioritise the findings, the Shearn et al.'s (2017) criteria for selecting abstract substantiated theories to support IRPT building was applied (See Table 6.0). This criteria ranks theories, models and frameworks based on their layer within the social strata, fit with programme aims, utility or simplicity and compatibility with realist notions of causation (Shearn et al., 2017). Salutogenesis, COM-B and TPB were chosen for their high ranking using these criteria (See Appendix 9 for the full shortlist). Salutogenesis was prioritised as it is a broad-stroke theory of health promotion and offers guidance for explaining phenomena at various levels of social strata. The theory fit well with the aims of the research in terms of its applicability to the co-located model in terms of the building design/architecture and also the healthcare delivered within the building. The theory offered utility in that the concepts, such as SOC, were easy to understand and apply. The theory also ranked highly in compatibility with realist notions of causation. Moreover, salutogenesis has been applied in other research in healthcare (Antonovsky, 1979; Diehl, 2009; Fries, 2020; Tsekleves & Cooper, 2017), PA (Ericson et al., 2021) and architecture (Bauer et al., 2019; Golembiewski, 2016; Pelikan, 2016).

Next COM-B was prioritised for its ability to explain health behaviour on the individual and interpersonal levels of social strata. The model fit well with the programme aims, offering guidance for explaining how co-location of healthcare and leisure may work on an individual level and interpersonal level to promote PA. COM-B ranked highly in utility, with simple concepts that are easy to understand and apply to co-location. Finally, COM-B has good

compatibility, but is not explicitly realist. Additionally, COM-B was chosen for its consistent use in previous research to explain health and PA behaviour (Howlett et al., 2019; Martin & Murtagh, 2015; Michie et al., 2011; Van Kasteren et al., 2020).

The third prioritised theory is TPB. TPB was chosen for its high ranking in terms of fit with social strata, or ability to explain behaviour on the individual level. TPB fit well with program aims and could add to the explanatory power of constructs relevant to the co-located model, such as social norms, intention and PBC. The theory ranked highly in terms of utility and compatibility with realist notions of causation.

These three theories/models were systematically selected as a means to structure the IRPTs to provide explanatory power and guide their development. There are other theories, models or frameworks which could also have been used but at the time of this research the author's best judgement was used to prioritise these three.

Next, the key findings associated with each IRPT are explained.

5.3 Initial Rough Programme Theory (IRPT) Development

The key findings associated with each IRPT are presented in five sections with each section introducing:

- the theme derived from the realist review
- how this theme was further refined in the light of the NCSEM stakeholder interview data
- MRTs that were chosen to scaffold the Phase 1 IRPTs
- the formulation of the IRPT which provides an explanatory account of 'what works,' 'how,' 'for whom and 'when' in relation to co-location of NHS clinics with leisure centres to promote PA

These explanatory accounts will be written as “IF (context), THEN (outcome)…BECAUSE (mechanism)” statements, representing context, mechanism and outcome (See section 2.6 for further explanation of realist theory presentation). The principal outcomes are focused on ‘what works’ to increase PA, including intention to participate, incidence of PA discussions and referrals made to ERS.

Please see section 11.0 for further information on the iterative and cyclical design of this research. See the below figure and highlighted text for the stage of research presented in this chapter.

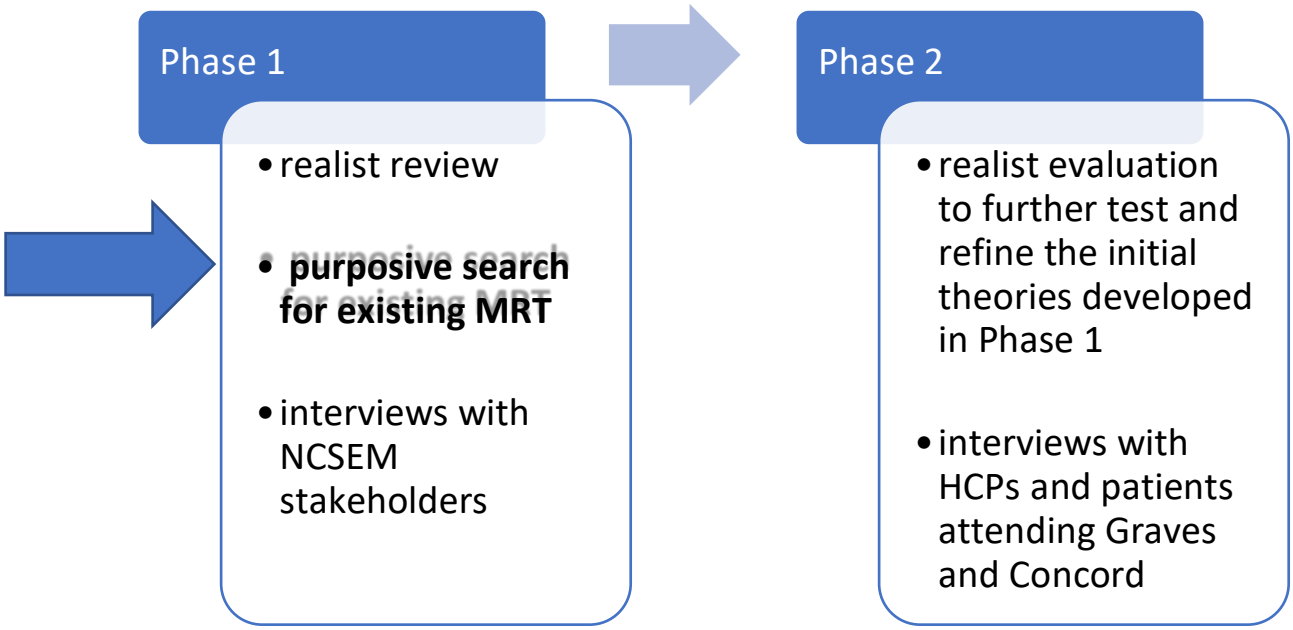

Figure 11.0 Theory development phases: Phase 1

5.4 Initial Rough Programme Theories (IRPTs)

The Phase 1 IRPTs presented below include: increases convenience, inconsistency in appointment location, Coordination and collaboration of health and exercise professionals (structural), Knowledge transfer and shared learning to promote PA, improved patient experience, improved staff experience, long term conditions, increases awareness of PA opportunities, people like me (normalising and modelling).

5.4.1 Infrastructural

5.4.1.1 Increases convenience to support PA participation

The initial theme derived from the realist review (chapter 3) was based on results which suggest that the integration of health and social care services creates a "single point of access" for service users (P. Williams, 2012). Additional grey literature documentation (Copeland, R., Hart, O., 2015) about the NCSEM co-location model suggested that Graves and Concord were developed with the intention of making opportunities convenient for service users. Increasing convenience through co-location by providing opportunities to be active 'right there' immediately coinciding with their appointment was suggested to make it more likely that users will engage with PA opportunities.

Data from the interviews with NCSEM co-location model stakeholder interviews (chapter 4) confirmed the themes from the realist review, adding further explanation about how colocation models might increase the convenience of PA opportunities. For example, if a patient Is referred to a clinic near their home and then has the time to attend a PA opportunity afterwards, co-location may enhance convenience for the patient. Participants recognised that co-location would not increase convenience for everyone, and in some

cases could create further barriers if a patient is referred to a facility far from their home. This nuance was acknowledged in the IRPT as a *logistical challenge.*

Constructs of the COM-B model which support this IRPT include that if the patient has the capability (the patient would gain knowledge about PA opportunities by meeting with the HCP and attending a co-located clinic) and motivation (which the HCP would aim to enhance through a conversation about PA with the patient), together with the opportunity to be active (provided by the leisure centre), this should help create a behaviour of PA. This might include attendance at the gym, PA class, ERS or becoming active outside the leisure centre.

The HCP could help facilitate and elucidate the patient's intention to participate in PA through a discussion within the appointment or by taking a patient into the gym. In the colocated setting, the patient is provided conveniently with the opportunity to participate in PA through the leisure centre/gym being located in the same location as the clinical appointment. This, in turn, gives the patient the immediate opportunity to be physically active in this environment. Attending a co-located clinic for an appointment could create convenience of PA opportunities for the patient, leading to enhanced capability and opportunity, as the leisure centre is in the same location as the clinic.

IRPT 1: Increases convenience to support PA participation		
IF clinics and leisure facilities are co-located	THEN this makes it easier for HCPs to refer and easier for patients to access PA opportunities	BECAUSE of the immediacy of the opportunities which creates a single point of access or "one-stop shop"
Logistical challenges		
IF there are logistical challenges (transport, distance & cost),	THEN co-location might not have the intended effect	BECAUSE logistical challenges might be a barrier to some patients accessing co-located health and leisure facilities, as patients may be referred from across the city.

5.4.1.2 Inconsistency in appointment location that prevents consistency

This theme was initially derived from findings of the realist review which suggested that if there is inconsistency in appointment location it can prevent consistency in exposure to PA opportunities.

This IRPT was refined further with data from the NCSEM stakeholder interviews which drew attention to the variation in patient choice of appointments. There are contextual nuances in how appointments are allocated-based on patient choice and/or availability. Patients appear to choose appointments based on different factors such as distance to travel or how soon the appointment is available regardless of location. This could depend on the particular clinic that the patient needed to attend and individual HCPs' working patterns, since they may work at different sites on different days. Although attempts are made to create consistency for patients, there is some variability on how this works in practice. Some patients may choose a facility that is farther away because they have more availability. This can lead to having appointments at different sites, creating inconsistency of the clinical schedule. In addition, if a patient attends different sites for each of their appointments, with some locations being co-located and salutogenically designed and others at traditionally designed clinical sites (community clinics and hospital), this could have an effect on their perception of their care and ability to self-manage their health because of the resources or deficits that the environment provides. Consistency of the clinical schedule in a salutogenically designed co-located setting could be more likely to enable the patient to self-manage their condition through a PA habit because the opportunities that co-location provides are consistently available or reinforced at successive appointments.

IRPT 2: Inconsistency of clinical schedule			
Phase 1	IF there is inconsistency of the clinical schedule, meaning patients might not have appointments at colocated facility every time, (due to contextual factors such as NHS structure and professional working patterns – i.e., set around the	THEN co-location might not work as intended to increase PA	BECAUSE the opportunities that colocation provides are not consistently available or reinforced at successive appointments
	consultant's working pattern and not the patients).		

5.4.2 Institutional/Interpersonal

5.4.2.1 Coordination and collaboration of health and exercise professionals (structural)

The IRPT derived from the realist review was based on results which suggest that when HCPs and exercise professionals work together in a co-located environment, structural collaboration is more likely to occur. Structural collaboration can include shared organisational processes, facilities and structures, such as IT systems, financial streams and scheduling systems.

This theme was substantiated following the stakeholder interviews but drew attention to the challenges faced to reach full structural collaboration with the co-located sites. In the main, these included NHS constraints regarding information technology systems and sharing of patient records. Therefore, the sub-section of this theory addresses the barriers faced to

communication and collaboration, which include NHS constraints regarding information technology systems and sharing of patient records. MRT chosen to scaffold this theory is COM-B. By enhancing HCPs *capability* to coordinate and collaborate in the co-located setting through physical co-location with exercise professionals and providing opportunities through sharing work processes, structures and facilities, this should lead to enhanced motivation to coordinated and collaborate with other HCPs.

IRPT 3: Coordination & collaboration of health and PA professionals (structural)

Phase 1	IF clinics are colocated with leisure centres	THEN health and exercise professionals are more likely to collaborate and communicate	BECAUSE they are working in the same environment, sharing the same facility, structures, and work processes.
	IF clinics are colocated with leisure centres	THEN health and exercise professionals may face difficulties to collaborating and communicating	BECAUSE of included NHS constraints regarding information technology systems and sharing of patient records.

5.4.2.2 Knowledge transfer and shared learning to promote PA

This IRPT was developed based on data from the realist review which suggested that colocation of health and leisure allows for face-to-face interaction between HCPs and exercise professionals that wouldn't ordinarily occur in a non-co-located environment (Sinclair, 2017; P. Williams, 2012). As explained in the realist review, learning through informal interactions is preferential to traditional desk-based structured learning (Williams, 2012).

Data from the stakeholder interviews suggested that there was overlap in responses given between this IRPT and integration, coordination and collaboration (cultural and structural)

and multidisciplinary approach. Participant responses for those themes have been synthesised to develop this IRPT.

Capability from COM-B was a construct chosen to scaffold this theory. In the co-located environment, an individual psychological capability for shared learning and knowledge transfer is supported. The opportunity is provided in the co-located environment for knowledge transfer and shared learning between HCPs and exercise professionals because of the physical co-location and social opportunities for interaction afforded through colocation. Automatic motivation of HCPs occurs though modelling of knowledge transfer and shared learning between HCPs and exercise professionals that are consistently making referrals and having conversations about PA.

IRPT 4: Knowledge transfer and shared learning to promote PA			
Phase 1	IF HCPs work in a colocated health and leisure environment AND partners are able to share their expertise and experience	THEN this may facilitate knowledge transfer and learning amongst different HCPs and exercise professionals, thus increasing the likelihood of PA referrals	BECAUSE co-location enables informal spontaneous interactions that are preferential to deskbased learning structured learning.

5.4.3 Individual

5.4.3.1 Improved patient experience

This IRPT was developed based on data in the realist review which suggested that patients would have a more positive experience visiting a clinic in a leisure centre in contrast to a traditional clinical setting or a hospital. Research has shown that patients are more satisfied with care that is integrated and multidisciplinary, including information about

selfmanagement information (topics such as exercise, PA lifestyle, diet and symptom management) from multiple HCPs, including physiotherapists, dietitians and rheumatologists (Moe et al., 2016). The NCSEM locations in Sheffield aim to promote a multidisciplinary model of working. In addition, the most commonly reported facilitator for GPs referring more patients to PA in the community was shown in one study to be positive experiences or effects for patients (Leemrijse et al., 2015).

Salutogenesis was shortlisted as an appropriate MRT in which to inspire this IRPT. Salutogenesis is applied here specifically to the co-located design of Graves and Concord which is seen to be health promoting and positive in contrast to traditional clinical settings.

It can be argued that co-located settings provide a more salutogenic environment which gives patients a sense of empowerment and provides patients with resources to take charge and manage their own condition (Antonovsky, 1996a).

IRPT 5: Improved patient experience			
Phase 1	IF the clinic is colocated with a leisure service	THEN there is potential for increased referral and uptake	BECAUSE patients have a more positive experience, resources to take manage their health through PA and a sense coherence.

5.4.3.2 Improved staff experience

This IRPT was developed from data in the realist review which suggested that an integrated healthcare environment with workplace PA and broader wellness offerings for staff may help the staff to feel valued (Olsen & Warren, 2011). During the realist review, it was

theorised that enabling staff to engage in positive health behaviours at work by providing them with access to fitness and leisure facilities they can use during the workday (and giving them permission to do so) would likely enhance staff experience. Additionally, it was thought that if HCPs were able to be physically active through workplace opportunities that they would be more likely to relay this message onto patients. The review and stakeholder interviews contributed similar evidence.

Evidence from the stakeholder interviews suggested that the staff experience would be more positive in the co-located sites because of the salutogenic working environment and the opportunities to be active that the co-located leisure centre provided for staff. It was this positive working environment and the personal benefits to individual staff that was considered important rather than any change in service delivery to patients that was particularly valued:

> *Participant 4: "…I think that this was about their health and well-being as a member of staff. Not necessarily as being a deliverer of the service…these new modernised buildings, easy to get to, easy to find parking, had windows, so that sense of being at work with, that sense of...having a much better working environment."*

Salutogenesis is the MRT chose to scaffold this IRPT. The salutogenic environment is seen to provide a more positive experience as HCP member of staff in the co-located environment as well (Schweitzer et al., 2004).

It is hypothesised that if staff feel valued in their working environment and have a better experience, they may be more likely to relay the message of PA onto the patients through conversations about PA. In addition, if they have used the gym themselves, they will feel more knowledgeable and confident talking to the patient about PA.

IRPT 6: Improved staff experience

Phase 1	IF staff are enabled to engage in PA through co-location	THEN they are more likely to relay a positive PA message to patients.	BECAUSE they feel valued in their working environment and have the opportunity to participate in PA in their working environment.

5.4.3.3 Long term conditions

This IRPT was initially developed based on data from two studies. The first study identified long term conditions, irrespective of condition, as a barrier for GP referral of patients to PA (Leemrijse et al., 2015). A study of an integrated cardiac rehab centre found that both patients and HCPs fear that exercise can raise cardiac risk in patients, but patients reported feeling safer and more likely to exercise in environments where they can be observed (McIntosh et al., 2017).

This IRPT was confirmed in the NCSEM stakeholder interviews, yet data obtained was limited by the fact that stakeholders could only comment on how they thought long term conditions *might* relate to co-location, as this theory directly relates to HCPs and patients.

Participants emphasised that HCPs have limited PA education in their professional training and thus may not feel comfortable prescribing exercise to patients with long term conditions, especially chronic, comorbid, or complex conditions. It was suggested that HCPs may only feel comfortable prescribing PA when they have the knowledge, skills and training regarding specific conditions to prescribe PA, even in a co-located environment. It was suggested that HCPs must feel confident that there are adequate resources to promote PA safely and that patients must feel confident in the HCP, exercise provider and resources that the facility offers. Stakeholders suggested that co-location might have an effect of increasing patients with long term conditions confidence to participate in PA.

Participant 3:

"...I guess it's gonna make them feel more confident to do an exercise programme if they know that they have a physio alongside them or at the very worst there is literally a physio and health care professional next door to them where they're exercising. I guess it all gets them a bit more support to actually encourage them to do an exercise program."

Participant 4 confirmed this,

"Seeing clinical services and seeing exercise and rehabilitation together I guess would have an impact on somebody's perception …I guess they wouldn't anticipate that if the doctor were physiotherapist or an occupational therapist or a nurse was acting out of those unis that it would be detrimental to their health. Therefore, my point of view I'm sure it must dispel that myth…as partners and practitioners on the professional pathway we are recommending app services on site with an exercise facility I would guess that it would alter their perception.

"… there's a lot of diabetic patients, …a lot of respiratory patients… with asthma, chronic obstructive pulmonary disease…if you run those clinics in an environment by where they can then go and have, particularly with the chest patients, a gentle exercise regimen, then that gets them past their initial stages of breathlessness, and moves them onto a longer term than for exercise that then impacts on their underlying asthma…you can see how there would be a benefit."

Participant 1: *"Increasing confidence ...and your clinician will take you into that environment, will show you how to do it, model it, and therefore that increases your self-efficacy. So that's kind of thinking really."*

By having HCPs working together in the same environment this could help reassure patients with long term conditions that they are safe to participate in PA and help to build their confidence that they are safe to do so without exacerbating their condition.

Salutogenesis has been applied here to scaffold this IRPT. The co-located health and leisure environment may provide patients with generalised resistance resources (leisure centre offerings) as a means of helping patients have agency over their own 'treatment.' Participant 1 suggested that by moving towards a more salutogenic approach to healthcare through co-location,

"You are moving from a place of illness to a place of illness, where people are being treated for illness to a place of wellness, where people are creating health so it's more of that salutogenesis model versus pathogenesis model. "

IRPT 7: Long term conditions			
Phase 1	IF patients with long term conditions attend consultations in a co-located setting	THEN patients will feel safer to undertake PA	BECAUSE they are reassured when HCPs are working in same facility and may be available to help if needed.
	IF patients with long term conditions attend consultations in a co-located setting	THEN HCPs will be more confident to refer patients to PA	BECAUSE they have greater awareness of the equipment, staff and special adaptations offered in the facility.

5.4.3.4 Increases awareness of PA opportunities

This IRPT suggests that co-location of healthcare and leisure increases awareness of PA opportunities in the minds of patients and HCPs. This IRPT was inspired from the following studies in the realist review (Copeland, R., Hart, O., 2015; Leenaars et al., 2015; Leotta et al., 2011) as well as individual correspondence (Copeland, individual correspondence, 2018). Lack of awareness of PA referral opportunities was seen as a barrier to referral (Leemrijse et al., 2015) but facilitators to referral could enable better awareness and understanding of PA opportunities available (Leenaars et al., 2015). Traditional facilitators to referrals from primary care include better understanding and awareness of services, groundwork for relationship, commercial benefit and funding (Leenaars et al., 2015). Copeland and Hart (2015) suggested that the NCSEM co-located model could serve as a novel facilitator for awareness of PA opportunities. The opportunities construct from COM-B was used to scaffold this theory as co-location increases the awareness of PA opportunities.

IRPT 8: Increases awareness of PA facilities		
IF clinics are colocated with leisure centres	THEN this may facilitate patient and HCP awareness of PA opportunities	BECAUSE lack of awareness of where to refer patients to exercise can serve as a barrier. Being co-located can eliminate this barrier as the gym is “right there.”

5.4.3.5 People like me (normalising & modelling)

This IRPT was developed from themes developed during the realist review. These two themes are *normalising* and *modelling.* In their study of a diabetes centre co-located with a gym in Sicily, Leotta et al. (2011) found that the purposeful ‘blurring’ of the lines between the gym and diabetes centre normalised PA for patients and HCPs because in this centre individuals could see others like themselves participating in PA. In a normal healthcare setting, especially for someone who is not already active, this may not be likely to occur.

This IRPT was developed based on review data that in a co-located environment a patient may witness other patients participating in PA and this *peer modelling* may encourage them to also become active (Leotta et al., 2011).

At the stage of the review, these themes were considered distinct, yet it became clear through interview data that these two themes overlapped and were conflated in the responses from participants. It also seemed unlikely that HCPs would participate in the same exercises as patients. Thus, it seemed that these themes could be combined to encompass both *normalising* and *modelling:* "*people like me."*

These themes were developed over multiple iterations of the realist review whilst the stakeholder interviews were taking place. Data from the stakeholder interviews addressed the *normalisation* of PA in the co-located environment:

> Participant 7*: "Co-location model normalises PA for patients and staff."*
>
> *Participant 6: "Seeing that people taking part in PA in the leisure centre weren't strange lycra clad beings who were different from us but were just normal people and perhaps it could be easier to bring people into PA."*
>
> Participant 8: *"I think using role models is the crucial but isn't it the role models that are being used and hopefully give them confidence and some of them are right at the extreme end of cardiac problems. I've always been impressed that wherever you go when you go Graves, there's pictures on the wall, seeing role models-more powerful even than clinicians. If you can engage with all models and stories of people that's probably the best thing to do… because you're bound to find someone that has more of a chronic condition than you, who has actually embraced it."*

The construct of *social norms* from the Theory of Planned Behaviour was chosen to scaffold this IRPT. Co-location may change social norms around PA making it acceptable to participate in PA. In addition, patients may be more likely to see others like them

participating in PA in this setting because they are more habitually exposed and primed with PA opportunities and messages than they would in a traditional clinical setting.

IRPT 9: People like me			
Phase 1	IF healthcare services and PA facilities are co-located	THEN patients will be more likely to view PA as normal	BECAUSE they see others “like them” participating in PA and therefore modelling the behaviour.

5.5 Chapter conclusion

This chapter provided an explanation of how the IRPTs were developed from themes through the realist review, tested and refined in the NCSEM stakeholder interviews and substantiated through MRT.

At the end of phase 1, 9 IRPTs were retained and taken forward into phase 2. To further refine the IRPTs developed in phase 1, a realist evaluation was conducted in phase 2 to test how theories were working in practice. The IRPTs were tested through interviews with both patients and HCPs.

Chapter 6. Phase 2: Patient and healthcare professional interviews

6.1 Introduction

In Phase 1 (Chapters 3-5), IRPTs were developed through a realist review, NCSEM stakeholder interviews and search for MRT. This chapter describes Phase 2 of this research where the IRPTs developed in Phase 1 were tested and refined through interviews with HCPs and patients. The theory development process continued to use Pawson's 4 I's to situate the IRPTs at the appropriate level of social strata (see p. 44 for an explanation of First, an overview the methodology and methods, including ethics and governance is presented. This is followed with a presentation of the results of stakeholder interviews.

6.2 Methodology and Methods

In Phase 2 of this research, interviews with patients and HCPs were conducted.

6.2.1 Phase 2: Theory Testing through interviews with patients and HCPs

6.2.1.1 Objectives

To develop refined programme theories of how, why, for whom and under what circumstances co-location of healthcare with leisure works to promote PA by testing IRPTs.

6.2.2.1 Methods

Theory testing in different contexts using semi-structured realist interviews with patients that have attended clinics and HCPs who work at Graves and Concord leisure centres. Interviews with patients and HCPs were appropriate to test how theory IRPTs developed in phase 1 (Theory Development Diagram (interviews with patients and HCPs): Figure 12.0) reflect the experiences of patients and healthcare professionals.

(NB: Please see chapter 2 for a detailed explanation of the methodological underpinnings of realist evaluation, and chapter 4 for a detailed outline of the interview method applied in this thesis to inform the realist evaluation).

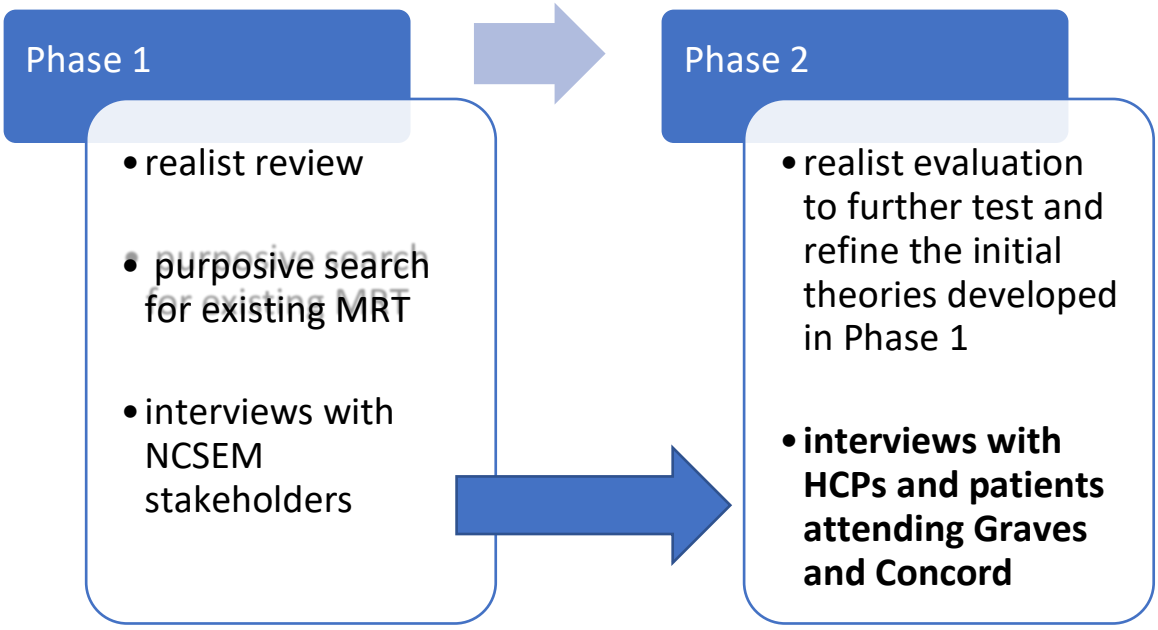

Figure 12.0 Theory development phases: Phase 2

6.2.1 Ethics and governance

Prior to submission to ethics and governance, study materials were reviewed by a Patient and Public Involvement (PPI) Panel. PPI is about conducting research "*with* and/or *by* members of the public, rather than *to*, *about*, or *for* them" (NIHR, 2022a). PPI focuses on a specific research project and can be used throughout the research cycle. Involving patients and public in research is seen as good research practice as it leads to research that is better designed, more relevant and of increased value (Biggane et al., 2019; Blackburn et al., 2018; NIHR, 2022b).

A research protocol (Appendix 10), participant information sheets (Appendix 12), consent forms (Appendix 13) and recruitment posters (Appendix 14) were reviewed by a Diabetes

PPI, a former MSK patient and a current diabetes patient. These PPI panels were chosen based on the availability of established PPI panels but also because the intention was to recruit patients from across diabetes and MSK physiotherapy clinics. Feedback was taken into consideration and amendments were made where necessary before submission to an NHS Research Ethics Committee (REC reference 19/LO/1304). Changes following PPI review included:

- Revised approach to participants: the PPI panel suggested initial approach to participants should be through HCP recruitment and to consider asking HCPs to hand out recruitment information to patients. This was added to the protocol.
- Simplification of technical terms such as 'pseudonymised' in participant-facing materials
- Addition of NHS logo to posters
- Changes to personal details provided by the researcher e.g., removal of personal mobile telephone number, addition of post-nominal letters after name.

Following institutional ethics review to secure University sponsorship for the research, an application was submitted for approval by NHS research ethics committee. Access permissions were granted for Graves and Concord and a research passport was obtained. See Appendix 11 (NHS REC approval; HRA Approval; Confirmation of NHS Capacity and Capability).

6.2.2 Sampling and Recruitment

To answer the research question of "*How and in what ways (if at all) does the co-location of health and leisure centres work to promote physical activity, for whom, under what*

circumstances and why?" it was important to speak to the HCPs and patients that work in and use the facilities. The IRPTs developed in phase 1 of the research had suggested that the benefits and challenges associated with co-location may vary for different patients and HCPs, including patients with varying levels of self-reported PA, health condition severity and health status. To explore these nuances, the study sample consisted of 10 HCPs and 10 patients that worked or attended one of four different clinical services at Graves and Concord Leisure Centres.

The proposed number of interviews was initially estimated to be 15-20 HCPs and patients each. The initial proposition of interviews was only an approximate plan and took into account that the process of theory testing in realist evaluation can be unstable and unpredictable, thus sample size can only be "weakly elaborated beforehand" (Emmel, 2013; Manzano 2016). A clearer idea of sample size was defined shortly after fieldwork began (Manzano, 2016). According to the RAMESES Quality and reporting standards for realist evaluations, sampling follows a rigorous and sequenced process of theory testing (Wong, et al., 2017). The sample of relevant respondents was deemed to be sufficiently large and diverse to provide evidence across different clinical conditions and contexts of HCPs and patients (Wong, et al., 2017).

Selection bias could lead to choosing patients and/or HCPs that only have positive experiences and/or engage in PA. This could result in the collection of data too closely aligned with the personal agenda of the researcher (Galdas, 2017). Development of a clear participant criteria/person specification Appendix 10 Research Protocol for Sampling Criteria)., recruiting participants through different individuals and different channels of communication, as well as using multiple recruitment strategies are some methods used

help eliminate some of the potential selection bias (Collier & Mahoney, 1996) (See Appendix 10: Patient and HCP research protocol).

6.2.3 Patients

The IRPTs developed in phase 1 did not suggest any factors relating to co-location that were specific to any particular disease group, thus patients were recruited from four different clinical groups attending treatment at NCSEM Graves and Concord (Table 7.0). These groups were MSK physiotherapy, pain management, diabetes and podiatry.

Patients were identified several different ways, which helped to eliminate some of the potential selection bias. Most were identified after they contacted the lead researcher after viewing a digital study recruitment poster in the waiting area or after being approached by the lead researcher before/after a clinical appointment at Graves or Concord clinics. A few other patients were recruited after a participant recommended several patients to the lead researcher. As the study was advertised via Diabetes UK, some patients may have seen the recruitment information in multiple places. Study information was also emailed to service leads for each clinical condition and the lead researcher requested that the study information be shared in patient mailings.

Patients were asked brief screening questions to assess their subjective health status and current PA levels. Health status was assessed using the EQ5-DL/ VAS (EuroQol, n.d.; Grandy & Fox, 2008) prior to recruitment. The EQ-VAS is a vertical visual analogue scale with values between 100 (best imaginable health) and 0 (worst imaginable health), on which patients provide a global assessment of their self-reported health (Grandy & Fox, 2008). The EQ5DL/VAS was selected because it is a valid, routinely used patient reported outcome measure

(PROM) that is simple to administer at the recruitment stage (Grandy & Fox, 2008) Whilst it was planned to recruit patients purposively, a convenience sample was used, whereby the first 10 patients agreeing to participate were selected. The sample of patients reported a range of levels of severity of different health conditions across the different services. Patients were asked about PA levels and were recruited across a range of levels, from 'not active at all' to 'very active.'

Although it was initially planned to recruit patients across all four clinical conditions, recruitment of patients from diabetes and pain management proved very challenging, possibly due to slow engagement from service leads and less overall patient numbers from these conditions accessing services at Graves and Concord. Thus, the majority of patients were musculoskeletal (MSK) and receiving physiotherapy. MSK physiotherapy might also be seen as a clinic that relates most closely to PA and patients might be more willing to discuss or have experiences of PA in the clinical setting.

Although the majority of patients recruited were MSK patients, they ranged from those with short term, acute conditions to long term, chronic conditions as well as patients who subjectively felt their health was reduced (self-reported from the EQ-5D scale and/or HCP diagnosed condition).

10 patients were recruited as sufficient confirmatory data was collected. There was diversity amongst individual MSK physiotherapy patients in terms of postcode, self-reported PA, self-reported health, condition for which being seen, PA experience with co-located sites, and motivation to participate in PA.

The characteristics of recruited patients are detailed below in Table 7.0.

Table 7.0 Patient characteristics

Code	Site	Clinic	PA Level	Health	Postcode
Patient 1	Graves	MSK physiotherapy	High	High	S10
Patient 2	Concord	MSK physiotherapy	Low	Moderate	S6
Patient 3	Graves	MSK physiotherapy	Moderate	Moderate	S7
Patient 4	Concord & Graves	Pain management	Low	Low	S6
Patient 5	Graves	MSK MSK physiotherapy, Podiatry	Moderate	Moderate	S20
Patient 6	Graves	Physio	Mod	Moderate	S8
Patient 7	Graves	MSK physiotherapy	High	Moderate	S10
Patient 8	Graves	MSK physiotherapy /podiatry	Mod	Moderate	S17
Patient 9	Concord	MSK physiotherapy	High	High	S7
Patient 10	Graves	MSK physiotherapy	Low	Moderate	S60

6.2.4 Health Care Professionals (HCPs)

HCPs worked in one of the same four clinical service areas: MSK physiotherapy, diabetes, pain management or podiatry at Graves or Concord Leisure Centres (See Table 7.0 and Appendix 10 Research Protocol for Sampling Criteria).

HCPs were identified through word of mouth, via posters in common areas, communicating the research with HCPs by directly approaching them in the sites when they worked (during breaks), as well as an email sent by their service lead. Recruitment of HCPs was with full permission and guidance from service leads and managers to ensure that all eligible staff are aware of the study. Eligible HCPs were recruited from any role, including MSK

physiotherapists, diabetes specialists (includes health and wellbeing consultants, nurses and allied HCPs), rheumatologists, podiatrists and pain specialists. The majority of HCPs were identified after being approached directly by the lead researcher in the waiting areas of the clinic, through word of mouth and through advertisement of the study by service leads to their staff.

Convenience sampling was used in recruitment of HCPs. Initially, it was intended to recruit an equal spread of HCPs across clinical conditions and with varying self-reported levels of PA and health (assessed by asking brief screening questions about self-reported health and PA levels), however, recruitment of HCPs proved to be difficult in general due to time constraints and limited availability. Specifically, it was difficult to recruit diabetes HCPs. It took more time to gain responses from diabetes service managers and only one diabetes HCP was recruited to participate.

To test the IRPTs from phase 1, it was necessary to interview HCPs with differing levels of confidence and attitude toward PA. During recruitment, HCPs were asked how often they take patients into the gym, make referrals to PA, or discuss PA. All but one of the HCPs recruited self-reported as having high PA levels.

The characteristics of recruited HCPs are detailed below in Table 8.0.

Table 8.0 HCP characteristics

Code	Site	Role	Clinic	PA Level	Health
HCP 1	Concord	Diabetes professional	Diabetes	High	High
HCP 2	Graves and concord	Physiotherapist	MSK physiotherapy	High	High
HCP 3	Graves and concord	Administrative healthcare professional	All	High	Moderate
HCP 4	Graves	Diabetes service lead	Diabetes	High	High
HCP 5	Graves	MSK rheumatology podiatrist	Podiatry	High	High
HCP 6	Graves and concord	MSK physiotherapy service lead	MSK physiotherapy	Low	High
HCP 7	Graves and concord	Physiotherapist lead integrated pain team	Pain management	High	High
HCP 8	Graves	Pain management lead	Pain management	High	High
HCP 9	Concord	Podiatrist	Podiatry	High	High
HCP 10	Graves	Specialist Physiotherapist	MSK physiotherapy	High	High

6.2.5 Consent

A participant information sheet was given to all HCPs and patients prior to the interview to read. They were then given the opportunity to speak to the lead researcher by phone/email/in person regarding any questions they may have. After 24 hours to consider the information, interested participants were contacted. If they still wished to participate, participants were asked to sign a written consent form prior to the start of the interview. Interviews were scheduled at a time and place convenient for the participant.

6.2.6 Interviews

Interviews were conducted between November 2019 and February 2020 at the participants' choice of location (Graves, Sheffield Hallam University, place of work) or by phone. Participants interviewed via telephone were sent a copy of the IRPTs in advance to aid communication and understanding of the questions. Interviews were recorded with a digital voice recorder.

The interview schedule was developed to test the IRPTs developed in Phase 1. Open questions were used to explore participants' experiences and views of the co-location model, PA and their health, followed by theory-led questions designed to test the IRPTs. Theory-led questioning was based on the 'teacher-learner cycle,' whereby the interviewer places theory before the interviewee to comment on, refute and/or help to refine (Manzano, 2016; Pawson, 1996; see Chapter 4).

Only IRPTs which were relevant to participant experiences were tested with that particular participant. During the interviews, some theories were skipped over because the participant could not speak to the theory based on their experiences. Some patients were asked to comment on theories that pertained to HCPs if their own experiences could provide valuable insights. Additionally, some HCPs were asked to comment on theories that may be more relevant to patients, but they might be able to speak to how they *perceive* patients might experience a theory.

6.3 Data analysis

This section presents the steps taken to analyse the data from the realist interviews with patients and HCPs. The steps of the analysis are detailed to enhance transparency and auditability of the process and credibility of the findings.

As per the phase 1 NCSEM stakeholder interviews, framework analysis (Ritchie & Spencer, 2010) was used to analyse the phase two interview data (see Chapter 4). Audio recordings were transcribed verbatim. To support document organisation, management and referencing of data, transcripts were uploaded to an existing NVivo 11 dataset which consisted of literature and documentation identified during the realist review (Chapter 3) and transcripts from the NCSEM stakeholder interviews (Chapter 4). A deductive coding framework was developed using *a priori* themes based on IRPTs and MRT from the interview schedule. Themes identified inductively that were relevant to the research question were also added to the coding framework. These inductive themes were not used to develop new IRPTs at this stage because this did not follow the realist convention used in this research (i.e., to develop theories in phase 1 and testing them in phase 2). Additionally, the inductive themes lacked sufficient depth to be included further, although they did help explain some of the data. All interview transcripts were coded according to participant, which means to highlight all of the text associated with each participant, so that during data analysis, only participant text was analysed (not the researcher's questions). All interview transcripts were then coded according to each IRPT or theme node. The nodes used to code each IRPT (coding framework) are listed below in Table 9.0.

For the purpose of focusing the evaluation and adhering to realist evaluation standards (Wong et al., 2016), only the IRPTs at the end of phase 1 are explained with the interview data. Only data that was relevant to refute, refine or confirm the IRPTs was included, and additional themes were disregarded as they were considered superfluous to the research question.

Table 9.0 Nodes used for coding IRPTS in NVIVO

Phase 1 IRPTs
1. IRPT Coordination and collaboration of health and exercise professionals (structural) 2. IRPT Improved patient experience 3. IRPT Improved staff experience 4. IRPT Inconsistency of clinical schedule 5. IRPT Increases convenience 6. IRPT Knowledge transfer and shared learning to promote PA 7. IRPT People like me (normalising & modelling) 8. IRPT Long term conditions 9. IRPT Increases awareness of PA opportunities 10. MRT COM-B 11. MRT Salutogenesis 12. MRT TPB

Once all the interview data was coded, the data that was coded against each theme was reviewed to consider whether it supported, refuted or indicated a need to refine the theory. Theory refinements took place iteratively, with multiple refinements made of each theory. Discussion took place with the supervisory team throughout each refinement.

6.4 Initial rough programme theory refinement

At the end Phase 1, nine IRPTs were developed iteratively with data from the realist review, MRT and NCSEM interviews data. In Phase 2, the IPRTs were further refined with data from HCP and patient interviews. These nine IRPTs are presented below with the addition of one IRPT developed solely from the interview data (misaligned business models). The data presented below is indicative (but not necessarily exhaustive) of the evidence found to support, refine or refute each IRPT. In Chapter 7, these theories are refined into final refined programme theories.

Each of the theories are presented below in table format following "IF, THEN, BECAUSE" statements grouped according to Pawson's 4 I's layers of social strata. At this stage in refinement, the IRPTs at the infrastructural level include increases convenience; logistical challenges, inconsistency in appointment location that prevents consistency and misaligned business models. At the institutional/ interpersonal level these include coordination and collaboration of health and exercise professionals (structural) *and* knowledge transfer and shared learning to promote PA. At the individual level include: increases awareness of PA opportunities, improved staff experience, people like me (normalising & modelling) and long term conditions.

6.4.1 Pawson's social strata level 1 - Infrastructural

6.4.1.1 Increases convenience to support PA participation

This theory proposes that IF patients have time immediately after their appointment to access PA opportunities, have the opportunity or and are motivated, willing and able to attend the leisure centre for PA opportunities, THEN this has the potential to create a single point of access or "one-stop shop," dependent upon the design and staff interaction in the co-located facility. A single point of access could make it easier for HCPs to refer to PA opportunities. It could also make it easier for patients to access PA BECAUSE of the immediacy of the opportunities. However, IF there are logistical issues (such as distance, transport and associated costs) THEN co-location might not have the intended effect of increasing PA discussions amongst HCPs and patients, participation, HCP referrals participation amongst patients BECAUSE these issues might be a barrier to some patients accessing co-located health and leisure facilities.

In Phase 1, the IRPT postulated that if clinics and leisure centres were co-located, it would make it easier for HCPs to refer and easier for patients to access PA opportunities because of the immediacy of the opportunities that the one-stop shop design allows for, but if logistical challenges exist, then co-location would not have the intended effect of because of the barriers these challenges create for patients.

This theory addresses the potential for co-location to create a convenient, single point of access for patients to access their clinical appointments and PA opportunities. Four clauses were added following the patient and healthcare interviews in Phase 2 to reflect data which explains the barriers to prevent co-location being convenient for everyone.

Most of the aspects of the original IRPT developed in Phase 1 were confirmed. Following the interviews in Phase 2, data showed that co-location could increase convenience because patients have the opportunity to attend the leisure centre to participate in PA opportunities immediately after their appointment and HCPs are able to refer the patient to PA opportunities in the leisure centre. Further clarification was provided following the interviews on contexts which enable co-location to increase convenience and for whom.

IRPT 1: Increases convenience to support PA participation			
Phase 1	IF clinics and leisure facilities are colocated	THEN this creates a single point of access or "one-stop shop" which makes it easier for HCPs to refer to PA opportunities. It also makes it easier for patients to access PA	BECAUSE of the immediacy of the opportunities
	IF there are logistical challenges (transport, distance & cost),	THEN co-location might not have the intended effect	BECAUSE logistical challenges might be a barrier to some patients accessing co-located health and leisure facilities, as patients may be referred from across the city.

The IRPT developed in phase was largely supported by the evidence from patient and HCPs in phase 2. In addition, the interview data revealed new considerations to include in the theory building process.

Data from the interviews also highlighted that the *extent* to which co-location increased convenience to create a single point of access for HCPs to refer patients to PA and patients to participate in PA was *determined* in part by whether patients have time immediately after their appointment to access PA opportunities. Whether the patient has the opportunity or makes the decision to attend the leisure centre for PA opportunities plays a role to the extent to which co-location creates convenience. The extent to which co-location creates a single point of access is also influenced by the design and layout of the co-located site and staff interaction within the co-located facility. These two nuances were added to the theory as additional clauses.

IRPT 1 initially posited that contextual factors such as logistical challenges (transport, distance & cost), could prevent co-location from having the intended effect (i.e. increasing PA). This might happen because such challenges could create barriers for some patients in accessing the co-located health and leisure facilities, especially for those patients who are referred from across the city. A third clause was added, as stakeholder interviews confirmed this, but also highlighted the *costs associated* with this distance, such as the expense of paying for public transport, automobile fuel and parking costs as specific barriers facing patients.

A fourth clause was added to this theory which provides additional clarity on the outcome of *increasing PA.* In the initial theorising, the outcome of *increasing PA* was vaguely defined. The interviews identified specific and measurable outcomes including increasing PA discussions amongst HCPs and patients, increasing HCP referrals to PA and increased participation in such activities amongst patients. These specific outcomes were deemed more appropriate to evaluating the effectiveness of the co-location in supporting increased PA amongst patients.

The theory was refined to include the four additional clauses described based on data from the interviews with HCPs and patients (see the box below with the new additional clauses listed in blue text). Data which support each of these additional clauses is listed below.

Phase 2	i) IF patients have time immediately after their appointment to access PA opportunities, have the opportunity or and are motivated, willing and able to attend the leisure centre for PA opportunities,	THEN this ii) has the potential to create a single point of access or "one-stop shop," dependent upon the design and staff interaction in the colocated facility. A single point of access could make it easier for HCPs to refer to PA opportunities. It could also make it easier for patients to access PA	BECAUSE of the immediacy of the opportunities.
	IF there are logistical iii) issues (such as distance, transport and associated costs)	THEN co-location might not have the intended effect iv) of increasing PA discussions amongst HCPs and patients, participation, HCP referrals participation amongst patients	BECAUSE these issues might be a barrier to some patients accessing co-located health and leisure facilities.

6.4.1.1.1 Data supporting theory refinement

i) IF patients have time immediately after their appointment to access PA opportunities, have the opportunity or and are motivated, willing and able to attend the leisure centre for PA opportunities,

The addition of this clause addresses that contextual factor in the patients individual reasoning that can affect whether they have the opportunity or make the decision to attend the leisure centre for their PA opportunities. For example, they may not have time following their appointment to attend the leisure centre for PA. They may not be able to afford the costs of a membership or individual class costs or feel that any of the PA offerings are suitable for them. The patient may not feel motivated enough to attend following their clinical appointment or be apprehensive about exercising with a long-term condition. All of

these issues could serve as access issues to using the leisure centre immediately following their appointment.

Even if the location is convenient for the patient, they may have other reasons for not attending the leisure centre for PA opportunities, such as scheduling conflicts, such as working during the hours when suitable PA opportunities are available. This is explained by Patient 2 below:

> *"That was more about me having difficulties with my lifestyle or the way my life is organised and where I could get to and when I could get to places. And unless, as I said, they haven't got an unending resource so unless there was something that exactly fit me, they probably weren't going to tick that box with me. I'm sure they would with other people. I suppose people who retired or maybe people who are off sick for that reason can maybe access the gym at all sorts of times."*

HCP 6 acknowledged, however, that for some patients, it works well to use the leisure centre following their clinical appointment, such as those who are unemployed, retired or older aged. If the patient has repeat visits to the same centre, where they can build familiarity and an association with their clinic visit and PA. This could make it easier to build a routine and habit of PA.

> HCP 6:
>
> *"Maybe non-working folk or older folk may well combine being here and using facilities. I've spoken to a patient fairly recently who continued to use the leisure centre facilities on the day that they used to come to have their physio treatment*

because they'd got in the habit of coming, so they kept on coming. And they're here every Wednesday."

Patient 7:

"I came across at Graves through podiatry and physiotherapy … because it's Graves, it's free parking, it's ideal because it's new, it's modern… …the appointments were a little bit quicker at that time. So rather than having to wait longer you could go and see someone there…They could either do it [be physically active] before their appointment or after their appointment because they're there."

According to HCP 6, immediacy could have an impact on whether a patient adopts a PA habit and that the sooner a patient participates in PA following their appointment the more likely they will act on their intention.

HCP 6: *"we often all leave with very good intentions and in that time have we lost that opportunity? It's like well, you know, they've gone back to their old habits. So maybe it does need to be done in a shorter window."*

HCP 5 (Podiatrist, Graves) confirmed that having repeat visits at the same site will help the patient to build familiarity and potentially develop a PA habit.

HCP 5 (Podiatrist, Graves):
"I think it's quite helpful because it's [leisure centre] there and you can seize that opportunity to do it. And I think you've got repeated appointments at the same location you chip away at appointment number one and then they've got four weeks to possibly think about it and you bring that conversation up again at appointment

number two and possibly at appointment number three as well… I think if they've had that change in their general foot problem, they're much more likely to then engage."

ii) has the potential to create a single point of access or "one-stop shop," dependent upon the design and staff interaction in the co-located facility. A single point of access could make it easier for HCPs to refer to PA opportunities. It could also make it easier for patients to access PA BECAUSE of the immediacy of the opportunities

The addition of this clause acknowledges that the design of the facility/"type of co-location" makes a difference to patient and HCP interaction with the facility and engagement with PA. Whilst both Graves and Concord are co-located, Graves has a single point of access, whilst Concord has a separate entrance for the leisure centre and health clinics. The design of Graves is more fluid with a shared entrance, reception and non-defined boundaries between clinical waiting areas and café seating. The leisure centre is completely visible to patients as they enter the site for their appointment, making it more likely for the patient to access PA opportunities because they are immediately available in the same space they attend for their clinical appointment. The accessibility of the leisure centre in Graves may make it easier for HCPs to take patients to the gym. Alternatively, Concord has two separate entrances. If a patient enters the clinical side, they will not see the gym and be unlikely to encounter anyone participating in PA. Data from the evaluation revealed that it is not as easy for the HCP to show the patient the gym or take them inside at Concord, as they would need to walk around to the other entrance to access the leisure centre and gym. However, there is less wait time for an exercise referral at Concord than Graves. In addition, the reception staff at Concord are very knowledgeable about the referral process and could help

provide the linkage that makes Concord feel more seamless for those that take an exercise referral.

HCP 7 explained how the differences in design of the facility affects how they are used:

> *"Concord is nice, but you don't really see people exercising that much at all. You can't see the gym, whereas, Graves, it's all open and you drive past it. So even if you've never been you're aware of what's going on at Graves, it's the fact that it's all glass and you can see people exercising and you can see people in the pool and you can see people walking in between.... [At this traditional community clinic, where I am working today] there's nothing that's saying health, whereas Graves there's nothing that's saying illness, it's all positive… it's easier for me to sell the [physical activity referral] system because I can fill in the form, I can hand it in and I can say to the patient come back here, you can do it here. And they already know what the environment looks like."*
>
> *"Concord have got a really good system where you just take it [the referral form] to the desk …sometimes they're able to give them an appointment there and then. And that really gets them, whereas at Graves you've got this waiting time. So, you always lose a bit because people don't hear anything for three or four or six weeks, something like that and* ***you've lost the momentum a little bit****."*

While Graves has been designed more accessibly with a single point of access and seamless boundaries, there is a longer wait for patients wishing to access an ERS. Once the momentum is built within the patient to participate in PA, it is easier to act on it at Concord where there is less wait for ERS.

Patient 9 described their experience during a visit at Concord, which drew attention to how the differences in design of the two buildings play a role in the patients' exposure to PA in the two sites:

> *"I went in from the back into the physiotherapy part and I knew there was a leisure centre there, but… I never saw any of the facilities … I don't remember seeing any people that looked like they were going to use the facilities."*

This clause illustrates that it is not enough to simply co-locate services in order to create a single point of access to promote PA, the intentionality of the design of the co- located facilities, and how patients and HCPs engage with them must be considered.

iii) issues (such as distance, transport and associated costs)

This clause was added to provide clarity on the access issues which create barriers for patients, particularly detailing associated costs.

Patient 7 recognised the benefits and convenience of co-location for some but expressed that the barriers faced with access, particularly for those of lower socioeconomic status, could outweigh the benefits:

> *"…for low socioeconomic groups being on a bus route, being in your local community, having them together should encourage people to use, you know, join the dots up and get the connection, and also if you have exercise on prescription for instance… if you could do it in the same place that would be fantastic…"*

> "*but the cheaper you can make it the more people will use it in those sorts of contexts…*

"it's all about location. It is not going to work for most people to have to go back to Graves to do their exercise, because it's in one particular area of Sheffield that is not city centre at all. And you need a car really to get there. Unless you live in the community, and you can walk there…it has to be convenient to people to use it. If you do not, I mean I'm very motivated to exercise, but if it's not convenient I would be just like everybody else, and I would probably do less exercise."

HCP 9 recognised the barriers that exist for patients, particularly with costs. Despite attempts to create affordable PA opportunities, financial barriers persist for some patients.

Patients and HCPs confirmed that distance, travel and associated costs could be a barrier for accessing the co-located sites for clinical appointments and PA opportunities in the leisure centre. For patients that live locally, barriers could be reduced because the location could be reached by foot or local bus. For some patients, however, bus fees could be too much of an expense.

iv) of increasing patient PA participation in the co-located sites, conversations about PA between patients and HCPs and patients referred to PA by HCPs

This clause was detailed to provide clarity on PA outcomes. In this research, the focus on 'increasing PA' needed to be further elaborated. It was necessary to look more broadly at outcomes related to increasing PA. These include a PA conversation between the patient and HCP, a patient experiencing the gym during their clinical visit, and HCPs referring the patient to a PA scheme. It was necessary to detail these outcomes to provide greater clarity to the programme theory.

HCP 10 explained the various ways the convenience of working in clinics co-located with leisure centres creates opportunities for PA outcomes to occur and described PA outcomes to include the HCP and the patient having a conversation about PA:

> *"The opportunity of being in Graves afforded the chance to have in the forefront of mind the fact that physios don't have to do everything for a patient. A patient could exercise by going to the leisure centre. It's easier to introduce that conversation when actually they've walked through the foyer of a leisure centre to get to their clinic room."*

PA outcomes supported by co-location include the HCP taking the patient into the gym:

> *"we are looking at better ways of enabling staff to be able to take their patients in to exercise spaces. What we've had to do instead is to create slightly different opportunities that didn't exist before we came here"*

Another potential PA outcome is referring the patient to PA in the leisure centre via exercise groups or an ERS:

> *"we run groups from the meeting room which involve exercise at very low levels for patients who are fearful of movement that we didn't have before, but you can then get them interested in that and that actually it's not as difficult as they'd feared and then you might be able to get them to take an activity pathways referral."*

This additional clause was added to bring clarity to the outcome of "increasing PA." Outcomes which lead to increases in PA are different for different clinical groups, health and PA status, as well as individual capability and motivation. This clause was applied to all IRPTs that contain an outcome of *increasing PA.*

6.4.1.2 Inconsistency of clinical schedule that prevents consistency in exposure to PA

The second IRPT at the infrastructural level postulates that, IF there is inconsistency of the clinical schedule, meaning patients might not have appointments at co-located facility every time, THEN co-location might not work as intended to increase patient PA participation in the co-located sites, conversations about PA between patients and HCPs and patients referred to PA by HCPs due to contextual factors such as NHS structure, professional working patterns (i.e., set around the HCP's working pattern and not the patients, patient choice (convenience of clinic location and appointment availability), IF there is consistency of the clinical schedule, meaning that the patient sees the same HCP at the same co-located site for every appointment, THEN this might help co-location to work as intended to increase PA discussions, patient PA intentions, patient visits to the gym, PA referrals. Consistency of the clinical schedule, meaning that the patient sees the same HCP at the same site for every appointment might help in developing a therapeutic alliance between the HCP and patient. A strong therapeutic alliance or established rapport between the HCP and patient may make it more likely that conversations about PA occur.

In Phase 1, the IRPT proposed that inconsistency of the clinical schedule could prevent colocation from working as intended to increase PA (due to contextual factors such as NHS structure and professional working patterns – i.e., set around the consultant's working pattern and not the patients).

Whilst data supported the initial clauses of this theory, three additional clauses have been added following the evaluation. These clauses bring greater clarity to the outcomes, explain how appointments are booked for patients and how consistency of exposure to the site and HCP can lead to formation of a therapeutic alliance.

IRPT 2: Inconsistency of clinical schedule			
Phase 1	IF there is inconsistency of the clinical schedule, meaning patients might not have appointments at colocated facility every time,	THEN co-location might not work as intended to increase PA	(due to contextual factors such as NHS structure and professional working patterns – i.e., set around the consultant's working pattern and not the patients).

This theory was largely supported by the evidence from the realist review, HCP and patient interview data. The theory was refined to include three additional clauses due to new data from the interviews with HCPs and patients. The first additional clause added clarity to the outcome of 'increasing PA.'

The next additional clause added brought clarity to contextual factors which prevent patients from having appointments consistently at a co-located site for every appointment. In the Phase 1 IRPT it was posited that contextual factor which prevent co-location from 'working' were due only to NHS structure (such as appointment allotment) and HCP working patterns. For example, one patient reported traveling over 30 minutes by car so that they could be seen quicker and by a certain clinic.

The third clause was added in light of new data which suggested why it is important for patients to have consistent appointments at co-located sites and how this may work to increase PA. Ideally, patients would see the same HCP at the same site consistently to build the therapeutic alliance, but in reality, patients usually see the HCP that is available at the location that is available soonest. A strong therapeutic alliance or established rapport between the HCP and patient may make it more likely that conversations about PA occur.

By having appointments at the same co-located site with the same HCP for every appointment, this helps build familiarity with both the leisure centre and HCP. HCP interviews suggested that consistently seeing the same HCP at the co-located sites helps build relationships, a therapeutic alliance and trust. Consistent exposure to the leisure centre environment makes it seem more natural for the HCP to discuss PA with the patient. These three clauses are detailed below with further explanation and supporting evidence.

Phase 2	IF there is inconsistency of the clinical schedule, meaning patients might not have appointments at colocated facility every time,	THEN co-location might not work as intended to increase i) patient PA participation in the co-located sites, conversations about PA between patients and HCPs and patients referred to PA by HCPs	due to contextual factors such as NHS structure, professional working patterns (i.e., set around the HCP's working pattern and not the patients), ii) patient choice (convenience of clinic location and appointment availability)
	iii) IF there is consistency of the clinical schedule, meaning that the patient sees the same HCP at the same co-located site for every appointment,	THEN this might help co-location to work as intended to increase PA discussions, patient PA intentions, patient visits to the gym, PA referrals.	Consistency of the clinical schedule, meaning that the patient sees the same HCP at the same site for every appointment might help in developing a therapeutic alliance between the HCP and patient. A strong therapeutic alliance or established rapport between the HCP and patient may make it more likely that
			conversations about PA occur.

6.4.1.2.1 IRPT 2: Data supporting theory refinement

i) patient PA participation in the co-located sites, conversations about PA between patients and HCPs and patients referred to PA by HCPs

This clause was added to bring clarity around participation in PA. PA outcomes in this IRPT were redescribed as conversations about PA between patients and HCPs and patients referred to PA by HCPs.

ii) patient choice (convenience of clinic location and appointment availability).

This clause was added to explain how patients choose appointments according to data from the evaluation. Where patients are given the choice, they often select appointments at what may seem to be less convenient clinics, based on their personal priorities, which potentially prevents them from benefitting from consistency in either HCP or location.

HCP 4 (Diabetes, Graves):

> *"It's only if, say, that on the rare occasion there'll be somebody that's referred from one side of the city to the other, because that's when the appointment's free, we want to get them in. And it doesn't happen very often, but people will come in and they will say, 'can I go back to the other side?' And so, they do once they've been seen. Or some people do that and then come in and say, 'oh no I'd rather just keep seeing you,' so they come back again."*

iii) IF there is consistency of the clinical schedule, meaning that the patient sees the same HCP at the same co-located site for every appointment, THEN this might help co-location to work as intended to increase PA discussions, patient PA intentions, patient visits to the gym, PA referrals. Consistency of the clinical schedule, meaning that the patient sees the same HCP at the same site for every appointment might help in developing a therapeutic alliance between the HCP and patient. A strong therapeutic alliance or established rapport between the HCP and patient may make it more likely that conversations about PA occur.

From the HCP perspective, a more consistent schedule makes it easier to develop a relationship with the patient and might help the HCP to change the patient's PA behaviour.

HCP 2 (Physiotherapist, Graves):

"…having a more consistent schedule would create more of a buy-in. Sometimes patients … either want to stay with the same practitioner so therefore they will wait weeks for them, or they will travel for them because they want to stick with that person. And sometimes they go, 'no I just want to go to the same place because I know where I'm going.' If you are more anxious perhaps about going to new places or doing new things then you're probably going to be more likely to say, 'no I'll just go to the same place and see somebody else, because the idea of travel or moving around is too much.'"

Evidence was contradictory whether appointments are booked for patients consistently at the same co-located venue with the same HCP. HCP 9 expressed that for her patients, they are triaged to a community clinic that is not co-located and there is no incentive for the community podiatrist to follow up with the patient's PA habits. This could mean that the patient may not have enough consistent exposure to PA through the co-located clinics to build familiarity and develop PA habits:

HCP 9 (Podiatry, Concord):

"…I think that is the big problem because … everything I've said is kind of a pipe dream…the reality is when I say goodbye to that patient after my 30 minutes, I know they're going to a community clinic where the podiatrist is under pressure, they're getting 20 minutes. There is nothing on the screen for that podiatrist to know to follow up activity levels…I know my colleagues won't do that. It's just because I'm

motivated that way and I work at Concord I do it…everything's just fallen past the wayside. And I think that's a fundamental flaw and a fundamental problem."

6.4.1.3 Misaligned business models which hinder the potential for co-location to effectively work to promote PA

The third IRPT at the infrastructural level proposes that IF there are different business models between the leisure sector and NHS clinical sector THEN this can hinder the potential for co-location to effectively work to promote PA BECAUSE financial priorities are not shared. If business models were shared between the leisure centres and healthcare, then this might ameliorate some of the barriers to full co-location to promote PA.

This IRPT was developed in Phase 2 solely from strong support from HCP interview data.

IRPT 3: Misaligned business models			
Phase 2	IF there are different business models between the leisure sector and NHS clinical sector	THEN this can hinder the potential for colocation to effectively work to promote PA	BECAUSE financial priorities are not shared.

The addition of this theory was necessary in light of data that suggests that it is not enough to physically co-locate leisure centres with NHS clinical services in hopes that this will enable PA opportunities and seamless work between sectors. Business models need to be shared to facilitate co-location to work effectively to promote PA. Data suggests that different business models between the leisure and healthcare sectors prevent full co-location facilitating PA opportunities.

Interview data suggests that the NHS business model needs to prioritise prevention through PA so that exercise professionals from the leisure sector are seen as part of the patient care team. It is hypothesised that this would have an effect of raising the profile of the exercise professional because they share business models.

An effect of these different business models is that there appears to be a reticence amongst HCPs to promote PA to patients, particularly if someone stands to gain commercially from their promotion (i.e., selling a leisure centre membership to the patient).

Business models of the NHS do not allow for enough time for the HCP to take every patient into the gym and complete all of the necessary administrative tasks required by the NHS. Additionally, not every patient can afford the cost to continue with a gym membership. Having shared business models/priorities which would allow for time to take patients into the gym. Having consistently free/subsidised gym memberships and would make it easier for co-location to work effectively to promote PA.

HCP 9:

> *"… it's hard for us, we get 30 minutes and we've got to do everything. And in the NHS, that's the problem. There are so many boxes you've got to tick…then we don't follow the patients up … would be nice to have that backup to maybe see where the patient's at mentally and help them take on board the advice and sort of follow it through with them rather than them just coming to see us once or a course of treatment and then that's it…it is good to have Concord and Graves because you can to an extent sometimes feed into the gym… if you can get them going there and enjoying that environment they're more likely to carry it on… that works better at*

Graves than Concord…for the reason you stated because we're attached to the back. I think the only issue to some extent is cost… certainly for a lot of our patients still quite a lot of money to ask… SIV and Concord but not Graves, they have started doing…different types of memberships. I don't know if Graves do the same… it's brought the cost down… someone can just join swimming or just do classes or do gym and, they can combine things or do separate things instead of paying one price for everything which is how it used to be. So that does help…I think that's the biggest drawback is cost but definitely just having the exercise facilities there is fantastic.

6.4.2 Pawson's social strata levels 2 and 3 Institutional/Interpersonal

6.4.2.1 Coordination & collaboration of health and PA professionals AND knowledge transfer and shared learning facilitates promotion of PA in a co-located healthcare and leisure environment

This IRPT proposes that IF clinics are co-located with leisure centres, with HCPs and exercise professionals working in the same environment AND time and effort is invested to develop relationships and trust, THEN health and exercise professionals are more likely to collaborate and communicate and share knowledge, BECAUSE there is a mutual understanding of each other's roles, professional respect, willingness to work together and share information. IF clinics are co-located with leisure centres, working in the same environment AND there are shared aims and goals (such as enabling patients to become physically active) between HCPs and exercise professionals. THEN coordination and collaboration is more likely to occur BECAUSE HCPs and exercise professionals see themselves as working together for a common purpose. IF clinics are co-located with leisure centres, with HCPs and exercise professionals working in the same environment AND there

are coordinated working patterns for different clinical specialities THEN collaboration will be more likely to occur between HCPS BECAUSE they are working at the same time as other HCPs from different disciplines. IF different clinical disciplines are purposely scheduled to work at the same time, THEN this has the potential to lead to more spontaneous interactions and informal coordination and collaboration BECAUSE the HCPs are already working at the same time in the same place together.

In Phase 1, this IRPT was separated into two: IRPT proposed that IF clinics are co-located with leisure centres, THEN health and exercise professionals are more likely to collaborate and communicate BECAUSE they are working in the same environment, sharing the same facility, structures, and work processes; AND IF HCPs work in a co-located health and leisure environment AND partners are able to share their expertise and experience THEN this may facilitate knowledge transfer and learning amongst different HCPs and exercise professionals, thus increasing the likelihood of PA referrals BECAUSE co-location enables informal spontaneous interactions that are preferential to desk-based learning structured learning.

Data from the Phase 2 interviews with HCPs and patients suggested overlap between IRPT 3 and 4, thus the theories have been conflated. They are shown in their Phase 1 iteration below.

IRPT 4: Coordination & collaboration of health and PA professionals (structural)

Phase 1	IF clinics are colocated with leisure centres	THEN health and exercise professionals are more likely to collaborate and communicate	BECAUSE they are working in the same environment, sharing the same facility, structures, and work processes.
IRPT 5: Knowledge transfer and shared learning to promote PA			
Phase 1	IF HCPs work in a colocated health and leisure environment AND partners are able to share their expertise and experience	THEN this may facilitate knowledge transfer and learning amongst different HCPs and exercise professionals, thus increasing the likelihood of PA referrals	BECAUSE co-location enables informal spontaneous interactions that are preferential to deskbased learning structured learning.

Data from the evaluation supports conflation of the two IRPTs. Similar responses were given by both HCPs and patients in response to IRPT 4 and 5. Thus, the meaning of both theories was interpreted similarly by participants.

Data from the evaluation suggest that for coordination and collaboration as well as knowledge transfer and shared learning to occur between HCPs and exercise professionals, the physical structure that the co-located environment provides is not enough. Whilst HCPs drew attention to the numerous potential benefits of coordination and collaboration/knowledge transfer/shared learning between and amongst HCPs and exercise professionals in a co-located environment, numerous barriers prevent this from happening as common practice consistently.

Some barriers which have made it difficult for collaboration/knowledge transfer/shared learning include lack of time, energy, effort and priority to develop relationships, mistrust between HCPs and exercise professionals and different areas of expertise and values. Lack

of coordinated scheduling between clinical appointments and PA opportunities, and uncoordinated working patterns for different clinical disciplines are also barriers.

The Phase 2 Theory iterations following data from the realist evaluation are presented below.

Phase 2	IF clinics are colocated with leisure centres, i) with HCPs and exercise professionals working in the same environment AND time and effort is invested to develop relationships and trust	THEN health and exercise professionals are more likely to collaborate and communicate and share knowledge	BECAUSE there is a mutual understanding of each other's roles, professional respect, willingness to work together and share information.
	ii) IF clinics are colocated with leisure centres, working in the same environment AND there are shared aims and goals (such as enabling patients to become physically active) between HCPs and exercise professionals.	THEN coordination and collaboration is more likely to occur	BECAUSE HCPs and exercise professionals see themselves as working together for a common purpose.
	iii) IF clinics are colocated with leisure centres, with HCPs and exercise professionals working in the same environment AND there are coordinated working patterns for different clinical specialities	THEN collaboration will be more likely to occur between HCPS	BECAUSE they are working at the same time as other HCPs from different disciplines.

	iv) IF different clinical disciplines are purposely scheduled to work at the same time,	THEN this has the potential to lead to more spontaneous interactions and informal coordination and collaboration	BECAUSE the HCPs are already working at the same time in the same place together.

6.4.2.1.2 Data supporting theory refinement

i) with HCPs and exercise professionals working in the same environment AND time and effort is invested to develop relationships and trust

When the leisure centres and clinics were initially co-located, a staff member of the colocated sites created numerous opportunities, such as meetings and in-service days for HCPs of different disciplines and exercise professionals to attend to encourage collaboration and coordination. These opportunities were not mandatory for staff to attend and as time went on, there was less attendance at these opportunities. At the time of the research these opportunities were occurring much less frequently than in the early stages of co-location; attendance was low because HCPs did not consider them a priority.

HCP 3 elaborated on the opportunities facilitated when co-location was initiated to encourage collaboration and coordination,

> *"I've tried to on a number of occasions bring clinicians together…to talk about physical activity and how they might talk to patients… I tried a lunch time meeting; I tried a morning meeting and various other things. It's about knowledge transfer and with obviously a focus on physical activity…. One of the best meetings… I had two clinicians turn up."*

Additionally, some clinics only work in the co-located sites once weekly which would reduce the chances of their HCPs crossing paths with HCPs from another discipline or exercise

professionals. This could prevent collaboration, coordination, knowledge transfer and shared learning from occurring naturally.

HCP 7 (Physiotherapist, Graves and Concord) reflected on the early stages of co-location when there were regular scheduled opportunities for staff from different disciplines and exercise professionals to meet each other.

> *HCP 7: "So, the thing I talked about was shared conferences, shared meetings. We never really managed to get that going across the disciplines. There have been some, but it would be nice to have more and regular. The thing that's happened is that the teaching hospital encroaches. So, we would have more dealings with the teaching hospital, with the rheumatologist, with consultants and less maybe than with the staff at Move More centres. So, we could do with having more facilitated interaction with the health trainers and stuff like that."*

One way to encourage knowledge transfer and shared learning between HCPs is to make it explicit and required in the job roles. Another way is to schedule regular and consistent training days.

> HCP 6 (Physiotherapist, Graves and Concord):
>
> *"So at our away day I put, 'these are our top three referrers to activity pathways, these are our top three referrers to working with, these are our top three referrers to social prescribing, if you need some help from any of them to be able to do the doing or to talk to them about their experiences that's who you need to go and have a talk to.'"*

In terms of effort, it appears that service leads attempt to incorporate PA education and discussion into staff training days, but there is a lack individual HCP volition to engage in

knowledge transfer between different HCPs and exercise professionals. If knowledge transfer and shared learning occurs it is more likely to take place between different disciplines of HCPs than between HCP and exercise professionals.

HCP 8 recognised that he individually enjoys collaborating with other exercise and HCPs.

> HCP 8:
>
> *"I like working, genuinely working with other team members. You know, I learn from them and I'm sure they learn from me, so it's good. And I've a belief that working closely with other people, with other practitioners and therapists will result in a better product for the patient, a better treatment offer."*

But he acknowledged that it takes individual volition and motivation to do so, but it doesn't happen consistently because of the workload.

> HCP 8: "*currently I work in one room and right beside me is a great pain physiotherapist and actually on the side of me is a pain physiotherapist; however, unless we make the time there's no, and it would be a case of knocking on doors and saying could you see this. And that's happened once or twice. And I've gone to them once or twice so there's a bit more of that. But unfortunately, any meaningful, it's not going to be meaningful change unless the workload is altered."*

Additionally, whilst the leisure centre has been co-located with the clinical area physically, there are some details of the building which could be added to aid collaboration and coordination. For example, it has been suggested by HCP 10 that a lack of a staff room is a barrier to coordination and collaboration because there is no place within Graves or

Concord where staff from the leisure centre and clinical disciplines could meet informally, such as a break room.

HCP 10 explained how this lack of shared space serves as a barrier:

> *"The fitness instructors' kind of stick to themselves and there's no real integration… if they could find a way to facilitate it would be good because…they'll give us new ideas for exercises…we can upskill one another… I've probably spoken to fitness instructors once or twice…I think again it's that whole there's not a staff room…it's a bit like them and us…I think the same for the other professions as well. Like some of the, like I think it's cardiac rehab or pulmonary rehab, they will kind of sit on another table that they found at lunchtime and their lunch time's different because it depends on their classes. … there's no kind of MDT environment. It's very much like you're on that team, you're on that team. It's a bit like being at school again."*

A shared space for all staff that work in the leisure centre could facilitate more informal interactions which could lead to development of familiarity, peer support and relationships between HCPs and exercise professionals. HCPs from within a specific discipline sometimes share lunch breaks and go on walks together at Graves, but most have staggered lunch times.

This clause was added to reflect data that suggested that co-locating HCPs and exercise professionals in one facility is not enough to encourage coordination and collaboration, time and effort needs to be invested for relationships and trust to form. Attempts were made by HCPs to encourage collaboration, but these events were poorly attended as they were not prioritised.

i) THEN health and exercise professionals are more likely to collaborate and communicate BECAUSE there is a mutual understanding of each other's roles, professional respect, willingness to work together and share information.

Evidence suggests that spontaneous interactions between different disciplines and between HCPs and exercise professionals could lead to more coordination and collaboration because there will be exposure to each other and chances to develop familiarity, mutual understanding, relationships and trust.

Not only has the evidence suggested that there is a lack of time, energy and effort devoted to developing relationships, there appears to be insufficient trust, lack of shared values, experience and priorities. In addition, some HCPs expressed fear that the exercise professionals would cause harm to the patients by giving inappropriate or harmful advice.

HCP 2 (Physiotherapy, Graves) elaborated on the lack of trust between HCPs and exercise professionals:

> *"… it's more that we panic that they're going to cause harm, and then probably the other way around as well…we've seen horrendous, everybody's seen a YouTube video of a PT doing something that's made you cringe … we almost need to employ therapy assistants or strength and conditioning coaches who can bridge that gap, between a health mindset and a physical activity mindset… it's hard to kind of recommend somebody…like I would never ever dare say to a patient 'go to cross fit.'*

She went on to highlight the issue that she does not know exercise professionals' qualifications and knowledge personally so doesn't feel comfortable referring patients. She also expresses reticence to 'sell' one gym over the other.

"I don't know the gym, I don't know the instructors, I don't know their knowledge. But if I did know them personally, if I said oh yeah, I know the guys at Heely and they're great, they know what they're doing then I can't do that because then I'm selling one place over another."

HCP 2 addressed that impartiality appears to be another barrier to making referrals to PA. This could illustrate fear of recrimination if the patient would be prescribed a harmful exercise programme.

"So, it's a difficult position to be in when you're employed as a public sector health provider because you've got to balance that recommendation versus impartiality. So, it's just easier to say I'm not going to say anything on this one. And I think that's quite sad…when you've got somewhere like Graves that there's a little bit more governance over what they're doing that's good, but we could do so much better."

This quotation illustrates several issues which prevent collaboration between HCPs and exercise professionals. These issues include different knowledge, attitudes, skills and mistrust between HCPs and exercise professionals. Fear of the exercise professional giving harmful advice to the patient and medical liability the HCP is another barrier to coordination and collaboration.

Whilst co-location has the potential to facilitate cross-discipline working and allow trust to build between disciplines, evidence suggested that barriers exist between the HCPs and exercise professionals for coordination and collaboration to occur consistently and as common practice.

ii) IF clinics are co-located with leisure centres, working in the same environment AND there are shared aims and goals (such as enabling patients to become physically active) between HCPs and exercise professionals. THEN coordination and collaboration is more likely to occur BECAUSE HCPs and exercise professionals see themselves as working together for a common purpose

This clause highlights the necessity for there to be shared goals and aims between HCPs and exercise professionals in order for coordination and collaboration to occur. Shared goals and aims, for example, promoting PA in patients, would help HCPs from different disciplines and exercise professionals to see themselves as working together for the same purpose. Colocation of leisure centres and clinics was developed in effort to promote PA in patients and in principle, HCPs that work in this environment are expected to do so, but this isn't mandated at time of this research.

HCP 2 explained that perhaps training sessions for HCPs and exercise professionals may aid in discussion of shared aims and goals.

> HCP 2: "… *there needs to be a more structured common goal or common discussion… if we did some training session that was run by the sports centre staff, and we went along to it and vice versa."*

iii) IF clinics are co-located with leisure centres, with HCPs and exercise professionals working in the same environment AND there are coordinated working patterns for different clinical specialities THEN collaboration will be more likely to occur between HCPS BECAUSE they are working at the same time as other HCPs from different disciplines. IF different clinical disciplines are purposely scheduled to work at the same time, THEN this has the potential to lead to more spontaneous interactions and informal coordination and

collaboration BECAUSE the HCPs are already working at the same time in the same place together.

Coordinated working patterns for different clinical specialities may help to facilitate coordination and collaboration between HCPs and exercise professionals. HCPs suggested that there is not enough time during the workday for collaboration and knowledge transfer/shared learning to occur.

In addition, due to NHS constraints, capacity and when clinics are scheduled, not all clinics held at the sites work together on the same day, although particular clinics are strategically held together (i.e., podiatry and physiotherapy).

HCP 6 (Physiotherapist, Graves & Concord):

> *"The sidewards facing benefits were being able to work in a venue with other professionals from community and hospital-based services. Like community podiatry because my podiatrists don't do the same interventions as community podiatry do, but if you're in the same place you get better communication, rheumatology. "*

More coordinated working patterns would increase the chances that different disciplines could communicate and collaborate because they would be physically in the same space at the same time. For coordinated working patterns to encourage communication and collaboration, lunch times and breaks should be coordinated to occur at the same times for all HCPs. It may be difficult for service managers to coordinate shared breaks for HCPs given the need to provide service provision throughout the day.

HCP 10 went on to describe the challenges of collaboration between physiotherapists, let alone HCPs from different disciplines, specifically lack of time and coordinated scheduling which would allow for collaboration and collaboration.

> *"Time is so tight, and I think if we had a little bit more time and were a little bit more relaxed in what we could do then those conversations would happen more naturally. But I think we probably need to force them at the moment, i.e., get a few people in a room and say right let's talk about this today to just do that... sometimes, I'll work at Graves, and I'll be there all day and I might see one or two other physios when there's 18, 20 of them in the building. Because it's back-to-back and if you're good and you can get a proper lunch break then yeah you might have a lunch break with a few of them and that's great; but if you're running behind and you've got other things to do then you just stay in your room…. You'd have to make sure that we've got the clinicians diaries lined up so that they were having a lunch at the same time."*

Several factors appear to play a role in facilitating coordination and collaboration in a colocated environment and data from the interviews drew attention to these factors which include shared work processes, coordinated scheduling, shared goals and aims, and time, effort and energy to develop relationships.

Data from the evaluation was not fully supportive of these IRPT 3 and 4 in their Phase 1 iterations. It appears from the data that if collaboration and coordination occur between HCPs it is most often those from the same discipline (physiotherapists with other physiotherapists), rather than between HCPs from different disciplines OR between HCPs and exercise professionals. Data supported conflation of these theories.

Three additional clauses have been added to these theories and the overlap between the two has been merged together.

6.4.3 Pawson's social strata level 4 - Individual

6.4.3.1 Co-located healthcare and leisure may lead to improved patient experience leading to improved self-management of health

The first IRPT on the individual level posits that IF clinics are co-located with a leisure centre, THEN patient experience may be more positive in contrast to traditional exercise referral or clinical appointments in the community, BECAUSE co-location allows for seamless transition between HCP and exercise provider and eliminates barriers.

IF the clinic is co-located with a leisure centre the patient may feel that they are better able to manage their own health in the co-located setting and that they are there to participate in PA, rather than merely be a patient receiving treatment, BECAUSE of the salutogenic environment which provides resources for the patient to take charge of their health.

In Phase 1, this IRPT proposed that if clinics are co-located with leisure, then patient experience may be more positive in contrast to traditional exercise referral because colocation allows for seamless transition between HCP and exercise provider and eliminates barriers.

Data from the evaluation largely confirmed this IRPT its initial iteration but added nuance to acknowledge that the patient experience in the co-located setting was seen by patients and interpreted by HCPs to be more positive in contrast to traditional exercise referral in the community *and* clinical appointments.

The co-located environment is more positive in contrast to traditional clinical settings and more seamless in contrast to typical exercise referral where a patient is often referred from

a GP clinic to an external leisure centre. In addition, the patient may have a greater sense of autonomy, agency and feel that they are better able to manage their own health in the colocated setting. The patient may feel that they are there to participate in PA, rather than merely be a patient receiving treatment.

IRPT 6: Improved patient experience			
Phase 1	IF the clinic is colocated with a leisure service	THEN patient experience may be more positive in contrast to traditional exercise referral	BECAUSE co-location allows for seamless transition between HCP and exercise provider and eliminates barriers.

The theory was refined to include three additional clauses due to new data from the interviews with HCPs and patients:

Phase 2	IF clinics are colocated with a leisure centre	THEN patient experience may be more positive in contrast to traditional exercise referral i) or clinical appointments in the community	BECAUSE co-location allows for seamless transition between HCP and exercise provider and eliminates barriers.
	IF clinics are colocated with a leisure centre	ii) the patient may feel that they are better able to manage their own health in the co-located setting and that they are there to participate in PA, rather than merely be a patient receiving treatment	BECAUSE of the salutogenic environment which provides resources for the patient to take charge of their health

6.4.3.1.2 Data supporting theory refinement

Additional clause

i) or clinical appointments in the community In addition, the patient may feel that they are better able to manage their own health in the co-located setting and

that they are there to participate in PA, rather than merely be a patient receiving treatment

This clause was added address that patient experience in the co-located environment is potentially more positive in contrast to traditional clinical settings and more seamless in contrast to typical exercise referral (where a patient is often referred from a GP clinic to an external leisure centre).

Patient 3 (Graves): "But going into it my god it's gorgeous…You walk in and the swimming pools on the left and that's so nice. And it was lovely. It was so kind of bright and airy… I think there was information on a screen and that was really interesting…. it makes you feel like a person in the community rather than a patient."

Patient 10:

"It's certainly more chilled. You're not going into that hospital environment with everybody else that's sick and ill because there's nothing worse than sat in a waiting room where everybody's coughing. It's a nice bright airier place. But the place is, like I say, because it's a sports place it just feels sporty, I suppose. To get away from the hospital's definitely a bonus…it takes a lot for me to go to the doctors. I'll limp a long time before I'll finally go to the doctors; whereas here seems a lot less formal."

ii) the patient may feel that they are better able to manage their own health in the co-located setting and that they are there to participate in PA, rather than merely be a patient receiving treatment BECAUSE of the salutogenic environment which provides resources for the patient to take charge of their health

Justification

This clause was added to address that patient experience is more positive in contrast to the traditional clinical setting because of the salutogenic environment of the co-located health and leisure which empowers patients to take charge of their health to manage their own condition.

Examples of supporting data

HCP 9:

"I think when you're in a place like Graves and Concord and you're talking about something like that it means more to the patient. Because you can actually make them see that it's worthwhile and its exercise; whereas, telling them to do it, I think just the GP telling them in a five-minute consultation or just the normal clinic environment, they'll be like what's the point in that, what's that going to do? Whereas when you're telling them from a, you're telling them in an establishment that's purpose built for activity, you're talking about it from that point of life change, life changing point of view, I do think they take it on board more. So, you can say one flight of stairs and all of a sudden, they actually think oh yeah maybe that will help, I can do one flight of stairs a day."

The environment of a clinic based within a leisure centre also empowers patients with a sense of empowerment, autonomy and agency (Patient 1):

"It also removes that feeling that oh this is a place where I go when I'm sick then it adds a new perception of actually this is a place where I go and be healthy and makes me keep healthy."

6.4.3.2 Improved staff experience

This IRPT posits that IF HCPs work in a co-located health and leisure environment and the HCP is motivated already to discuss PA with patient, THEN they may attribute working in a co-located environment to a more positive experience BECAUSE they care about the promotion of PA with their patients and the environment in which they work is congruent with these values.

In Phase 1, this IRPT posited that IF staff are enabled to engage in PA through co-location, THEN they are more likely to relay a positive PA message to patients BECAUSE they value the benefits of PA personally.

The Phase 1 IRPT was completely refined in light of new data from the interviews.

There is confirmatory evidence to support the idea that the co-located sites are a more positive experience for staff, but there are several reasons for this positive experience, and they vary between HCPs.

Some HCPs may feel more valued working in the co-located environment because they have access to benefits not available at traditional clinical locations, such as ample free parking, a more positive building environment and free gym membership. Additionally, the opportunity to engage with other staff members and a free gym membership appear to be aspects that HCPs value, but in practice do not engage with other staff members or use the free gym memberships as often as initially theorised, according to HCP interview data.

Some HCPs see the co-located environment as a more positive experience because they have the opportunity to promote PA in an environment which is supportive of PA, in contrast to a traditional clinic. For HCPs that value enabling patients to become physically

active, see themselves as innovative and are physically active themselves, then working in a co-located site may be seen to be in line with their values and makes it easier to promote PA. In addition, for those that are motivated to promote PA, the co-located environment just facilitates them to do so, making the experience more positive than the traditional setting.

IRPT 7: Improved staff experience			
Phase 1	IF staff are enabled to engage in PA through co-location	THEN they are more likely to relay a positive PA message to patients.	BECAUSE they value the benefits of PA personally.

The theory was refined to include three additional clauses due to new data from the interviews with HCPs and patients.

Phase 2	IF HCPs work in a colocated health and leisure environment and i) the HCP is motivated already to discuss PA with patients	ii) THEN they may attribute working in a co-located environment to a more positive experience	iii) BECAUSE they care about the promotion of PA with their patients and the environment in which they work is congruent with these values.

6.4.3.2.1 Data supporting theory refinement

IF HCPs work in a co-located health and leisure environment and i) the HCP is motivated already to discuss PA with patients ii) THEN they may attribute working in a co-located environment to a more positive experience iii) BECAUSE they care about the promotion of PA with their patients and the environment in which they work is congruent with these values.

If the HCP is motivated already to discuss PA with patients, then they may attribute working in a co-located environment to a more positive experience because they care about the

promotion of PA with their patients and the environment in which they work is congruent with these values. Whilst valued, it is notable that this benefit of co-location appears to be secondary to direct staff benefits such as parking, social environment and free gym membership.

> HCP 10: *"I think that Graves is such a good location to be in because you have that gym environment … if patients are willing or they have a gym membership, you can help them take ownership of their treatment better. It's very hard comparatively in Manor for example or Northern General to replicate the exercises I'm suggesting without them actually doing them if exercise isn't something that they're used to doing…often just getting them to do exercise is a huge barrier to overcome… from like an MSK physio side of things it's really, really good to be in a health centre, particularly Graves because you can see everyone exercising in the environment that they're in…But I think for other professions I think it's probably quite good for them to have that environment around them… it's at your work you can go before or after work, you've not got to travel anywhere…. we get free membership [at Graves] so actually that might help staff health… it could… improve staff wellbeing…"*

Staff report the co-located environment to be more positive for numerous reasons including amenities and social benefits.

Due to relevance to co-location of health and leisure, this theory was refined to the final set of theories.

6.4.3.3 Patients with long term conditions may feel safer participating in PA in a colocated environment

The next IRPT at the individual level proposes that IF patients have long term conditions, THEN co-location may help patients feel safer to undertake PA, BECAUSE they are reassured when HCPs are working in same facility and may be available to help if needed.

IF patients have long term conditions, THEN HCPs may be more confident to refer patients to PA in a co-location model, BECAUSE they have greater awareness of the equipment and special adaptations offered in the facility. If the HCPs are aware of exercise professionals' skills and knowledge, THEN they may be more likely to make referral, BECAUSE they feel safer putting the patient in the exercise professionals care and are not worried that the exercise professional would cause harm.

In Phase 1 the IRPT posited that IF patients have long term conditions, THEN co-location may help patients feel safer to undertake PA BECAUSE they are reassured when HCPs are working in same facility and may be available to help if needed.

IF patients have long term conditions, THEN HCPs will be more confident to refer patients to PA in a co-location model, BECAUSE they have greater awareness of the equipment, staff and special adaptations offered in the facility.

In Phase 2, clauses were added to acknowledge nuances regarding why and when HCPs would be more likely to refer patients with long term conditions to PA.

Additionally, data from the interviews was provided to illuminate Phase 1 data which proposed that patients would feel safer to undertake PA in a co-located environment.

Interviews data explained that co-location may support referral for patients with long term conditions, but referral seems more likely to occur if the HCP is aware of the specific exercise professionals' skills, knowledge and capabilities, particularly around whether or not the HCP trusts that the exercise professional is competent to safely help a patient with a specific condition. Furthermore, there is a fear that the exercise professional may cause harm and this liability could fall back on the HCP.

If a patient has a long term condition, interview data shows that they may feel safer to participate in PA in the co-located setting in contrast to an isolated gym or leisure centre without HCPs working nearby. HCPs may feel more confident to refer patients to PA in this environment, *if* they are aware of the exercise professional's knowledge, skills and capability and feel safe referring their patient to the exercise professional.

IRPT 8: Patients with long term conditions are supported to participate in PA			
Phase 1	IF patients have long term conditions,	THEN co-location may help patients feel safer to undertake PA	BECAUSE they are reassured when HCPs are working in same facility and may be available to help if needed.
	IF patients have long term conditions,	THEN HCPs will be more confident to refer patients to PA in a co-location model	BECAUSE they have greater awareness of the equipment, staff and special adaptations offered in the facility.

The theory was refined to include one additional clause due to new data from the interviews with HCPs and patients:

Phase 2	IF patients have long term conditions,	THEN co-location may help patients feel safer to undertake PA	BECAUSE they are reassured when HCPs are working in same facility and may be available to help if needed.
	IF patients have long term conditions,	THEN HCPs may be more confident to refer patients to PA in a co-location model	BECAUSE they have greater awareness of the equipment and special adaptations offered in the facility.
	i) If the HCPs are aware of exercise professionals' skills and knowledge	THEN they may be more likely to make referrals.	BECAUSE they feel safer putting the patient in the exercise professionals care and are not worried that the exercise professional would cause harm.

6.4.3.2.1 Data supporting theory refinement

Additional clause

IF the HCPs are aware of exercise professionals' skills and knowledge THEN they may be more likely to make referrals BECAUSE they feel safer putting the patient in the exercise professionals care and are not worried that the exercise professional would cause harm.

According to the administrative staff and physiotherapy service lead, there is significant variation in the confidence to refer and number of referrals made amongst physiotherapy staff. Physiotherapists' anxieties regarding PA referral stems from uncertainty whether they are qualified enough to refer patients with comorbidities such as cardiac and respiratory conditions, which are deemed outside of their scope of practice, and by doing so they could harm the patient. Additional concerns are based on uncertainty about whether the exercise professional receiving the referral has sufficient knowledge and skills to provide exercise

prescription. This is further complicated by exercise professionals having no access to patients' medical records.

According to physiotherapists interviewed, many patients experience fear avoidance, or worry that they may cause additional harm to their condition by participating in PA but doing so in a co-located environment may help them feel safer and less avoidant of PA. Attending an appointment at a co-located setting may feel more integrated from the patient perspective.

> HCP 7 (Physiotherapy, Graves):
>
> "I say to people 'come here, I'm discharging you to [the physical activity referral scheme]. They'll look after you, you'll be fine. I'm downstairs if you want to ring me. I'll see you on a Monday.' And sometimes it's just the reassurance that they need. Because they don't like to be discharged as such, so technically I've discharged them. But they don't know."
>
> HCP 10 (Physiotherapy, Graves):
>
> "...a lot of chronic pain patients that we get coming through…a lot of them are unemployed or they live very, very sedentary lifestyles…when they go in, and they see that there's a lot of older people or they've got the assisted gym there I think sometimes it makes them … consider exercise a lot more. a lot of people with cardiac and respiratory problems that come through the door…people with chronic pain problems have a huge amount of fear avoidance… worried about causing more damage or injuring themselves further I think they feel reassured if they know that

we're in the same building… they never probably would come down and speak to us if they did something right there and then I think they just feel reassured"."

Patient 2 discussed how it made sense to her that she might be able to go into the gym during her clinical appointment because of the leisure centre environment but it didn't happen during her visit. She felt that the clinic wasn't making full use of the advantages of being co-located with a leisure centre. From her perspective, many patients are fearful or unconfident participating in PA in a leisure centre, but if the HCP took the patient in the gym during their clinical visit, that it could really help with confidence in being physically active.

"when we went in there were lockers and I thought 'oh maybe you'll get to go in the pool…'And not exactly kind of expecting them to be babysitting you to go and do things but to maybe just go 'actually if you get in the pool, I'll show you these exercises'. Or 'if you come in here and look at the treadmill, I'll show you those exercises.' I thought there might have been an element of that. I didn't expect it and I wasn't overly disappointed it wasn't there, but I felt like it was a bit of shame that because they were together that they couldn't have linked that in a bit more… I think for some people taking it one step further to like showing practically how this could work in a fitness setting rather than right now go away and join a gym or now go away and do this bit of exercise, I think that would have helped a lot of people maybe. And to feel encouraged to go to the gym, because obviously some people have got a lot of confidence issues about walking into a gym."

Fear and interpersonal factors such as HCPs trust with exercise professionals appear to act as a mechanism for that could prevent HCPs from making ERs. However, when a HCP can see the exercise referral professionals taking patient blood pressure readings in the gym,

this could act to reduce the HCPs fear and anxiety around causing harm to a patient by referring to PA.

HCP 6 (Physiotherapy, Graves & Concord):

"… there was an anxiety amongst clinicians, whether they were qualified to be able to advise somebody that they could exercise if they had high blood pressure, heart problems, asthma, comorbidities, because actually we're experts in MSK, we're not experts in all those other things…there was a bit of a fear originally about whether or not we were qualified to say you can go and exercise.… It might not be everybody, but I think there's a lot less fear about the fact that we can say it's OK to go and exercise and that it's OK to refer them to one of the activity pathways providers. "

HCP 6: *"Because we see them out there with blood pressure monitors and that sort of thing and actually they're doing the check that they then say, 'I can't take you onto the programme, you need to go and see your GP, and when your GP has got your blood pressure under control then you can come back'…I think our staff are more confident that there is a check that it won't be our fault if we send somebody to exercise, there's a filter and that's done by somebody who is trained and competent to either let them into the exercise programme or not."*

Some patients reported feeling safer exercising with a long term condition in a setting where a HCP is working nearby, even if they know that the HCP won't be exercising with them or won't be able to come to their aid immediately should they need help. Patients appear to recognise that the there are limits to the boundaries of a HCP in terms of PA but acknowledge that co-location has the potential to create a more 'joined-up' way of working which could support patients with long term conditions.

Patient 2 (Physiotherapy, Concord): *"…I think for somebody with a more serious condition that would be helpful. I suppose that there's a load there then about what's the role of the healthcare practitioner. How much …of their time should be spent taking somebody to the gym…so they're not advocating babysitting, but I think there's this element of handover isn't it? There's this element of interworking...that makes people feel confident about doing that*." Patient 7 (Physiotherapy, Graves): "I think it gives people a sense of reassurance, even if that sense of reassurance is slightly misguided, because they're not going to come and rescue you are they, if everything goes wrong."

One patient with co-morbidities, including type 1 diabetes, expressed fear about going into the 'main gym' at Graves and more comfort with the smaller assisted gym, with amenities for diabetic patients.

Patient 8 (Physiotherapy and Podiatry, (type 1 diabetic), Graves):

"I like the smaller gyms of which Graves has the Milon gym which is just a circuit or two...there's a place to rest, there's coffee if you need it, there's sugar if I ever needed any glucose… one person who's always on duty understands diabetes better than some of the big gyms…I can go up to the big gym, but diabetics to me feel a bit lost, type 1s feel a bit lost in that large gym, because people can't watch you. I know we should be responsible for our own health, but there are times you can't be."

Due to relevance to co-location of health and leisure and data from the interviews which reinforce this theory, it was refined to the final set of theories.

6.4.3.4 Co-located health and leisure facilities increase awareness of PA opportunities

This IRPT proposes that IF clinics are co-located with leisure centres, THEN this may facilitate patient and HCP awareness and i) salience of PA, depending on the design of the building, BECAUSE the gym is "right there," co-located with the NHS clinics. Lack of awareness of where to refer patients to exercise can serve as a barrier, which co-location helps to eliminate.

In Phase 1 the IRPT posited that Phase 1: IF clinics are co-located with leisure centres, THEN this may facilitate patient and HCP awareness, BECAUSE lack of awareness of where to refer patients to exercise can serve as a barrier. Being co-located can eliminate this barrier as the gym is "right there."

In Phase 2, interview data demonstrated a necessity to include the concept of salience to this theory. Data showed that there is not only greater awareness of PA through co-location (in contrast to traditional clinical settings) but also greater salience. The degree to which salience and awareness exists in the minds of patients and HCPs is dependent upon the building design differences (between Graves and Concord).

Data from the evaluation supported this IRPT. One additional clause has been added to this IRPT to address the addition of the concept of *salience* and to acknowledge how building design plays a role in this IRPT.

IRPT 9: Increases awareness of PA facilities			
Phase 1	IF clinics are colocated with leisure centres	THEN this may facilitate patient and HCP awareness	BECAUSE lack of awareness of where to refer patients to exercise can serve as a barrier. Being co-located can eliminate this barrier as the gym is "right there."

The theory is explained in the Phase 1 and Phase 2 iterations below. The theory was refined to include one additional clause due to new data from the interviews with HCPs and patients:

Phase 2	IF clinics are colocated with leisure centres	THEN this may facilitate patient and HCP awareness and i) salience of PA, depending on the design of the building	BECAUSE the gym is "right there," co-located with the NHS clinics. Lack of awareness of where to refer patients to exercise can serve as a barrier, which colocation helps to eliminate.

6.4.3.4.1 Data supporting theory refinement

i) salience of PA depending on the design of the building BECAUSE the gym is "right there," co-located with the NHS clinics.

This clause was added to the theory to include the "salience" of PA in the co-located environment. Salience was added because has a different meaning to awareness. Salience, or being "top of mind," (Day, Higgins, & Koch, 2009)(Higgins & Kruglanski, 1996) recognises that the leisure centre environment stimulates HCPs to discuss PA and patients to engage in PA, in contrast to non-co-located clinics and hospitals.

Similarly, to IRPT 1: increasing convenience, a component was added to explain how the design of the building in terms of how the buildings are co-located plays a role in awareness and salience of PA in the minds of patients and HCPs.

These factors were difficult to separate in the data, as the design of the buildings clearly impacted how aware and salient PA was for patients and HCPs.

Both HCPs and patients broadly recognised how awareness and salience of PA was facilitated through co-location. Data showed that design of the clinic attended by the

patient clearly played a role in their exposure and awareness of PA. HCPs appeared to be more aware because of their existing knowledge of the facility they work in, yet the salience of PA was still perceived to be lower for Concord than for Graves because of building design. Overall HCPs confirmed initial theorising that awareness of PA is enhanced for Graves than for Concord because of the design of the building which places PA opportunities at the forefront rather than attached at a separate interest.

HCP 2 (Physiotherapist, Graves):

"Concord's different because it's tagged on the side, so you don't get that exposure. You could easily go to Concord and come out of it and not really have much interaction with the gym space at all. And I think that's where that could improve, having more accessibility, kind of making people have to walk through the gym or walk into that environment... Graves … you'd have to be sensory deprived in many different ways to not notice going into that building."

The seamless design of Graves versus Concord appears to enhance awareness and salience of PA in the minds of both and patients.

HCP 7(Physiotherapist):

"they walk into Graves and it's a nice big, you park in the carpark, and you see people exercising upstairs in that big window and that will have a significant effect on people. You go to Concord you don't see anything. Whereas Graves is well designed like that, that you see the people, see things happening."

For patients PA is less salient at Concord than for Graves.

Patient 4:

"The clinic is completely separate. You bypass the main entrance and once you know that that's where you're going you have no need to go to the Concord Leisure Centre. It doesn't feel like it will be a natural thing to be encouraged to go and explore it… when I go, I don't make that connection that I should oh maybe go into the gym because it does feel so disconnected where it is."

Data from the interviews overlapped with this IRPT and IRPT 1: increases convenience. Due to relevance to co-location of health and leisure and data which reinforces this theory, it was refined to the final set of theories, but later consolidated with IRPT 1.

6.4.3.5 In co-located health and leisure environments, patients may be more likely to see others like themselves which could lead to normalising and modelling of PA behaviour

In Phase 1 IF healthcare services and PA facilities are co-located, THEN patients will be more likely to view PA as normal, BECAUSE they see others "like them" participating in PA and therefore modelling the behaviour.

In Phase 2, two additional clauses were added based on data from HCP and patient interviews. The importance of exposure to PA opportunities in order for the patient to normalise PA has been made evident through the realist evaluation.

This addition of two clauses was necessary to account for data which shows that not every patient is exposed to PA during a visit to the co-located sites. Additionally, this clause relates to data that suggests that for patients to value PA as normal, there is a necessity for the patient to not only be exposed to and observe "people like them" participating in PA, but also to internalise such observations. To internalise means to" take in or assimilate values into an individual's sense of self" (Ryan & Deci, 2002). Internalising behaviour (such as PA)

results in more self-determined or autonomous behaviour (Ryan & Deci, 2002). Individuals who are self-determined and autonomously motivated are more likely to adhere to PA long term because it has become part of their values and sense of self (Hartmann, Dohle, & Siegrist, 2015).

IRPT 10: People like me (normalising and modelling)			
Phase 1	IF healthcare services and PA facilities are co-located	THEN patients will be more likely to view PA as normal	BECAUSE they see others "like them" participating in PA and therefore modelling the behaviour.

The theory was refined to include three additional clauses due to new data from the interviews with HCPs and patients:

Phase 2	IF healthcare clinics and PA facilities are co-located, and the i) patient is exposed to and observes people that they can identify/relate with AND ii) internalises these observations	THEN patients will be more likely to view PA as normal	BECAUSE they see others "like them" participating in PA and therefore modelling the behaviour.

6.4.3.5.1 Data supporting theory refinement

Additional clause

i) IF healthcare clinics and PA facilities are co-located, and the patient is exposed to and observes people that they can identify/relate with

The addition of this clause addresses the importance of exposure to PA opportunities in order for the patient to normalise PA. This clause recognises that not every patient who

enters the co-located clinics will encounter or be exposed to other patients participating in PA.

A number of factors influence the likelihood of a patient being exposed to PA opportunities during their appointment:

- Physical layout of the building and the likelihood of patients walking past PA facilities
- Fluctuations in footfall at different times of the day affecting the number of people participating in PA at the centre
- Individual HCPs' motivation and/or time to show patients the facilities or complete referral paperwork

HCP 3 (Clinic = Operations, Site = Graves and Concord):

> *"… co-location: one of the big benefits of co-location to me is the ability for people to see people like them. To check out a venue without any expectations. Because I'm sure a lot of the people that we are wanting to have the biggest impact on which are the inactive populations, that you know, by the very nature of the fact that they are inactive they probably wouldn't think of you know what, I'll go and have a look around Concord. Besides the fact that you can't get in Concord without going through barriers so you can't just go and have a look around the venue unless you speak to somebody. Whereas the co-location gives you the ability to be in a venue, have a look around and go, 'actually it isn't that scary.'"*

HCP 6 (Physiotherapy, Graves and Concord):

> *"It's the guys in the middle who I think it's most valuable for. It's the ones that we can move patients to here, to normalise activity. I think it's the patients for whom we*

need to be able to show them the walking tennis or the paying public that are choosing to be here. It's the people who we can hand hold to the desk to pass over to the health trainers to book an appointment. It's the people who just need the motivation or the permission that it's OK and that they'll be cared for whilst they're exercising, that I think benefit most from being in a venue like this."

HCP 2 (Physiotherapist, Graves):

"...if you walk down to the far end of Graves at half past one on any given day and there's the indoor bowls group having their coffee afterwards. And you see 20, 30 people, hugely of retired age and some of them of significant retired age and you see ah look these people are out the house, they're doing something and now they're having the social bit."

Data suggests that some individuals relate more to those that are "like them" (i.e., matched to their physical capabilities and fitness level) whilst others may be more motivated to participate in PA when they observe someone who has greater levels of fitness, whom they may aspire to become. Individuals are motivated differently depending upon their individual psychology, current motivation and past experiences with PA.

Patient 6:

"Well, I suppose because you're actually at Graves and you're seeing other people wandering about it just seems like anybody can go there: it's not the preserve of super fit people."

Patient 8:

"They see other people in a similar situation to them struggling to get up the stairs, going into the gym. They're not alone…seeing other people, the older people, they have classes which is purely the older people. They do these over 50s, they do over 60s, so nobody feels in the wrong place…those areas are encouraging people with the disabilities to go swimming, to go to the gym. And yes, you are sort of on view, but it doesn't matter. Whereas you go to one of the big gyms like Virgin where everybody's there, 'lycra lizar'd as I call them."

HCP 2:

"I remember once having a lady…I think she was maybe late 70s. She came in and she went people like me exercise here. I'm going to give it a go. And she came back the next week."

HCP 7 (Clinic = Physiotherapy, Site = Graves and Concord):

"...I think if it was empty, I think it doesn't quite matter so much. But the fact that you can see people and see people exercising, I think that's a huge…whereas Graves is well designed like that, that you see the people, see things happening and you see what size and shape they are, and you realise well…they're not that different from me. They're not all athletes; there's old people. You immediately become aware that this is a place that's full of people like me, ordinary people. So, you walk in, and you see the pool. You see people again of all sizes."

This clause recognises that patients must be exposed to patients participating in PA that they can identify and relate with in order for them to normalise PA.

This clause relates to data that suggests that for patients to value PA as normal, there is a necessity for the patient to not only be exposed to and observe "people like them" participating in PA, but also to internalise such observations. To internalise means to "take in or assimilate values into an individual's sense of self" (Ryan & Deci, 2002). Internalising behaviour (such as PA) results in more self-determined or autonomous behaviour (Ryan & Deci, 2002). Individuals who are self-determined and autonomously motivated are more likely to adhere to PA long term because it has become part of their values and sense of self (Hartmann, Dohle, & Siegrist, 2015).

Whilst HCP 10 acknowledged the how taking patients into the gym can help to normalise and model PA behaviour.

> *"I think when they go to somewhere like Graves and they see people that are less able than them actually participating in physical activity it makes them, it empowers them a little bit more as well. A lot of the time I find there's quite a difference between when I work in other clinics which are health centres as opposed to at Graves, because they have to walk through the whole gym environment to get to the appointment. They might sit in the café for a bit and see people and notice that Graves has a very wide age group that use it.* ***And it makes them think oh actually I could do that sort of thing."***

This clause recognises the necessity for patients to internalise observations that they make around PA in order for them to normalise PA.

Due to relevance to co-location of health and leisure and data which reinforces this theory, it was refined to the final set of theories.

6.5 Chapter conclusion

This chapter presented the results of the realist evaluation interviews with HCPs and patients. Nine IRPTs were refined in light of new data from the interviews with the addition of one IRPT developed solely from interview data. The IRPTs at the infrastructural level include increases convenience; logistical challenges, inconsistency in appointment location that prevents consistency and misaligned business models. At the institutional/ interpersonal level these include coordination and collaboration of health and exercise professionals (structural) *and* knowledge transfer and shared learning to promote PA. At the individual level include increases awareness of PA opportunities, improved staff experience, people like me (normalising & modelling) and long term conditions.

The final refined programme theories are presented in Chapter 7, developed iteratively over two phases during this PhD.

Chapter 7. Refined programme theories

7.1 Chapter introduction

This chapter presents the five final refined programme theories of how co-location of healthcare and leisure is working to promote PA. These final refined programme theories were developed iteratively over two phases during this PhD. In Phase 1, initial programme theories were developed through a realist review, synthesising existing academic, grey and policy literature on the co-location of health and leisure. Initial rough programme theories from the realist review were then 'tested' and 'refined' using data provided from semistructured realist interviews with stakeholders involved in the development of the colocation model, resulting in nine theories. In Phase 2, these theories were tested through semi-structured interviews with ten health care professionals and ten patients across four clinical services based in the co-located sites.

7.2 Methodology and methods

The ten IRPTs developed following the patient and HCP interviews (See Chapter 6) are presented in this chapter as final refined programme theories. Following realist convention, they have been synthesised where there is a shared underlying mechanism into five final refined programme theories. This process was iterative, with the use of MRT (see Chapter 5) to both inform the development of programme theory and to help guide the analysis (Shearn et al., 2017). (NB: Please see chapter 2 for a detailed explanation of the methodological underpinnings of realist evaluation, and chapter 4 for a detailed outline of the interview method applied in this thesis to inform the realist evaluation).

Each overarching refined programme theory is presented below with sub-theories to explain the constructs which comprise each theory. These are presented as "IF, THEN, BECAUSE" statements, with a summary of the supporting data and rationale presented below each theory.

7.3 Refined programme theories

The Phase 2 theory refinements are presented in Table 10.0. The first column shows the nine IRPTs developed in Phase 1. The second column shows the five final programme theories that were synthesised from Phase 1 theories. Some theories (See Table 10.0) have been consolidated as the supporting data indicated a shared underlying mechanism. Additional interview data combined with re-reflection on the literature indicated necessity to develop a new theory: *misaligned business models of NHS and leisure centre which constrain full co-location to promote PA*.

Table 10.0 Theories refined from realist evaluation

Phase 1 IRPTs	**Phase 2 Refined Theories**
1. Increases convenience 2. Increases awareness of PA opportunities 3. Improved patient experience 4. Improved staff experience	1. Co-located environments that are salutogenically designed help promote PA
5. Coordination and collaboration of health and exercise professionals (structural) 6. Knowledge transfer and shared learning to promote PA	2. Co-located environments that enable joint working between HCPs and exercise professionals help to promote PA

7. People like me (normalising & modelling)	3. People like me (normalising & modelling) of PA in a co-located environment
8. Long term conditions	4. Patients with long term conditions are supported to participate in PA in a co-located environment
9. Inconsistency of clinical schedule	5. Misaligned business models of NHS and leisure centre which constrain full co-location to promote PA

IRPTs were mapped against these levels in Chapter 3 (Figure 7.0) to illustrate the interaction between the theories across the levels of social strata. Figure 13.0 maps the five newly refined programme theories that help explain co-location of health and leisure, with each refined theory mapped against one of four levels of social strata: Infrastructural, institutional, interpersonal and individual (Pawson & Tilley, 2004). Mapping the theories onto the four levels of social strata illustrates the interaction between the mechanisms, which do not operate at one level alone. See Chapter 3 (Figure 8.0) for the IRPTs mapped onto this diagram in phase 1.

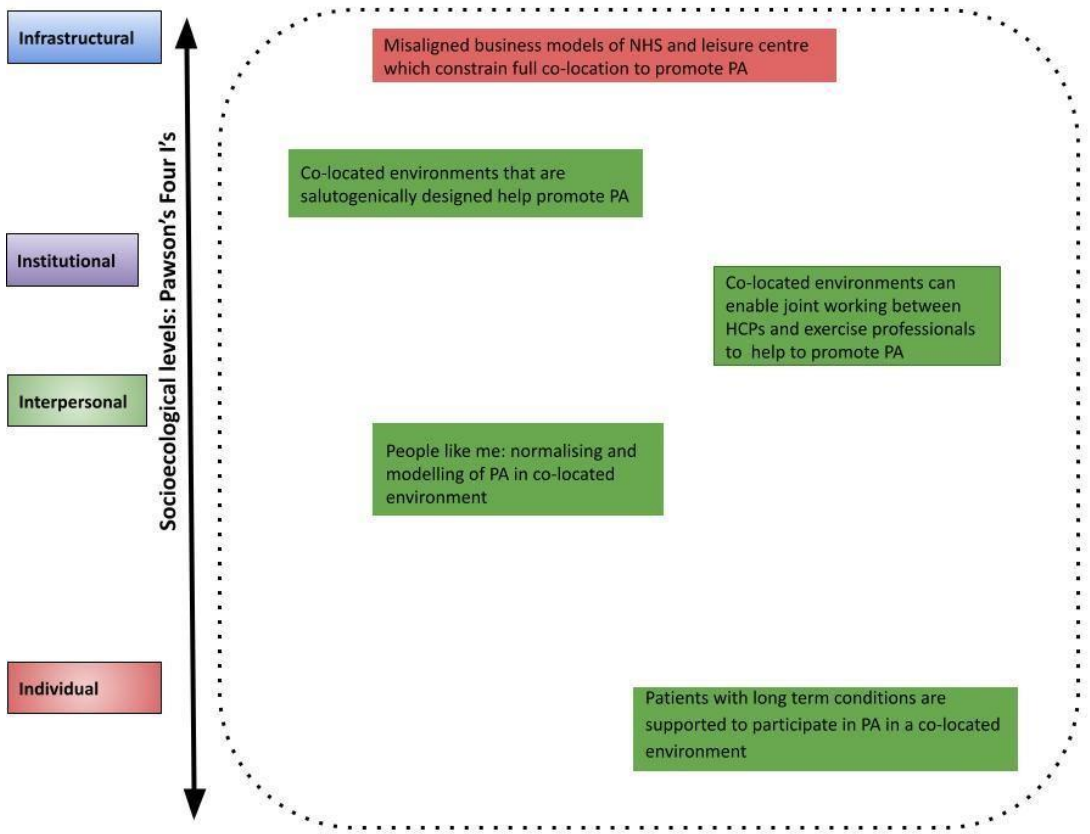

Figure 13.0 Final refined programme theories mapped according to Pawson's 4 I's

The following section presents each refined programme theory, beginning with the phase 1 IRPTs which led to the formation of the final refined theories. See Chapter 5.4 for detailed description of each phase 1 IRPT.

7.3.1 Programme theory 1: Co-located environments that are salutogenically designed help promote PA

Phase 1 IRPTs

- Increases convenience
- Increases awareness of PA opportunities
- Improved patient experience
- Improved staff experience

Refined Programme Theory 1: Co-located environments that are salutogenically designed help promote PA				
IF there is co-location of health and leisure environment and health-supportive architecture THEN there will be promotion of PA BECAUSE patients and HCPs will have a sense of coherence between their health and the resources available for PA				
	Sub-theory			
Refined Programme Theories	Convenience	IF there is a colocated health and leisure environment a single point of access and patients are prepared for physical activity	THEN this allows for the ready promotion of PA	BECAUSE colocation creates an accessible, seamless boundary between health and leisure
	Awareness	IF there is a colocated health and leisure environment with visible opportunities for PA for patients and HCPs	THEN patients are more likely to participate in PA and HCPs are more likely to promote PA	BECAUSE this creates salience of PA
	Patient and staff experience	IF there is a colocated health and leisure environment that includes psychosocially supportive design principles	THEN patients and HCPs will be more receptive to promotion of PA	BECAUSE the interaction between the individual and environment provokes positive emotion which creates a sense of agency to encourage patients and HCPs promote or engage in PA
	Sense of coherence	IF there is a colocated health and leisure environment with health promotive design	THEN patients are more likely to participate in PA and HCPs are more likely to promote PA	BECAUSE the environment provides patients with generalised resistance resources (GRR) to manage their health condition. This can foster a sense of

				coherence (SOC) in the minds of patients

This theory was strongly supported through evidence gathered from the realist review, NCSEM stakeholder interviews, MRT and HCP/patient interview data. This theory suggests that if the co-located environment is salutogenic (See Chapter 5.2.2 for a detailed explanation of Salutogenesis), this can lead to promotion of PA, in contrast to non-colocated settings and co-located settings that do not contain elements of health-supportive architecture (Golembiewski, 2016a; Mittelmark et al., 2016; Schweitzer et al., 2004).

The findings suggest that the salutogenic environment may be generated through four different causal configurations which, independently, do not appear to be sufficient for the promotion of PA in a co-located environment but collectively may be sufficient for the promotion of PA.

The first of the necessary conditions is *convenience*. If a health and leisure environment is co-located with a health promotive design and a single point of access, this allows for increased convenience and increased awareness of PA in the minds of HCPs and patients because there are no boundaries between health and leisure. In practice this means that it can be easier for a patient to engage in PA opportunities following their appointment as they are conveniently located in the same building. It is also easier for HCPs to refer to PA opportunities in this environment as the HCP has awareness of PA opportunities offered onsite. The COM-B model was used to inform development of this theory and relates to *convenience*, as a co-located health and leisure environment provides capability and opportunity for the HCP to promote PA and for the patient to engage in PA.

The second of the necessary conditions is *awareness.* If there is a co-located health and leisure environment with visible opportunities for PA for patients and HCPs then patients are more likely to participate in PA and HCPs are more likely to promote PA because this creates salience of PA.

For example, whilst Concord is also co-located, this may create awareness of the leisure centre aspect of the building (in contrast to a traditional clinical setting which is not colocated) but there is limited visibility of PA opportunities because of the separate entrances and lack of seamless flow. Evidence from both patient and HCP interviews confirms the differences in visibility of PA opportunities between Graves and Concord (see Chapter 6 for further examples of supporting data from the interviews).

Having a seamless flow between the health and leisure (in Graves) aspects allows for greater awareness of PA opportunities because of the visibility of PA opportunities, intermingling and socialising due to shared spaces, open floor plans and seating arrangements makes it easier for socialising to occur, which contributes to the resources that this setting provides. In addition, co-locating clinics with a leisure centre may prepare the patient and HCPs to be more receptive to the message of PA because of the shared environment of the leisure centre.

The third of the necessary conditions is *patient and staff experience.* If there is a co-located health and leisure environment that includes psychosocially supportive design principles, then individuals will be more receptive to promotion of PA because the interaction between the individual and environment provokes positive emotion which creates a sense of agency to promote or engage in PA. Psychosocially supportive design principles include aspects like large windows with views of the outdoors and other spaces within the leisure centre (such

as the pool and fitness studios), artwork and quotations on the walls, accessible stairways and attractive colouring (Dilani, 2009; Tsekleves & Cooper, 2017).

The fourth of the necessary conditions for this theory is *sense of coherence.* If there is a colocated health and leisure environment, then this can foster a sense of coherence (SOC) in the minds of patients because the environment provides patients with generalised resistance resources (GRR) to manage their health condition and empower them to take charge of their health.

The biomedical, pathogenic or disease oriented model of health, focused on treating illness, is reflected in traditional hospital architecture and design, with sterile colours, closed corridors, few windows and centralised staff areas (Golembiewski, 2016a). In contrast, a salutogenically designed environment, as attempted in the design of Graves, has been shown to improve patient and HCP experience by enabling patients with a SOC. Coherence is comprised of GRR (See 5.5.3), which are resources which enhance comprehensibility, meaningfulness and manageability (Golembiewski, 2016a). A focus on the sense of coherence and resources, creates a framework that can be applied to healthcare facility design (Golembiewski, 2016a). Design supportive of a SOC can help to free the resources that enable prevention of disease in the first place (Golembiewski, 2016a). Aspects of Graves such as a prominently located, attractive staircase which encourages PA use, the leisure centre, pool and attractively designed clinical seating area provide patients with "resources" to self-manage their condition, thus fostering a SOC. If a patient has a strong SOC, they will believe that challenges are understandable (comprehensibility), believes that they have the necessary resources to cope (manageability), and find purpose in coping (meaningfulness) (Antonovsky, 1979; Dilani, 2009; Tsekleves & Cooper, 2017).

The constructs of the COM-B model which relate to a *sense of coherence* include capability and opportunity. The capability and opportunity constructs of the COM-B model relate specifically to the GRR that the co-located model provides to patients and HCPs. For example, the patient would gain knowledge around ways to become physically active by meeting with their HCP at a co-located site (capability) and opportunities to become active in the same place where they attended their appointment (opportunity). If the patient is motivated, which can be elicited from interactions with the HCP, then this can result in the behaviour of becoming physically active.

7.3.2 Programme theory 2: Co-located environments that enable joint working between HCPs and exercise professionals help to promote PA

Phase 1 IRPTs

- Coordination and collaboration of health and exercise professionals (structural)
- Knowledge transfer and shared learning to promote PA

Programme theory 2: Co-located environments can enable joint working between HCPs and exercise professionals to help to promote PA				
IF there is co-location that is supported by processes, systems and collaborative culture that facilitate joint working THEN there will be promotion of PA BECAUSE HCPs have better interpersonal relationships with exercise professionals and knowledge of each other's roles				
	Sub-theory			
Refined Programme Theories	Time and effort	IF HCPs and exercise professionals are working in the same environment AND time is allocated to the development of relationships	THEN HCPs and exercise professionals are more likely to collaborate and share knowledge	BECAUSE there is a mutual understanding of each other's roles, professional respect and trust, and a willingness to work together and promote PA

	Shared IT systems	IF HCPs and exercise professionals are working in the same environment and there are shared IT systems between healthcare and leisure	THEN HCPs and exercise professionals are more likely to collaborate and share knowledge, (particularly about patients' PA levels) resulting in promotion of PA	BECAUSE there is capability to share information between healthcare and leisure
	Shared aims and goals	IF clinics HCPs and exercise professionals are working in the same environment AND there are shared aims and goals (such as enabling patients to become physically active) between HCPs and exercise professionals	THEN there will be a coordinated and collaborative approach to PA promotion	BECAUSE HCPs and exercise professionals see themselves as working together for a common purpose

This theory was strongly supported though evidence from the literature and stakeholder interviews which suggested that co-location would facilitate joint working (professionals knowledge transfer and shared learning AND coordination and collaboration). Although evidence from the realist review suggested that "co-location of facilities, joint appointments, trust and interpersonal relationships were seen important for tacit knowledge exchange" (Sinclair, 2017; P. M. Williams, 2012b), there was weak support from HCP interview data that supported physical co-location of healthcare and leisure as

sufficient for joint working to occur. This programme theory details conditions which collectively may be sufficient for joint working to occur in a co-located setting, but there is weak support from the HCP interview data which shows that this is currently happening in practice. There is, however, no disconfirmatory evidence for the theory postulated above. This theory cannot be discounted as the conditions were not right to support the mechanisms leading to the outcomes as detailed above.

In addition, participants gave similar responses to the Phase 1 IRPTs: *coordination and collaboration of health and exercise professionals (structural)* AND *knowledge transfer and shared learning to promote PA* in both the NCSEM and HCP interviews, even though they were understood to be separate conceptualisations in the mind of the researcher. Supported by evidence from the stakeholder and HCP interviews, the Phase 1 IRPTs: *coordination and collaboration of health and exercise professionals (structural)* AND *knowledge transfer and shared learning to promote PA* have been synthesised in the final refined programme theory presentation and shall be referred to collectively as *joint working*.

The conditions identified in the sub-theories above are seen as collectively sufficient for the co-location of healthcare and leisure to result in joint working to enable PA promotion. These conditions are further elaborated below.

The first of these necessary conditions is *time and effort.* If HCPs and exercise professionals are working in the same environment AND time is allocated to the development of relationships then HCPs and exercise professionals are more likely to collaborate and share knowledge because there is a mutual understanding of each other's roles, professional respect and trust, and a willingness to work together and promote PA. It is necessary for

time and effort to be invested in creating relationships between sectors. Whilst attempts have been made to coordinate meetings between HCPs and exercise professionals at the colocated sites to enable networking, familiarisation and sharing of best practice, these were not well attended (See Chapter 4 for data from the NCSEM interviews and Chapter 6 for HCP interview data), therefore attendance may need to be mandated by senior management and/or alternative methods may need to be used.

The second of these conditions is *shared IT systems.* If HCPs and exercise professionals are working in the same environment and there are shared IT systems between healthcare and leisure then HCPs and exercise professionals are more likely to collaborate and share knowledge, (particularly about patients' PA levels) resulting in promotion of PA because there is capability to share information between healthcare and leisure. Lack of shared IT systems between healthcare and leisure was reported as a barrier (Leemrijse et al., 2015; Leenaars et al., 2015) based on data from the realist review and NCSEM stakeholder interview data. Additionally, HCPs reported that issues with the current healthcare reporting system prevented consistent tracking of a patients reported PA behaviour. Thus, having shared IT systems between health and leisure is seen as a necessary condition which must be satisfied.

The third condition which must be satisfied in order for co-location to facilitate joint working to result in PA promotion is having *shared aims and goals* between healthcare and leisure. If clinics HCPs and exercise professionals are working in the same environment AND there are shared aims and goals (such as enabling patients to become physically active) between HCPs and exercise professionals, THEN a coordinated and collaborative approach to PA promotion is more likely to occur BECAUSE HCPs and exercise professionals see themselves as working

together for a common purpose. This must include establishing and agreeing shared aims and goals for patient outcomes, between HCPs and exercise professionals (at the cultural level) and establishing coordinated working patterns. Without this shared sense of purpose and a co-ordinated approach to service delivery, data here suggests that the benefits of co-location will not be realised due to existing time pressures, competing priorities between health and exercise specialities and hierarchical structures within the healthcare system.

The COM-B model was used to inform the development of this theory. Co-location of health and leisure provides capability for HCPs and exercise professionals to work together in the same environment to share knowledge, coordinate and collaborate. Capability together with opportunities such as shared time and effort, IT systems, aims and goals should result in motivation for HCPs and exercise professionals to work together to promote PA. Automatic motivation of HCPs occurs through modelling of knowledge transfer and shared learning between HCPs and exercise professionals that are consistently making referrals and having conversations about PA.

Whilst the physical context created within the NCSEM sites in Sheffield has created the potential for different ways of working – such as shared spaces for HCPs, exercise professionals, patients and researchers (Copeland, R., Hart, O., 2015; Speake et al., 2016), more needs to be made of the opportunity afforded through the co-location model overcome existing system challenges.

7.3.3 Programme theory 3: People like me (normalising & modelling) of PA in a colocated environment

Phase 1 IRPTs

- People like me (Normalising and modelling)

Programme theory 3: People like me: normalising and modelling of PA in co-located environment				
IF there is co-location of health and leisure environment and the patient observes people like themselves participating in PA THEN there will be promotion of PA BECAUSE patients change their views on social norms for PA				
	Sub theory			
Refined Programme Theories	Exposure and observation to PA	IF healthcare clinics and PA facilities are colocated, and the patient is exposed to and observes people that they can identify/relate	THEN patients will be more receptive to the promotion of PA	BECAUSE they see others "like them" participating in PA modelling the behaviour that is being promoted
	Internalisation of observations of PA	IF healthcare clinics and PA facilities are colocated and the patient internalises observations of others participating in PA	THEN patients will be more likely to view PA as normal and be more willing to participate in PA themselves	BECAUSE they change their mindset about what is the social norm for PA

There was strong support from findings from the realist review, data from the NCSEM stakeholder interviews, and interviews with patients and HCPs for programme theory 3. In the initial iteration of the theory, it consisted of two separate theories: normalising and modelling. It became evident from data from the NCSEM interviews that these theories were seen as the same concepts in the minds of the participants, although the researcher conceptualised them as being different. Data from the realist review and stakeholder

interviews suggested that co-locating health and leisure that this could normalise PA in the minds of patients (Leotta et al., 2011).

The findings suggest that normalising and modelling of PA may be generated through two causal configurations, which in isolation, do not appear to be sufficient for PA promotion in a co-located environment but together may be sufficient.

The first condition is *exposure and observation to PA*. If healthcare clinics and PA facilities are co-located, and the patient is exposed to and observes people that they can identify/relate, then patients will be more likely to view PA as normal because they see others "like them" participating in PA and therefore modelling the behaviour. For colocation of health and leisure to work effectively to normalise and model PA for patients, the patient must be able to see others being active that they resonate with. In Graves, the pool and leisure centre area are visible when entering the clinic for an appointment, yet in Concord the gym/leisure centre entrance is separate from the clinical area. Seeing others 'like them' being physically active (modelling PA behaviour) may increase the chance that the patient will become physically active themselves (Leotta et al., 2011). Data from the realist review and stakeholder interviews indicated that the co-located health and leisure environment would provide an opportunity for patients to see others (patients, HCPs and leisure centre customers) being active that may not otherwise enter a leisure facility.

The second of the conditions which must be met in order for co-location to result in normalising and modelling of PA is *internalisation of observations of PA*. IF healthcare clinics and PA facilities are co-located and the patient internalises observations of others participating in PA then patients will be more likely to view PA as normal and be more

willing to participate in PA themselves because they see others "like them" participating in PA and therefore normalising modelling the behaviour. It was initially posited that the "model" for a patient may be either another patient or HCP, but data from the patient/HCP interviews (Chapter 6) showed that HCPs interviewed may not use the co-located leisure centre for their own personal PA and patients might not see them being active or look to them as a "model" of PA behaviour. Whilst the potential "model" may be different for each patient based on their individual psychology, patients interviewed appeared to see other patients perhaps further along their physical activity journey, but not too dissimilar from themselves as more relatable (than other HCPs being physically active).

MRT used to inform the development of this theory include the construct of *social norms* from TPB (See Chapter 5.2.4 for further explanation of TPB). Co-location of health and leisure may change social norms around PA making it acceptable to participate in PA in the minds of patients. In addition, patients may be more likely to observe other patients that they relate to participating in PA in the co-located environment.

Whilst both centres are co-located health and leisure settings, it is important to consider the physical differences in the layout of the building and the role that this can play in normalising and modelling of PA. Data here suggests that for models of co-location to be effective at normalising and modelling PA, the physical layout of the building must be taken into consideration so that patients have an opportunity to observe others "like them" participating in PA.

7.3.4 Programme theory 4: Patients with long term conditions are supported to participate in PA in a co-located environment

Phase 1 IRPTs

- Long term conditions

Programme theory 4: Patients with long term conditions are supported to participate in PA in a co-located environment

IF patients with long term conditions attend a co-located clinic, THEN there will promotion of PA BECAUSE patients feel safer, and HCPs feel more confident to refer to PA				
	Sub-theory			
Refined Programme Theories	Patient perception of safety in colocated environment	IF patients with long term conditions attend an appointment at a co-located clinic and they know that HCPs are working in same facility and may be available to help if needed	THEN patients may be more receptive to PA promotion	BECAUSE patients feel safer to undertake PA
	HCP confidence in making referrals	IF HCPs working in a co-located clinic and as a result, have they have greater awareness of the equipment and special adaptations offered for certain long term conditions	THEN HCPs will be more likely to promote PA	BECAUSE they have greater confidence in patient safety and support
	HCP awareness of exercise professionals' knowledge and skills	IF the HCPs working in a colocated clinic and as a result, are more aware of exercise professionals' skills and knowledge in relation to long term conditions	THEN they may be more likely to make to promote PA	BECAUSE they feel safer putting the patient in the exercise professionals care and are not worried that the exercise professional would cause harm

There was strong evidence from the realist review, NCSEM stakeholder interviews and interviews with patients and HCPs to suggest that patients with long term conditions will feel safer participating in PA in a co-located environment in contrast to a leisure centre which is not co-located (Leemrijse et al., 2015; McIntosh et al., 2017). Evidence that HCPs may feel safer referring patients to PA in a co-located healthcare and leisure setting was also supported by the review, NCSEM stakeholder interviews and interviews with HCPs. Evidence from the HCP interviews suggested that HCPs would be more likely to refer patients to PA with long term conditions in a co-located setting if they are aware of the knowledge, skills and abilities of the exercise professional(s) receiving the referral and feel that they would not harm their patient or their own reputation (as they would feel personally liable should something go wrong) by making a referral to PA).

The conditions identified in the sub-theories above may be collectively sufficient for the colocation of healthcare and leisure to result in patients with long term conditions feeling safer and HCPs may be more likely to refer to PA in a co-located environment.

The first of these conditions is *patient perception of safety in co-located environment*. If patients with long term conditions attend an appointment at a co-located clinic, then this may help patients feel safer to participate in PA because they are reassured when HCPs are working in same facility and may be available to help if needed. Data from the patient interviews suggested that patients feel safer participating in PA in co-located environment because they were aware that HCPs were simply working in the same facility, in contrast to a leisure centre that is not co-located. For example, one patient explained that she felt safer participating in PA in Graves because exercise professionals were knowledgeable about type

1 diabetes and were skilled in helping her if she had any complications, (and the necessary help was available if she had a hypoglycaemic episode), which may not be the case in an isolated leisure centre.

The second of these conditions is *HCP confidence in making referrals*. If patients have long term conditions, then HCPs may be more confident to refer patients to PA because they have greater awareness of the equipment and special adaptations offered in the co-located environment. Data from the HCP interviews suggested that HCPs may feel more confident in referring a patient to PA in a co-located environment because they have awareness of the equipment and its suitability for their patient as well as any adaptations available in the facility because they are already working in the same environment.

A HCP said that she felt safer referring patients with long term conditions to PA in a colocated environment because knew that exercise professionals in the co-located facilities would check patients' blood pressure and refer the patient back to their GP if necessary.

The third condition is HCP *awareness of exercise professionals' knowledge and skills*. If the HCPs are aware of exercise professionals' skills and knowledge, then they may be more likely to make referrals to PA, because they feel safer putting the patient in the exercise professionals care and are not worried that the exercise professional would cause harm in a co-located environment. Finally, data from the several HCP interviews showed that HCPs are more likely to refer to PA if they have knowledge of an exercise professionals' capabilities, trust them and feel safe referring a patient to PA. In the co-located environment, a HCP is more likely to have knowledge of the exercise professionals capabilities if they are working in the same environment together and make time to do so.

The MRT, salutogenesis, (See Chapter 5.2.2 for a detailed explanation of salutogenesis) was used to inform the development of this theory. The co-located health and leisure environment may provide patients with resources (GRR) (physical, social and psychological) (leisure centre offerings) as a means of helping patients develop a sense of agency and coherence (SOC) in the management of their condition.

COM-B was also used to inform the development of this theory. HCPs working in the colocated environment with exercise professionals have the opportunity to gain information about the exercise professionals' skills and knowledge and awareness equipment and special adaptations offered for certain long term conditions (psychological capability). Capability and opportunity may result in enhanced motivation, with the potential to result in greater promotion of PA by HCPs for patients with LTCs.

This PhD research shows that patients in a co-located setting might feel safer participating in PA than in an isolated gym. Thus, co-location has potential to address the growing burden of NCDs by helping patients through support from their HCP to begin a PA habit and feel safer in becoming physically active, as an alternative to visiting primary care. Whilst physical colocation of the buildings are important, it is essential that time and effort is taken for the HCPs and exercise professionals working in co-located centres to take time to understand each other's knowledge, skills and abilities so that HCPs feel confident to refer patients to exercise professionals working in the sites in the first place.

7.3.5 Programme theory 5: Misaligned business models of NHS and leisure centre which constrain full co-location to promote PA

Phase 1 IRPTs

- Inconsistency of clinical schedule

Programme theory 5: Misaligned business models of NHS and leisure centre which constrain full co-location to promote PA
IF business models not aligned between organisations that are co-located THEN colocation will not work to promote PA because of incompatible in organisational objectives, processes governance and performance metrics which influence staff behaviours and goals

	Sub-theory			
Refined Programme Theories	Inconsistency of clinical location and HCP seen	IF there is inconsistency of the clinical schedule, meaning patients might not have appointments at co-located facility every time, due to contextual factors such as NHS structure, professional working patterns	THEN co-location might not work as intended to increase PA promotion	BECAUSE the opportunities that co-location provides are not consistently available or reinforced at successive appointments
	Consistency of clinical location and HCP seen	IF there is consistency of the clinical schedule, meaning that the patient sees the same HCP at the same co-located site for every appointment	THEN this might help co-location to work as intended to facilitate PA promotion	BECAUSE Consistency of the clinical schedule, means that the patient sees the same HCP at the same site for every appointment might facilitate development of a therapeutic alliance between the HCP and patient

	Misaligned business models	IF there are misaligned business models between the leisure centre and NHS clinics	THEN this can hinder the potential for colocation to effectively work to result in PA promotion	BECAUSE financial priorities are not shared and there is not a mutual understanding of the priorities and processes that are essential for facilitation of PA promotion
	Aligned business models	IF business models are aligned between the leisure centre and NHS	THEN this would facilitate colocation to allow for PA promotion	BECAUSE there is a mutual understanding of the priorities and processes that are
				essential for facilitation of PA promotion

There was supportive evidence from the realist review which suggested that inconsistency of the clinical schedule might present a barrier to co-location of health and leisure integrated effectively to promote PA consistently (McIntosh et al., 2017). It was inferred from realist review data, that inconsistency of the clinical schedule could mean that patients would have appointments at different sites and/or with different HCPs depending upon NHS appointment availability, the needs or schedule of the HCPs, not based on the needs of the patients. It was inferred that this could mean that it would be more challenging for the patient and HCP to develop a therapeutic alliance and for the patient to build a PA habit.

After iteration between the literature from the realist review and the data from the HCP and patient interviews, it was postulated that *misaligned business* models was a more appropriate term. HCPs and patients suggested that appointments may not always be based around the most convenient timing and location for the patient. Crucially, data from the

interviews revealed that clinical appointments do not coincide with PA opportunities (such as fitness classes, groups and ERS). If priorities and business models were aligned between the leisure centre and NHS, this would enable a seamless flow between clinical appointment and PA opportunities in the leisure centres, enabling patients to be referred immediately into PA opportunities following their appointment.

The conditions identified in the sub-theories explain how misaligned business models and inconsistency of the clinical schedule can impair co-location of healthcare and leisure of resulting in PA promotion; these conditions are detailed below. It is necessary for both *consistency of the clinical schedule* and *alignment of business models* for co-location to result in PA promotion. (The conditions which hinder PA promotion in a co-located environment are written in this theory as the misalignment as this what is currently posited to be happening). Although these theories in their aligned/consistent iteration are not evidenced from the interviews conducted in this PhD, there is no disconfirmatory evidence to show that these conditions, would not result in PA promotion if implemented.

The first of these conditions is *inconsistency/consistency of clinical location and HCP seen.* If there is inconsistency of the clinical schedule, meaning patients might not have appointments at co-located facility every time, due to contextual factors such as NHS structure, professional working patterns (i.e., set around the HCP's working pattern and not the patients), patient choice (convenience of clinic location and appointment availability) then co-location might not work as Intended to increase PA promotion because the opportunities that co-location provides are not consistently available or reinforced at successive appointments. NCSEM stakeholder interviews confirmed this hypothesis, however there was evidence both for and against this hypothesis from the realist interviews

with HCPs. Several HCPs suggested that as much as possible, appointments are scheduled with the same HCP at the same location, *but* sometimes a patient will choose an appointment that is available soonest, meaning they would travel to a different site and/or see a different HCP.

If there is *consistency of the clinical schedule*, meaning that the patient sees the same HCP at the same co-located site for every appointment, then this might help co-location to work as intended to facilitate PA promotion because consistency of the clinical schedule, meaning that the patient sees the same HCP at the same site for every appointment might facilitate development of a therapeutic alliance between the HCP and patient. A strong therapeutic alliance or established rapport between the HCP and patient may make it more likely that conversations about PA occur. NHS business models that are shared with the leisure sector would allow for prioritisation of a PA, prevention-oriented approach.

The second of the conditions identified in the sub-theories above *is misaligned/aligned business models*. If there are misaligned business models between the leisure centre and NHS clinics, then this can hinder the potential for co-location to effectively work to result in PA promotion BECAUSE financial priorities are not shared. If business models are aligned between the leisure centre and NHS, then this would allow for more consistency of appointments and seamless flow between clinical appointments and PA opportunities in the leisure centres because there is a mutual understanding of the priorities and processes that are essential for facilitation of PA promotion.

The MRT COM-B was used to inform the development of this theory. If business models are aligned and there is consistency of the clinical schedule between health and leisure, then this could provide capability for HCPs to promote PA to patients and for patients to have

consistent exposure to PA opportunities. Providing capability together with opportunity should enhance motivation of HCPs to promote PA to patients and patients to participate in PA.

In the current healthcare system context of the UK, with increasing pressures facing the NHS (financial constraints, COVID-19 backlog, staffing shortages (The King's Fund, 2021)), it may be challenging on a systems level to align business models of healthcare and leisure industries, which have different revenue streams. However, for co-located healthcare and leisure to effectively work to facilitate PA promotion, interview data from this PhD suggests that there needs to be greater alignment between the healthcare and leisure business models.

7.3 Additional contingent conditions

The following presents data from the patient and HCP interviews which details additional contingent conditions for the co-location of healthcare and leisure to work to promote PA with evidence from HCP and patient interviews.

Co-location works best for HCPs that are active themselves and seek congruence in their personal beliefs about PA and meaning their work with patients. HCPs that are already active themselves find it easier to promote PA in a co-located environment.

> HCP 9 (Podiatry, Concord):
>
> *"I think it works better for people, it works better for people who value their own fitness and it's important to them as a clinician. And it's easier for us to deliver the advice if you're practising what you preach. So, I think it's harder for somebody else who isn't really active themselves."*

HCPs who are innovative and willing to change practice appear to work best in a co-located environment.

HCP 8 (Pain Management, Concord):

"I think first thing is you're talking to someone who loves change. I like change. I get bored otherwise. So, I like doing things differently. I like working, genuinely working with other team members. You know, I learn from them and I'm sure they learn from me, so it's good. And I've a belief that working closely with other people, with other practitioners and therapists will result in a better product for the patient, a better treatment offer. Now it doesn't necessarily mean we're going to make these patients better because they have to do the work."

Co-location works best for patients that are pre-contemplating or contemplating becoming physically active but need some support and advice to feel safe to participate without exacerbating their health condition and choose to attend a co-located site for their clinical appointment.

HCP 6 (Physiotherapy, Graves & Concord):

"It's the guys in the middle who I think it's most valuable for. It's the ones that we can move patients to here, to normalise activity. I think it's the patients for whom we need to be able to show them the walking tennis or the paying public that are choosing to be here. It's the people who we can hand hold to the desk to pass over to the health trainers to book an appointment. It's the people who just need the motivation or the permission that it's OK and that they'll be cared for whilst they're exercising, that I think benefit most from being in a venue like this."

Co-location of healthcare and leisure works best for HCPs under circumstances where HCP values and is motivated to discuss PA AND/OR there is continuity of care, external enforcement or accountability for discussions and referrals to PA.

HCP 9:

"…the big problem because actually everything I've said is kind of a pipe dream. Because actually the reality is when I say goodbye to that patient after my 30 minutes, I know they're going to a community clinic where the podiatrist is under pressure, they're getting 20 minutes. There's nothing on the screen for that podiatrist to know to follow up activity levels. And I know my colleagues won't do that. It's just because I'm motivated that way and I work at Concord [so]I do it."

Co-location of healthcare and leisure works for patients under the circumstances when patients that are committed to travelling OR they live (subjectively) near to the co-located site.

Patient 7:

"it's located where you want it to be located, and again it's all about location. It's not going to work for most people to have to go back to Graves to do their exercise, because it's in one particular area of Sheffield that is not city centre at all. And you need a car really to get there. Unless you live in the community, and you can walk there."

According to the data from this PhD, co-location of healthcare and leisure appears to work best for PA promotion for patients that are already motivated to become active but need support, patients with long term conditions, and those that live subjectively near to a

colocated healthcare and leisure site. Co-location works best for patients that have a chance to observe other patients “like them” or HCPs that they can aspire to, being physically active, which is more likely to happen in Graves, where patients have the opportunity to walk past the leisure centre as they enter the clinical area.

Co-location of healthcare and leisure also appears to work best for HCPs that are physically active themselves, champions of PA, and/or willing to embrace change and more holistic approaches to patient care.

7.4 Chapter conclusion

This chapter presented the final refined programme theories, addressing the question of *what works (or not), for whom under what circumstances and why* for the co-location of healthcare and leisure to promote PA. These five theories were developed over two phases of research. Phase 1 included a realist review, purposive search for MRT and interviews with NCSEM stakeholders from the health, leisure and PA sectors. This phase ended with nine theories. Phase two consisted of interviews with HCPs and patients to test and refine the IRPTs, resulting in five refined programme theories.

These five refined theories explain the elements of how co-location of health is working (or not) to promote PA. These five theories are: (1) Co-located environments that are salutogenically designed help promote PA, (2) Co-located environments can enable joint working between HCPs and exercise professionals to help to promote PA, (3) People like me: normalising and modelling of PA in co-located environment, (4) Patients with long term conditions are supported to participate in PA in a co-located environment and (5) Misaligned business models of NHS and leisure centre which constrain full co-location to

promote PA. Whilst physical co-location of healthcare and leisure is important, these five theories, developed from the realist review, MRT and interviews with stakeholders, HCPs and patients, explain the elements needed for co-location to facilitate PA promotion.

With the growing burden of NCDs, challenges faced by the NHS and previously unsuccessful attempts at long term PA behaviour change, alternative approaches to PA promotion are warranted. Co-location of leisure and healthcare holds potential to normalise PA, help patients to develop a PA habit, manage their chronic conditions and create a salutogenic model of healthcare. However, this potential can only be realised when business models are aligned between healthcare and leisure *and* when HCPs and exercise professionals work together to allow for knowledge transfer and shared learning to occur. In the context of the NHS which is currently based on a biomedical model, co-location of healthcare and leisure faces additional challenges in the effective promotion of PA. These theories serve as a framework for planners, service commissioners, architects, healthcare and exercise professionals to use in development and implementation of co-located healthcare and leisure. They are seen as essential elements for effective facilitation of PA promotion in the co-located healthcare and leisure setting.

Chapter 8. Conclusion

This chapter presents a discussion of the findings presented in the previous chapter and draws conclusions about the research. This chapter revisits the literature, presents contributions to knowledge, strengths, limitations and the recommendations for future research. Finally, the implications of the results for the wider field of health, PA and exercise research and the effects of COVID-19 pandemic on the co-location of health and leisure are discussed.

8.1 Discussion

The primary aim of this research was to develop refined programme theories to help explain the key contexts and mechanisms of why, how, for whom and under what circumstances the co-location of health clinics and leisure opportunities is expected to work (or not) to promote PA. Co-location in this research is defined as community healthcare clinics and leisure integrated or joined in a shared physical location. In Sheffield, these sites were formed as part of the National Centre for Sport and Exercise Medicine (NCSEM) which legacy programme of 2012 London Olympics.

To address the primary aim of this research, a realist approach was followed over two phases of research. In the first phase, IRPTs were developed from a rapid realist review of a wide body of academic and grey literature (chapter 3) *and* MRT (chapter 5) and interviews with NCSEM stakeholders who were instrumental in the development of the co-located healthcare and leisure sites in Sheffield (chapter 4). In phase 2, these theories were tested with HCPs and patients who had experience of the co-located sites (chapter 6) and subsequently refined (chapter 7). These refined theories provide a portrait of how

colocation is working (or not) to promote PA and thus can serve as a framework for other healthcare and leisure co-location models.

The following theories are evidence based although they are partial, fallible and subject to refinement from further testing.

8.1.2 Programme theory 1: Co-located environments that are salutogenically designed help promote PA

This PhD research found that a salutogenic co-located environment improves patient & HCP experience, provides support, increases convenience & awareness of PA. The co-located health and leisure environment increases convenience and awareness of PA opportunities for HCPs and patients because co-location creates a single point of access and seamless boundaries between health and leisure. In addition, co-location of health and leisure facilitates promotion of PA amongst staff already motivated to discuss PA and engagement for patients ready to engage in PA. This is in part driven by the salutogenically designed environment, which makes PA visible, proximal and accessible for patients and staff as compared to the traditional clinical and hospital environments. In the co-located health and leisure environment, this can foster a sense of coherence (SOC) in the minds of patients because the environment provides patients with greater generalised resistance resources to manage their health. (See Chapter 5.2.2 for a detailed explanation of salutogenesis).

Whilst there is currently no existing published evidence (at the time of writing this thesis) on the use of salutogenesis as a lens to study co-location of healthcare and leisure, research on salutogenic approaches to healthcare has been applied to architecture, particularly in the field of healthcare. Evidence from this body of literature points to the value of salutogenesis in providing a basic theoretical understanding of psychosocially supportive design (Dilani,

2005, 2009; Ghaffari et al., 2021; Golembiewski, 2016a; Mittelmark et al., 2016), suggesting that salutogenic architecture has the capability to enhance patients SOC. Furthermore, research shows that architecture can provide a narrative context which affects behaviour and can directly influence an individual's health (Golembiewski, 2016b). These ideas were substantiated through this PhD research.

Salutogenesis has also been recently examined in relation to PA promotion. Existing research on salutogenesis and PA in older adults found that adults with a higher SOC are more likely to value PA (Ericson et al., 2021). Research in adolescent populations found that interventions which aimed to increase SOC resulted in meaningful increases in PA frequency (Bronikowski, 2010; Jakobsson, 2014). This literature adds explanatory power as to how the opportunities provided for PA in the co-located setting could enhance a patient's SOC. Findings from this PhD research suggest that patients and HCPs generally report the colocated environment to be more positive than the traditional clinical setting. Moreover, this setting could provide resources for patients to manage and develop a sense of ownership over their health.

The research from this PhD contributes new evidence and theory that suggest that the colocated environment is salutogenic, or health promotive, in contrast to the traditional isolated clinical setting. This theory provides an explanation of the underlying causal mechanisms of the impact of the physical co-location on the PA behaviour and psychology of the patient. Evidence gathered here suggests that both the *design* of the co-located setting and the *care* delivered within may be salutogenic if HCPs promote the opportunities available in the co-located settings and patients are able to utilise these resources. The novelty of this PhD research is the developed theory and evidence to explain how

salutogenesis can be enhanced through co-location of healthcare and leisure, in terms of both the healthcare delivered in the location *and* the health promoting architecture of the building. The novelty of this PhD research is the developed theory and evidence to explain how salutogenesis can be enhanced through co-location of healthcare and leisure, in terms of both the healthcare delivered in the location *and* the health promoting architecture of the building.

8.1.3 Programme theory 2: Co-located environments can enable joint working between HCPs and exercise professionals to help to promote PA

This PhD research found that that co-located environments can facilitate joint working between and within professions, but this relied heavily on individual motivation and behaviour and was therefore not widespread. Additionally, this PhD research demonstrated that a collaborative culture is essential for learning and knowledge exchange to occur between professions. This culture can be curated through joint appointments, communication that builds trust and prioritising time to build interpersonal relationships between professions, which have all been noted elsewhere (P. Williams, 2012). To drive changes across professional groups and fully realise the potential of co-location, organisational and systems level changes (e.g., different working pattens, aligned business models and shared aims/goals), are required.

The importance of spatial (geographical) proximity and organisational and technological proximity (meaning organisational business models and IT systems are also shared) in driving collaboration also appears key to making the most of co-location, has been identified previously (Knoben & Oerlemans, 2006). Studies suggest that spatial proximity can engender greater quality and quantity in communication (Kousgaard et al., 2019) and support cross-

disciplinary collaboration (Salazar Miranda & Claudel, 2021). Salazar and colleagues (2021) found that buildings that hosted researchers working in similar fields from multiple departments can increase the potential to collaborate, but the benefits of this (shared publications and bid submissions) without additional processes in place to bring people together.

A case study examining collaboration of HCPs at a multidisciplinary health centre in Denmark also found that co-location alone did not result in cross-sectoral collaboration due to different working patterns, professional identities, misaligned economic incentives and disjointed management (Kousgaard et al., 2019; Scheele & Vrangbæk, 2016).

Research demonstrates that co-location of HCPs can provide opportunities for coordination and collaboration in the healthcare setting (Bonciani et al., 2017, 2018) but there is mixed evidence on co-location leading to integration of HCPs from different disciplines (Jesson & Wilson, 2003; Maslin-Prothero & Bennion, 2010; Memon & Kinder, 2017). Co-location can serve as a catalyst for service innovation and shared learning (Memon & Kinder, 2017) but a lack of understanding of HCPs roles, mismatch in cultures, identities and status inequalities often inhibit joint working in a co-located setting (Jesson & Wilson, 2003; Maslin-Prothero & Bennion, 2010; Wistow & Waddington, 2006).

Recent realist research on implementation of behaviour change practices in ERS found perceived shared effort across professions to be essential to successful outcomes (Downey et al., 2021). These findings were supported by the PhD research as there appeared to be a lack of *shared* effort in terms of PA promotion *between* HCPs and exercise professionals in the co-located sites.

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This research contributes to our current understanding of knowledge transfer/shared learning and coordination and collaboration between HCPs from different disciplines and between HCPs and exercise professionals. Findings demonstrate that across a range of settings and actors involved, physical co-location in isolation may enhance, but does not appear to result in joint working without the support of other factors. Co-location appears to enable joint working for HCPs that are active themselves, care about promoting PA to patients, make time to build relationship with other HCPs and exercise professionals and are innovative. The mixed effectiveness of co-location observed here in terms of driving joint ways of working amongst different disciplines, warrants further investigation.

8.1.4 Programme theory 3: People like me: normalising and modelling of PA in co-located environment

This PhD research found that co-location of healthcare and leisure can help to normalise PA behaviour because patients see others "like themselves" participating in PA in this environment (Leotta et al., 2011; Silva et al., 2013; Ukactive, 2018). This type of 'modelling' behaviour does not occur in traditional clinical settings. Existing research shows that when an individual does not feel aligned to the cultural norms of a particular context, this can be a barrier to PA participation (Richardson et al., 2016). In the co-located setting, patients that might not ordinarily be exposed to the leisure centre environment (e.g., those with a long term health condition) are exposed to people being active when they attend their clinical appointment. When the patients sees others "like themselves" participating in PA, especially with a long term condition, this could empower them to believe that they can also participate in PA without exacerbating their condition(s) (Leotta et al., 2011; McIntosh et al., 2017). (The design of the co-located setting can have an impact on whether or not a patient

is exposed to others being physically active, particularly in Graves, where there are more visible opportunities to see others being physically active (in contrast to Concord)). Whilst this underlines the benefit of co-location, research here also identified that for some patients a commercial gym setting where they perceive everyone to be in much better physical condition than themselves, remains a barrier to PA engagement. Encouragingly, interview data from this PhD research suggests that if patients regularly attend a leisure centre in contrast to a clinical setting for their appointment, they begin to normalise going to a leisure centre and will be more likely to consider PA as 'something for them'. This is a central benefit of the co-location model and draws on the power of social norms and modelling. Indeed, a wealth of empirical research suggests that human behaviour is influenced through observation of another modelling a given behaviour (Ball et al., 2010; Bettenhausen & Murnighan, 1985); for a model to be effective in helping an individual to change behaviour, the individual must observe, relate to and internalise the modelled behaviour (Bandura, 1986). Research on ERS shows that when patients exercise with other patients, this provides realistic role models and enhances self-efficacy (Moore et al., 2011).

This PhD adds to the theoretical insights on the constructs of normalising and modelling applied to PA behaviour. According to this PhD research, co-location facilitates normalisation of PA for patients who traditionally avoid commercial gyms because they do not see themselves in those contexts. Co-location achieves this by creating different social norms and utilising alternative models of PA behaviour that patients view as 'more like them'.

8.1.5 Programme theory 4: Patients with long term conditions are supported to participate in PA in a co-located environment

This PhD research found that co-location can help patients feel safer to participate in PA with a long term condition as they are reassured knowing that HCPs are working in same facility and may be available to help if needed. Additionally, HCPs feel more confident to make referrals to PA when working in a co-located setting as they have greater awareness of the equipment and special adaptations offered in the facility, especially when they have experience of using it themselves. Additionally, HCPs may feel more confident to refer patients to PA in this environment, *if* they are aware of the exercise professional's knowledge, skills and capability and feel safe referring their patient to the exercise professional.

Research demonstrates the potential for community leisure centres to play a key role in helping people with long term conditions to be physically active (Rennie et al., 2020; Sheill et al., 2021; Ukactive, 2018; Whitsel et al., 2021). Existing research on ERS and CR suggests that patients with fear of exercise report feeling safer when exercising with peers (who also have long term conditions) and with HCPs and exercise professionals (who are knowledgeable about long term conditions) working in the same facility that can offer help and support if needed (McIntosh et al., 2017; Moore et al., 2011; F. Morgan et al., 2016).

Research has also demonstrated that HCPs feel more comfortable referring patients to hospital based facilities and exercise professionals in comparison to community-based settings (Bantham, 2020). Research on integration of PA into primary and secondary care found that relationship building, and networking are essential to support the implementation and growth of referrals to exercise from HCPs (Rennie et al., 2020). Indeed,

limited knowledge of local exercise facilities and the competence of exercise professionals is a reason that GPs report for not making referrals to exercise (Leemrijse et al., 2015). Data from HCP interviews suggested that co-location may facilitate referral to PA for patients with long terms conditions, (partly through greater awareness of the leisure centre through the physical co-location) but is much more likely to occur if the HCP is aware of the exercise professionals' skills, knowledge and capabilities, particularly for fear of being medically liable should the patient become injured during a session. These findings that suggest HCPs want to feel that they can trust the exercise professional to safely work with their patient (Bantham, 2020; Henderson et al., 2017) are not new, but what this PhD research highlights is that simply co-locating healthcare and leisure is not enough to ameliorate these barriers.

Whilst a model of co-location enables opportunities for PA referral to occur more easily, translating this into actual increases in referral is still dependent on trust and relationship building between HCPs and exercise professionals. Co-location facilitates greater chance of this trust building because of proximity and increased familiarity over time, but depends on professionals engaging with formal and informal opportunities to develop mutual respect and share practice.

This theory adds to the body of research on understanding why co-location may support patients with long term conditions to become physically active through increased perceptions of safety afforded by HCPs working in the same location.

8.1.6 Programme theory 5: Misaligned business models of NHS and leisure centre which constrain full co-location to PA

This PhD research found that misaligned business models result in inconsistency of the clinical schedule, suggesting that patients might not have appointments at a co-located

facility every time. This is exacerbated by contextual factors such as NHS structure, professional working patterns and patient choice. These logistical challenges potentially undermine the value of 'social norms and modelling' through which co-location can promote to patients and also limits the number and frequency of conversations taking place about PA between patients and HCPs. The downstream impact of this is that HCPs make fewer patient referrals to PA, because the opportunities that co-location provides are not consistently available or reinforced at successive appointments.

When there is *consistency* of the clinical schedule, meaning that the patient sees the same HCP at the same co-located site for every appointment, this helps to increase PA discussions, patient PA intentions, patient visits to the gym and PA referrals. Aligning business models between NHS and leisure facilities would allow for synchronised appointment schedules so that patients can access services all in one visit, such as a fitness class immediately after their clinical appointment.

This research found the current business models of the NHS and leisure centre have incongruencies in their operating procedures, goals and business approach. Whilst both in theory, may aspire to improve health through PA, the different ways of working and different funding models do not facilitate healthcare and leisure to work effectively through co-location. Conversely, the business model of the leisure sector in the UK is oriented towards income generation through sales of memberships, services such as personal training, facility bookings and classes. According to a consultation report from ukactive, public sector leisure is seen to have a substantial social value, yet evidencing this social value was not a key part of funding contracts (ukactive, 2021). Moving away from the traditional contractual approach towards formal contracts with a partnership approach

would encourage development of shared goals and objectives to encourage trust and collaboration (ukactive, 2021).

Downey et al., (2021) also found that exercise professionals (qualified in both personal training and exercise referral) often see their role in personal training as incompatible with exercise referral; these roles appear to have competing priorities (Downey et al., 2021). The findings from this literature help to illuminate how aligned business models between health and leisure could support PA promotion in a co-located health and leisure environment.

This PhD research demonstrated that because there is different scheduling between clinical appointments and PA opportunities, this does not facilitate the *immediacy* construct potential which is a novel factor of the co-located healthcare and leisure centre environment (Sinclair, 2018). This theory is the first realist theory which attempts to explain how and why the different business models of healthcare and leisure prevent co-location from working effectively to promote PA.

8.2 Project strengths and limitations

This section presents a summary of the strengths and limitations of this research.

8.2.1 Strengths, limitations, and future directions

This is the first doctoral degree and research study (at time of publication) examining the colocation of health and leisure to promote PA, evidenced by the absence of literature on colocated health and leisure facilities identified within the realist review. The research question is complex in nature and the chosen methodology is a useful tool for evaluating complexity, as realist evaluation has the utility to examine how and under what circumstances an intervention is working, rather than only *if* it is working or not (Pawson et al., 2005a).

The realist nature of the literature search in phase 1 allowed for the examination of a wide variety of literature and documentation, from which evidence was extracted to develop initial programme theory themes. Beginning the stakeholder interviews (phase 1 realist evaluation) with initial theory themes developed from the literature helped to develop a structure based on levels of social strata (Pawson's 4 I's). Using Pawson's 4 I's helped to illuminate the contextual factors which interact with the mechanisms to result in outcomes. In addition, conducting an initial realist review helped to prevent finding what is 'already known' in the literature (Shearn et al., 2017).

A strength of this research is the incorporation of MRT which served to scaffold the theory themes developed from the review and phase 1 evaluation, to help prevent again, 'finding what already exists' in the literature, and to provide further explanation to the theories. The inclusion of patients in the development of this research is also a strength. For example, the interview documentation and schedules were presented before a PPI panel as well as former patients. PPI engagement benefitted this research by gaining feedback on study materials before submission to ethics. This feedback was then used to refine study documentations to make it more useful, accessible and understandable for potential study participants (Roberts et al., 2012). In addition, PPI engagement created awareness of the research amongst HCPs and patients, which was helpful for recruitment.

Multiple participant recruitment modalities were used (in-person at clinics, in-clinic advertisement, social media, word of mouth, NHS gatekeepers, service leads, HCPs), which meant that participants were recruited from a wider, more diverse sample than if only recruited via one recruitment modality. Furthermore, the research was accessible to potentially more people than if only recruited through one method. An equal number (10

each) of patients and HCPs were interviewed to strive for equal representation of both HCPs and patient views in an attempt to balance patient and HCP views.

Patients were interviewed across a range of postcodes which allowed for examination of how and why appointments were chosen and attended. This enabled theory refinement and allowed for more detailed inferences to be make on for which patients co-location was working (or not). An observation based on convenience sampling, is that despite the colocated sites being based in low SES areas in Sheffield, patients using the sites generally are not from those areas. This supports the Programme theory 5: Misaligned business models.

Patients reported a range of PA levels and health status. Interviews with patients with a range of health status and reported PA levels was helpful in examining the influence of selfperceived health status and PA levels in the analysis of the data. HCPs interviewed worked at both Concord and Graves (as well as some community-based clinics). This helped to present a more balanced presentation of the differences of working in each of the colocated sites.

This section presents limitations of this PhD research. Firstly, it is important to be transparent on the potential bias of the participants interviewed in this research.

The NCSEM stakeholder group, whilst all of them were experienced in their careers as HCPs or business executives, they were only speculating on how co-location might work rather than offering objective insights. A second consideration is that all participants from this group were male. Whilst this was the natural makeup of this stakeholder group, research

shows that there are gender differences in motivation and experience of PA (Ashford et al., 1993; Ulseth, 2008) thus, their ideas of how co-location work could have been influenced from their own experiences. There is research to support that women are currently underrepresented in senior leadership roles and Boards in the sport and leisure sectors, with national governing bodies (NGBs), for example achieving approximately 30% board gender diversity (Women in Sport, 2016). The stakeholders did not also directly experience the sites as a patient or HCP but were instead making an informed decision on how and why they thought co-location would work (or not) for patients and HCPs.

The views of this research were not limited to the NCSEM stakeholder group, as both HCPs and patients were also interviewed. In addition, the theories were developed with evidence from academic literature, documentation and MRT. Even so, it could have been helpful to also interview exercise professionals.

Conducting interviews with exercise professionals as part of this PhD research would have enhanced the robustness of the programme theories. The data from these interviews would be useful to provide an understanding of how co-location is working from their perspective and served to confirm or refute the data provided from the interviews conducted with NCSEM stakeholders, HCPs and patients. Interviews with exercise professionals were not conducted due to several reasons. Interviews with exercise professionals were not conducted due largely to limited time and resources remaining and so for pragmatic reasons exercise professionals were not interviewed. Limited time and resources remaining and so for pragmatic reasons exercise professionals were not interviewed.

Although multiple recruitment modalities were used (in-person at clinics, in-clinic advertisement, social media, word of mouth, NHS gatekeepers, service leads, HCPs) it was

difficult to recruit an equal spread of patients from all four conditions. Including an equal number of patients across conditions would have allowed for more equal representation of patient and HCP voices across conditions and enhanced the robustness of the research. In addition, all but one patient interviewed were female. Most patients (7) reported their clinical visit to the co-located site to be for MSK Physiotherapy (although several has visited multiple clinics in the past). Only two patients reported their current or most recent visit to podiatry and one patient for pain management.

HCPs were also difficult to recruit due to workload and making time for interviews, however, different modalities and locations were used to conduct interviews which allowed for greater convenience for the HCPs. In terms of HCPs, the majority interviewed were also female. Whilst there was a more even distribution of HCPs interviewed in terms of clinic, (2 diabetes, 4 physiotherapists, 2 podiatrists, 1 pain management, 1 administrator) the majority were physiotherapists. Seven out of ten HCPs interviewed were women. The majority of HCPs reported high health status and PA which could mean that they were more likely than other HCPs (who were not interviewed) with low self-reported health status and PA to discuss PA with patients.

Whilst social media was used as one method in this research to recruit HCPs and patients and has been shown to help recruit participants from diverse populations (Gelinas et al., 2017; McRobert et al., 2018), other strategies could have been used to make social media recruitment more effective such as using hashtags specific to each condition that the study aimed to recruit. Additionally, the lead researcher could have directly contacted more condition specific groups through social media that were harder to reach, such as diabetes

and pain management. In hindsight, to increase the diversity of the patient sample, it would have been helpful to present the research in person directly to additional community groups such as condition specific support groups, locality health organisations and physical activity groups (such as chair-based exercise classes, walking football etc). To recruit an even sample across all conditions of HCPs and patients, recruitment could have taken place over a longer period of time until an equal spread was included. Ideally, recruitment would have started earlier, but this was not possible due to waiting for NHS ethical approval for recruitment to begin.

8.3 Summary and Wider Impact

The existing knowledge base on the co-location of healthcare and leisure is limited, therefore, this research contributes new evidence and theory on the topic. Existing literature related to co-location of healthcare and leisure focuses on several different topical areas: benefits of exercise referral, co-location of services and salutogenic healthcare architecture.

ERS in the UK are well established, traditionally centred around a GP referring a patient to an exercise referral specialist for chronic disease management. Increasingly, referrals are made by other HCPs such as physiotherapists, podiatrists and nurses (NICE, 2014). Evidence on the effectiveness of ERS is inconclusive. Moreover, there are many barriers to success of such schemes reported by both patients and HCPs. Barriers faced by patients include transport, distance and cost to attend the ERS location (K. Morgan et al., 2021). Barriers for HCPs include lack of awareness of appropriate exercise facilities, lack of time to prescribe exercise and apprehension about exercise professionals skills/knowledge to safely treat their patient (Leenaars et al., 2015; McPhail & Schippers, 2012). Literature and data from interviews from this PhD research show that co-location of healthcare and leisure has the

potential to address many of these barriers by increasing awareness and convenience of PA opportunities for patients and HCPs, making it easier to refer patients to PA and easier for patients to attend if they are referred following their clinical appointment. Moreover, data from the interviews shows that patients may feel supported and safer being physically active in the co-located environment and see others "like them" being active, which helps to normalise and model PA. This is likely to encourage more patients to participate in PA.

Emerging research on the application of salutogenesis to healthcare and hospital architecture has shown feasibility and effectiveness for improving health outcomes (Golembiewski, 2016a, 2016b), yet interventional evidence is limited. Evidence from this PhD programme suggests that co-located healthcare and leisure environments with a salutogenic design can help change patient and HCPs mindset about managing their health. As opposed to hospital or community-based clinical settings, co-location increases of PA, creates awareness of PA and makes it easier for HCPs to have conversations about PA with patients.

8.3.1 Recommendations for others seeking to co-locate healthcare and leisure services

The following recommendations synthesise findings from across this PhD programme of study in terms of what works, for whom and in what circumstances regarding the promotion of PA through the co-location of healthcare and leisure services. The recommendations are intended as a guide for service providers, commissioners of services, architects, town planners, healthcare professionals (HCPs) and leisure leaders seeking to promote PA through a co-located health and leisure model. The recommendations are not a definitive 'how to' guide and further empirical testing is required to refine, refute or validate these recommendations. That said, what follows is a 'good place to start':

For service commissioners:

- Fostering a collaborative culture between HCPs and exercise professionals is key to realising the value of co-location. This culture must be leveraged through supportive processes and systems. It won't just 'occur' through co-location itself.
- Where business models can be aligned to create the conditions for joint working to occur, the benefits of co-location are more likely to be realised. By business models we mean; compatible organisational objectives, IT systems, working processes, governance and performance metrics which influence staff behaviours and goals.
- Wherever possible, make PA opportunities visible to patients attending clinics. This could be achieved by planning clinical appointments so that they coincide with PA opportunities such as fitness classes, exercise referral schemes and other PA opportunities. It is acknowledged that this will be challenging and, in some cases, not feasible. Moreover, the collaborative culture will be essential to even exploring this.

For healthcare service leads:

- Make it easy (e.g., by incentivising the behaviour, providing training and resources) for HCPs to have conversations with patients about PA during routine consultations.
- Incentivise attendance of HCPs and exercise professionals at meetings to share experiences and stories of how PA has made a difference to people.
- On a regular basis ensure that time and effort is taken to establish an understanding of skills, job roles and experience between HCPs and exercise professionals. This will build trust and help to enhance capability and opportunity for joint working.
- Encourage HCPs to model PA behaviour to others by creating opportunities for them to use leisure facilities as part of their working day. This will help enhance and

maintain the HCP's own wellbeing, and mean they are more likely to discuss PA with their patients.

For planners and architects:

- The promotion of PA through co-location of services can be enhanced (or inhibited) through intentional, salutogenic and psychosocially supportive building design.
- The co-location of healthcare *with* leisure is not merely about creating adjacent facilities but rather an opportunity to consider how the interaction of these spaces and cultures can become more than the sum of their parts in terms of how the promote PA.
- What works are features such as:
    - creating a single point of access,
    - a centralised reception for health and leisure,
    - a journey flow between healthcare and leisure services that facilitates easy observation of PA opportunities so that patients can 'see others like them' being active.
    - building design that is bright, open and attractive, including prominent and accessible staircases but without exacerbating inequality
    - shared spaces for clinical and leisure staff to eat together, share stories and meet formally to build relationships and problem solve.
- Accessibility to and at the facilities is key. Fee car parking is valued by all but in addition, ensure that there are accessible public transport options and safe footpaths and cycleways (and storage) to eliminate barriers of access to co-located health and leisure centres.

For healthcare professionals:

- As a HCP, you have a huge role to play in enabling patients to consider increasing their PA. Co-location with leisure makes it more likely that you will have conversations with patients about their PA but for this to happen regularly, you need incentives and support. Ask service managers for additional training and seek opportunities to be creative with clinical delivery that includes PA.
- What helps is where you are given permission and access to use leisure facilities for your own wellbeing and are also able to take patients into exercise spaces as part of their clinical appointment.
- Model being physically active to colleagues and patients. HCPs that are active themselves are far more likely to promote PA to their patients.
- As a HCP, you are also more likely to signpost patients to PA opportunities when you are aware of the local PA opportunities yourself, know who is delivering them and trust their expertise. Therefore, where possible invest time to explore where these PA opportunities are, share with colleagues and have conversations with exercise professionals and get to know their knowledge, skills and abilities.
- For patients with fear avoidance, reinforce that PA is safe and that you and other HCPs are working on site and can help if needed.

For leisure centre executives:

- Design co-located leisure centres so that opportunities to be physically active are visible to patients attending the co-located leisure centre for a clinical appointment.
- Offer free or discounted PA opportunities to patients attending clinical appointments in the co-located health and leisure centres.

- Encourage exercise referral specialists, personal trainers and gym instructors to share their experiences of working with patients with long term conditions with HCPs.
- Create opportunities and provide permission for HCPs to access PA opportunities as part of their working day.
- Prioritise spaces that bring HCPs and exercise professionals together to eat, share stories and build relationships.
- Work with healthcare service providers and commissioners to align business models (e.g., organisational objectives, IT systems, performance metrics) and incentivise leisure staff behaviours that align to a shared goal of promoting PA for patients.

8.4 Acknowledgement of the impact of the COVID-19 pandemic and future direction

8.4.1 Effects of COVID-19 pandemic on leisure sector

This section acknowledges the implications of the COVID-19 pandemic from 2020 onwards on theories developed from this research and provides a summary of the challenges and impact on healthcare and leisure sectors.

The leisure and health sectors have significantly changed (globally and in the UK) since data collection for this PhD research. The closures of the leisure sector during the lockdown periods of the COVID-19 pandemic in the UK had an unprecedented effect on the sector, adding to existing financial pressures it faced as a result of previous austerity measures (ASPE, 2021). Fear of leaving the house and/or apprehension of returning to the leisure centre environment once they were open added to the losses in (Mackintosh et al., 2021).

Leisure centres, particularly public leisure centres, experienced unprecedented closures and financial strain and will need to collaborate more effectively with the healthcare sector to overcome losses from the pandemic and to support the population with COVID-19 recovery (A. Lowe, personal communication, October 12, 2021; (Sport England, 2021). A new model which sees integration of leisure into the wider health and wellbeing agenda to overcome pandemic losses is necessary (ASPE, 2021).

Despite the benefits of PA, the closures and social restrictions have made it harder for people to access leisure facilities. This decrease in PA levels is most likely due to the leisure centre closures and other lockdown measures to restrict PA, movement and socialising, both indoors and outdoors(Sport England, 2020b). The double burden of both communicable (COVID-19) and NCDs. in addition to the economic deficit of the leisure sector has accelerated the case for co-location of healthcare and leisure.

8.4.2 Effects of COVID-19 pandemic on leisure sector in Sheffield

The public leisure and healthcare sectors in Sheffield have changed since prior to the COVID19 pandemic, experiencing financial losses similarly to the UK as a whole. In Sheffield, the co-located NCSEM sites (Graves, Concord) were able to stay open during the government mandated lockdown closures of leisure centres in order to operate the healthcare clinics.. Some patients have experienced hesitancy to attend appointments in hospital settings for fear of contracting COVID-19(Mackintosh et al., 2021). Patients may feel more confident attending appointments in a leisure centre setting because it is a less clinical environment, and they might be less fearful of contracting COVID-19 (A. Lowe, personal communication,

October 12, 2021

These recommendations will need to be written into operational plans of both the healthcare and leisure centres in order to be implemented into practice (A. Lowe, personal communication, October 12, 2021). To summarise, following the COVID-19 pandemic, the leisure sector needs to rebrand itself with a clearer health-promotion identity.

8.4.3 Policy direction in the UK

Government, health, sport and PA policy bodies in the UK outline steps to overcome the declining PA levels and health inequalities exacerbated by the COVID-19 pandemic (Sport England, 2021). Co-location is one potential solution to overcome these challenges.

There is no new evidence which suggests that co-location is less appropriate or feasible as a result of the pandemic, however, the NHS is now facing additional pressures which could limit or create potential barriers to promotion of PA within healthcare.

Research findings from this PhD research bolster the findings for much of this recent policy and provide more evidence to support these calls. Making PA "easy, personalised and supported" is a relevant aim of this policy (Sport England, 2021) and one which the findings of this PhD research on co-location of health and PA is aligned to. This policy emphasises the necessity of embedding PA in in all facets of the healthcare journey for both patients and HCPs, which this PhD research shows can be viable through co-location if HCPs and exercise professionals take time to develop trust, understanding and knowledge of each other to allow for knowledge transfer and shared learning. Sport England calls for enhancing the connections between sport, physical activity, health and wellbeing, so more people can feel the benefits of, and advocate for, an active life (Sport England, 2021). Findings from this research support this policy call and demonstrate that co-location can be a viable way to

help connect patients to PA that might not ordinarily have access to or feel that they belong in a leisure centre environment, through support for those with *long term conditions* and by helping to *normalise and model PA.*

Policy, existing research and findings from this PhD support the "joining up" of the health and leisure sectors to help build back the health of the population, prevent disease and to sustain the leisure sector recovery (Sport England, 2021), but only if co-location is implemented in a considered way, considering local contextual factors that can impact implementation, alignment of business models and taking time to develop trust and understanding between HCPs and exercise professionals. Yet, in light of the COVID-19 pandemic, HCPs are facing new levels of pressure and have less time to discuss and promote PA.

8.4.4 COVID-19 Pandemic Implications for theory findings developed in this research

The COVID-19 pandemic impacted the healthcare and leisure industries as demonstrated briefly in the paragraphs above; thus, there are implications for the theories developed in this PhD research, which are discussed below. There are opportunities for the leisure sector and co-location to play a role in the recovery from COVID-19 pandemic but there are also lots of additional challenges that need to be overcome. No new data for this PhD research has been collected following the COVID-19 pandemic, thus, the following are inferences based on available evidence.

8.5 Implications of COVID-19 pandemic on programme theories

8.5.1 Programme theory 1: Co-located environments that are salutogenically designed help promote PA

In light of the COVID-19 pandemic, there may be greater support for this theory as discussed in the above paragraphs. With the growing backlog for NHS care (British Medical Association, 2022), population level decline in PA (Sport England, 2020b), possible apprehension of return to clinic environments because of fear of COVID-19 (Mackintosh et al., 2021) and policy emphasising the need for "joining up" of sport and health (Sport England, 2021), this theory has an even greater relevance. There may be greater support for promotion of healthy lifestyle behaviours and need for effective collaboration between primary and secondary care (British Medical Association, 2022) to address the growing backlog of care. Yet, there may be less resources available to effectively implement colocated services due to leisure centre budget deficits due to COVID-19 lockdowns (Local Government Association (LGA), 2020) and NHS resources directed towards clearing the backlog of services.

8.5.2 Programme theory 2: Co-located environments can enable joint working between HCPs and exercise professionals to help to promote PA

Following the COVID-19 pandemic, there is potentially more support for HCPs and exercise professionals working together to share learning, transfer knowledge, coordinate and collaborate. With the backlog of visits to primary, preventative and community care, exercise professionals in co-located settings are well places to pick up some of the backlog. Exercise referral specialists, particularly, are trained in knowledge of exercise prescription

for chronic disease and can also help to support patients experiencing long COVID in these settings. In the co-located environment, as the HCPs and exercise professionals are simply a short walk away from each other, it only makes sense to use the exercise professional to ameliorate the backlog of NHS appointments, prevent chronic disease and to address long COVID. However, in order for HCPs and exercise professionals to work together, trust must be established between HCPs and exercise professionals by taking the time to develop relationships and understanding. With the backlog for NHS treatment, HCPs are under increasing time pressure and working together with exercise professionals may be even more challenging.

8.5.3 Programme theory 3: People like me: normalising and modelling of PA in co-located environment

This theory may be more important following the COVID-19 pandemic. With reduction in population level PA, long-COVID and growing burden of NCDs, co-located healthcare and leisure environments can help these populations feel more comfortable in a leisure environment as they will see others experiencing the same conditions as themselves participating in PA that they may not see in a traditional corporate gym environment. In addition, for those that have lost fitness due to the pandemic lockdowns, COVID infection or long COVID, the co-located environment can serve as a place to feel supported back into a PA habit in a non-threatening way. Whilst it has been shown that leisure centres can operate safely and there is low risk of COVID-19 transmission (Jimenez et al., 2020), some individuals may still feel worried about being physically active in indoor spaces with others for fear of contracting the virus.

8.5.4 Programme theory 4: Patients with long term conditions are supported in participate in PA in a co-located environment

This theory remains relatively unchanged following the COVID-19 pandemic with additional support for the findings and also for those recovering from infectious disease, as co-located healthcare and leisure sites are well suited to help individuals with long COVID to recover.

Individuals with long-COVID may feel uncomfortable exercising in a traditional leisure centre/gym environment as they may struggle with loss of previous fitness levels, COVIDrelated breathlessness and anxiety about purposely getting to a breathless state resulting from exercise.

8.5.5 Programme theory 5: Misaligned business models of NHS and leisure centre which constrain full co-location to promote PA

In the height of the COVID-19 pandemic many of the preventative and routine services offered by the NHS were stopped or postponed focusing on the pandemic response. This was seen as necessary to cope with the immediate impact of infectious disease on the healthcare system. This focus on infectious disease coupled with the lockdown closures of leisure centres (which play a preventative role) only drew attention to the misaligned business models of healthcare and leisure, each with different aims, priorities and revenue streams. In addition, the lockdown highlighted which services that the government deemed as essential, which in the first phases of the pandemic leisure centres were excluded (HM Government, 2020)(even though research now shows that they can operate safely to prevent COVID-19 infection and have a valuable preventative role to play in both infectious and NCDs)(Jimenez et al., 2020). In light of the pandemic, this theory recognises the potential for elevating the status of leisure centres and increasing resource allocation to

promotion of PA within healthcare to those that can impact changes on a systems level to work towards greater alignment of leisure and healthcare business models. These changes need to come from sharing of values, priorities and aims at the top so that clinical scheduling, IT systems, patient information and funding can be shared at an organisational level to allow for greater integration of healthcare and leisure.

Whilst the data for this PhD research was collected prior to the COVID-19 pandemic, the description above provided information in light of the COVID-19 pandemic's implication on the theories developed in this realist evaluation. These theories are subject to refinements as the PA policy, funding and healthcare landscape change over time.

8.6 Implications and recommendations for future research

The findings of this PhD research are emergent and could be strengthened by future research. As realist research recognises, programmes work differently for different groups and under different circumstances, which reiterates the necessity of testing theories amongst different user groups, such as patients and HCPs from different clinical conditions, co-located sites in other areas and with exercise professionals. In this PhD research, exercise professionals were not interviewed. Thus, it would be useful to interview exercise professionals to test the theories developed in this research, particularly to understand the impact of working in a co-located health and leisure environment on the trust between HCPs and exercise professionals. Furthermore, it would be useful to conduct another interview study, following the COVID-19 pandemic to see how the theories might change in light of increasing need for alternative approaches to tackle the growing waitlists for treatment and burden of chronic disease.

In addition, other examples of co-location of healthcare and leisure to promote PA should be researched across the UK and abroad, particularly how the design of the building and local, regional and country differences may affect co-location to promote PA.

The refined programme theories developed in this PhD through two phases of research have implications for policy, theory and practice in the healthcare, leisure and physical activity sectors.

8.6.1 Policy

This research recognised that whilst co-location of healthcare and leisure to promote PA may physically bring together these two industries, this does not mean they are integrated on a business model level. To influence the effectiveness of co-location PA integration into healthcare needs to be promoted at a policy level by PA, sport and healthcare bodies. Further support for recognising the value of PA for NHS sustainability is essential. The findings from this PhD should be of interest to healthcare, public health, leisure and PA policy makers.

8.6.2 Practice

This research shows that co-located services are not yet utilised to their full potential to promote PA. Data from HCP interviews demonstrated that HCPs who see themselves as innovative and physically active are likely to work best in a co-located environment. It may be useful to put these HCPs in a clinical champions role to support and encourage other HCPs to promote PA amongst patients. Moreover, co-location can facilitate joint ways of working, yet for this to happen in practice, HCPs need to make time to learn about each

other's roles and to develop trust. For co-located settings to work effectively practice needs to change so that business models are shared between leisure and healthcare.

Salutogenically designed architecture that provides patients with resources to manage their health, promotes awareness and increases convenience of PA opportunities should be of interest to urban planners, architects, commissioners of healthcare services and HCPs.

Whilst the theories proposed in this PhD research are tentative in nature, they should be explored amongst commissioners, HCPs, service leads, patients and exercise professionals for their utility to inform practice.

8.6.3 Theory

As no existing theories on co-location of healthcare and leisure exist at the time of this research, these findings add to the growing body of realist theories and specifically to theory on co-location of how healthcare and leisure works to promote PA for the first time. These theories provide a transferable framework by which other sites wishing to co-locate can use to ensure that co-location works to its full potential to facilitate PA promotion. In addition, other researchers in sport, PA and health studying co-located sites in healthcare and leisure will have existing theory and evidence to use for their research.

These theories were developed based on literature, theory and qualitative interview data from a small sample size in the North of the UK. The explanatory power of these theories could be strengthened through additional qualitative evidence (in the forms of interviews and focus groups), quantitative data on referrals to PA opportunities and statistical analysis.

These theories should be further refined through testing in interviews with exercise professionals, patients and HCPs from different clinical conditions (such as mental health,

prehabilitation and rehabilitation in cancer, COVID, etc). The theories should also be tested in other co-located healthcare and leisure settings in other locations.

Researchers on co-location of healthcare and leisure should examine contexts and mechanisms which support PA opportunities through co-location, barriers and facilitators.

8.7 Conclusion

This thesis presents tentative but refined programme theories of how, for whom, under what circumstances, why and how the co-location of healthcare with leisure is expected to work (or not) to promote PA opportunities.

This research provides programme theory up to the point of time of writing which represents co-location of healthcare and leisure, synthesising evidence from existing research, documentation, and theory as well as stakeholder, patient and healthcare accounts. Logistical challenges and misaligned business models present challenges to full colocation. The co-located environment can be salutogenic, promoting normalising and modelling of PA, collaborative working between HCPs and exercise professionals, and support for chronic conditions to promote PA engagement.

This research highlights factors which facilitate PA opportunities through co-location and those which hinder; the research provides a transferable framework through which other cities seeking to co-locate can apply in their local context.

This research contributes to the evidence base on the topic of co-location of healthcare and leisure, in an area where there was little existing evidence through empirical evidence and programme theories. In addition, the research contributes to understanding of how healthcare and leisure co-location in a salutogenically designed environment can promote

PA, challenging the mindset the traditional medical model of care in hospitals and potentially improving health outcomes long term.

This research contributes to theory and evidence of co-location of health and leisure to promote PA by providing evidence and programme theory to demonstrate how, why, for whom and under what circumstances co-location is working or not to promote PA. Further effort is required to enable effective co-location of healthcare with PA opportunities to prevent disease and promote health long term.

8.8 Reflexive account

8.8.1 Growth as a researcher

Throughout the doctoral research process, I experienced growth as a researcher. Attempting to understand my views and beliefs as a researcher took a great deal of research and self-reflection.

I learnt about the academic and health research processes, some of which are unique to NHS research in the UK setting. The ethical processes of Sheffield Hallam University, IRAS and HRA were new to me at the beginning of the PhD and took time to learn. I also learnt about patient and public involvement and participant recruitment to research. In addition, I learnt about project management, qualitative research databases and reference managers, such as Mendeley.

8.8.2 Topical understanding

My topical understanding has also grown throughout the PhD. Prior to the PhD, I had a good understanding of public health and physical activity (mostly in the context of the US), but only knew a bit about the commissioning of healthcare and exercise referral in the UK. I have gained a much greater understanding of these areas and how they are evolving with

policy changes in the UK. My understanding has changed from looking at the topic through different perspectives: my own beliefs and knowledge, existing literature, MRT, NCSEM stakeholders, patients, and HCPs views. In addition, the COVID-19 pandemic has challenged my thoughts around the role of the healthcare system in protecting population health and the governments' role in providing (or preventing) access to PA. The mixed methodology used in this research allowed me to explore the topic through different lenses.

8.8.3 Philosophical understanding

Prior to undertaking the doctoral research, I had very little understanding of philosophy, ontology or epistemology. Throughout the PhD my philosophical understanding has evolved. It took considerable personal research to attempt to understand philosophy in general and my individual stance. I learnt that I generally take a pragmatic view in research and try to choose the best method for the research question rather than aligning closely to one ideology. Realist methodology sits well with my public health background as it can evaluate a topic rigorously and take into account multiple modalities of data.

8.8.4 Changing views

Prior to beginning the PhD, I assumed that combining PA or exercise opportunities with health clinics could alone inspire individuals to become active, but I learnt over the course of the research that the topic is much more nuanced and complicated due in part to longstanding contextual factors. I learnt how the NHS healthcare system works in practice and how referrals to PA are made. I still think co-location of health and leisure holds great potential to help people to become active as part of their clinical appointments, but this must be seen as part of a larger set of solutions to address population level PA.

8.8.5 Personal Growth

Throughout the course of the PhD, I faced numerous personal challenges including physical and mental health difficulties. In 2019, I was hospitalised for two operations and took and took some time off the PhD. In addition, I was isolated beginning March 2020 due to the COVID-19 pandemic. In this time, I experienced a stress fracture. This made my research challenging as I was without social support, income and coping strategies that I relied on, such as my job as a group fitness instructor and personal physical activity. I took an additional extension but continued to work on my thesis as I applied for jobs. Throughout my life I have struggled with self-esteem and self-efficacy which was never more challenged than during the PhD. However, overcoming this significant self-doubt was possible only through challenging myself to believe in my own abilities to become a researcher and complete the PhD thesis. I am extraordinarily grateful for the encouragement from my best friend, Polly and my dad. I am grateful for Rob who gave the opportunity as a PhD student. I am grateful for the constructive and thoughtful feedback from a methodological, topical and recent student perspective from Katie and Helen. I am grateful for the opportunities from Lee Bell and Dave Rogerson to teach, which gave me confidence. I am also grateful to the many colleagues and customers at the gym and in my spin classes who kept me going. I know this process has made me stronger and I have come out of it with knowledge and experience of how to conduct academic research.

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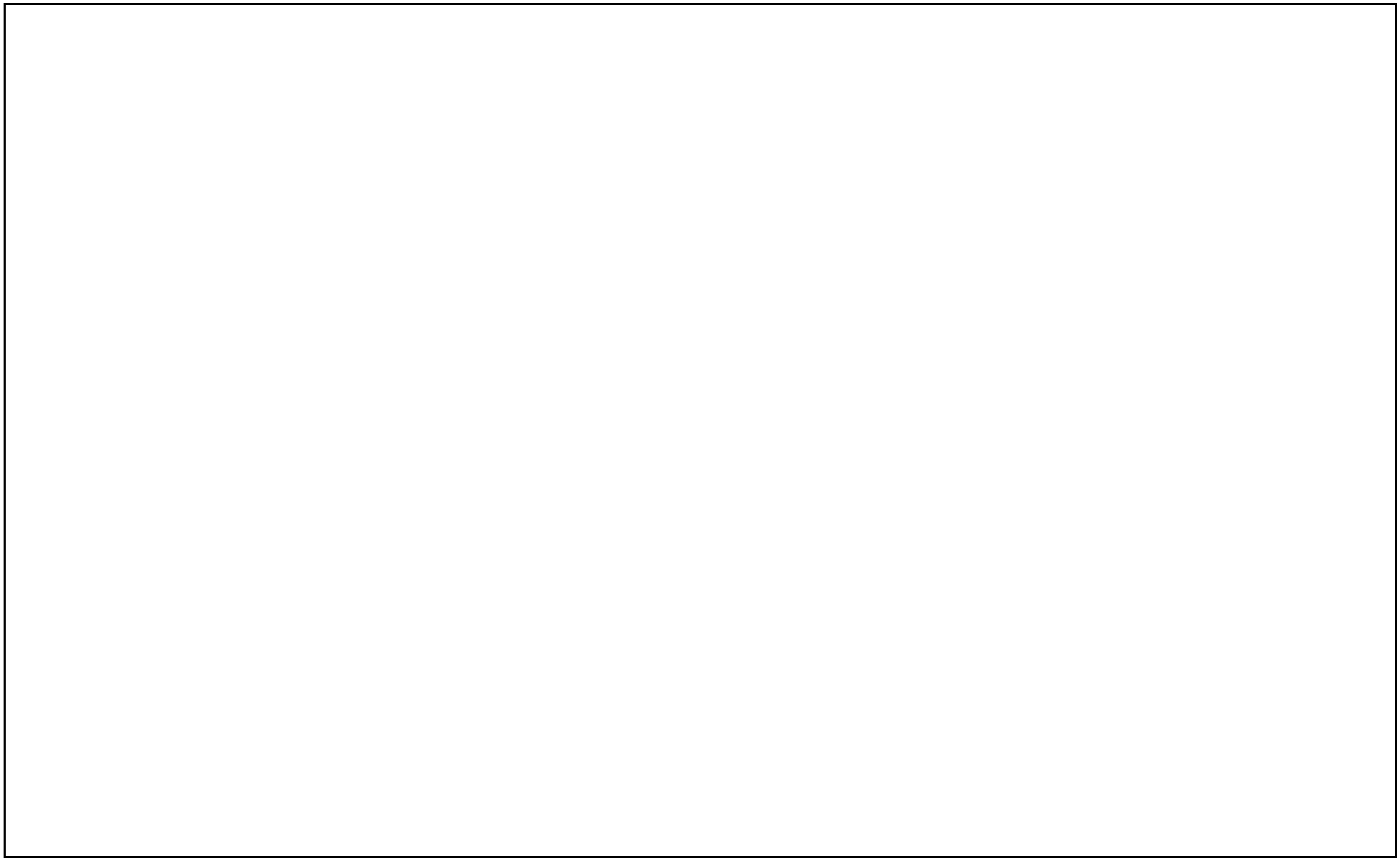
Appendices

Appendix 1: Search processes

Search process, search terms, number of abstracts selected per database for screening against inclusion/exclusion criteria

Scoping Review	**Academic Database Search**	**Websites and Grey Literature** **Policy Websites**
Using Google and Google Scholar search engines as well as governmental, organisation, voluntary websites in health, physical activity and co-location	MEDLINE, CINAHL, SportDiscus, SCOPUS and PsychInfo Second search utilising academic databases in health, sport and medical subjects. This included any documents related to barriers and facilitators of sport and health collaboration,	The National Institute for Health and Care Excellence (NICE) specifically, physical activity related information https://pathways.nice.org.uk/pathways/physical-activity Public Health England (PHE) https://www.gov.uk/government/organisations/public- health-england National Health Service (NHS) https://www.england.nhs.uk/five-year-forward-view/ ***Other relevant Websites*** Design Council

opinion papers on physical activity approaches, physical activity interventions and strategies as well as policy recommendations. **Search Results** **The search was run after several trials searching abstract, title and subject terms on 25/04/2018 and retrieved after removal of duplicates:** **MEDLINE: 199** **CINAHL: 146** **SportDiscus: 27**	https://www.designcouncil.org.uk/ UK Active http://www.ukactive.com/policy-insight/empowering-communities Gov.uk Sport and Leisure https://www.gov.uk/government/publications/sporting-future-a-new-strategy-for-an-active-nation Project for Public Spaces https://www.pps.org/article/pps-releases-new-report-the-case-for-healthy-places-how-to-improvehealth-through-placemaking Glasgow Centre for Population Health http://www.gcph.co.uk/publications/745_building_connections_colocating_advice_services_in_gps_and_job_centres **Specification, Marketing and Evaluation Documentation (not otherwise found from websites)** Copeland, R., Hart, O., and Till. S. (2015). National Centre for Sport and Exercise Medicine (NCSEM). Community MSK: a hub and spoke model.



	PsychInfo: 110 **Scopus: 1698** **The results were uploaded into Mendeley as well as to (2150 results) Excel for title and abstract screening. After removal of duplicates, 1789 were left.** **After title screening, 72 results were left. After application of the inclusion/exclusion criteria, 33 documents were left for full-text review.**		

	6 documents were included from the grey literature to bring the total to 39 documents for inclusion in the review.	

Appendix 2: 19 original themes of co-location from Realist Review and Data Source Contribution to Themes

Emergent themes from literature on leisure, physical activity, and health co-location

Level of social strata	IRPT Theme	IF... THEN Propositions to Test
Infrastructural	Instability	IF there is instability of the clinical schedule, meaning patients might not have appointments at co-located facility every time, THEN colocation might not work as intended (due to contextual factors such as NHS structure and professional working patterns – i.e. set around the consultant's working pattern and not the patients) (McIntosh et al., 2015)
	Logistical challenges	IF there are logistical challenges (transport, distance & cost) might be a barrier to some patients accessing co-located leisure and NHS clinics THEN co-location might not have the intended effect (Borjesson, 2013; McIntosh et al., 2015)
	Affordability for the system, business models	IF clinics are co-located with leisure centres, THEN it may be a more affordable model for the system. THEN this business model-may reduce health care costs as PA can help prevent and treat disease that would otherwise be treated by more costly, acute services. Colocation may help free up other acute services (Jones, et al., 2007)
institutional	Purpose built (perceived importance)	IF clinics are purposely co-located with leisure centre, THEN this makes it easier to refer and treat patients to PA by raising profile and perceived importance of PA and exercise professionals in minds of HCPs and patients (Williams, et al., 2012)

	Single point of access	IF clinics and leisure facilities are co-located, THEN the single point of access, “one-stop shop” makes it easier for patients to access PA opportunities because of immediacy and makes it easier for HCPs to prescribe and refer to PA opportunities (UK Active, no date; Williams, et al, 2012).

Intrapersonal/individual	Conversation in context	IF clinic is located in the context of the leisure facility, THEN discussing PA with patients in a co-located facility just “makes sense” and HCPs will be more motivated to discuss PA with patients (Copeland,2015; individual correspondence, 2018).
	Integrated care environment of co-location	IF there is an integrated care environment such as co-location THEN this will result in increased patient satisfaction and more positive, holistic patient experience (Olsen et al., 2011; Moe, et al., 2016)
	Social support	IF patients are in an environment in which they feel socially supported (i.e. co-located clinics) THEN they are more likely to adhere to treatment (McIntosh et al., 2015; Murphy, et al., 2010)
	Coordination/collaboration of health and PA professionals (structural)	IF clinics are co-located with leisure centres, THEN health and PA professionals are more likely to collaborate and communicate (Leotta, C., 2007; Leemrijse, et al., 2015)
	Collaboration of health and exercise professionals (cultural)	IF clinics are co-located with leisure centres, THEN it may make it easier for HCPs and exercise professionals to collaborate (Leemrijse, et al., 2015; Lederman, 2017)

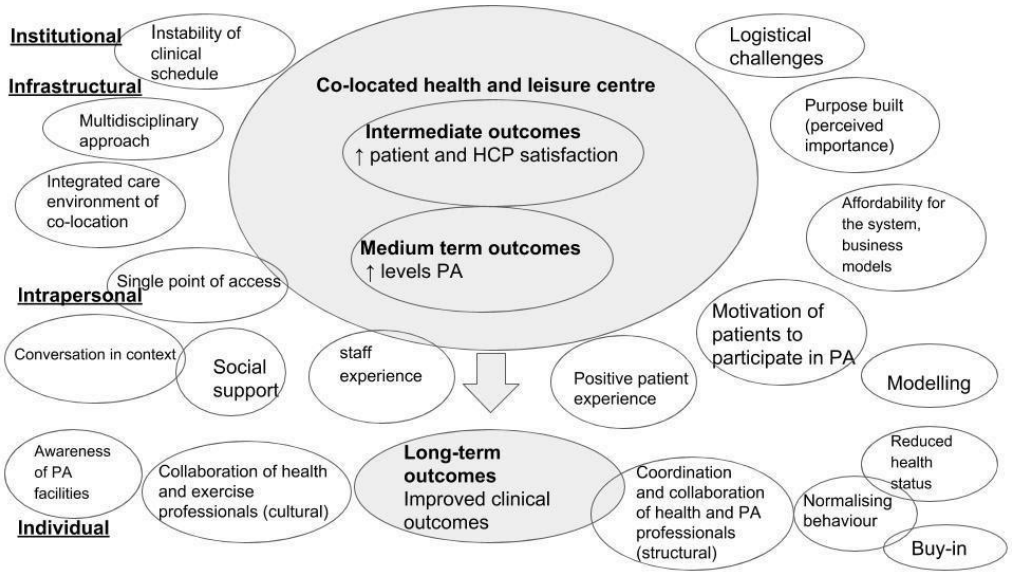
	Multidisciplinary approach	IF clinics are co-located with leisure centres, THEN this may create a multidisciplinary approach to /treatment priorities of the illness/condition due to access to leisure centre facilities and collaboration of different disciplines working in same space (Williams, et al., 2012) IF clinics are co-located, THEN, patients will be more satisfied with their care (Moe, et al., 2016).
	Normalising behaviour	IF the lines are purposely blurred between the medical care and physical exercise facilities THEN the patient will be more likely to see the behaviour as normal (Leo tta, C., 2007)

	Modelling	IF the patient sees the gym staff and medical professionals also participating in the same exercise routine that they have been prescribed THEN the patient will be more likely to adopt and maintain the behaviour of PA; "staff teach by doing" or model behaviour (Leotta, 2007)
individual	Positive experience	IF a clinic is co-located THEN patient experience may be more positive in contrast to traditional exercise referral as co-location allows for seamless transition between HCP and exercise provider and eliminates barriers that might lead to a negative experience (Copeland & Hart, 2015; Leemrijse, et al., 2015; Moe, et al., 2016)
	Motivation of patients to participate in PA	IF patients see other patients like them exercising and receiving support from HCPs in co-located environment THEN it might motivate them to also exercise (Leemrijse, et al., 2015)

	Buy-in	IF there is buy-in from health practitioners THEN this will enable colocation to work as intended. HCPs must support and promote PA referrals and facilitate communication between exercise professionals and HCPs; co-location may increase buy-in (Whitelaw et al., 2017)
	Positive staff experience	IF staff feel cared for THEN they feel more pride and recognition in their work and are better enabled to relay that message to patients because of the integration of fitness into health and the time devoted to lifestyle intervention and behaviour change (Olsen et al., 2011)
	Awareness of PA facilities	IF clinics are co-located with leisure centres, THEN this may facilitate both patient and HCP awareness because lack of awareness of where to refer patients to exercise can serve as a barrier. Being co-located can eliminate this barrier as the gym is “right there.” (Copeland, et al., 2015; Leemrijse, et al., 2015; Leenaars et al., 2015)
	Long term conditions	IF patients have long term conditions, THEN this will limit the patient's motivation to undertake physical activity BECAUSE they

		fear physical activity will cause them to pain/ make their condition worse. (Leemrijse, et al., 2015) IF patients have long term conditions, THEN they will be ideal candidates for referral AND be more likely to want to undertake physical activity BECAUSE they have the potential to benefit greatly from the intervention IF patients have long term conditions, THEN co-location may help patients feel safer to undertake physical activity BECAUSE they are reassured when HCPs are working in same facility and may be available to help if needed (McIntosh et al., 2017). IF patients have long term conditions, THEN HCPs will be more confident to refer patients to physical activity in a co-location model BECAUSE they have greater awareness of the equipment, staff and special adaptations offered in the facility. (Leemrijse, et al., 2015)

Initial Theme Mapping


Institutional
Instability of clinical schedule
Infrastructural
Multidisciplinary approach
Integrated care environment of co-location
Co-located health and leisure centre
Intermediate outcomes
↑ patient and HCP satisfaction
Medium term outcomes
↑ levels PA
Logistical challenges
Purpose built (perceived importance)
Affordability for the system, business models
Single point of access
Intrapersonal
Conversation in context
Social support
staff experience
Positive patient experience
Motivation of patients to participate in PA
Modelling
Awareness of PA facilities
Individual
Collaboration of health and exercise professionals (cultural)
Long-term outcomes
Improved clinical outcomes
Coordination and collaboration of health and PA professionals (structural)
Reduced health status
Normalising behaviour
Buy-in

Appendix 3: Consent form for NCSEM stakeholder interviews

Consent Form

Stakeholder Interviews

Stakeholder interviews to explore the development and impact of the National Centre for Sport and Exercise Medicine (NCSEM) capital model in Sheffield

		Please initial:
1	I confirm that I have read and understood the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.	
2	I understand that my participation is voluntary and that I am free to withdraw up to two weeks after the interview.	
3	I understand that the information I provide will be confidential and that my identity will not be used in any outputs from the research.	
4	I give permission for research personnel to retain my personal details only for the purposes of participation in the research study. I understand these details will not be passed on to third parties under any circumstances. I understand that my identifiable data will be kept securely by the research team in hard copy only.	
5	I agree that my anonymised responses may be used for research purposes and publication.	
6	I agree to the interview being audio recorded.	
7	I give permission for the researcher to contact me after the interview so that I may review a copy of the transcript of the interview. I give permission for my contact details to be retained for this purpose.	
8	I understand if I withdraw from the study, all data taken from my participation in the study will be retained for analysis.	
9	I agree to take part in the above study.	

Name of participant (PRINT)	Date	Signature
Name of individual taking consent (PRINT)	Date	Signature

2 copies to be kept; 1 for site file; 1 for stakeholder

Appendix 4: Participant information sheet: NCSEM stakeholder interviews

Sheffield Hallam University

National Centre for Sport & Exercise Medicine
Working for Health & Wellbeing

Participant Information Sheet

Stakeholder interviews to explore the development and impact of the National Centre for Sport and Exercise Medicine (NCSEM) capital model in Sheffield

Stakeholder Interviews

We would like to invite you to take part in a research study. Before you decide, you need to understand why the research is being done and what it will involve for you. Please take time to read the following information carefully.

What is the purpose of the study?

This study is being conducted as part of a programme of research exploring the development of a theory of change for the co-location of NHS clinics within leisure centres to embed physical activity within the NHS.
The purpose of this study is to understand capital NCSEM stakeholder perspectives on the development of the initial co-location model as in Sheffield as well as the impact. This understanding will support the existing literature to aid in the development of a theory of co-located services.

Why have I been invited to take part?

You have been invited to take part because you were a part of the initial capital NCSEM co-location team. The research is being done with people involved in the initial development of the three co-located sites (Thorncliffe, Graves and Concord). We want to understand the thought processes that went behind the initial development of these facilities as well as their impacts.

What will happen if I choose to participate?

If you decide to take part, you will be asked to participate in an interview. This can be arranged at a time convenient for you, either at your place of work, Sheffield Hallam University, by telephone or Skype. The interview will last approximately one hour. The interview will be audio recorded so that the researcher can listen back to it at a later time.

The topics to be discussed will include your involvement with the initial NCSEM colocation plan, who else was involved, and your perspectives on the initial formation and impact.

You do not have to answer or make a comment on any topic if you do not wish to do so. We will ask you to ensure the accuracy of what you have told us. You will be asked to agree to the interview being recorded by signing the consent form.

What are the possible benefits of taking part?
Although we cannot guarantee this study will benefit you directly, we hope that your responses will add to the development of a theory which has the potential to inform service delivery long term.

What are the possible disadvantages of taking part?
No direct disadvantages have been identified. You are free to choose not to answer any questions that you do not wish.

Do I have to take part?
It is up to you to decide whether or not to take part in this research. If you wish to volunteer, you will be asked to sign a consent form to show that you have read this information sheet and agreed to take part. You are free to withdraw your information from the study up to two weeks after the interview. Taking part in this study will not affect your medical care in any way.

What if I change my mind during the study?
You are free to withdraw from the study at any time without affecting your treatment.

Will my involvement in the study be kept confidential?
Yes. We will follow legal and ethical practice and all information about you will be handled in strict confidence.

What you tell us will be confidential at all times. We will transcribe the recordings of the interviews and will be writing up a report of the findings, but we will not use your real names anywhere in the transcripts or the report. When we are analysing the data, it will only be seen by the research team, and it will be stored securely according to the regulations of Sheffield Hallam University and the Data Protection Act.

The documents relating to the administration of this research, such as the consent form you sign to take part, will be kept in a folder called a site file. This is stored securely and can only be viewed by the research team. The folder can be checked

by people in authority who want to make sure that researchers are following the correct procedures. These people will treat your details confidentially.

What will happen to the information from the study?

The results of this study will be used to inform development of an initial rough programme theory of how we think the co-location model works. This will be used to inform further interviewing of patients and health care professionals. The results may be written up and anonymised for publication in scientific journals. We will be able to provide you with the overall results if you desire. The results will also be included in a PhD thesis.

All research data will be securely stored for at least 10 years after research completion. After your consent, your data may be shared with other researchers who are also conducting ethically approved research.

Who has reviewed this study?

This study has been reviewed by the Sheffield Hallam University Research Ethics Committee.

Who is funding the study?
This study is funded by Sheffield Hallam University and UK Active as part of a PhD programme of work.

What if I have further questions or would like more information about the study?
If you would like more information about the study, you are invited to contact: -

Natalie Grinvalds Led researcher natalie.grinvalds@student.shu.ac.uk

Dr. Robert Copeland Principal Supervisor r.j.copeland@shu.ac.uk
XXXXXXXXXXX

THANK YOU FOR TAKING THE TIME TO CONSIDER PARTICIPATING IN THIS STUDY

Natalie Grinvalds

Appendix 5: SHU ethics for NCSEM stakeholder interviews

Stakeholder interviews to explore the development and impact of the National Centre for Sport and Exercise Medicine (NCSEM) capital model in Sheffield

Q1. General overview of study *

This study aims to explore National Centre for Sport and Exercise Medicine (NCSEM) capital co-location model stakeholder perspectives through semistructured qualitative interviews. These stakeholders will be interviewed with a retrospective lens about their perspectives and experiences with regards to the initial development of the co-location model. This study is crucial to inform the tacit theory of why the model was developed and its anticipated impacts. As no existing comparable models exist that the researcher is aware of, it is important to understand what rationale went into the initial development to guide the development of a theory a change.

Q2. Background to the study and scientific rationale (if you have already written a research proposal, e.g., for a funder, you can upload that instead of completing this section).

see attached

Q6. Main research questions *

What are the perspectives of the NCSEM capital stakeholders with regards to formation of the co-location of leisure centres with GP practices?

What were the capital NCSEM stakeholders hoping to achieve with the development of co-location of leisure centres with NHS clinical services?

Q7. Summary of methods including proposed data analyses *

Include outline of techniques to be used but do not include actual protocols

To achieve the study aims, a multidisciplinary group of stakeholders from the capital NCSEM co-location model stakeholder group will be recruited to participate in qualitative research based on principles of a realist approach.

The research will consist of semi-structured interviews. The interviews will take place face-face or via telephone based on the interviews preference. Interview guides have been designed to develop an understanding of the perspectives of the stakeholders with regards to the development of the co-location model.

The schedule will cover:

- Their perspectives on what the initial co-location model was trying to achieve
- Their involvement (how, why and when they became involved)
- Their experiences with the development of the model
- Their perception of whether or not the model is working as intended and for what population

The interviews will be recorded with a digital voice recorded, transcribed, anonymised and analysed using thematic framework analysis. These results will be utilised to inform the development of an initial rough programme theory (IRPT) in line with the first step of a realist approach to research.

Q12. Where data is collected from human participants, outline the nature of the data, details of anonymisation, storage and disposal procedures if these are required (300 - 750)

Data collected from human participants will consist of audio recorded dialogue that will be anonymised and transcribed. The audio recordings and typed transcriptions will be stored on the Sheffield Hallam University secure drive. Paper copies will be securely stored in a drawer in Chestnut Court, Sheffield Hallam University Collegiate Campus. Data will be stored for a minimum of 10 years.

- **P6 - Human Participants - Extended ***

Q1. Describe the arrangements for recruiting, selecting/sampling and briefing potential participants. *

This should clearly indicate if participants with a particular health condition or healthy volunteers are being used, the inclusion and exclusion criteria. Upload and reference copies of any advertisements for volunteers, letters to individuals/organisations inviting participation and participant information sheets. The sample sizes with power calculations if appropriate should be included.

It is proposed that stakeholders will be purposively recruited from the initial capital NCSEM co-location model stakeholder group. These stakeholders consist of healthy participants ages 18 and over.

A purposive sampling strategy will be used to recruit study participants (See Table 1 below). A sample size will be approximated, but due to the use of thematic analysis which does not stipulate a predetermined sample size, this will be determined once themes reach saturation.

Table 1

Population	Inclusion Criteria	Exclusion Criteria	Method of recruitment	Target Number
Capital NCSEM co-location model stakeholders	Capital NCSEM co-location model stakeholders involved in the initial development	n/a	Email, telephone calls, word of mouth from interviews	As many stakeholders as possible (due to limited number this may be less than 20) or until themes reach saturation

Q2. Indicate the activities participants will be involved in. *
In particular this should highlight any instances of providing biological samples, taking pharmacologically active substances or nutritional supplements, or participating in diet or exercise programmes or activities.

Biological samples - provide full details of samples including number and power calculation as appropriate, who is undertaking the sampling, location, procedures for collection, preservation and storage to ensure compliance with Human Tissues Acthttps://www.hta.gov.uk. Please refer to the SHU Human Tissue Subcommittee web pages and ensure SHU processes are followed for documentation of collection, storage and disposal of samples.
Substances and supplements - give full details of the preparation, dose, treatment duration, a route of administrations and relevant safeguards you will put in place to prevent harm to participants.

Diet and exercise - give full details of the programmes, their content and duration and the relevant safeguards you will put in place to prevent harm to participants. **Q3. What is the potential for participants to benefit from participation in the research? ***
No direct benefits for participants are guaranteed although participation may aid in development of a theory which has the potential to improve NHS treatment long term.

Q4. Describe any possible negative consequences of participation in the research along with the ways in which these consequences will be limited *

No direct negative consequences are anticipated. The participant is welcome to skip any questions which they do not wish to answer.

Q5. Describe the arrangements for obtaining participants' consent. *
This should include uploads and references to the information that they will receive (participant information sheet), and participant written consent forms where appropriate. If children or vulnerable people are to be participants in the study, details of the arrangements for obtaining consent from those acting in loco parentis or as advocates should be provided.

Participant information sheets will be provided (see attached) will be provided explaining full details of the study. Participants will be asked to sign two written consent forms.

Q6. Describe how participants will be made aware of their right to withdraw from the research. *
This should also include information about participants' right to withhold information and a reasonable time span for withdrawal should be specified.

Participants will be made aware of their right to withdraw from the study in the participant information sheet. The participant will be given two weeks after the interview takes place to withdraw their information.

Q7. If your project requires that you work with vulnerable participants describe how you will implement safeguarding procedures during data collection *

Q8. If Disclosure and Barring Service (DBS) checks are required, please supply details *

Q9. Describe the arrangements for debriefing the participants. *

The participants will be reminded that the researchers contact information is provided on the participant information sheet and that they have the right to withdraw up to two weeks after the study. The participants will be reminded of the purpose of the study and the further opportunity to answer any questions.

Q10. Describe the arrangements for ensuring participant confidentiality. This should include details of: * * How results will be presented
* Exceptional circumstances where confidentiality may not be preserved *
If images/videos will be used, how is anonymity to be addressed?

In reporting of study outcomes, no names will be given to identify and participants (i.e., Participant 1, 2). The interviews will be audio recorded, transcribed, anonymised and stored on the secure Sheffield Hallam University Drive for a minimum of 10 years. Confidentiality agreements will be securely stored in a locked drawer at Chestnut Court, Sheffield Hallam University.

Q11. Are there any conflicts of interest in you undertaking this research? *
e.g., are you undertaking research on work colleagues or in an organisation where you are a consultant? Please supply details of how this will be addressed. n/a

Q12. What are the expected outcomes, impacts and benefits of the research? *

The expected outcomes from the stakeholder interviews are that the results will be used to inform the development of a theoretical framework which will then be tested and refined through further studies. The resulting theoretical framework has the potential to add to the literature on co-located health services, aid in the embedding of physical activity into NHS treatment pathways, leading to more empowered and engaged patients. This all could result in less of an economic burden on the NHS and the economy as a whole.

Q13. Please give details of any plans for dissemination of the results of the research. *

Dissemination includes contribution to a PhD programme of work as well as potential publication in a peer-reviewed academic journal. Data will be stored on the secure Sheffield Hallam University Drive for a minimum of 10 years.

Appendix 6: Stakeholder interview schedule

Stakeholder perspective of Sheffield NCSEM co-location development and impact

Stakeholder Interview Guide
Research objectives for stakeholder interviews:

- To help understand the development of the co-location model and its impact
- To ascertain insight into what is not available in the literature
- To assess stakeholder perspectives of theory themes from the literature

Introduction

- **Introduce self**
- **Introduce research**
- **Introduce interview aims**
- **Explain why they have been asked to participate**
- **Explain: confidentiality, recording, interview length (1hr approximately), nature of discussion, reporting and data storage**
- **Explain nature of realist interview:**
    - Structured and unstructured
    - Used to test researchers' theories: confirm, falsify or refine ○ Continuous probing with the question "why" to understand stakeholder perspectives of underlying causal processes • **Opportunity to ask questions**

Topic guide for stakeholder interviews Story

- **In your own words, what do you think was trying to be achieved by combining NHS clinical services within leisure centres?**
- **Tell me about when you first heard about the NCSEM co-location model • When did you become involved?**
    - What did you do next? ○ How did you go about finding out how to do this?
    - Tell me about your role with the NCSEM capital model?
    - Tell me about your experiences with NCSEM?

Actors

- **Whose idea was the NCSEM colocation model** ○ Who was involved at the beginning? ○ Who made the decisions?
    - What other examples of this concept of co-location informed your decisions?
        - ✦ i.e. evidence base?

Theory Testing

- **Do you think the co-location model is working for whom it was intended?**

<u>Phrasing and Word Choice example for theory "testing"</u>

- "There is this idea that"
- "What is it about X that makes a difference"
- "I see, So you are saying that …XYZ[CMO?]…is that correct?…"

- Why is this a good idea?

Theory themes:

- *This is what we hypothesise the co-location is doing…*
    - *How does this resonate with your ideas of how co-locating a leisure centre with NHS clinics is expected to work?*
    - *Does this work more for some people / patients / practitioners / managers / specialisms / types of appointments than others?*

Theory	**Counter-theory**
(1) Proximity of resources, single point of access, "one-stop" shop • a) convenience-PA and clinical appointment in same facility • b) saliency-PA is seen important because it is in the same facility as clinical appointments • c) immediacy-leisure centre is 'right there'-patients don't have to leave facility to go find PA opportunity (Williams, et al., 2012)	(1) Patients may not budget in extra time to attend PA referral following clinic visit and not return to leisure centre facility for next appointment because of NHS appointment allotment and waitlist of they may be given next available appointment at traditional musculoskeletal services at the hospital or care practice.
(2) Motivation of patients to exercise -co-location might help increase motivation in some patients who wouldn't be motivated to exercise in traditional clinic	(2) Patients may not be motivated to exercise, and colocation may not change this for some (Leemrijse, et al., 2015)
(3) **Long term conditions** may pose as a barrier to exercise referral and co-location working for some (because of fear of exercising with long term conditions) (Leemrijse, et al., 2015)	(3) Patients may feel supported in leisure centre environment that is co-located with health facilities because HCPs are working in same facility, and they may feel safer in their presence, and this may help lessen/reduce this barrier

(4) **Awareness of PA facilities** -co-location may aid in awareness because lack of awareness of where to refer patients to exercise can serve as a barrier. Being colocated can eliminate this barrier as the gym is "right there." (Leemrijse, et al., 2015; Leenaars et al., 2015)	(4) Patients may be aware but not feel comfortable in the leisure centre environment and remain unaware of the physical activity opportunities offered
(5) **Collaboration of health and exercise professionals** (cultural) -co-location of PA and health may make it easier for HCPs and exercise professionals to collaborate (Leemrijse, et al., 2015)	(5) HCPs and exercise professionals may not have time or willingness to collaborate, and co-location may not facilitate this (cultural)
(6) **Patient experience** in co-located health and leisure centre may be more positive in contrast to traditional exercise referral as co-location allows for seamless transition between HCP and exercise provider (Leemrijse, et al., 2015)	(6) Co-location may not have a positive effect or even have a negative effect due to implementation not working as intended

(7) **Affordability for patient, business model** - co-located health and PA facilities may provide more affordable option for patients making it more likely that HCPs will refer, and patients will attend (provided that co-located health and leisure provides reduced cost/free membership) - could eliminate cost barrier; also serve as a source of clients for leisure centre (Leemrijse, et al., 2015)	(7) **may not be affordable for all or a viable business model** -co-location may not be cheaper than exercise at a traditional facility
(8) **Buy-in from health practitioners**-for the co-location to work as intended, HCPs must support and promote PA referrals and facilitate communication between exercise professionals and HCPs; co-location may increase buy-in (Whitelaw et al., 2017)	(8) health practitioners may not support or provide leadership for PA in health care (lack of buy - in from health professionals)
(9) **Coordination/collaboration of health and PA professionals (structural)** -studies have found when HCPs and exercise providers collaborate, more referrals are likely to result and co-location may aid in this collaboration (Leemrijse, et al., 2015)	(9) Due to time constraints with NHS appointment scheduling or feasibility issues there may be lack of coordination between health and exercise professionals

(10) **Purpose built (perceived importance)** The fact that health clinics are purposely built with leisure centre may raise profile of PA as medicine (Williams, et al., 201	(10) Perhaps some patients will not recognise perceived importance and just see it as a convenient location for their NHS appointment
(11) **Multidisciplinary approach** impact on perspective/treatment priorities of the illness/condition (Williams, et al., 2012; Leenaars et al., 2015)	(11) Patients may not receive multidisciplinary approach due to NHS time constraints for appointments, lack of resources, coordination
(12) **Affordability for the system, business model**-may cut health care costs as PA can help prevent and treat disease that would otherwise be treated by more costly, acute services. Co-location may help free up other acute services (Jones, et al., 2007)	(12) -co-location may not be affordable or result in cost savings for NHS or leisure centre
(13) **integrated care environment of colocation will result in increased patient satisfaction and more positive, holistic patient experience** (Olsen et al., 2011;Moe, et al., 2016)	(13) negative or no difference in patient experience from integrated care environment to usua l care
(14) **positive staff experience** Staff feel cared; feel more pride and recognition in their work because of the integration of fitness into health and the time devoted to lifestyle intervention and behaviour change (Olsen et al., 2011)	(14) negative or unanticipated staff experience
(15) **instability of clinical** schedule meaning patients might not have appointments at colocated facility every time so co-location might not work as intended (due to contextual factors such as NHS structure and professional working patterns – i.e. set around the consultant's working pattern and not the patients) (McIntosh et al., 2015)	(15)
(16) **social environment** of a co-located environment might increase participation in PA as treatment (McIntosh et al., 2015)	

(17) access to **specialised exercise equipment** in co-located environment might increase participation in PA because of desirability of equipment and accessibility to patients that might not otherwise use it (McIntosh et al., 2015)	
(18) **logistical challenges (transport, distance & cost)** might be a barrier to some patients accessing co-located leisure and NHS clinics and prevent co-location from having the intended effect (Borjesson, 2013; McIntosh et al., 2015)	
(19) Discussing PA with patients in a co-located facility just **"makes sense"** and HCPs will be more motivated to do so. (Copeland, R, 2015- Hub and Spoke document; individual correspondence, 2018)	

Summary:

- Is there anything you would like to discuss in relation to what we have been talking about?

Appendix 7: Data management plan for NCSEM stakeholder interviews

Data Management Plan

Stakeholder interviews to explore the development and impact of the National Centre for Sport and Exercise Medicine (NCSEM) capital model in Sheffield

Principal Investigator/Researcher- Natalie Elizabeth Grinvalds

Plan data contact- natalie.grinvalds@student.shu.ac.uk

DATA COLLECTION
What data will you collect or create?

Audio-recordings and notes will be collected from hour long qualitative semistructured interviews with capital NCSEM stakeholders.

How will the data be collected or created?
Data will be collected through an approved digital audio recording device as well as via researcher collected notes**.**

ETHICS AND LEGAL COMPLIANCE How will you manage any ethical issues?
None that the researcher is aware.

How will you manage copyright and Intellectual Property Rights (IPR) issues?
None that the researcher is aware.

STORAGE AND BACKUP
How will the data be stored and backed up during the research?
The interviews will be audio recorded, transcribed, anonymised and stored on the secure Sheffield Hallam University Drive for a minimum of 10 years. Confidentiality agreements will be securely stored in a locked drawer at Chestnut Court, Sheffield Hallam University. Consent forms need to be securely stored *separately* from the data in a locked cabinet. After the project is completed, they will be stored in the University Archive. Once the project is complete, the researcher will contact the library who will arrange for the data to be transferred to SHURDA for long term storage and sharing

How will you manage access and security?
Ongoing data will be stored on the secure SHU Research Store Q Drive. Only the PhD researcher, Natalie Grinvalds and the supervisory team including Robert Copeland, Katie Shearn and Liam Bourke will have access.

SELECTION AND PRESERVATION
What data are of long-term value and should be retained, shared, and / or preserved?
What is the long-term preservation plan for the dataset?
The interviews will be digitally audio recorded, transcribed, anonymised and stored on the secure Sheffield Hallam University Drive for a minimum of 10 years.

DATA SHARING
How will you share the data?
Themes of interviews will be shared with participants to ensure accuracy and see if they have additional information to add, potentially for a further study.
Data will also be included as part of a publication and as a PhD thesis. A detailed methodology chapter will be included in the thesis which outlines methodology of the project and further information will be made available upon request to the author or Director of Studies.

Are any restrictions on data sharing required?

None of which the researcher is aware.

RESPONSIBILITY AND RESOURCES

Who will be responsible for data management?
The main PhD researcher, Natalie Grinvalds.

What resources will you require to deliver your plan?

Access to a secure university drive as well as a locked storage drawer and separate cabinet for consent forms on the SHU campus.

Appendix 8: Themes that emerged solely from the stakeholder interviews

The following themes emerged solely from the stakeholder interviews.

Relationship between Healthcare professional (HCP) and patient and patient to care

This theme highlights how co-location could change the relationship between the HCP and patient in addition to relationship of the patient to their care. This may not be the case for every patient, however, as some may prefer for the HCP to hold the authority for their healthcare decision making. It is hoped that through co-location, patient and HCP perspectives could evolve into a collaborative approach between the HCP and patient to promote health.

Participants described how co-location might foster a change in the relationship of the patient to the HCP and healthcare, from the patient taking a 'treatment' perspective to one of self-management. In addition, patients and HCPs may see themselves a team working together to promote health in contrast to the HCP holding sole authority.

> *Participant 5: "With regards to some patients wanting to be told what to do, yeah, I totally support that. You're always gonna get people that need to be told all the time, but you would hope that as part of that saying that the telling you know, that the telling changes to asking, sharing, as opposed to telling thoughts. That's typically what a good mentor or a good instructor would do. So, that the patient will take*

responsibility for their own actions for their own treatment…It's not just about kicking backsides and asking for more reps all the time. "

Therefore, through co-location, the relationship between some patients and their HCPs may change to one in which the HCP holds less authority for health decisions and actions, and the patients take more ownership and self-management. Likewise, the relationship between patients and their healthcare may also change. Due to individual psychological differences, preferences, health conditions and habits, some patients may not like taking more ownership for their own healthcare. Thus, co-location may not work to change relationships for all patients and HCPs.

Holistic Model of Health/Salutogenesis versus Pathogenesis & Prevention vs. Treatment

This theme suggests that co-location fosters a holistic, biopsychosocial, prevention focused approach to health in contrast to the traditional, biomedical, treatment focused approach to healthcare. This finding emerged through interviews with several stakeholders in their descriptions of the vision of the model of co-location they were trying to create. Although there is some overlap with the "positive patient experience" theory above, this theme was seen to be distinct and necessary to explain separately.

Participant 2: "… the system is still quite traditional. The format of going to an outpatient appointment at the hospital is still kind of seen as the unit of transaction in the same way that a 10-minute consultation with the GP is still the predominant thing. If we are going to adopt this more what I like to call. 'coaching approach to health', then we will have to think about the systems…you know that's a thing even in my practice I still struggle against … those in nursing and even patients that expect the more traditional approach… we are fighting against cultural change …if you're

too far ahead of the curve you're out of touch with reality, aren't you?...I know for instance that the pain clinic have co-located their services. They always have a bend towards getting people to encouraging people to move better and to think about how their physical activity impacts upon their condition and I think that they have really benefited from running their services up there because staff having shared along different lines of expertise. The physios and exercise instructors probably have a better understanding of what it means to address the specific needs of people with chronic pain. Probably the chronic pain experts have a much more holistic wider understanding of what they can offer in terms of exercise interventions they can offer."

Furthermore, the co-located design of the environment plays a role in promoting health. A health-promoting, or salutogenic environment may provide patients with a sense of coherence, meaning and manageability over their condition through the architectural design and access to leisure centre facilities which provide patients with a sense of control (Antonovsky, 1996a; Golembiewski, 2016a; Harrop et al., 2007; Schweitzer et al., 2004). Salutogenesis is involved with identifying the mechanisms and pathways which promote *health*, rather than those that maintain *illness* (pathogenesis) (Antonovsky, 1996a).

Participant 3: "The fact that you're going through the front door, and it hasn't got the hospital entrance, it hasn't got the NHS blue badge and everything else, it's important so people aren't thinking, 'Oh, I'm ill, I'm going to the hospital and everything else.' Just in terms of the subconscious, the psyche of it all, it really helps."

Participant 6 echoed these themes, as quoted in the "positive patient experience" theory previously described. He suggested that the co-located models create an environment that

is positive (not merely the absence of the negative). He suggested that the co-located models could have the ethos of PA, without being intimidating like a traditional gym or fitness centre could be to those with long term conditions.

A co-located environment is likely to have a salutogenic effect on those that are aware of the environmental design differences between the co-located environment and the traditional clinical settings or are able to utilise the resources that this environment provides. It may also work on a subconscious level, priming patients through their interactions with the environment in ways that are different to the traditional clinical setting.

Works Best For

This theme provided answers to the question of for whom does co-location "wok best for?" (Does co-location work more for some people/ patients/ practitioners/ managers/ specialisms/ types of appointments than others?)

The consensus amongst participants was hat co-location could work for any conditions, types of patients and HCPS.

Co-location appears to work best for chronic and lifestyle associated conditions, as they are most closely associated with interventions which PA plays a role.

Participant 5, UK University Head of Sport and Physical Activity, suggested that cardiovascular and associated diseases are a "good place to start."

In addition, co-location appears to work best for those (both patients and HCPs) that are most 'bought into' the model, however, perceptions may change upon habitual exposure to the co-located environment.

Participant 6 said that co-location works best for HCPs that are “bought-in” to the model.

The co-location of health and leisure to promote PA may work best for NCDs for which lifestyle factors play a role in prevention, treatment and management. The context of colocation may also work best for HCPs and patients that recognise and can act on the resources that the environment provides.

Co-location Alone Is Not Enough

This theme reflects the nature that it is ‘not enough’ to simply physically co-locate clinics with leisure centres; there are other essential factors which the actors, community and culture impart to facilitate successful co-location. Culture change was considered key to making co-location work.

> *Participant 1: “You can build it and they will come but they will do what they've always done. Knowledge, attitudes, and culture needs to change and it's an ongoing process.”*
>
> *Participant 2: “Culture change...if you’re going to change culture you have to think on lots of levels.”*
>
> Participant 6: “Actually *buying* in versus nice place to hold clinics.”

For co-location to work as intended to promote PA, it is necessary that there is a cultural change amongst HCPs, staff and stakeholders. Cultural change is a mechanism which could lead co-location to promote PA as intended.

Appendix 9: MRT search results

Criteria for selecting abstract substantiated theories to support initial theory building (Shearn et al., 2017)

Criteria	Explanation	Scoring
9		
Social strata	The layer within the social system that the theory relates to. That is, the extent to which the theory offers guidance for explaining phenomena at or between micro, meso or macro levels	0 = unstructured 1 = layer identified 2 = one or more layer identified and relations between them explained
Fit	The theory's potential fit with the general programme aims. That is, the extent to which the theory offers guidance for explaining the likely phenomena observed when looking at the transformation of services	0 = no fit 1 = likely partial fit 2 = likely full fit
Utility	The theory's simplicity. That is the extent to which the theory could be readily utilised as an inspirational tool for data collection / analysis.	0 = highly complex, hard to understand and apply 1 = complex but easy to understand and apply 2 = simple concepts easy to understand and apply
Compatibility	The theory's compatibility with realist notions of causation. That is, the extent to which they offer guidance for articulating underlying causal processes.	0 = limited or no compatibility with key tenets 1 = compatibility with key tenets but not explicitly realist 2 = compatible and explicitly realist

Criteria

Search strategy	Papers identifying theories	Middle range theories extracted	Social strata	Fit	Utility	Compatibility	Total
Suggested theory / own reading	Antonovsky, A. (1979). Golembiewski, J. A. (2017). Salutogenic Architecture in Healthcare Settings. In The Handbook of Salutogenesis (pp. 267-276). Springer, Cham. Schweitzer, M., Gilpin, L., & Frampton, S. (2004). Healing spaces: elements of environmental design that make an impact on health. Journal of Alternative & Complementary Medicine, 10(Supplement 1), S-71	Salutogenesis of innovations (Antonovsky, 1979)	2	1	1	2	6

	Hochbaum, G., Rosenstock, I., & Kegels, S. (1952). Health belief model. United States Public Health Service. Rosenstock, I. M., Strecher, V. J., & Becker, M. H. (1988). Social learning theory and the health belief model. Health education quarterly, 15(2), 175183.	Health Belief Model (HBM)	1	1	1	1	4
	Latané, B. (1981). The psychology of social impact. American Psychologist, 36(4), 343-356. Latané, B., Liu, J. H., Nowak, A., Bonevento, M., & Zheng, L. (1995). Distance	**-social impact:** Immediacy is one of three major determinants on virtually any form of social influence - **Social impact theory** assumes that most or all of the multiple processes of social influence can be understood at a metatheoretical level by seeing individuals as	2	1	1	2	6

	matters: Physical space and social impact. Personality and Social Psychology Bulletin, 21(8), 795-805.	located in social force fields determined by the strength, (persuasiveness, prestige), immediacy (closeness in time and space), and number of sources of influence, (including the self) -according to this theory the impact (defined as any effect on a target) exerted by a source decrease with increasing distance					
	Lewin, K. (1951). Field theory in social science. New York: Harper.	Field theory -Lewin's field theory argues that behaviour is derived from the totality of coexisting and interdependent forces that impinge on a person or group and make up the life space in which the behaviour takes place --" Behaviour is a function of the total situation"	2	1	0	2	5

	Bandura, A. (1986). Social foundations of thought and action: A social cognitive theory. Englewood Cliffs, NJ:	Social Cognitive Theory (Bandura, 1986)	1	2	2	0	5

	Prentice- Hall, Inc						
	Nova, N. (2004). Sociocognitive functions of space in collaborative settings: a literature review about Space, Cognition and Collaboration.	Theories/propositions about proximity -co-presence -visibility -proxemics	2	2	2	1	7

	Marchiori, D. R., Adriaanse, M. A., & De Ridder, D. T. (2017). Unresolved questions in nudging research: Putting the psychology back in nudging. Social and Personality Psychology Compass, 11(1), e12297. Thaler, R. H., & Sunstein, C. (2008). Nudge: Improving decisions about health, wealth, and happiness. New Haven, CT: Yale	Nudging, Theories of Automatic, Impulsive and Habitual Behavior; (de Ridder, 2014; Thaler & Sunstein, 2008) Simple changes in the presentation of choice alternatives that make the desired choice the easy, automatic or default choice. Requires autonomy: freedom of choice, a sense of awareness, and the healthy choice being default: easy and attractive”	1	2	2	2	7

	University Press. Eldredge, L. K. B., Markham, C. M., Ruiter, R. A., Kok, G., Fernandez, M. E., & Parcel, G. S. (2016). Planning health promotion programs: an intervention mapping approach. John Wiley & Sons.						
	Ajzen, I. (1991). The theory of planned behavior. Organizational behavior and human decision processes, 50(2), 179211.	Theory of planned behavior (TPB)	2	2	2	2	8
	social norms theory (Perkins and Berkowitz, 1986)	social norms theory (Perkins and Berkowitz, 1986)	2	1	2	2	7

	Theoretical Domains Framework (Cane, O'Connor, & Michie, 2012)	**Theoretical Domain Framework (TDF):** belief about consequences: outcome expectations-belief	1	2	2	2	7
		that exercise will harm					
		Systems Theory (Von Bertalanffy, 1968)	2	0	0	1	3
		Behaviour Change Wheel / Com-B (Michie et al., 2011)	1	2	2	1	6

Appendix 10: Patient and healthcare professional research protocol

EXPLORING THE CO-LOCATION OF NHS HEALTH SERVICES, PHYSICAL ACTIVITY AND LEISURE

PROTOCOL VERSION NUMBER: 4 DATES: 14/06/2019

RESEARCH REFERENCE NUMBERS

IRAS Number: XXXXXX

Sheffield Hallam University Ethic Review ID: XXXXXX

KEY STUDY CONTACTS

Insert full details of the key study contacts including the following

Chief Investigator	**Natalie Grinvalds** **Natalie.grinvalds@student.shu.ac.uk** **XXXXXXXXXX**
Academic Supervisor	**Professor Robert J. Copeland** **r.j.copeland@shu.ac.uk** **Telephone XXXXXXXXXX**

Study Co-ordinator	**Full contact details including phone, email and fax numbers**
Sponsor	**Angela Pinder** **Clinical Research & Innovation Office Co-ordinator** **Sheffield Teaching Hospitals NHS Trust** **(XXXXXXXXXXXXX XXXXXXXXX)**
Funder(s)	**SHU studentship and Ukactive**
Key Protocol Contributors	**Natalie Grinvalds** **Natalie.grinvalds@student.shu.ac.uk** **XXXXXXXXXX**

STUDY SUMMARY

Study Title	**Exploring the co-location of NHS clinical services, physical activity and leisure**
Internal ref. no. (or short title)	**Exploring the co-location of health, physical activity and leisure**
Study Design	**Realist qualitative interviews with health care professionals (HCPs) and patients**
Study Participants	**-NHS patients of Sheffield Teaching Hospitals attending clinic at Concord and Graves Leisure Centres** **-HCPs working at Concord or Graves Leisure Centres**
Planned Size of Sample (if applicable)	**-15-20 patients** **-15-20 HCPs**
Follow up duration (if applicable)	**N/A**
Planned Study Period	**July 2019-January 2020**
Research Question/Aim(s)	**Aim:** **As part of a realist evaluation, support the development of refined realist programme theory to explain, "How and in what ways, if at all, does the colocation of health and leisure centres work to promote physical activity, for whom, under what circumstances and why?"**

KEY WORDS: **Physical activity, exercise, sports medicine, preventative medicine, holistic health, integrative medicine, co-location**

Study Activity Schedule

(Note: the table below provides a rough outline and is subject to change pending date of ethical approval and recruitment fulfillment.)

Time Period	Activity
July 2019-January 2020	**Recruitment of health care professionals (HCPs) and patients**
August 2019-January 2020	**Conduct interviews with HCPs and patients**
August 2019-January 2020	**Transcription and analysis of interview data, refine interview schedule as needed**
January 2020	**End study**

STUDY PROTOCOL

Exploring the co-location of NHS health services, physical activity and leisure

1. Background

Physical inactivity and chronic disease

In the United Kingdom (UK), non-communicable chronic diseases (NCDs) account for almost 90% of total deaths (WHO 2014). Elimination of physical inactivity globally has the potential to remove up to 10% of the major NCDs as well as reduce allcause mortality rates (Lee et al., 2012). The Chief Medical Officers in the UK recommend that adults participate in at least 150 minutes of moderate intensity physical activity (PA) per week as well as two days of muscle strengthening exercise. While the benefits of PA are well known (DH, 2016), in 2016 only 66% of men and 58% of women met the recommended guidelines (NHS, 2018). More than one fifth of men (21%) and a quarter (25%) of women were classed as inactive (NHS, 2018).

Health and physical activity inequality

In more deprived areas, rates of NCDs are higher and people are less active (Farrel et al., 2013; WHO, 2011). The barriers to PA that adult in lower socioeconomic status (SES) groups face are underpinned by lower social capital and cohesion (Lindström, et al., 2001). This highlights the need to address the wider social determinants of health as part of a drive to increase PA at a population level. In other words, making PA more accessible and equitable for all has to be the priority.

Addressing physical activity levels in primary care

Historically in the UK, the dominant model for addressing physical inactivity and NCDs has been through exercise referral (ER) linked to primary care practices (PCPs). General practitioners (GPs) can prescribe or refer at risk patients to participate in an exercise programme to reduce their risk or manage existing disease. These programmes often take place in leisure facilities in different parts of a city/town. However, many barriers exist, and considerable uncertainty remains as to the efficacy and cost effectiveness of ER schemes in primary care (Pavey, et al., 2011).

Co-location and health

An alternate option to ER in primary care is to bring together health and PA services through a model of physical co-location. In 2016, Baroness Tanni Grey-Thompson made a call for a £1 billion investment into regeneration of leisure centres, which would combine several services such as GP clinics, library and police services into "wellness hubs." The aim of these "one-stop shops" would be to empower individuals to take a self-management approach to their health and ultimately aid in prevention of costly NCDs (UKactive, 2016). Studies of co-located facilities, meaning housing "under one roof, "or creating structural linkages between different services from normally disparate areas such as health services with social care, have shown improvement in service delivery, quicker referral, improved knowledge acquisition, shared learning and greater innovation (Jackson, et al., 2007; Memon & Kinder, 2017; Todahl, et al., 2005). A "one-stop shop" or co-located centre would provide an opportunity for practitioners to have conversations with patients around PA in a facility that is contextually appropriate. A co-located environment where the leisure centre is just down the corridor could eliminate barriers for some patients, prime the discussion of PA for HCPs and normalise the idea of participating in PA for patients (Copeland, 2015; Leotta, et al., 2011; Speake, et al., 2016).

The National Centre for Sport and Exercise Medicine (NCSEM) Sheffield and the Co-Location Model

As part of the 2012 London Olympic Legacy, three consortia, including Sheffield, were awarded £10 million per consortia from the Department of Health (DH) to develop a National Centre for Sport and Exercise Medicine (NCSEM) with the aim of improving the health of the nation through sport, exercise and physical activity.

The NCSEM works towards impact across 5 core themes: (1) Physical Activity in Disease Prevention, (2) Physical Activity in Chronic Disease Treatment, (3) Sports Injuries and Musculoskeletal Health, (4) Mental Health and Wellbeing, and (5) Performance Health. In Sheffield, specifically, the vision of the local NCSEM (NCSEM Sheffield) is to create a culture of PA, through the local "Move More"

strategy, which aims to transform Sheffield into the most active city in the UK (Copeland, 2015).

As part of achieving this aim, clinical services, PA opportunities and researchers were co-located together in three leisure centres across the city (Copeland, et al., 2015). The goal of these sites was to embed PA as a treatment option within NHS services (Copeland, 2015). Additionally, the aims of the NCSEM facilities aligned with the Sheffield Clinical commissioning Group (CCG) aspirations at the time to redevelop MSK services and bring care closer to patients, in their communities.

Locations

The co-location model has been established in three NCSEM facilities across Sheffield (Graves, Thorncliffe and Concord). The three co-located sites were chosen because of their location within areas of higher-than-average deprivation, high incidence of NCD, proximity to green space and geographical spread across the city, thereby, enhancing access to a broad as possible population. The intention was that these facilities would serve individuals in those communities and address health inequalities and accessibility issues (Copeland, 2015). Almost all of the wards that the sites serve fall into the 10% most deprived neighbourhoods in England (except for Brightside) (Ministry of Housing, Communities & Local Government, 2015). The three facilities were newly developed or redeveloped with existing facilities. All three sites have the Move More branding and signage prominently displayed on the exterior and the inside of the buildings. All three facilities have been developed with a similar ethos and were developed with attention paid to the physical environment by making these sites brightly painted, open and well-lit. Priming strategies are in place in the facilities using signage, case studies and other environmental features such as prominent placement of the stairs. These features aim to help normalise having a discussion around PA during the appointment.

Rationale

The co-location model could reduce barriers to PA, improve patient empowerment, self-management, HCP promotion of PA, enhance productivity and reduce absenteeism rates, which could lead to more efficient and improved patient care. Colocation of clinical services within leisure centres could foster a culture of PA, making it easier for HCPs to prescribe and refer patients to PA and reducing barriers for patients to participate in PA.

Whilst this model has the potential to impact service design, healthcare delivery and policy, resulting in adoption of new forms of co-location across the UK and internationally, there is no existing theory or empirical evidence to explain why or how co-location works (or not).

Co-locating NHS secondary care clinics with leisure centres is considered a complex intervention due to multiple interacting components and non-linear causal pathways (Petticrew, 2011). Therefore, it is necessary to try to unearth the underlying

processes which contribute to making the co-location work (or not) to help build initial programme theories of how co-located health, leisure and PA work. Traditional methods of review such as scoping and systematic reviews lack the utility to examine the underlying causal processes of programme theories and are typically focussed only on outcomes rather than a chain of events that lead outcomes to occur (or not) (Pawson, 2013; Pawson & Tilley, 1997). Realist evaluation seeks to understand programme theory, the underlying mechanisms and the contexts in which they may operate.

A realist evaluation, which includes interviews with key stakeholders (HCPs and patients) is the next step in developing refined realist theory of what works for whom, under what circumstances and why, for co-location of health and physical activity in leisure centres.

2. Research Question

- Research Question: How and in what ways, if at all, does the co-location of health and leisure centres work to promote physical activity, for whom, under what circumstances and why?
- Aim: To explore what works for whom, under what circumstances and why for the co-location of health, PA and leisure.
- Objective: To test initial rough programme theories through semi-structured realist interviews with patients and HCPs.
- Outcomes:
    1. To develop refined programme theory of what works for whom, under what circumstances and why for the co-location of health, PA and leisure.
    2. To add to the empirical evidence of what works for whom, under what circumstances and why for the co-location of health, PA and leisure.

3. Method

Design

The theoretical framework for the study is of realist methodology, specifically a realist evaluation. Realist evaluation is theory-driven and seeks to illuminate underlying causal processes of a programme or intervention (Pawson, 2013; Pawson & Tilley, 1997). Realist approaches are well-suited to evaluating complex programmes or interventions, that which co-locating health, leisure and PA is considered (Pawson, 2013; Pawson & Tilley, 1997).

Realist approaches work best for evaluating new initiatives or programmes that may be scaled up in the future. Realist evaluation seeks to understand programme theory, underlying mechanisms and the contexts in which they may operate. Because the NCSEM co-location model is a new initiative, a complex "intervention", no theory currently exists and because this area is of interest to policy (Ukactive, 2016) and health care decision makers, a realist evaluation is appropriate for this research**.** A realist evaluation of interviews with patients and HCPs will be conducted

to further refine initial programme theories that were developed in an earlier study with capital NCSEM stakeholders.

3.1 Sampling and Recruitment

To answer the research question of "How and in what ways, if at all, does the co-location of health and leisure centres work to promote physical activity, for whom, under what circumstances and why?" it is important to speak to those that use and work in the facilities. The "co-location" may be working differently for different clinical areas and service users, because of factors related to the condition, prior knowledge, attitudes and beliefs of patients or HCPs, demographic issues, and experiences. The IRPTs suggest that the benefits and challenges associated with co-location may vary for different patients and HCPs, including patients with varying levels of health condition severity and a range of levels of received health status.

The study population will consist of 15-20 HCPs and 15-20 patients that work or attend one of four different clinical services at Graves and Concord Leisure Centres. (For the pragmatic reasons that this study forms part of a PhD, the sample will be drawn from the two NCSEM sites (Graves and Concord Leisure Centres) with the longest established models of co-location.

The proposed number of interviews to be carried out is only an approximate plan as the process of theory testing in realist evaluation can be unstable and unpredictable, thus sample size can only be "weakly elaborated beforehand" (Emmel, 2013; Manzano 2016). A clearer idea of sample size can be defined shortly after fieldwork begins (Manzano, 2016). Practically speaking, the data from 30-40 participants in total (HCPs and patients) will provide a rich data set to support a detailed refinement of the theories and adequately address the research questions. According to the *RAMESES Quality and reporting standards for realist evaluations*, sampling follows a rigorous and sequenced process of theory testing (Wong, et al., 2017). The sample of relevant respondents should be sufficiently large and diverse to provide evidence across subgroups and contexts (Wong, et al., 2017).

<u>Patients</u>

Initial rough programme theories (IRPTs) were produced through a rapid review and interviews with capital NCSEM stakeholders in phase 1of a PhD project. The IRPTs did not suggest any factors relating to co-location that are specific to any particular disease groups, therefore, the recruitment of patients will come from across different services that are currently co-located within the NCSEM.

Patients will be recruited from four clinical groups. These groups include musculoskeletal, pain management, diabetes and podiatry that take place at Graves and Concord Leisure Centres. The purposive sample will include patients with a range of levels of severity of different health conditions across the different services. This will

encompass patients with short term, acute conditions to long term, chronic conditions as well as patients who subjectively feel their health is reduced (selfreported from the EQ-5D scale and/or HCP diagnosed condition).

A person specification and corresponding questionnaire will be provided to HCPs s to assist in identifying patients who fit the criteria to the study. Whilst this strategy may be quicker at identifying patients that meet the criteria, it has the potential to introduce "gatekeeper bias", with the HCPs own biases and opinions affecting their selection of patients (Guillemin, et al., 2017). To reduce this bias, patients will be randomly selected from the list that meet the criteria. Patients will also be approached in the waiting areas of the sites explaining the research and inviting them to participate. Additionally, patients will also be recruited using posters displayed in waiting areas of Graves and Concord, leaflets given to administrative staff to distribute with patient mailings and through word of mouth. In cases of low recruitment, further briefings will be delivered at local patient support groups explaining the research (i.e Diabetes UK).

Patients that self-recruit will be asked to fill out a short screening questionnaire to assess their subjective health status and current physical activity levels. Developing a clear participant criteria/person specification, recruiting participants through different individuals and different channels of communication, as well as using multiple recruitment strategies can help eliminate some of the bias.

A participant information sheet will be available for all HCPs (Appendix 1) and patients (Appendix 2) to read. They can then speak to the lead researcher by phone/email/in person regarding any questions they may have. After 24 hours to consider the information, interested participants will be contacted to see if they wish to participate and arrange an interview time and date that is convenient for them. If they wish to participate, they will be asked to sign a written consent (Appendices 3 and 4) form prior to the start of the interview.

Interviews will be scheduled at a time and place convenient for the participant.

Health Care Professionals (HCPs)

HCPs will work in one of the four following clinical service areas: musculoskeletal, diabetes, pain management or podiatry at Graves or Concord Leisure Centres. To test the IRPTs, it is necessary to interview HCPs with differing levels of referral of patients into PA pathways.

HCPs will be identified through speaking to clinical service leads, word of mouth and attending HCP team meetings. HCPs will also be recruited via posters in common areas, communicating the research with HCPs by directly approaching them in the sites when they are available, as well as an email sent by their service lead. Another way HCPs will be recruited is ask for permission to attend staff training/in-service days where the lead researcher will explain the research and the pros and cons of participating. HCPs may be too busy to read emails, so this is another means of recruiting them. Recruitment of HCP

will be with full permission and guidance from service leads and managers to ensure that all eligible staff are aware of the study. Eligible HCPs will be from any role (These include MSK/Physioworks physiotherapists, diabetes specialists (includes consultants, nurses and allied HCPs), rheumatologists, podiatrists, pain specialists.

Table 1.

Population	**Inclusion criteria**	**Exclusion criteria**	**Method of recruitment**	**Target number**
Patients	-ages 18 and older -attending NHS clinical services in MSK, pain management, diabetes and podiatry at Graves or Concord Leisure centre	-not currently receiving care from MSK, pain management, diabetes and podiatry at Graves or Concord -younger than 18 -individuals suffering from acute or emergency medical conditions -individuals who are considered unsuitable by their referring HCP -individuals who do not provide written consent	-identified by health professionals and referred to the lead researcher -approaching directly before/after clinics -recruitment posters displayed at clinics -local independent patient groups (e.g., Diabetes UK Sheffield group)	15-20

Health care professionals (HCPs)	-currently involved in care or treatment of patients from MSK, pain management, diabetes and podiatry at Graves or Concord Leisure Centres -received an information pack and provided written consent	-not currently involved in care or treatment of patients from MSK, pain management, diabetes and podiatry at Graves or Concord -not provided written consent	- identification through speaking to clinical service leads, word of mouth and attending HCP team meetings -posters in common areas - communication of research with HCPs by directly approaching them in sites when they are available - email sent by their service lead - attendance at staff training/inservice days to explain research	15-20

3.2 Consent All participants will be provided a written information sheet (Appendices 1 & 2). Each participant will be given the opportunity to speak with the lead researcher, or another member of the research team if they wish, to ask any questions and discuss any concerns. The participant will be given a consent form (Appendices 3 & 4). to take home and complete in order to have time to decide whether to participate. Written consent will be obtained prior to the interview taking place. As new evidence emerges and theories evolve, it may be necessary to repeat interview select participants. Participants will be made aware they have the option to consent to this prior to the interview and can provide consent to be contacted should it be necessary to interview them again at a later time.

3.3 Interviews

The interviews will consist of semi-structured questions about the participants experiences and views of the co-location model, physical activity and their health. In line with realist methodology, the interviews will be theory-led, based 'teacher-learner cycle,' whereby the interviewer places theory before the interviewee to comment on, refute and help to refine (Manzano, 2016; Pawson, 1996). Participants may be asked, "why" several times following some of the interview questions to gain a deeper understanding of why processes may or may not be happening. (See attached Interview Schedule, Appendix 5). The interview schedule will follow an

iterative approach, adapting to the participants experiences. As mentioned above, it may be necessary to schedule repeat interviews as theories evolve. Because of the iterative nature of realist methodology, the specific participants to be interviewed a second time cannot be decided prior to interviews, but participants will be made aware in the participant information sheet and in the consent form that they may be contacted for a repeat interview, only with their consent.

3.4 Data Analysis

Interviews will be audio recorded, transcribed verbatim and pseudonymised. Data will be collected through an approved digital audio recording device as well as via researcher collected notes. Transcripts will be uploaded into qualitative data analysis software (QDA) QSR-NVivo Version 11 to aid data analysis using a framework analysis (Ritchie & Spencer, 1994) approach based on key aspects of the initial rough theories in the first phase of the research. Excerpts from the interview transcripts will be allocated to the pre-developed coding framework based on the initial programme theories. Where data does not fit pre-existing codes, new codes will be developed. Data will be analysed against a framework based on the initial rough programme theories. Analysis within and across cases will be used as well as triangulation with other sources will be used to increase validity and reduce bias. The refinement and development of programme theories will be completed with members of the researcher's supervisory team to ensure

4.0 Data Protection and Confidentiality

Audio files and pseudonymised transcripts will be stored on the secure Sheffield Hallam University (SHU) Drive for a minimum of 10 years. Confidentiality agreements will be securely stored in a locked drawer at Chestnut Court, Sheffield Hallam University. Consent forms need to be securely stored separately from the data in a locked cabinet. Ongoing data will be stored on the secure SHU Research Store Q Drive. Only the PhD researcher, Natalie Grinvalds and the supervisory team including Robert Copeland, Katie Shearn and Helen Speake. Any data to be shared electronically will be encrypted and password protected. Data collected in the field will be USB encrypted in the field and transferred at the earliest possible opportunity to secure systems. All computers and laptops will be password protected. Participants will be assigned an identification number and names and personally identifiable information will be removed from the data. Only members of the research team will have access to transcripts and/or audio recordings. Members of the research team only for the purposes of triangulation and discussion of framework analysis and/or academic supervision. The data will be analysed at Sheffield Hallam University and/or via an encrypted password protected laptop at the lead researcher's home address. Triangulation of the data may take place with members of the research team at Sheffield Hallam University. Only anonymised data that participants cannot be directly or indirectly identified will be stored after the study has ended. This data will be stored in the Sheffield Hallam University's Repository for Data (SHURDA) before the end of the research project. The data will be stored in the SHURDA archive for 10 years. Personally identifiable data will not be published. Any information that could indirectly identify study participants will not be published.

5.0 Dissemination

Feedback to patients and health care professionals will be through collaboration with Clinical teams at Graves Leisure Centre as well as through dissemination to Patient Participation Groups (PPG)/Patient Reference Groups (PRG), such as I*nvolve Me*. Dissemination through existing groups and health bodies is intended to minimise excessive contact which could be burdensome for patients. Dissemination publicly will take place at Sheffield Hallam University, through conferences and as part of a PhD thesis, conference presentations, journal manuscripts, NCSEM board meetings and STH staff in-service meetings.

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Appendix 11: Ethics and approvals for HCP and patient interviews

SHU Ethics: HCP and Patient Interviews

Exploring the co-location of NHS health

services, physical activity and leisure Ethics

Review ID: XXXXXXXXX

Workflow Status: Approved with Advisory Comments

Type of Ethics Review Template: IRAS - projects requiring NHS or HMPPS ethics

Primary Researcher / Principal Investigator

Natalie Grinvalds

(Health and Wellbeing)

Converis Project Application:

Q1. Is this project: ii) Doctoral research

Director of Studies

Robert Copeland

(Health and Wellbeing)

Supervisory Team

Katie Shearn

Helen Speake

(Centre for Sport and Exercise Science), (Nursing & Midwifery)

Q3b. External Investigator Details: Angela Pinder Clinical Research & Innovation Office Coordinator

Sheffield Teaching Hospitals NHS Trust (XXXXXXXXXXXXXXXXX)

Q4. Proposed Start Date of Data Collection: 24/06/2019

Q5. Proposed End Date of Data Collection: 11/12/2019

Q6. Will the research involve any of the following:

i) Participants under 5 years old: No

ii)Pregnant women: No iii) 5000 or more participants: No iv) Research being conducted in an overseas country: No

Q7. If overseas, specify the location:

Q8. Is the research externally funded? No

Q9. Will the research be conducted with partners and subcontractors? No

Q10. Does the research involve one or more of the following?

i. Patients recruited because of their past or present use of the NHS or Social Care: Yes

ii. Relatives/carers of patients recruited because of their past or present use of the NHS or Social Care: No iii. Access to data, organs, or other bodily material of past or present NHS patients: No iv. Foetal material and IVF involving NHS patients: No

v. The recently dead in NHS premises: No

vi. Participants who are unable to provide informed consent due to their incapacity even if the project is not health related: No

vii. Prisoners or others within the criminal justice system recruited for health-related research: No

viii. Prisoners or others within the criminal justice system recruited for non-health-related research: No

ix. Police, court officials or others within the criminal justice system: No

Is this a research project as opposed to service evaluation or audit? Yes

Q11. Category of academic discipline: Life Sciences

Q12. Methodology: Qualitative

P8 - Attachments

Are you uploading any recruitment materials (e.g. posters, letters, etc.)?: Yes

Are you uploading a participant information sheet?: Yes

Are you uploading a participant consent form?: Yes

Are you uploading details of measures to be used (e.g. questionnaires, etc.)? Non Applicable
Are you uploading an outline interview schedule/focus group schedule?: Yes

Are you uploading debriefing materials?: Non Applicable

Are you uploading a Risk Assessment Form?: Yes

Are you uploading a Serious Adverse Events Assessment (required for Clinical Trials and

Interventions)?: Non Applicable

Are you uploading a Data Management Plan?: Yes

Are you uploading a draft IRAS application and supporting documents?: Yes

Upload:

Appendix 5_ Interview schedulesv2030319.docx

Appendix 3_ Consent Form Realist Interviews Health

care professionals_v3_12_03_19 (1).docx

IRAS references (2).docx

Risk Assessment Form.docx

Appendix 4_ Consent Form Realist Interviews

Patients_v3_26_03_19 (1).docx

Patient Recruitment Poster v2_02_04_19.docx

Appendix 1_Health care professionals

(HCPs) Participant Information Sheet Realist

Interviewsv4_11_04_19.docx

Appendix 2_ Patient Participant Information Sheet

Realist Interviewsv4_02_04_19.docx

Health care professional Recruitment Poster

v1_01_04_19.docx

Screening Questions Patients.docx

Protocol NG_v4_27_03_19.docx

FullDatasetTrialForm (16).pdf

P9 - Adherence to SHU Policy and Procedures

Primary Researcher / PI Sign-off:

I can confirm that I have read the Sheffield Hallam University Research Ethics Policy and Procedures: true

I can confirm that I agree to abide by its principles: true

Date of PI Sign-off: 13/05/2019

Director of Studies Sign-off:

I confirm that this research will conform to the principles outlined in the Sheffield Hallam University

Research Ethics policy: true

I can confirm that this application is accurate to the best of my knowledge: true

Director of Studies' Comments: This is a considered and well-constructed programme of research that has

real-world impact through the NCSEM. The ethical conditions for the study have

been thoroughly considered and this presents little risk to patients and researcher.

Date of submission and supervisor sign-off: 27/05/2019

Director of Studies Sign-off

Robert Copeland

P10 - Review

Comments collated by Lead Reviewer (Or FREC if escalated): I have no major ethical concerns

regarding the study. I have highlighted several points below that might be picked up by the HRA assessor/

NHS REC that the researcher may want to amend before submitting the IRAS application if they haven’t

already done so. There is a lot of repetition in IRAS forms in A6-2 and A13. Section A21 - over what period

of time will the participant be involved in the study if they are selected for a second interview (e.g., 6 months)?

A72 - might also be worth ticking 'other' for Graves and Concord as data collection will take place there.

Recruitment Randomly sampling from those who meet the inclusion criteria might unnecessarily limit the

number of participants who can be recruited in the 5–6-month study period. If random sampling is to be

used please provide further details i.e., how and when participants will be randomly sampled and what will

happen with those who are not selected. Supporting documents Consent form: Need a statement to say 'I

understand I can withdraw at any time without giving a reason for my withdrawal or to decline to answer any

particular questions in the study'. This could replace statement 2 and be followed by statement 8. Ceasing

participation in the study and withdrawing data from the study are two different things and this needs to be

clearer in the consent form. How long will personal identifiable data be kept for? The HCP consent form has

a reviewer comment that needs removing/addressing. Participant information sheet: Version number and

IRAS number could go in header. If participants will be asked again at the end of the interview if they would

be willing to participate in a second interview, perhaps the statement about a second interview should be

removed from the informed consent form. Typo at the bottom of page 2 (HCP PI sheet). Remove second 'for'

in 'What is the legal basis for research for studies?' Will also be reviewed by NHS REC not just HRA. Once

the application has been allocated to a review board, include the name and ethics number in the participant

information sheet. Screening questionnaire: The questionnaire lacks explanation and explicit questions. I.e.

please indicate which facility you attended. Problem with formatting - cannot see scales.

Why is postcode required when this isn't an inclusion/exclusion criterion. Doesn't ask for age.

Final Decision to be completed by Lead Reviewer (or FREC if escalated): Approved with advisory

comments

Date of Final Decision: 12/06/2019

P12 - Post Approval Amendments

Amendment 1

In my judgement amendment 1 should be: Select Amendment Outcome

Amendment 2

In my judgement amendment 2 should be: Select Amendment Outcome

Amendment 3

In my judgement amendment 3 should be:: Select Amendment Outcome

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HRA approval

Miss Natalie E Grinvalds PhD Researcher

Sheffield Hallam University c/o A017 Collegiate Hall Centre for Sport and Exercise Science Sheffield Hallam University S10 2BP

Email: XXXXXXXX@nhs.net XXXXXXXXXXXXXXXXX

11 October 2019

Dear Miss Grinvalds

Study title: Exploring the co-location of NHS health services, physical activity and leisure IRAS project ID: 261778 Protocol number: 5 REC reference: 19/LO/1304

I am pleased to confirm that **HRA and Health and Care Research Wales (HCRW) Approval** has been given for the above referenced study, on the basis described in the application form, protocol, supporting documentation and any clarifications received. You should not expect to receive anything further relating to this application.

Please now work with participating NHS organisations to confirm capacity and capability, in line with the instructions provided in the "Information to support study set up" section towards the end of this letter.

How should I work with participating NHS/HSC organisations in Northern Ireland and Scotland? HRA and HCRW Approval does not apply to NHS/HSC organisations within Northern Ireland and Scotland.

If you indicated in your IRAS form that you do have participating organisations in either of these devolved administrations, the final document set and the study wide governance report (including this letter) have been sent to the coordinating centre of each participating nation. The relevant national coordinating function/s will contact you as appropriate.

Please see IRAS Help for information on working with NHS/HSC organisations in Northern Ireland and Scotland.

How should I work with participating non-NHS organisations? HRA and HCRW Approval does not apply to non-NHS organisations. You should work with your non-NHS organisations to obtain local agreement in accordance with their procedures.

What are my notification responsibilities during the study?

The standard conditions document "*After Ethical Review – guidance for sponsors and investigators*", issued with your REC favourable opinion, gives detailed guidance on reporting expectations for studies, including:

- Registration of research
- Notifying amendments
- Notifying the end of the study The HRA website also provides guidance on these topics and is updated in the light of changes in reporting expectations or procedures.

Who should I contact for further information? Please do not hesitate to contact me for assistance with this application. My contact details are below.

Your IRAS project ID is **261778**. Please quote this on all correspondence.

Yours sincerely,

Thomas Fairman HRA
Approvals Manager

Email: XXXXXXX@nhs.net

Copy to: *Dr Keith Fildes (Sponsor Contact)*

List of Documents

The final document set assessed and approved by HRA and HCRW Approval is listed below.

Document Version Date Copies of advertisement materials for research participants [Health care professional recruitment poster]

2 15 May 2019

Copies of advertisement materials for research participants [Patient recruitment poster]

3 15 May 2019

Evidence of Sponsor insurance or indemnity (non NHS Sponsors only) [Indemnity Insurance] Interview schedules or topic guides for participants [Interview Schedules]

2 03 March 2019

IRAS Application Form [IRAS_Form_12072019] 12 July 2019 Non-NHS/HSC Site Assessment Form [Risk Assessment] 1 01 April 2019 Other [CV+RC+19 (2)] Other [CV+HS] Other [Provisional Opinion Corrections] 1 08 October 2019 Other [Katie Shearn CV 2019 short] Participant consent form [Health care professional consent form] 5 12 June 2019 Participant consent form [Patient consent form] 5 12 June 2019 Participant information sheet (PIS) [Health care professional Participant Information Sheet]

5 15 May 2019

Participant information sheet (PIS) [Patient Participant Information Sheet]

5 15 May 2019

Participant information sheet (PIS) [Health care professional Participant Information Sheet]

6 13 September 2019

Participant information sheet (PIS) [Patient Participant Information Sheet]

6 13 September 2019

Research protocol or project proposal [Protocol] 5 14 June 2019 Summary CV for

Confirmation of capacity and capability

IRAS project ID 261778

Information to support study set up
The below provides all parties with information to support the arranging and confirming of capacity and capability with participating NHS organisations in England and Wales. This is intended to be an accurate reflection of the study at the time of issue of this letter.

Types of participating NHS organisation

Expectations related to confirmation of capacity and capability

Agreement to be used

Funding arrangements

Oversight expectations **HR Good Practice Resource**

Pack expectations

There is only one participating NHS organisation therefore there is only one site type.

Research activities should not commence at participating NHS organisations in England or Wales prior to their formal confirmation of capacity and capability to deliver the study.

The single NHS

A Local organisation taking Collaborator part in the study

should has confirmed it appointed at study does not require

sites any agreement for this non- interventional student

project.

No external funding has been sought.

No Honorary Research Contracts, Letters of Access or pre-engagement checks are expected for local staff employed by the participating NHS organisations.

Where arrangements are not already in place, research staff not employed by the NHS host organisation undertaking any of the research activities listed in the research application would be expected to obtain a Letter of Access based on standard DBS checks and occupational health clearance.

Other information to aid study set-up and delivery

This details any other information that may be helpful to sponsors and participating NHS organisations in England and Wales in study set-up.

The applicant has indicated they do not wish to apply for inclusion on the NIHR LCRN Portfolio.

Appendix 12: Participant information sheets for patient and HCP interviews

Patient participant information sheets

Sheffield Hallam University

National Centre for Sport & Exercise Medicine
Working for Health & Wellbeing

Participant Information Sheet Version 6: 13.09.2019 IRAS Number: 261778

Exploring the co-location of NHS health services, physical activity and leisure

Patient Interviews

We would like to invite you to take part in a research study. Before you decide, you need to understand why the research is being done and what it will involve for you. Please take time to read the following information carefully.

What is the purpose of the study?

This study is being conducted as part of a programme of research. We are looking at what happens when health clinics are put together with leisure centres. The aim of combining health clinics with leisure centres is to make physical activity part of NHS care.

We are trying to understand how patients understand and experience co-location. We will compare those experiences with our ideas about how it is working, for whom it is working for, under what circumstances and why.

Why have I been invited to take part?

You have been invited to take part because you have attended or currently attend clinics at Graves or Concord Leisure Centres from one of the four following clinical services: musculoskeletal (MSK) physiotherapy, diabetes, podiatry and/or pain management. The research is being done with patients attending Graves and

Concord. We want to understand their experience of attending a clinic that's based in a leisure centre.

What will happen if I choose to participate?

If you decide to take part, you will be asked to participate in an interview. This can be arranged at a time convenient for you, either around your appointment at Graves or Concord, another convenient location for you, Sheffield Hallam University, or by telephone. The interview will last approximately one hour. With your permission, the interview will be audio recorded so that the researcher can listen back to it at a later time, and it can be written up. With your permission, we may contact you to be interviewed again at a later date. This is optional and you can decide whether to participate in a follow up interview. We will ask you again at the end of the interview if you would like to be contacted for a follow up interview. If agreed, the second interview will take place at Graves or Concord, Sheffield Hallam University (City or Collegiate campus) or via telephone.

The topics to be discussed will include your experiences of attending clinics at the centres, your personal health and physical activity. During the interview, we will present to you some ideas of how we think the co-located centres (Graves or Concord) might be working to see what you think and to understand your opinion. There will be no right or wrong answer.

You do not have to answer or make a comment on any topic if you do not wish to do so. You will be asked to agree to the interview being recorded by signing the consent form.

What are the possible benefits of taking part?
This study may not benefit directly, but your answers may help to improve health care and the way services are run for all, long term.

What are the possible disadvantages of taking part?
Some topics can be sensitive, such as talking about personal health issues. However, the researchers are experienced, and you will not be asked to talk about anything which makes you uncomfortable. If there is any topic or question that makes you uncomfortable you can let the researcher know and we will move on.

If you require any further information about any personal concerns you are facing, we will be happy to direct you to the relevant help.

If during the interview you were to disclose intention to harm yourself or another person, confidentiality would be breached for your safety and that of others.

Do I have to take part?
It is up to you to decide whether or not to take part in this research. If you wish to volunteer, you will be asked to sign a consent form to show that you have read this information sheet and agreed to take part. You are free to withdraw your information

from the study up to two weeks after the interview. Taking part in this study will not affect your medical care in any way.

What if I change my mind during the study?
You are free to withdraw from the study at any time without affecting your treatment. If you choose to do so, you will no longer be contacted about the study and information about you will no longer be collected. If you withdraw two weeks after the interview, data already collected as part of your participation in the study will remain as part of the study records and cannot be removed.

Will my involvement in the study be kept confidential?
Yes. We will follow legal and ethical practice and all information about you will be handled in strict confidence.

We will write up your interview recording and produce a report of everyone's views. Your name will not be used anywhere in the transcript or report.

When we are analysing the data, it will only be seen by the research team, and it will be stored securely according to the regulations of Sheffield Hallam University and the Data Protection Act.

The documents relating to the administration of this research, such as the consent form you sign to take part, will be kept in a folder called a site file. This is stored securely and can only be viewed by the research team. The folder can be checked by people in authority who want to make sure that researchers are following the correct procedures. These people will treat your details confidentially. When the personally identifiable features are removed, other researchers at the university will be able to access the transcripts for their research.

What will happen to the information from the study?

The results of this study will be used to inform the development of a programme theory of how we think the co-location model works. While we can't absolutely guarantee anonymisation, every effort will be made to remove personally identifiable information. Names and other information that could be used to identify you will not be stored after the study has ended. The results may be written up and anonymised for publication in scientific journals. We will be able to provide you with the overall results if you desire. The results will also be included in a PhD thesis. Your responses in the interview will be stored securely for at least 10 years after research completion. The lead researchers PhD supervisory team will also have access to the responses. None of your personal details will be stored after the study has ended. <u>All data collected will be analysed and stored by SHU. No data will remain at the NHS site where the research takes place.</u>

What is the legal basis for research for studies?

The University undertakes research as part of its function for the community under its legal status. Data protection allows us to use personal data for research with

appropriate safeguards in place under the legal basis of public tasks that are in the public interest. A full statement of your rights can be found at https://www.shu.ac.uk/about-this-website/privacy-policy/privacy-notices/privacynotice-for-research. However, all University research is reviewed to ensure that participants are treated appropriately, and their rights respected. This study was approved by Sheffield Hallam University Research Ethics Committee (UREC) with Converis number ER13227199. Further information at https://www.shu.ac.uk/research/ethics-integrity-and-practice

Who has reviewed this study?

This study has been reviewed by the Sheffield Hallam UREC and NHS Health Research Authority.

Who is funding the study?
This study is funded by Sheffield Hallam University and UK Active as part of a PhD programme of work.

What if I have further questions or would like more information about the study?

If you would like more information about the study, you are invited to contact:

Natalie Grinvalds	**Lead researcher**	natalie.grinvalds@student.shu.ac.uk **XXXXXXXXXX**
Professor Robert Copeland	**Academic Supervisor**	r.j.copeland@shu.ac.uk **XXXXXXXXXX**
The Patient Services Team (PST) at Sheffield Teaching Hospitals	-point of contact for patients who have a concern but either don't know which member of staff or department to raise it with or feel that they need to speak to someone outside of the department or ward to which their concern relates.	The team can be contacted in the following ways: • Telephone on XXXXXXXXX • Via email onXXX@sth.nhs.uk • In person in the Patient Partnership Department on B Floor, Royal Hallamshire Hospital or at Huntsman main entrance on C Floor at the Northern General Hospital by appointment only Outside of this time people can leave both telephone and email messages for the team to respond to on the next working day.

THANK YOU FOR TAKING THE TIME TO CONSIDER PARTICIPATING IN THIS STUDY

Natalie Grinvalds

You should contact the Data Protection Officer if:	You should contact the Head of Research Ethics (Professor Ann Macaskill) if:
• you have a query about how your data is used by the University • you would like to report a data security breach (e.g., if you think your personal data has been lost or disclosed inappropriately) • you would like to complain about how the University has used your personal data	• you have concerns with how the research was undertaken or how you were treated
XXX@shu.ac.uk	XXXXXXXX@shu.ac.uk
Postal address: Sheffield Hallam University, Telephone:	Sheffield S11WBT

Sheffield Hallam University

National Centre for Sport & Exercise Medicine
Working for Health & Wellbeing

Participant Information Sheet Version 6: 13.09.2019 IRAS Number: 261778

Exploring the co-location of NHS health services, physical activity and leisure

Health care professional interviews

We would like to invite you to take part in a research study. Before you decide, you need to understand why the research is being done and what it will involve for you. Please take time to read the following information carefully.

What is the purpose of the study?

This study is being conducted as part of a programme of research exploring the development of a theory for the co-location (or "putting together") of health clinics within leisure centres to embed physical activity within the NHS.

The purpose of this study is to understand health care professionals perspectives on the co-location of NHS clinics within leisure centres, how it is working, whom it is working for, under what circumstances and why. This understanding will support the existing literature to aid in the development of a theory as well as add to the evidence of how co-located health, physical activity and leisure works.

Why have I been invited to take part?
You have been invited to take part because you are involved in care or treatment of patients at clinics held at Graves or Concord Leisure Centres from one of the four following clinical services: musculoskeletal (MSK), diabetes, podiatry and pain management. We want to understand for whom the co-located model is working best for, under what circumstances and why.

What will happen if I choose to participate?
If you decide to take part, you will be asked to participate in an interview. This can be arranged at a time convenient for you, either around your working day at Graves or Concord, another convenient location for you, Sheffield Hallam University, by telephone or Skype. The interview will last approximately one hour. The interview will be audio recorded so that the researcher can listen back to it at a later time. With your permission, we may contact you to be interviewed again at a later date. This is optional and you can decide as you wish to participate at this time. We will ask you again at the end of the interview if you would like to be contacted for a follow up interview. If agreed, the second interview will take place at Graves or Concord, Sheffield Hallam University (City or Collegiate campus) or via telephone.

The topics to be discussed will include your job role and experiences of working in clinics at the centres, your personal health and physical activity. During the interview, we will present to you some ideas of how we think the co-located centres (Graves or Concord) may or may not be working to see what you think and to understand your opinion. There will be no right or wrong answer.

You do not have to answer or make a comment on any topic if you do not wish to do so.. You will be asked to agree to the interview being recorded by signing the consent form.

What are the possible benefits of taking part?
Although we cannot guarantee this study will benefit you directly, we hope that your responses will add to the development of a theory which has the potential to inform service delivery for all long term.

What are the possible disadvantages of taking part?
No direct disadvantages have been identified. You are free to choose not to answer any questions that you do not wish. Some topics can be sensitive such as personal health experiences and physical activity habits. The reason we might ask about personal health experiences or physical activity habits is because we would like to know if and how it may play a role in your work. However, the researchers are experienced, and you will not be asked to talk about anything which makes you uncomfortable. If there is any topic or question that makes you uncomfortable you can let the researcher know. You have the right not to answer and will not be required to do so if you do not wish to respond.

Do I have to take part?

It is up to you to decide whether or not to take part in this research. If you wish to volunteer, you will be asked to sign a consent form to show that you have read this information sheet and agreed to take part. You are free to withdraw your information from the study up to two weeks after the interview.

What if I change my mind during the study?
You are free to withdraw from the study at any time.

Will my involvement in the study be kept confidential?
Yes. We will follow legal and ethical practice and all information about you will be handled in strict confidence.

What you tell us will be confidential at all times. We will transcribe the recordings of the interviews and will be writing up a report of the findings, but we will not use your real names anywhere in the transcripts or the report. When we are analysing the data, it will only be seen by the research team and it will be stored securely according to the regulations of Sheffield Hallam University and the Data Protection Act.

The documents relating to the administration of this research, such as the consent form you sign to take part, will be kept in a folder called a site file. This is stored securely and can only be viewed by the research team. The folder can be checked by people in authority who want to make sure that researchers are following the correct procedures. These people will treat your details confidentially. When the personally identifiable features are removed, other researchers will be able to access the transcripts for their research.
Please note that assurances on confidentiality will be strictly adhered to unless evidence of wrongdoing or potential harm is uncovered. In such cases the we may be obliged to contact relevant statutory bodies/agencies.

What will happen to the information from the study?
The results of this study will be used to inform the development of a programme theory of how we think the co-location model works. While we can't absolutely guarantee anonymisation, every effort will be made to remove personally identifiable information. Names and other information that could be used to identify you will not be stored after the study has ended.

The results may be written up for publication in scientific journals. We will be able to provide you with the overall results if you desire. The results will also be included in a PhD thesis. Your responses in the interview will be stored securely for at least 10 years after research completion. The lead researchers PhD supervisory team will also have access to the responses. <u>None of your personal details will be stored after the study has ended. All data collected will be analysed and stored by SHU. No data will remain at the NHS site where the research takes place.</u>

What is the legal basis for research for studies?

The University undertakes research as part of its function for the community under its legal status. Data protection allows us to use personal data for research with appropriate safeguards in place under the legal basis of public tasks that are in the public interest. A full statement of your rights can be found at https://www.shu.ac.uk/about-this-website/privacy-policy/privacy-notices/privacynotice-for-research

However, all University research is reviewed to ensure that participants are treated appropriately and their rights respected. This study was approved by Sheffield Hallam University Research Ethics Committee (UREC) with Converis number ER13227199 . Further information at https://www.shu.ac.uk/research/ethicsintegrity-and-practice

Who has reviewed this study?

This study has been reviewed by the Sheffield Hallam University UREC and NHS Health Research Authority.

Who is funding the study?
This study is funded by Sheffield Hallam University and UK Active as part of a PhD programme of work.

What if I have further questions or would like more information about the study?
If you would like more information about the study you are invited to contact:-

Natalie Grinvalds Lead researcher natalie.grinvalds@student.shu.ac.uk XXXXXXXXXX

Prof. Robert Copeland Director of Studies r.j.copeland@shu.ac.uk XXXXXXXXX

THANK YOU FOR TAKING THE TIME TO CONSIDER PARTICIPATING IN THIS STUDY

Natalie Grinvalds

You should contact the Data Protection Officer if: • you have a query about how your data is used by the University • you would like to report a data security breach (e.g. if you think your personal data has been lost or disclosed inappropriately) • you would like to complain about how the University has used your personal data DPO@shu.ac.uk Postal address: Telephone: [redacted]	**You should contact the Head of Research Ethics (Professor Ann Macaskill) if:** • you have concerns with how the research was undertaken or how you were treated a.macaskill@shu.ac.uk versity, Howard Street, Sheffield S1 1WBT

Appendix 13: Consent forms for patient and HCP interviews

Patient consent form

Sheffield Hallam University

National Centre for Sport & Exercise Medicine
Working for Health & Wellbeing

Consent Form version 4

Patients

Exploring the co-location of NHS health services, physical activity and leisure

Please initial:

1	I confirm that I have read and understood the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.	
2	I understand I can withdraw at any time without giving a reason for my withdrawal or to decline to answer any particular questions in the study.	
3	I understand if I withdraw from the study after two weeks, all data taken from my participation in the study will be kept for analysis.	
4	I understand that the information I provide will be confidential and that my identity will not be used in any outputs from the research. I understand that confidentiality will be followed unless evidence of wrongdoing or potential harm is uncovered. In such cases the University may be required to contact relevant statutory bodies/agencies.	

5	I give permission for research personnel to keep my personal details only for the purposes of participation in the research study. I understand these details will not be passed on to third parties unless evidence of potential harm or wrongdoing is uncovered. I understand that my identifiable data will be kept securely by the research team in hard copy only.	
6	I agree that my pseudonymised responses may be used for research purposes and publication. This means that my name and any information that could identify me will be removed from the transcripts.	
7	I agree to the interview being audio recorded.	
8	I give permission for the researcher to contact me after the interview for a second optional interview. I give permission for my contact details to be retained for this purpose.	
9	I agree to take part in the above study.	

Name of participant (PRINT)	Date	Signature
Name of individual taking consent (PRINT)	Date	Signature

2 copies to be kept; 1 for site file; 1 for stakeholder

Healthcare professionals consent form

Sheffield Hallam University

National Centre for Sport & Exercise Medicine
Working for Health & Wellbeing

Consent Form version 4

Health care professional Interviews

Exploring the co-location of NHS health services, physical activity and leisure

Please initial:

1	I confirm that I have read and understood the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.	
2	I understand that taking part is voluntary and that I am free to withdraw up to two weeks after the interview. Any information already collected will be used for the purposes of the study.	

3	I understand that the information I provide will be confidential and that my identity will not be used in any outputs from the research. I understand that assurances on confidentiality will be strictly adhered to unless evidence of wrongdoing or potential harm is uncovered. In such cases the University may be obliged to contact relevant statutory bodies/agencies.	
4	I give permission for research personnel to keep my personal details only for the purposes of participation in the research study. I understand these details will not be passed on to third parties unless evidence of potential harm or wrongdoing is uncovered. I understand that my identifiable data will be kept securely by the research team in hard copy only.	
5	I agree that my pseudonymised responses may be used for research purposes and publication.	
6	I agree to the interview being audio recorded.	
7	I give permission for the researcher to contact me after the interview for a second potential interview. I give permission for my contact details to be retained for this purpose.	
8	I understand if I withdraw from the study after two weeks, all data taken from my participation in the study will be retained for analysis.	
9	I agree to take part in the above study.	

Name of participant (PRINT)	Date	Signature
Name of individual taking consent (PRINT)	Date	Signature

2 copies to be kept; 1 for site file; 1 for stakeholder

Appendix 14: Recruitment Posters

Sheffield Hallam University

Sheffield Teaching Hospitals NHS
NHS Foundation Trust

UK active
More people
More active
More often

National Centre for Sport & Exercise Medicine
Working for Health & Wellbeing

Sheffield Hallam University, Sheffield Teaching Hospitals NHS Trust and UKactive are looking at how placing health clinics in leisure centres affects physical activity and patient experiences.

Can I participate? • Are you

18 and older?

- Have you attended any of the following NHS clinics at Graves or Concord Leisure Centres:
- *Physiotherapy*
- *Diabetes*
- *Podiatry*
- *Pain Management*

If you have answered YES to the above, then we would love to speak to you about your experiences! If you are interested, please email Natalie Grinvalds, MPH, BSc, CHES n.grinvalds@shu.ac.uk

n.grinvalds@shu.ac.uk Natalie Grinvalds	n.grinvalds@shu.ac.uk Natalie Grinvalds	n.grinvalds@shu.ac.uk Natalie Grinvalds	n.grinvalds@shu.ac.uk Natalie Grinvalds	n.grinvalds@shu.ac.uk Natalie Grinvalds	n.grinvalds@shu.ac.uk Natalie Grinvalds	n.grinvalds@shu.ac.uk Natalie Grinvalds	n.grinvalds@shu.ac.uk Natalie Grinvalds

UK active
More people
More active
More often

Sheffield Teaching Hospitals NHS
NHS Foundation Trust

Sheffield Hallam University, Sheffield Teaching Hospitals NHS Trust and UKactive are looking at how placing health clinics in leisure centres affects physical activity and patient and health care professional experiences.

Am I eligible?

- Do you work at any of the following NHS NCSEM clinics at Graves or Concord Leisure Centres: ○ *Physiotherapy* ○ *Diabetes* ○ *Podiatry* ○ *Pain Management*

If you have answered YES to the above, then we would love to speak to you about your experiences! If you are interested, please email

Natalie Grinvalds, MPH, BSc, CHES  **n.grinvalds@shu.ac.uk**

n.grinvalds@shu.ac.uk Natalie Grinvalds	n.grinvalds@shu.ac.uk Natalie Grinvalds	n.grinvalds@shu.ac.uk Natalie Grinvalds	n.grinvalds@shu.ac.uk Natalie Grinvalds	n.grinvalds@shu.ac.uk Natalie Grinvalds	n.grinvalds@shu.ac.uk Natalie Grinvalds	n.grinvalds@shu.ac.uk Natalie Grinvalds	n.grinvalds@shu.ac.uk Natalie Grinvalds