

Sheffield Hallam University

Exploring the user-centred design of a physical activity pathway in NHS care

SPEAKE, Helen <<http://orcid.org/0000-0003-3474-2793>>

Available from the Sheffield Hallam University Research Archive (SHURA) at:

<http://shura.shu.ac.uk/22412/>

A Sheffield Hallam University thesis

This thesis is protected by copyright which belongs to the author.

The content must not be changed in any way or sold commercially in any format or medium without the formal permission of the author.

When referring to this work, full bibliographic details including the author, title, awarding institution and date of the thesis must be given.

Please visit <http://shura.shu.ac.uk/22412/> and <http://shura.shu.ac.uk/information.html> for further details about copyright and re-use permissions.

**Exploring the user-centred design of a
physical activity pathway in NHS care**

Helen Speake

**A thesis submitted in partial fulfilment of the requirements of
Sheffield Hallam University
for the degree of Doctor of Philosophy**

December 2017

Abstract

Background

The UK National Health Service (NHS) has been identified as a key domain for tackling non-communicable diseases through reducing population physical inactivity. Research demonstrates that health professionals struggle to deliver existing physical activity (PA) interventions due to a perceived lack of time and confidence in behaviour change. Evidence also suggests that programmes are being delivered inconsistently. Existing interventions are failing to engage a sufficient range of patients and have not demonstrated a long term impact on patients' PA. As end users, patients and health professionals are fundamental to the success of PA interventions and must be actively involved in their design and evaluation.

Method

This study adopted a Research through Design methodology using the UK Design Council's Double Diamond framework (Discover, Define, Develop, Deliver; Design Council, 2007) to explore the user-centred design of a physical activity pathway in NHS care. Semi-structured interviews with 'users' (patients and health professionals) were undertaken. This was followed by a series of co-design workshops to identify specific problems and solutions. Users and other stakeholders were consulted via a survey, interviews and face-to-face consultations to test and refine solutions. A case study using one NHS service (Physioworks) was carried out to develop and evaluate implementation recommendations. Data was analysed throughout the process using inductive thematic analysis.

Findings

Popular solutions focused on making it easier for health professionals to initiate conversations about PA and ensuring that referral options were appropriate for patients. Novel elements of the pathway included priming patients prior to their appointment to normalise PA within the consultation, and feedback from PA providers to inform and positively reinforce health professionals' referral behaviours. Health professionals suggested that the co-designed pathway reflected a model of best practice but that traditional organisational constraints such as time pressures remained a barrier to its consistent use with patients. Further work is needed to refine and test the pathway and to ensure that it is helpful for a broad range of patients and professionals.

Conclusions

This research extends knowledge about the promotion of PA and the application of user-centred design in this context. Early impact of the research includes improvements within the clinical settings such as environmental prompts, establishment of graded introductory PA groups and streamlined appointment booking with PA providers. Further collaboration is planned with Physioworks NHS service to integrate the pathway into existing caseloads.

Candidate's Statement

I declare that the work in this thesis was carried out in accordance with the regulations of Sheffield Hallam University and is original except where indicated by specific reference in the text. No part of the thesis has been submitted as part of any other academic award. The thesis has not been presented to any other education institution in the United Kingdom or overseas.

Any views expressed in the thesis are those of the author and in no way represent those of the University.

Helen Speake

Acknowledgements

First and foremost I must thank all the participants of this research. The people (patients, health professionals and NHS service leads) who gave so generously of their time, thoughts and feelings have made this piece of work possible. Thanks also to NCSEM staff Glenn Carlin, Claire Parkinson, Kerry Morbin and Trina Sutton who helped me to make things happen on the ground.

I am grateful to my supervisory team: Professor Rob Copeland, Dr Simon Till and Dr Jeff Breckon. Thank you for putting your trust in this project and in me, and steering me in the right direction with thoughtful advice and good-hearted wisdom.

To my parents, who watched from a slightly bemused distance as I embarked on this PhD but who raised me to think for myself, stay open-minded and never stop working hard. To my big sister Liz for her love, patience and dry wit and my twin brother Mike for always having my back and being an all-round diamond of a bloke. And to Nina, who has particularly championed my survival through the last year.

I must also take this opportunity to thank the friends and colleagues who have provided a brilliant mix of stimulating discussion and light relief: Martin Lamb, Katie Shearn, Annie Dunsmore-Dawson, Katie Marvin-Dowle, Liam Humphreys, Gabbi Frith and Lindsey Reece. Caroline Adams my formatting guru, and all my fellow PhD researchers at Chestnut Court. Lucy Follett and Nick Hamilton for the human-centred design geek-outs, and Rich Follett for keeping me well fed. My friend and former boss Clarissa Baldwin for being the most fabulous role model. Jan Gurung for helping me to dig deep and see my own worth. And all the friends who have supported me over the years, particularly: Jen and Salim Aouachria, Michelle Persaud, Alison Gee, Kim Howes, Marilyn Rice, Laura Barnett, Tineke De Freitas, Kariym McHoney and Clare Merrington. Thank you for always believing in me and for always being there. This was a team effort.

Published material from this thesis

Publications

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), 939-946

Speake, H., Copeland, R. J., Till, S. H., Breckon, J. D., Haake, S., Hart, O., & Goyder, E. C. (2016). Embedding physical activity in health services: the National Centre for Sports and Exercise Medicine, Elizabeth Goyder. *European Journal of Public Health*, 26 (suppl_1)

Conference and research presentations

Speake, H., Copeland, R.J., Till, S.H., Breckon, J. (2018) Co-designing a physical activity pathway with patients and health professionals [oral presentation] Yorkshire and Humber Physical Activity Knowledge Exchange, Sheffield

Copeland, R.J., Speake, H. (2017) Changing behaviour and getting patients active before surgery [oral presentation] Association of Anaesthetists Great Britain and Ireland Annual Congress, Liverpool

Speake, H., Copeland, R.J., Till, S.H., Breckon, J. (2017) Designing physical activity into NHS Care [oral presentation] Exercise and Preventative Medicine seminar, National Centre for Sports Medicine East Midlands, Loughborough

Speake, H., Copeland, R.J., Till, S.H., Breckon, J. (2017) Embedding physical activity into NHS healthcare [oral presentation] Institute for Sport, Exercise and Health, London

Speake, H., Copeland, R.J., Till, S.H., Breckon, J. (2016) User insights regarding the role of physical activity in NHS care [oral presentation] Faculty of Health and Wellbeing Research Day, Sheffield Hallam University

Abbreviations

BACPR	British Association for Cardiovascular Prevention and Rehabilitation
BHF	British Heart Foundation
BME	Black and minority ethnicity
CASP	Critical Appraisal Skills Programme
CHD	Coronary Heart Disease
CMO	Chief Medical Officer
COPD	Chronic Obstructive Pulmonary Disorder
CPD	Continuing Professional Development
EAST	Easy, Accessible, Social, Timely
EIM	Exercise is Medicine®
ENTREQ	ENhancing Transparency in REporting the synthesis of Qualitative research
FSEM	Faculty of Sport and Exercise Medicine
GP	General Practitioner
GPPAQ	General Practitioner Physical Activity Questionnaire
HRA	Health Research Authority
HMW	How might we
IAPT	Improving Access to Psychological Therapies
IOC	International Olympic Committee
IPAQ	International Physical Activity Questionnaire
LGM	Let's Get Moving
MI	Motivational Interviewing
MRC	Medical Research Council
MSK	Musculoskeletal
NCD	Non-communicable disease
NCSEM	National Centre for Sport and Exercise Medicine
NERS	National Exercise Referral Scheme
NHS	National Health Service
NICE	National Institute for Health and Care Excellence
NPT	Normalisation Process Theory
PA	Physical activity
PAM	Patient Activation Measure
PAR-Q	Physical Activity Readiness Questionnaire
PAVS	Physical Activity as a Vital Sign
PHE	Public Health England
PPI	Patient Public Involvement
REC	Research Ethics Committee
SPARS	Sheffield Physical Activity Referral Scheme
T2D	Type 2 Diabetes
UK	United Kingdom
WHO	World Health Organisation

Table of contents

Contents

Abstract	i
Candidate's Statement	ii
Acknowledgements	iii
Published material from this thesis	iv
Abbreviations	v
Table of contents	vi
Structure of the thesis	xiii
List of Figures	xv
List of Tables	xvii
List of Appendices	xviii
Chapter one: Introduction	1
1.0 Overview	1
1.1 Consequences of low levels of physical activity	1
1.2 Global and national cost of physical inactivity.....	1
1.3 The role of healthcare services in promoting PA.....	2
1.4 UK policy shaping the NHS response to physical inactivity.....	3
1.5 Current NHS approaches to promote PA.....	3
1.5.1 Effectiveness of current PA interventions.....	4
1.5.2 Delivery and quality of PA programmes.....	5
1.5.3 Reach of existing pa programmes.....	6
1.5.4 Impact and maintenance of PA interventions.....	7
1.6 The role of health professionals in delivering PA interventions	7
1.7 Engaging patients in PA interventions	9
1.8 Patients and health professionals as key users of PA interventions.....	10
1.9 Chapter summary	10
Chapter 2: Review of literature - patients' and health professionals' views towards PA	12
2.0 Overview	12
2.1 Review aims and approach	12
2.2 Search strategy	13
2.2.1 Study inclusion criteria and screening.....	13
2.2.2 Quality assessment.....	14

2.3	Extraction and synthesis of search results.....	16
2.3.1	Framework synthesis.....	16
2.3.2	Development of a priori frameworks:.....	17
2.4	Results of literature involving patients.....	17
2.4.1	Study characteristics.....	17
2.5	Patient themes.....	27
2.5.1	Patients' definitions of PA.....	28
2.5.2	Patients' understanding and beliefs about PA as a medical intervention.....	28
2.5.3	Role and impact of the health professional regarding PA.....	29
2.5.4	Barriers and facilitators to PA.....	30
2.6	Results of literature involving health professionals.....	31
2.6.1	Study characteristics.....	31
2.7	Health professional themes.....	35
2.7.1	Health professionals' perceptions of PA.....	35
2.7.2	Intervention factors influencing effectiveness of PA promotion.....	36
2.7.3	Socio-political and organisational factors influencing PA promotion.....	36
2.7.4	Health professional factors associated with PA promotion.....	37
2.7.5	Patient-related issues affecting PA promotion.....	38
2.8	Qualitative studies combining views of patients and health professionals.....	38
2.9	Application of qualitative findings to the design of current interventions.....	42
2.10	Summary of qualitative literature review.....	44
2.11	Aims of the thesis.....	45
2.11.1	Gaps identified in the existing qualitative literature.....	45
2.11.2	Research aims and objectives.....	46
2.11.2	Setting for the thesis.....	46
2.12	Chapter summary.....	48
	Chapter 3: Theoretical and methodological underpinning of this research.....	49
3.0	Overview.....	49
3.1	Background to the choice of methodology.....	49
3.2	Ontological and epistemological framework.....	50
3.2.1	Realist-constructionism.....	51
3.2.2	Pragmatism.....	52
3.2.3	Participation / User involvement.....	52
3.2.4	Different approaches to participation.....	53
3.2.5	Involvement of the researcher - personal reflexivity.....	54
3.3	Design research methodology.....	54
3.4	Double Diamond.....	55
3.4.1	Flexible use of research methods to be applied within the double diamond.....	57
3.5	Specific methods applied in this thesis.....	57
3.5.1	Methodological reflexivity.....	57
3.6	Validity and scientific rigour.....	60
3.6.1	Issues of quality that apply to this thesis.....	60
3.7	Chapter summary.....	62

Chapter 4: Discover	63
4.0 Overview	63
4.1 Preparatory work for the Discover and Define phases	63
4.1.1 Protocol development and patient-public involvement (PPI)	63
4.2 Discover phase	65
4.2.1 Development of interview guides	65
4.2.2 Pilot interviews	65
4.2.3 Sampling and recruitment	66
4.2.4 Procedure	67
4.2.5 Data analysis	67
4.3 Results from interviews with patients	68
4.3.1 Multiplicity of health concerns and their impact on everyday life	69
4.3.2 The effects of care experiences on self-management and long-term outlook	71
4.3.3 Association between social identity and confidence and PA	72
4.3.4 Psychological factors influencing attitudes towards PA	73
4.3.5 Variation in individual needs and preferences regarding PA	75
4.3.6 Influence of social networks on PA adoption and maintenance	76
4.3.7 Summary of interviews with patient participants	77
4.4 Results of interviews with health professionals	79
4.4.1 The impact of professional working style and perceived responsibilities on PA promotion behaviours	81
4.4.2 Organisational barriers and facilitators influencing PA promotion behaviours	82
4.4.3 Approaches and motivations for empowering patients	84
4.4.4 One size does not fit all - recognising the need to tailor advice and support to the patient	86
4.4.5 Positioning PA within wider NHS system and objectives	88
4.4.6 Summary of interviews with health professionals	89
4.5 Feedback to participants	90
4.6 Discussion and reflections	91
4.6.1 Non condition-specific sampling	91
4.6.2 Methodological reflections	92
4.7 Chapter summary	93
Chapter 5: Define	95
5.0 Overview	95
5.1 Co-design workshops	95
5.1.1 Workshop recruitment	95
5.1.2 Separation of patients and health professionals into two groups	97
5.1.3 Co-facilitators	97
5.2 Orienting participants to the design thinking mindset	98
5.3 Patient personas	99
5.3.1 Persona development	99
5.3.2 Persona refinement - changes and additions	100
5.3.3 Final personas	101
5.4 Translating interview data into key points for design	109
5.4.1 Card sorting exercise	109

5.4.2	Card sorting results	110
5.5	Core design requirements	110
5.6	The end of the first diamond - establishing specific problems	111
5.6.1	Addressing professional liability.....	112
5.6.2	Good communication and rapport between health professional and patient	112
5.6.3	Information upfront - managing expectations.....	113
5.6.4	Holistic assessment	114
5.6.5	Address patient concerns about safety and risk	114
5.6.6	Patients require different levels of support	114
5.6.7	Patient-centred goals and outcome measures	115
5.6.8	Feedback and accountability amongst health professionals regarding patients' PA progress and maintenance	115
5.6.9	Long term impact of NHS support on patients' PA behaviour	115
5.7	Discussion and reflections	116
5.7.1	Methodological reflections - personas.....	116
5.7.2	Methodological reflections - sequencing the core design requirements.....	117
5.8	Chapter summary	117
Chapter 6: Develop	118
6.0	Chapter overview.....	118
6.1	Ideation stage	118
6.1.1	Preparing for ideation (developing 'how might we' statements)	118
6.1.2	Brainstorming (and ranking exercises for each group)	119
6.2	Shortlisting ideas.....	120
6.3	Engaging other stakeholders in feedback.....	121
6.3.1	Feedback from health professionals: prototyping survey.....	122
6.3.2	Feedback from patients: informal engagement at clinics	123
6.3.3	Feedback from PA providers: semi-structured interviews.....	124
6.4	Combining data from patients, health professionals and PA providers	126
6.5	Priming patients about PA as part of routine appointments.....	126
6.5.1	Prototype 1: Priming patients via their appointment letter	127
6.5.2	Prototype 2: Signage prompts in waiting areas	129
6.5.3	Additional suggestions re: priming.....	133
6.6	Making it easier to discuss PA within limited time in consultations.....	133
6.6.1	Prototype 3: Pre-appointment measures.....	133
6.6.2	Prototype 4: Decision tool.....	135
6.6.3	Other suggestions re: making the conversation easier	138
6.7	Improving awareness and access to local PA options.....	138
6.7.1	Prototype 5: MoveMore online 'activity finder'	138
6.8	Supervised, low level introductions to PA	142
6.8.1	Prototype 6: Low level PA group	142
6.8.1	Non-PA specific group	144
6.8.2	Prototype 7: Jointly run sessions.....	144
6.9	Making referral processes easier for health professionals	145
6.9.1	Prototype 8: Directly bookable PA appointment slots with providers.....	145

6.9.2	Prototype 9: Inter-service referral	147
6.9.3	Prototype 10: Approved provider quality mark for PA providers	147
6.10	Raising the priority and profile of PA	148
6.10.1	Prototype 11: Electronic recording of PA conversations via medical record	148
6.10.2	Prototype 12: Feedback loops between providers and health professionals	150
6.11	Summary of solutions	150
6.12	Discussion.....	152
6.12.1	Methodological reflections.....	155
6.13	Chapter summary.....	158
Chapter 7: Deliver		159
7.0	Overview.....	159
7.1	Storyboarding a pathway.....	159
7.1.1	Creating the storyboard	160
7.1.2	Challenges and observations during the storyboarding task	162
7.1.3	Constructing the pathway map	163
7.2	Considering implementation using a case study approach	165
7.2.1	Selecting a case study.....	165
7.2.2	Data collection.....	166
7.2.3	Data analysis.....	166
7.3	Case study findings	167
7.3.1	The context for implementation within Physioworks	167
7.3.2	Appraisal of the PA pathway	168
7.3.3	Engagement and buy-in	170
7.3.4	Incorporating the pathway into practice.....	173
7.4	Interpreting the case study using normalisation process theory	174
7.5	Patients' perspective of the pathway	177
7.6	Revisiting personas	177
7.7	Comparison of the co-designed pathway with existing models of PA promotion.....	182
7.7.1	Let's Get Moving pathway.....	182
7.7.2	Exercise is Medicine® Initiative	184
7.8	Discussion	187
7.8.1	Methodological reflections	190
7.8.2	Participants' reflections.....	193
7.9	Summary of chapter	194
Chapter 8: Discussion, reflections and conclusions.....		195
8.0	Overview.....	195
8.1	Aims and objectives of the thesis	195
8.2	Objective 1: Explore patients' health aspirations and support needs in relation to PA pathways	196
8.2.1	Health concerns and aspirations transcend physical factors	196
8.2.2	Links between active health engagement and PA.....	197
8.2.3	Meeting patients' specific and varying needs	198

8.3	Objective 2: Explore the training, resources and support needs of health professionals to effectively promote PA amongst patients.....	199
8.3.1	Balancing limited time and standardisation with patient-centred PA promotion	199
8.3.2	Improving adaptive knowledge and skills regarding PA.....	200
8.4	Objective 3: Involve patients and health professionals in the design a PA pathway which meets users' needs.....	201
8.4.1	Perceived novelty of the co-designed pathway	201
8.4.2	Suitability of the pathway for meeting patients' needs	202
8.4.3	Recognition and involvement of PA providers as key stakeholders.....	203
8.5	Objective 4: Identify the likely barriers to implementation of a PA pathway and identify steps to reduce or resolve these barriers	203
8.5.1	Barriers and facilitators to implementation of the pathway.....	203
8.5.2	Reflecting on the non- condition-specific focus of the research.....	205
8.6	Objective 5: Document and evaluate the user-centred approach to designing a PA pathway in NHS care	206
8.6.1	Strategies used to involve patients	207
8.6.2	Power dynamics and participants' ownership of the project.....	208
8.6.3	Incremental versus radical innovation	209
8.6.4	Users at the centre of the research.....	210
8.6.5	Impact of the research	210
8.7	Limitations of the current study	210
8.7.1	Generalisability of the findings.....	212
8.8	Implications for future practice	212
8.9	Recommendations for further research	214
8.10	Personal reflections on the research process	216
8.11	Conclusions	218
	References	219
	Appendices	242
	Appendix A: CASP appraisal questions applied to literature review	245
	Appendix B: Qualitative synthesis themes and subthemes: literature involving patients.....	246
	Appendix C: Qualitative synthesis themes and subthemes: literature involving health professionals	258
	Appendix D: NHS REC approval letter	262
	Appendix E: Semi-structured interview guides (Discover phase).....	266
	Appendix F: Example patient interview transcript (Discover phase)	270
	Appendix G: Example health professional interview transcript (Discover phase)	280
	Appendix H: Interview summary report for participants (Discover phase).....	286
	Appendix I: Patient persona building: characteristics and extremes (Define phase).....	306
	Appendix J: Results of card sort exercise (identifying core design requirements) (Define phase)	307
	Appendix K: "How might we" statements used for idea generation (Develop phase)	313
	Appendix L: Ideas generated in the brainstorm (Develop phase)	314

Appendix M: Qualtrics survey questions - gathering feedback from health professionals regarding idea prototypes (Develop phase)	317
Appendix N: General themes from semi-structured interviews with physical activity providers (Develop phase).....	326
Appendix O: Higher and lower order themes from case study analysis (Deliver phase)	330
Appendix P: Summary of participants' feedback and evaluation forms following the co-design workshops	352

Structure of the thesis

Chapter One: Introduction

Chapter one outlines the social, economic and health consequences associated with physical inactivity in the UK and globally. It also highlights evidence reporting the opportunities and benefits of promoting physical activity via NHS pathways. Strengths, opportunities and shortfalls of existing physical activity interventions are presented underlining the need to engage users in the design of interventions. Users of physical activity interventions are defined as patients *and* frontline health professionals.

Chapter Two: Review of literature

Chapter two presents a review of current qualitative research exploring the views of patients and health professionals towards physical activity and investigates the extent to which these views have influenced the design and/or delivery of current interventions. A rationale is provided for the increased involvement of users in the development of physical activity interventions. The chapter concludes by setting out the aims and objectives of the thesis.

Chapter Three: Theoretical and Methodological Underpinning of the Research

Chapter three presents a rationale and description of the methodological approach adopted within the thesis, including the epistemological underpinning. The narrative sets out how the UK Design Council double diamond framework (*Discover, Define, Develop, Deliver*) has been used in the current research to explore the application of a user-centred design approach to the design of a physical activity pathway in the NHS. The four phases of the double diamond framework are assigned specific research methods to meet the aims of the thesis.

Chapter Four: Discover

Chapter four describes the activities and objectives of the first phase of the double diamond framework (*Discover*). This focused on generating insight and empathy with users. The findings of semi-structured interviews with patients and health professionals from multiple health conditions are presented and discussed.

Chapter Five: Define

Chapter five sets out the work undertaken within the second phase of the double diamond framework (*Define*), focusing on consolidating insights from patients and health professionals into defined problems. The formation and content of co-design workshops with patients and health professionals is detailed. Description is provided on how data from the semi-structured interviews outlined in Chapter four have been translated into patient personas and used to inform the core design requirements for a physical activity pathway.

Chapter Six: Develop

Phase three of the double diamond (*Develop*) is outlined in Chapter six providing a description of the co-design workshops, including the identification of solutions and prototyping of ideas. Exercise referral providers and local voluntary groups are identified as important stakeholders to realising some of the proposed solutions and their perspectives are explored through semi-structured interviews. The views of physical activity providers, health professionals and patients are gathered and combined to appraise the feasibility and acceptability of a shortlist of prototypes.

Chapter Seven: Deliver

The final phase of the double diamond (*Deliver*) focuses on delivering and implementing solutions. This chapter outlines the storyboarding and development of a service map which brings together the prototyped solutions into a physical activity pathway. A case study approach is taken to consider how this pathway might be delivered within a particular NHS service, highlighting likely barriers and facilitators and plans for implementation.

Chapter Eight: Discussion, reflections and conclusions

The final chapter reflects on the findings throughout the thesis, synthesising key learning. An evaluation of the user-centred design approach and its application in the context of this thesis are discussed. Recommendations for the development of physical activity pathways are presented along with broader recommendations about the promotion of physical activity in the NHS and future research.

List of Figures

Figure 1	Study selection and exclusion for searches of patient and health professional literature
Figure 2	NCSEM Sheffield - Graves Leisure Centre
Figure 3	NCSEM Sheffield - Concord Leisure Centre
Figure 4	Double Diamond Framework
Figure 5	Research methods applied in this thesis to the double diamond
Figure 6	Patients' group objective
Figure 7	Health professionals' group objective
Figure 8	Matching interview quotes to the draft personas
Figure 9	Card sort exercise
Figure 10	Clustering of cards
Figure 11	Core design requirements for a physical activity pathway
Figure 12	Double Diamond
Figure 13	Brainstorming ideas for one HMW statement
Figure 14	Multiple HMW statements after brainstorm
Figure 15	Amended patient appointment letter
Figure 16	Survey responses regarding appointment letter wording
Figure 17	Decision matrix prototype
Figure 18	Survey responses regarding the use of a decision tool
Figure 19	MoveMore website activity finder
Figure 20	Survey responses regarding the online activity finder
Figure 21	Suggested fields for health professionals to consider adding to patient record
Figure 22	Survey responses regarding changes to the electronic patient record
Figure 23	Example blank storyboard template
Figure 24	Patient journey sketch from early workshops informing the storyboard task
Figure 25	Physical activity pathway storyboard

Figure 26	Pathway map created during deliver phase
Figure 27	Normalisation process theory constructs and components
Figure 28	Pathway map modelled using "Pete" persona
Figure 29	Pathway map modelled using "Ameera" persona
Figure 30	Pathway map modelled using "Natalia" persona
Figure 31	Let's Get Moving pathway (England)
Figure 32	Exercise is Medicine® solution flow chart
Figure 33	MINDSPACE framework

List of Tables

Table 1	Approaches to promoting PA within the NHS
Table 2	Literature search strategy developed based on SPIDER tool
Table 3	Literature review results: patient literature
Table 4	Literature review results: health professionals literature
Table 5	Literature review results: patients and health professionals views combined
Table 5	Research objectives at different phases of the Double Diamond
Table 6	Semi-structured interviews: Patient participants
Table 7	Semi-structured interviews: Health professional participants
Table 8	Health professionals taking part in co-design workshops
Table 9	Patients taking part in co-design workshops
Table 10	Ideas shortlisted to be prototyped
Table 11	Survey participants by service
Table 12	Survey participants by role
Table 13	PA provider interview participants
Table 14	Priming signage
Table 15	Mean rating for pre-appointment measures
Table 16	Summary of actions and iterations for shortlisted ideas
Table 17	Normalisation process theory constructs relevant to the case study
Table 18	Comparison of key stages between co-designed and existing pathways

List of Appendices

Appendix A	Literature review: CASP quality appraisal questions
Appendix B	Qualitative synthesis themes and subthemes: literature involving patients
Appendix C	Qualitative synthesis themes and subthemes: literature involving health professionals
Appendix D	NHS REC study approval letter
Appendix E	Semi-structured interview guides - patients and health professionals
Appendix F	Example transcript - patient interview
Appendix G	Example transcript - health professional interview
Appendix H	Qualitative findings - summary report for participants
Appendix I	Patient persona building: characteristics and extremes
Appendix J	Results of card sort exercise (identifying core design requirements)
Appendix K	List of "how might we" statements
Appendix L	Full list of ideas generated in the brainstorm
Appendix M	Qualtrics survey questions for health professionals (prototype feedback)
Appendix N	General themes from semi-structured interviews with physical activity providers
Appendix O	List of higher and lower order themes from case study
Appendix P	Summary of participants' feedback and evaluation forms following the co-design workshops

Chapter one: Introduction

1.0 Overview

This introductory chapter outlines the consequences associated with physical inactivity in the UK and globally and discusses the role of the NHS in promoting physical activity. The opportunities and shortfalls of existing physical activity interventions are presented, highlighting the need to engage patients and health professionals in the design of interventions.

1.1 Consequences of low levels of physical activity

Physical inactivity is a major global public health priority. It is the fourth leading risk factor for mortality worldwide and is responsible for an estimated 3.6 million deaths per year (Lee et al., 2012). In the UK, the Chief Medical Officer (CMO) has set guideline amounts of physical activity (PA) for children, adults and older people (Department of Health, 2011) yet conservative estimates suggest that 40% of adults in the UK do not meet these guidelines (The Health and Social Care Information Centre, 2012). PA is a modifiable risk factor for non-communicable diseases (NCDs) including; ischaemic heart disease, stroke, diabetes, breast and colon cancer and obesity (WHO, 2014). Evidence is also emerging regarding the association of PA with impaired cognitive function and dementia (Sallis et al., 2016).

1.2 Global and national cost of physical inactivity

NCDs create strain on economic and individual resources. The cost of physical inactivity to global health care systems in 2013 was estimated at (INT\$) 53.8 billion worldwide (Ding et al., 2016). UK analyses suggest that insufficient PA costs the country £7.4 billion a year (Public Health England, 2014), with the financial burden on the National Health Service (NHS) estimated as high as £1.2 billion (British Heart Foundation, 2017).

National strategies in some high income countries including Canada and Finland have been successful in increasing PA (Pratt et al., 2015), but despite significant epidemiological evidence and on-going efforts to identify effective interventions, wide scale impact has not been achieved (Reis et al., 2016). To date, multifaceted approaches to increasing PA have been recommended (Sallis et al., 2016; Trost, Blair, & Khan, 2014) including interventions targeting the built environment, transport, schools, communities and public awareness campaigns.

1.3 The role of healthcare services in promoting PA

Promotion of PA through national healthcare systems is considered a key element of multi-component approaches (MacAuley, Bauman, & Frémont, 2015; The Academy of Medical Royal Colleges, 2015). Global initiatives such as Exercise is Medicine® (Lobelo, Stoutenberg, & Hutber, 2014) in North and South America, and WHO Europe's 'Health-Enhancing Physical Activity' (Martin et al., 2006) have attempted to garner support and momentum for national healthcare strategies promoting PA. A significant evidence base exists regarding the effects of PA on disease pathogenesis and symptoms, which has informed recommendations about the optimal type and dose of PA to be 'prescribed' in at least 26 different conditions (Pedersen & Saltin, 2015).

The association between inactivity and health indicates that many people in contact with the NHS are likely to benefit from an increase in PA. The NHS deals with 1 million patients every 36 hours (NHS Confederation, 2014) through primary care consultations, emergency and routine hospital admissions, outpatient consultations, community health services and dental treatments. People with long-term conditions use a significant proportion of health care services (50% of GP appointments, 70% of days spent in hospital beds) and account for 70% of hospital and primary care spending in England (NHS Confederation, 2014). Relative health gains from PA are higher for the least active (The Health and Social Care Information Centre, 2012) and there is potential to redress current imbalances in PA according to income, gender, age, ethnicity and disability (Department of Health, 2011). Whilst not all inactive members of the population are NHS patients, calls to improve population health and stem the

increase in NCDs has resulted in the NHS being targeted as a key environment for promotion of PA.

1.4 UK policy shaping the NHS response to physical inactivity

In 2014 Public Health England (PHE) published the 'Everybody Active, Every Day' strategy highlighting health and social care as a central domain for promoting PA. The National Institute for Health and Care Excellence (NICE) has published clinical guidelines that include PA in recommendations for the treatment of 39 health conditions (Weiler, Feldschreiber, & Stamatakis, 2012). There are also specific quality standards for PA (NICE, 2015) and for health professionals delivering behaviour change support (NICE, 2013). In 2014 the NHS Chief Executive set out the Five Year Forward View, a vision and strategy for the NHS emphasising prevention, self-management of long-term conditions and the promotion of independent healthy living, creating a clear rationale for PA in NHS care (NHS England, 2014).

1.5 Current NHS approaches to promote PA

Within the NHS, PA interventions range from preventative programmes aimed at reducing long-term health care needs and costs, to contexts where PA is used as treatment or adjunct therapy for a wide variety of specific health conditions. Table 1 illustrates some of these different approaches.

Current PA interventions differ not only in terms of content - the type, frequency, intensity and duration of PA - but also in the processes underpinning them, such as how patients are recruited, where and by whom they are referred and the role of NHS professionals throughout the PA 'pathway'. Due to the breadth of research, a comprehensive overview of every current PA intervention is beyond the scope of this thesis. Therefore, the following section presents an overview of the strengths and weaknesses of some of the most prevalent PA interventions for which evidence on a national scale is available.

Table 1
Different approaches to promoting PA within the NHS

Purpose of PA	Objectives of the strategy	Examples
PA as primary prevention	<p>Objective is largely preventative - targeting patients at risk of particular NCD's and those significantly below current PA guidelines</p> <p>Often involves signposting or referral to either community-based or NHS-based group physical activity programme; alternatively advice is provided on self-managed PA</p>	<ul style="list-style-type: none"> • Brief advice by GPs (NICE, 2013) • Exercise Referral Schemes (NICE, 2014) • Primary care physical activity pathways - e.g. NHS Scotland PA Pathway, NHS England 'Let's Get Moving' (Jackson et al., 2014; Department of Health, 2009) • NHS health checks for adults in England aged 40-74 (www.healthcheck.nhs.uk) • Promotion of PA via social prescribing pilots (Brandling & House, 2009) • National Diabetes Prevention Plan www.england.nhs.uk/diabetes/diabetes-prevention/
PA as treatment / adjunct therapy	<p>PA is offered as an addition to routine medical treatment/care for a specific health condition</p> <p>Can be used as active treatment or condition management</p> <p>PA is either home-based, self-managed or supervised</p>	<ul style="list-style-type: none"> • Exercise for depression/anxiety (NICE, 2009) • Physiotherapy-led exercise intervention for specific musculoskeletal problems (Artz et al., 2013) • Diabetes self-management programmes e.g. DESMOND www.desmond-project.org.uk • Pre or peri-operative PA (University of Southampton NHS Foundation Trust, 2016)
PA as rehabilitation / secondary prevention	<p>Typically short supervised, structured intervention (6-12 weeks) which can lead into longer community-based schemes</p> <p>Targeting patients with specific long-term conditions or post-acute event such as cancer diagnosis</p>	<ul style="list-style-type: none"> • Cardiac rehabilitation (BHF, 2016) • COPD rehabilitation (NHS, 2015) • Exercise after stroke www.exerciseafterstroke.org.uk • PA for cancer rehabilitation www.canexercise.co.uk

1.5.1 Effectiveness of current PA interventions

A systematic review of interventions promoting PA in primary care found small to medium positive effects at 12 months (Orow, Kinmonth, Sanderson, & Sutton, 2012). Completion of exercise referral schemes is associated with increased self-reported PA, and better health outcomes including reduced body mass and blood pressure

(Edwards et al., 2013; James et al., 2009). However, there is little evidence to suggest that exercise referral schemes provide significant effects over and above other methods such as brief advice, and economic analyses indicate they are less cost-effective (NICE, 2014). Critics warn against the propagation of PA as a "miracle cure" (MacAuley et al., 2015) particularly in tackling obesity (Malhotra, Chan, Zhou, Dalager, & Finkelstein, 2015) and highlight the importance of moderation in expectations of the role of medicine to address inactivity.

1.5.2 Delivery and quality of PA programmes

Despite a growing evidence base informing PA guidelines, the extent to which recommendations are being delivered to patients consistently across the UK is unclear. Some PA programmes have become part of routine practice. This applies most notably to cardiac rehabilitation, which has a national audit body and clear standards (BACPR, 2017). There is also growing attention to the inclusion of PA as part of cancer care, with NHS England's cancer task force working with Macmillan Cancer Support charity to roll out a recovery package that emphasises the role of PA (NHS England, 2016). However, evidence of what is being delivered in usual care on a national scale remains elusive. The majority of research relates to individual randomised controlled trials (RCTs) (Reis et al., 2016) making it difficult to judge the extent to which PA is 'embedded' throughout NHS care. Recently there have been calls for greater "optimisation strategies" to ensure that interventions are fit for purpose and can be delivered within routine care before they are tested in large-scale RCTs (Levati et al., 2016). This is particularly relevant in the context of an NHS facing significant resource pressures.

The evidence that exists indicates that PA interventions are commissioned and managed variably across the UK (BACPR, 2017; Pavey et al., 2011). Where core components and quality standards have been established (for example cardiac and pulmonary rehabilitation), many schemes are not considered to be reaching minimum standards (British Heart Foundation, 2016; British Thoracic Society, 2015). As a result, there remains a lack of consistency in delivery and quality being offered to patients.

The cost-effectiveness of PA promotion also varies widely (Anokye et al., 2011), including the amount patients are charged for participating.

Healthcare-based PA interventions found to be effective in 'ideal' trial conditions are not always replicated precisely when transferred to usual care settings (Lobb, Colditz, & Louis, 2014). A review of the NHS 'Let's Get Moving' PA pathway in primary care found that elements of the original intervention were less feasible in practice, and it was delivered differently by health professionals based on their perceptions of individual patients' needs, their own skills, time and resources (Bull & Milton, 2011). Developing interventions in the context they will be delivered in could reduce these problems.

1.5.3 Reach of existing PA programmes

The effectiveness of PA interventions is mediated by adherence (Dunkley et al., 2014; Murphy et al., 2012; Wasser, Vasilopoulos, Zdziarski, & Vincent, 2017). Exercise referral schemes have become widespread across the UK, recruiting patients initially from primary care but increasingly from secondary and community care, allied health professions and community pharmacists (Horgan, Blenkinsopp, & McManus, 2010; Jackson, Myers, Oates, & Martin, 2014). Despite this coverage, reports suggest that the numbers of clinicians referring into schemes, and the numbers of patients attending, remain lower than intended (Ward, 2014). Patient uptake - the difference between the number of eligible patients, number of patients referred and numbers attending or completing programmes - is rarely reported making it difficult to assess the extent to which patients are benefiting from existing provision. Evidence regarding factors predicting uptake is also variable (Pavey et al., 2012).

Attendance of cardiac rehabilitation programmes has generally increased year on year, reaching an average of 50% of patients in the 2016 national audit. The main reason provided for not taking part was "lack of interest or refusal" (British Heart Foundation, 2016) suggesting further work is needed to widen participation. Cardiac rehabilitation audits report positive adherence rates; of those patients who started, 77% completed the core programme (British Heart Foundation, 2016). Completion of pulmonary

rehabilitation is slightly lower, with 60% completing their programme (British Thoracic Society, 2015). Internationally, results from meta-analyses show that PA referral schemes can positively affect PA adherence, with meta-regressions indicating that this may be influenced by programme characteristics (Arsenijevic & Groot, 2017). The challenge for existing programmes is to retain participants for long enough to facilitate positive health outcomes.

1.5.4 Impact and maintenance of PA interventions

PA interventions employed within the NHS are predominantly short-term and resource-intensive, commonly lasting between six and twelve weeks. Evidence suggests these programmes do not lead to long-term maintenance of PA in their patrons. This applies to educational programmes encouraging lifestyle change for self-management (Khunti et al., 2012) as well as the structured, supervised group programmes typical of many exercise referral schemes (NICE, 2014).

Evidence from current PA interventions points to two critical factors in their design, which could offer insight into their relative success or failure:

1. The feasibility within current interventions for health professionals to deliver effective PA support to patients
2. The desirability and suitability of current PA programmes and interventions for patients

1.6 The role of health professionals in delivering PA interventions

NICE-recommended approaches to promoting PA have typically focused on individual factors such as education and motivation, based on evidence-based behaviour change techniques (Tully & Hunter, 2015). Yet evaluations suggest that behaviour change elements including motivational interviewing, goal-setting and scheduled follow-ups are being delivered poorly (Moore, Raisanen, Moore, Din, & Murphy, 2013). Health professionals admit to adapting and modifying elements of PA pathways due to lack of time and capacity. This results in subjective judgements to screen only those patients

perceived as suitable and following patients up less frequently (Bull & Milton, 2010, 2011; Jackson, Myers, Oates, & Martin, 2014).

Health professionals also have mixed attitudes towards the value of PA counselling, with some feeling uncomfortable or doubting their ability to change behaviour (Hébert, Caughy, & Shuval, 2012). The confidence and skills of health professionals has received much attention; efforts to incorporate PA and other lifestyle advice into medical school education are now gaining momentum (Gates, 2015; Lowe, Gates, & Callaghan, 2016). PHE offers free CPD e-learning modules on PA in the treatment of long-term conditions and brief motivational interviewing (www.learning.bmj.com) and has launched a peer-to-peer PA clinical champions teaching programme for primary care and allied health professionals (www.gov.uk/government/organisations/public-health-england). The impact of these programmes is yet to be evaluated.

Health professionals referring to the National Exercise Referral Scheme (NERS) in Wales describe their role as helping patients to overcome anxieties about the exercise environment, whilst providing education and interpersonal support to assist the patient's confidence and motivation (Moore, Moore, & Murphy, 2011). This is not necessarily reflected in how the 'success' of PA interventions is measured, which tends towards a focus on reductionist measures such as referral numbers rather than the content and complexity of discussions involving PA.

Understanding and clarifying the role of health professionals may help to identify training and support needs, and consider appropriate outcome measures. Involving health professionals in the design of PA interventions means that they are more likely to adopt new protocols and that programmes will be fit for purpose (Gammon, Strand, & Eng, 2014; Rodgers, Cohen, Joseph, & Rossi, 2012; Van Hecke et al., 2011). This is supported by evaluations carried out retrospectively which highlight buy-in and readiness to adopt new protocols as active ingredients of successful implementation (Fixsen, Blase, Naoom, & Wallace, 2009).

1.7 Engaging patients in PA interventions

Even where efforts have been specifically targeted towards increasing patient referrals there remain noticeable gaps between the numbers of patients referred and the numbers of patients taking up, and adhering to PA programmes (Boyden, Rubenfire, & Franklin, 2010). This suggests that clinical effectiveness of a programme does not guarantee consistent adoption by patients. There may be a need for more research exploring the views of non-attenders to ascertain factors that might discourage uptake and how to make programmes more attractive or accessible.

The majority of people attending an exercise referral scheme drop out within 12 months (Leijon et al., 2010), and only 1 in 36 will achieve the recommended levels of PA (NICE, 2014). Reasons for dropout may vary, but research suggests that the social environment can significantly impact upon patient experiences, attendance and adherence (Mills, Crone, James, & Johnston, 2012). This is not traditionally included in key indicators and standard evaluation protocols. Evidence also suggests a need for careful consideration of the appropriateness of referrals, including patients' readiness for change (Johnston, Warwick, De Ste Croix, Crone & Sidford, 2005).

There are questions about the demographic diversity of attenders and completers and the extent to which PA interventions are engaging those patients most in need of support. Females are consistently underrepresented in cardiac rehabilitation programmes (British Heart Foundation, 2016). In exercise referral schemes there has been lower uptake for patients with mental health issues (Crone, Johnston, Gidlow, Henley, & James, 2008). This is problematic given the association between long-term physical conditions and mental health (The Health and Social Care Information Centre, 2012). It has also been suggested that black and minority ethnic (BME) patients experience barriers to PA which current interventions may not address (Galdas, Oliffe, Kang, & Kelly, 2012; Ski & Thompson, 2011). The majority of patients who are the least active are of low socio-economic status (Weed, 2016). Yet evidence indicates that exercise referral schemes may be at risk of reproducing inequalities (Gidlow, Johnston, Crone, Ellis, & James, 2006) and that current PA promotion fails to address socio-economic determinants of PA (Williams & Gibson, 2017). There are calls for greater

adaptation of interventions to suit different patient groups (Murray et al., 2017). A one-size fits all approach to PA promotion could in fact be harmful to some patients.

Reviews have criticised a “top-down” approach to health service design led by government initiatives, claiming that this undervalues the exploration of genuine needs and problems (Jun, Morrison, & Clarkson, 2014). Evidence suggests that involving patients in the design of programmes is critical for lifestyle change, so that interventions are attuned to patients’ real needs. If NHS initiatives to promote PA are to engage the right audiences, a fuller understanding of what will appeal to and work for these patients needs to be developed.

1.8 Patients and health professionals as key users of PA interventions

A recent International Olympic Committee (IOC) consensus statement suggests that current reductionist approaches have not been successfully applied and scaled. The IOC proposes instead that users are placed at the centre of efforts to develop sustainable and effective PA programmes (Matheson et al., 2013). The evidence presented in this chapter suggests that in this context, users should be defined as patients and frontline health professionals, and that both groups need to be included in the design of PA interventions.

1.9 Chapter summary

Healthcare settings have been identified as a key player in the global movement to tackle NCDs through increasing population PA. Scientific research, largely randomised controlled trials, have provided substantial evidence on which to base the promotion of PA in the NHS along with a growing field of research in behaviour change. Available evidence indicates that exercise referral schemes and secondary prevention programmes have become the most established modes by which PA is currently promoted.

Nevertheless, process evaluations show that health professionals struggle to provide these evidence-based interventions, and programmes are being delivered inconsistently (Din et al., 2015). Programmes are also failing to engage a sufficiently diverse audience and do not demonstrate a long term impact on patient PA levels. This raises concerns about implications for health inequalities and return on investment for the NHS. Meanwhile, policies and initiatives that focus solely on increasing the numbers of referrals to PA interventions may do so at the expense of sufficient attention to the appropriateness of the activity, quality of experience for the patient and development of sustainable PA habits. They also neglect to consider the feasibility for health professionals to deliver this support within routine care.

A well-intended and evidenced intervention is ineffectual if patients and health professionals cannot or will not attend, complete or deliver it. Patients and health professionals are fundamental to the success of PA interventions and therefore must be actively engaged in every stage of their design and evaluation. This begins with understanding PA and its role in healthcare from the perspective of those groups. The following chapter will explore the state of the current qualitative literature involving patients and health professionals and consider its impact on the design of PA interventions.

Chapter 2: Review of literature - patients' and health professionals' views towards PA

2.0 Overview

This chapter presents a review of qualitative literature exploring the views of patients and health professionals towards PA, highlighting gaps in the literature and opportunities for future research. The literature review points towards common themes across patients from multiple health conditions, but a lack of user involvement in the design of PA interventions. The aims and objectives for this thesis are subsequently outlined to explore these opportunities.

2.1 Review aims and approach

Chapter one highlighted the central role of patients and frontline health professionals as 'users' of PA interventions in the NHS. An understanding of these groups' perspectives towards PA is therefore critical to understanding why and how PA interventions are successful and the extent to which they are adopted and implemented within and across healthcare services. Qualitative research methods provide an opportunity for rich exploration of such views.

The primary aim of this review was to understand what qualitative research has been undertaken to explore the perspectives and/or experiences of patients and health professionals towards PA. The secondary aim was to consider how this research may have informed the design and development of PA interventions historically or currently. The review would involve synthesis of qualitative research, not to draw comparisons nor seek consensus between studies, but to explore the depth and diversity in qualitative findings being reported. It would also provide an understanding of the respective contributions of this research to the knowledge base regarding PA interventions in healthcare settings. The review highlighted directions for further research to inform the aims of this thesis.

The review was conducted following stages set out in the ENTREQ statement: enhancing transparency in reporting the synthesis of qualitative research (Tong, Flemming, McInnes, Oliver, & Craig, 2012).

2.2 Search strategy

A search strategy was developed using the SPIDER tool (Cooke, Smith, & Booth, 2012) devised specifically for qualitative and mixed method literature searching. Two separate searches were carried out; one for literature involving patients and another for literature involving health professionals. Search terms are outlined in Table 2.

Table 2
Search strategy developed based on SPIDER tool

SPIDER component	Application to review aims	Search terms
Sample	Patients Health professionals	"patient*" "healthcare professional*" OR "health professional*" "doctor*" "nurse*" "physiotherapist*" "podiatrist"
Phenomenon of Interest	Physical activity promoted or delivered in health care settings	"physical activity" OR "exercise" AND "care" "treat*" "pathway"
Design	Methods to determine individual or group views	"workshop*" OR "questionnaire*" OR "survey*" OR "interview*" OR "focus group"
Evaluation	Outcomes of the research i.e. the views and/or experiences of patients OR health professionals	"view*" OR "experience*" OR "opinion*" OR "attitude*" OR "perce*" OR "belie*"
Research type	Qualitative	n/a

Searches were conducted for peer reviewed articles published over the last 10 years (2007 to 2017) using five electronic databases: Embase, Medline, Cinahl, PubMed and PsycInfo. Additional papers were identified by hand searches of key commentaries on PA as medicine and systematic reviews of qualitative literature regarding PA.

2.2.1 Study inclusion criteria and screening

Studies were included if they met the following criteria:

- Peer reviewed, original research published from 2007 onwards
- Qualitative research design

- Patients with a physical or mental health condition aged 18+ OR any health professional
- Studies with a focus on participant views towards, or experiences of, PA
- English language

Papers were excluded on the following basis:

- Quantitative research design including randomised controlled trials without a qualitative component
- Qualitative research exploring health professionals' personal PA behaviours
- Articles addressing physiotherapy and physical therapy treatments as opposed to general PA or exercise
- Trials of specific PA-related technology or mobile apps
- Studies involving children or adolescents aged <18
- Studies not published in English language

Following initial searches and removal of duplicates, papers were screened first by title and subsequently by abstract. Studies not meeting the criteria and review purpose were removed. Full text articles were then obtained and read to establish a final set of search results. A flow chart illustrating the study selection and exclusion process is displayed at Figure 1.

2.2.2 Quality assessment

A modified version of the Critical Appraisal Skills Programme (CASP, 2017) framework to appraise qualitative research was used to assess the quality of papers. Studies were rated as 'Yes/No/Can't tell' according to key questions from the framework that had not previously been addressed in the screening process. To encourage reflexivity, the author of this thesis and an independent researcher initially coded 10% of the papers independently. Ratings between the two researchers were consistent for all but one question. After discussion it was established that this question was being interpreted differently. With this shared understanding the papers were re-coded with 95% consensus.

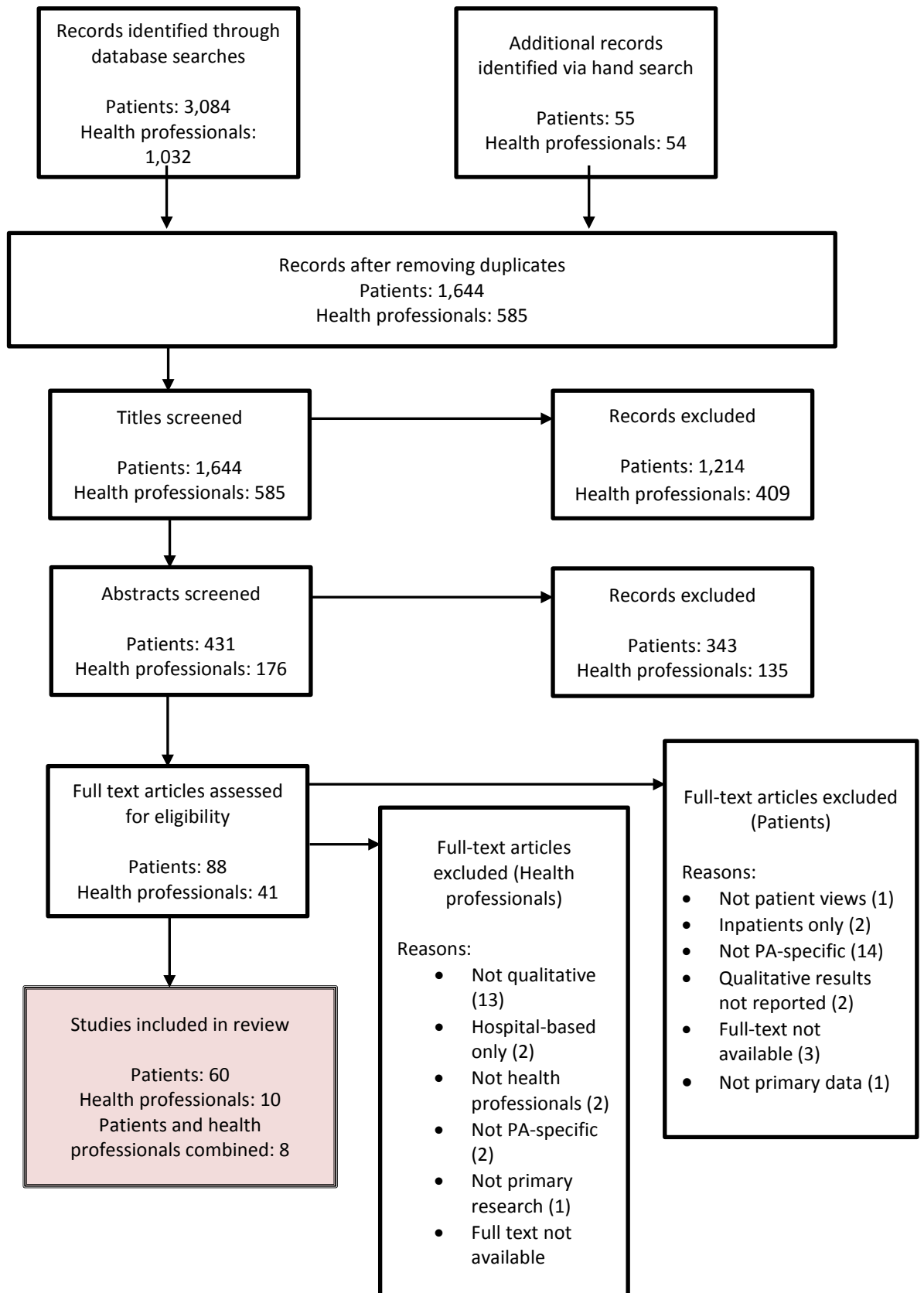


Figure 1: Study selection and exclusion for searches of patient and health professional literature

Previous commentaries on appraising quality in qualitative research note that reviews can only scrutinise what has been reported in the published article, which may not fully reflect the validity or reliability of the study (Dixon-Woods, Shaw, Agarwal, & Smith, 2004) and caution against excluding articles on the basis of perceived quality. In this case, the purpose of quality appraisal was to develop an overview of the general quality of published research in the context of this review. One item in the CASP framework was commonly under-reported: *Has the relationship between researcher and participants been adequately considered?* Although the majority of papers reported triangulation between researchers (Braun & Clarke, 2013) during data analysis, few explicitly addressed their potential influence on formulation of research questions or data collection.

Questions applied in the quality appraisal exercise are listed at Appendix A.

2.3 Extraction and synthesis of search results

2.3.1 Framework synthesis

This review adopted a framework synthesis method (Brunton, Oliver, Oliver, & Lorenc, 2006) which provides a structured approach to organising and analysing large amounts of qualitative data (Barnett-Page & Thomas, 2009). Built on principles of framework analysis (Ritchie & Spencer, 1994) framework synthesis involves charting and mapping techniques to organise data into meaningful categories. An *a priori* framework identified from within existing literature as broadly fitting the topic (Carroll, Booth, & Cooper, 2011) was used to extract findings deductively, followed by inductive development and incorporation of new themes or categories (Barnett-Page & Thomas, 2009). This approach was suitable given the large number of search results, the heterogeneity of studies spanning a wide range of health conditions, and the moderately short time available to conduct the review.

2.3.2 Development of *a priori* frameworks:

For the patient literature, a systematic review and qualitative synthesis of the views of patients with chronic low back pain towards PA (Slade et al., 2014) and a conceptual framework of patients' experiences of PA based on qualitative research in COPD patients (Dobbels et al., 2014) were combined to form an initial framework for extraction. For the search results involving health professionals, the core themes identified from within a systematic review and synthesis of primary care professionals' views towards promoting PA (Huijg et al., 2014) was used as a starting framework on which to build. An additional category was purposely added to both frameworks: how the findings were summarised to inform the development of future PA interventions.

2.4 Results of literature involving patients

2.4.1 Study characteristics

60 full-text articles regarding patients' experiences and views towards PA were extracted and included in the review. Table 3 presents the main characteristics of the included studies.

The included studies covered a range of physical and mental health conditions, indicating the growing interest toward PA research in the healthcare sector. Studies predominantly focused on patients with chronic non-communicable conditions, the most prevalent being cancer (18 studies). The majority of papers (58 studies) addressed PA, with a subset of these (7 studies) focusing on specific types of PA such as yoga, walking or football and two studies concerning combined PA and dietary interventions. The most popular research methods were semi-structured interviews (42 studies) and focus groups (15 studies). A smaller number of papers (5 studies) used written or telephone surveys involving a combination of closed and open-ended questions.

Table 3

Reviewed articles exploring patients' views towards PA

	Authors	Date	Title	Journal	Country	Health condition	Method	Sample size	Context
1	Anderson, Steele, & Coyle	2013	Lifestyle issues for colorectal cancer survivors—perceived needs, beliefs and opportunities	Supportive Care in Cancer	UK	Cancer-Colorectal	Focus groups		Non 'participants'
2	Arthur, Delk, Denmark-Wahnefried et al.	2016	Pancreatic cancer survivors' preferences, barriers, and facilitators related to physical activity and diet interventions	Journal of Cancer Survivorship	US	Cancer - Pancreatic	Telephone survey	50	Non 'participants'
3	Bäck, Öberg, Krevers	2017	Important aspects in relation to patients' attendance at exercise-based cardiac rehabilitation – facilitators, barriers and physiotherapist's role: a qualitative study	BMC Cardiovascular Disorders	Sweden	Coronary artery disease	Semi-structured interviews	16	Experience of programme: Mix of attenders and non-attenders of CR
4	Burke, West, Grocott et al.	2015	Exploring the experience of adhering to a prescribed pre-surgical exercise program for patients with advanced rectal cancer: A phenomenological study	Psychology of sport and exercise	UK	Cancer-advanced rectal	Semi-structured interviews	10	Experiences of pre-operative programme - interviews at 3 time points
5	Bruun, Krustup, Hornstrup et al.	2014	"All boys and men can play football": A qualitative investigation of recreational football in prostate cancer patients	Scandinavian Journal of Medicine and Science in Sports	Denmark	Cancer - prostate	Focus groups and participant observation	26	Participants of a pilot study and subsequent RCT

6	Chard	2016	Qualitative perspectives on aquatic exercise initiation and satisfaction among persons with multiple sclerosis.	Disability and rehabilitation	US	Multiple sclerosis		45	Experiences of water-based exercise in last 6 months
7	Cheville, Dose, Basford et al.	2012	Insights Into the Reluctance of Patients With Late-Stage Cancer to Adopt Exercise as a Means to Reduce Their Symptoms and Improve Their Function	Journal of Pain and Symptom Management	US	Cancer - late stage lung	Interviews	20	Participants: monitored monthly based on activity and physical function
8	Chong, Doyle, Cyarto et al.	2016	Physical activity program preferences and perspectives of older adults with and without cognitive impairment	Asia-Pacific Psychiatry	Australia	Cognitive impairment (Alzheimers, subjective memory complaints)	Focus groups and interviews - included 'controls'	50	Non 'participants'
9	Clarke, Young, Hull et al.	2015	Motivations and barriers to exercise in chronic kidney disease: a qualitative study	Nephrology Dialysis Transplantation	UK	Chronic Kidney Disease	Focus groups and semi-structured interviews	13 FG; 17 SSI	Non 'participants'
10	Craike, Hose, Courneya et al.	2013	Perceived benefits and barriers to exercise for recently treated patients with multiple myeloma: a qualitative study.	BMC Cancer	Australia	Cancer - multiple myeloma	Semi-structured interviews	24	Experiences of self-directed PA
11	Crank, Carter, Humphreys et al.	2017	A qualitative investigation of exercise perceptions and experiences in people with multiple sclerosis before, during and after participation in a personally-tailored exercise program	Archives of Physical Medicine and Rehabilitation	UK	Multiple sclerosis	Focus groups and semi-structured interviews	33	Experiences of trial

12	Darlow, Perry, Dean et al.	2016	Putting Physical Activity While Experiencing Low Back Pain in Context: Balancing the Risks and Benefit	Archives of Physical Medicine and Rehabilitation	New Zealand	Low back pain	Interviews	12 acute; 11 chronic	Experiences of self-directed PA
13	Desrochers, Kairy, Pan et al.	2016	Tai chi for upper limb rehabilitation in stroke patients: the patient's perspective	Disability and rehabilitation	Canada	Stroke	Semi-structured interviews	8	Experiences of trial
14	Desveaux, Rolfe, Beauchamp et al.	2014	Participant experiences of a community-based maintenance program post-pulmonary rehabilitation.	Chronic respiratory disease	Canada	COPD	Focus groups	12	Experiences - attending 6months min.
15	Devi, Campbell, Powell et al.	2014	Exploring the experience of using a web-based cardiac rehabilitation programme in a primary care angina population: a qualitative study	International Journal of Therapy and Rehabilitation	UK	Angina	Semi-structured interviews	16	Experiences of trial
16	Donnelly, Lowe-Strong, Rankin et al	2013	A focus group study exploring gynaecological cancer survivors' experiences and perceptions of participating in a RCT testing the efficacy of a home-based physical activity intervention	Supportive Care in Cancer	UK	Cancer - gynaecological	Focus groups	9*trial; 7*control	Experiences of trial
17	Elley, Dean, Kerse	2007	Physical activity promotion in general practice-- patient attitudes.	Australian Family Physician	New Zealand	Primary care - sedentary	Semi-structured interviews	15	Experiences post-trial
18	Emslie, Whyte, Campbell et al.	2007	I wouldn't have been interested in just sitting round a table talking about cancer'; exploring the experiences of women with breast cancer in a group exercise trial.	Health Education Research	UK	Cancer - breast	Focus groups	36	Experiences post-trial

19	Eriksson, Arne, Ahlgren	2013	Keep moving to retain the healthy self: the meaning of physical exercise in individuals with Parkinson's disease	Disability and Rehabilitation	Sweden	Parkinsons	Semi-structured interviews	11	Experiences of exercise programme - regular participation min. 12 months
20	Fisher, Wardle, Beeken et al.	2016	Perceived barriers and benefits to physical activity in colorectal cancer patients.	Supportive Care in Cancer	UK	Cancer - colorectal	Survey	495	Non 'participants'
21	Groven, Råheim, Engelsrud	2013	Changing Bodies, Changing Habits: Women's Experiences of Interval Training Following Gastric Bypass Surgery	Health Care for Women International	Norway	Obese - post gastric bypass surgery	Interviews	11	Experiences of programme
22	Hefferon, Murphy, Mcleod et al.	2013	Understanding barriers to exercise implementation 5-year post-breast cancer diagnosis: a large-scale qualitative study	Health Education Research	UK	Cancer - breast	Semi-structured interview	83	Experiences post-trial
23	Heinen, Evers, van Uden et al.	2007	Sedentary patients with venous or mixed leg ulcers: determinants of physical activity.	Journal of advanced nursing	Netherlands	Venous leg ulcers	Interviews	25	Non 'participants'
24	Henriksson, Arving, Johansson et al	2016	Perceived barriers to and facilitators of being physically active during adjuvant cancer treatment	Patient education and counselling	Sweden	Cancer - breast, prostate, colorectal	Focus groups and semi-structured interviews	23	Non 'participants'
25	Hillsdon, Kersten, Kirk	2013	A qualitative study exploring patients' experiences of standard care or cardiac rehabilitation post minor stroke and transient ischaemic attack	Clinical rehabilitation	UK	Stroke and transient ischaemic attack	Semi-structured interviews	22	Experience of trial

26	Holmberg, Farahani, Witt,	2016	How Do Patients with Chronic Neck Pain Experience the Effects of Qigong and Exercise Therapy? A Qualitative Interview Study	Evidence - Based Complementary and Alternative Medicine	Germany	Chronic neck pain	Semi-structured interviews	20	Experiences during and after
27	Holmberg, Rappenecker, Karner et al.	2014	The perspectives of older women with chronic neck pain on perceived effects of qigong and exercise therapy on aging: A qualitative interview study	Clinical interventions in ageing	Germany	Chronic neck pain	Semi-structured interviews	20	Experiences of trial
28	Husebø, Karlsen, Allan et al.	2015	Factors perceived to influence exercise adherence in women with breast cancer participating in an exercise programme during adjuvant chemotherapy: A focus group study	Journal of clinical nursing	Norway	Cancer - breast	Focus group	24	Experiences of trial
29	Ingram, Wessel, Courneya	2010	Women's perceptions of home-based exercise performed during adjuvant chemotherapy for breast cancer	European Journal of Oncology Nursing	Canada	Cancer - breast	Telephone survey; evaluation survey	8	Experiences of trial
30	Joelsson, Berhardsson, Larsson	2017	Patients with chronic pain may need extra support when prescribed physical activity in primary care: a qualitative study	Scandinavian Journal of Primary Health Care	Sweden	Chronic pain	Narrative interview	15	Experiences of programme
31	Jokar, Yousefi, Yousefy et al.	2015	Behavioral Change Challenges in the Context of Center-Based Cardiac Rehabilitation: A Qualitative Study	Iranian Red Crescent Medical Journal	Iran	Ischemic heart disease	Semi-structured interviews	30	Experiences of programme
32	Kaptein, Backman, Badley et al.	2013	Choosing where to put your energy: A qualitative analysis of the role of physical activity in the lives of working adults with arthritis	Arthritis Care and Research	Canada	Arthritis	Focus groups	40	Non 'participants'

33	Larun, Malterud	2011	Finding the right balance of physical activity. A focus group study about experiences among patients with chronic fatigue syndrome	Patient education and counselling	Norway	Chronic Fatigue	Focus group	10	Non 'participants'
34	Luoma, Hakamies-Blomqvist, Blomqvist et al.	2014	Experiences of breast cancer survivors participating in a tailored exercise intervention - a qualitative study.	Anticancer research	Finland	Cancer - breast	Focus groups	25	Experiences of trial
35	Malpass, Andrews, Turner	2009	Patients with Type 2 Diabetes experiences of making multiple lifestyle changes: A qualitative study	Patient education and counselling	UK	T2D	Semi-structured interviews	30	Experiences of trial
36	McPhail, Schippers, Marshall et al.	2014	Perceived barriers and facilitators to increasing physical activity among people with musculoskeletal disorders: a qualitative investigation to inform intervention development.	Clinical interventions in ageing	Australia	MSK	Survey	217	Non 'participants'
37	Mikkelsen, Hendriksen, Schjødt et al.	2016	Alcoholic liver disease patients' perspective of a coping and physical activity-oriented rehabilitation intervention after hepatic encephalopathy	Journal of clinical nursing	Denmark	Liver disease (alcoholism)	Semi-structured interviews	10	Experiences of programme
38	Missel, Pedersen, Hendriksen et al.	2015	Exercise intervention for patients diagnosed with operable non-small cell lung cancer: a qualitative longitudinal feasibility study	Supportive Care in Cancer	Denmark	Cancer - lung	Interviews - multiple time points (therefore not all completed)	11	Experiences of trial

39	Moore, Hogg, White	2012	Acceptability and feasibility of pulmonary rehabilitation for COPD: A community qualitative study	Primary Care Respiratory Journal	UK	COPD	Interviews	24	Experiences - completers, non-completers and decliners
40	Nicholson, Donaghy, Johnston et al.	2013	A qualitative theory guided analysis of stroke survivors' perceived barriers and facilitators to physical activity	Disability and rehabilitation	UK	Stroke	Semi-structured interviews	13	Previous participation in a pedometer study
41	Nordvall-Stromberg, Fjellman-Wiklund, Wadell	2014	Enhanced information regarding exercise training as treatment is needed. An interview study in patients with chronic obstructive pulmonary disease.	Disability and rehabilitation	Sweden	COPD	Semi-structured interviews	10	Non 'participants'
42	Normansell, Holmes, Victor et al.	2016	Exploring non-participation in primary care physical activity interventions: PACE-UP trial interview findings.	Trials	UK	Primary care	Semi-structured interviews	30	Decliners
43	O'Donovan & Kennedy	2015	"Four legs instead of two" – perspectives on a Nordic walking-based walking programme among people with arthritis	Disability and rehabilitation	Ireland	Arthritis	Focus groups	27	Experiences of trial
44	Peel, Douglas, Parry et al.	2010	Type 2 diabetes and dog walking: Patients' longitudinal perspectives about implementing and sustaining physical activity	British Journal of General Practice	UK	T2D	Interviews over 4 years	20	Experiences of trial
45	Rae & White	2009	Swimming pool-based exercise as pulmonary rehabilitation for COPD patients in primary care: Feasibility and acceptability	Primary Care Respiratory Journal	UK	COPD	Focus group	16	Experiences of trial

46	Rastad, Martin, Asenlöf	2014	Barriers, benefits, and strategies for physical activity in patients with schizophrenia.	Physical Therapy	Sweden	Schizophrenia	Semi-structured interviews	21	Non 'participants'
47	Roaldsen, Biguet, Elfving	2011	Physical activity in patients with venous leg ulcer - between engagement and avoidance. A patient perspective.	Clinical rehabilitation	Sweden	Venous leg ulcers	Semi-structured interviews	22	Non 'participants'
48	Searle, Calnan, Lewis et al.	2011	Patients' views of physical activity as treatment for depression: a qualitative study.	British Journal of General Practice	UK	Depression	Interviews	33	Experiences of trial
49	Sharma, Bulley, Van Wijck	2012	Experiences of an exercise referral scheme from the perspective of people with chronic stroke: a qualitative study	Physiotherapy	UK	Stroke	Semi-structured interviews	9	Experiences of programme
50	Simony, Pederson, Dreyer et al.	2015	Dealing with existential anxiety in exercise-based cardiac rehabilitation: A phenomenological-hermeneutic study of patients' lived experiences	Journal of clinical nursing	Denmark	Angina / MI	Observation, Focus group, Interview	11	Experiences of programme
51	Slade, Molloy, Keating	2009	People with non-specific chronic low back pain who have participated in exercise programs have preferences about exercise: a qualitative study.	Australian Journal of Physiotherapy	Australia	Chronic low back pain	Focus groups	18	Experiences of programme
52	Smit, Hale, Mulligan et al.	2013	Participant perceptions of a novel physiotherapy approach ("Blue Prescription") for increasing levels of physical activity in people with multiple sclerosis: a qualitative study following intervention	Disability and rehabilitation	New Zealand	Multiple sclerosis	Semi-structured interviews	27	Experiences of programme
53	Smith, Croker, Fisher et al.	2017	Cancer survivors' attitudes towards and knowledge of physical activity, sources of information, and barriers and facilitators of engagement: A qualitative study	European Journal of Cancer Care	UK	Cancer	Interviews	19	Non 'participants'

54	Stenmark Tullberg, Olsen, Shams et al.	2017	“Stepping with ease towards a new way of living” – experiences of physical activity 5 years after bariatric surgery.	European Journal of Physiotherapy	Sweden	Obese - post bariatric surgery	Interviews	12	Current own
55	Stone & Baker	2017	Painful Choices: A Qualitative Exploration of Facilitators and Barriers to Active Lifestyles Among Adults with Osteoarthritis	Journal of Applied Gerontology	Canada	Osteoarthriti s	Semi- structured interviews	15	Non 'participants'
56	Thorpe, Kumar, Johnston	2014	Barriers to and enablers of physical activity in patients with COPD following a hospital admission: A qualitative study	International Journal of COPD	Australia	COPD	Semi- structured interviews	28	Non 'participants'
57	van Uden- Kraan, Chinapaw, Drossaert et al	2013	Cancer patients' experiences with and perceived outcomes of yoga: Results from focus groups	Supportive Care in Cancer	Netherlan ds	Cancer	Focus group	29	Experiences of programme
58	Wiklund, Olsén, Willén et al.	2011	Physical Activity as Viewed by Adults with Severe Obesity, Awaiting Gastric Bypass Surgery	Physiotherapy research international	Sweden	Severely obese	Semi- structured interviews	18	Experiences of programme
59	Withall, Haase, Walsh et al.	2016	Physical activity engagement in early rheumatoid arthritis: a qualitative study to inform intervention development	Physiotherapy	UK	Rheumatoid arthritis	Focus groups	19	Non 'participants'
60	Wong, Zhong, Sit et al.	2015	Attitude toward the out-patient cardiac rehabilitation program and facilitators for maintenance of exercise behavior	Psychology, health and medicine	Hong Kong	CHD	Interviews	22	Experiences of programme

The reviewed studies fell into two main clusters. The first cluster, comprising the majority of studies in the review (43 studies), explored patients' views and experiences of taking part in existing or preconceived PA interventions, for example as an adjunct to a controlled trial. Qualitative research of this type has the potential to provide a better understanding of why or how interventions do or do not work, and which aspects of the intervention are well received. While this provides valuable insights into lived experiences of PA programmes, it is generally limited to a purposeful sample of patients who completed the intervention. Participants might represent only a subgroup of the potential target audience for PA, and authors have suggested that participants in these samples might have differing motivation to other patients in routine care (Peel et al., 2010). This potentially limits the generalisability of findings for increasing participation. Three papers in the current review recruited patients who declined or failed to complete the intervention (Bäck, Öberg, & Krevers, 2017; Moore, Hogg, & White, 2012; Normansell et al., 2016). These papers identified a combination of personal attitudinal and practical factors that influenced patients' decisions about whether or not to attend a PA intervention.

The second cluster of studies (17 studies) explored the perceptions of patients who were not participants of a PA intervention (herein referred to as 'non-participants'). A small number of these studies acknowledged a need to understand patients' views towards PA prior to the development of a programme. Others explored attitudes towards PA in the wider context of living with a chronic condition. Authors of one paper involving non-participants noted that perceived barriers and facilitators cannot be interpreted as predictors of PA behaviour (Nicholson et al., 2013) but instead offer insights into the underlying attitudes and needs of patients prior to any PA intervention.

2.5 Patient themes

The review resulted in five themes drawn from the views of patients:

- Patients' definitions of PA
- Patients' understanding and beliefs about PA as a medical intervention
- Role and impact of health professionals in patients' PA experiences and uptake

- Patients' perceived barriers and facilitators to PA
- Patients' reported consequences of PA for health

Appendix B provides a table summarising themes, subthemes and related papers.

2.5.1 Patients' definitions of PA

Unless the definition was implicit in the intervention being evaluated, PA was not explicitly defined in all studies. In two studies the authors defined PA for the article but this was not reflected in the findings or interview guides (Darlow et al., 2016; Hefferon, Murphy, McLeod, Mutrie, & Campbell, 2013a); others provided patients with a definition by asking them to recount how much of certain activities they engaged in (Fisher, Beeken, Heinrich, Williams, & Wardle, 2016; Heinen et al., 2007; Stenmark Tullberg, Fagevik Olsén, Shams, & Wiklund, 2017; Wiklund, Olsén, & Willén, 2011).

Variation between definitions illustrates the challenges associated with exploring patients' views of PA. Where patients were asked to provide their own definitions (Kaptein et al., 2013; Normansell et al., 2016; Rastad, Martin, & Åsenlöf, 2014; Roaldsen, Biguet, & Elfving, 2011) these tended to reflect physical ability, and PA was therefore defined in terms of what patients perceived that they could or could not do. This had consequences for patients' likely receptiveness to PA interventions and implications if patients' and health professionals' expectations were not aligned. The tendency towards gentler forms of PA and activities of daily living as opposed to structured or higher intensity forms of exercise may also reflect that the majority of studies involved patients with chronic or limiting conditions for whom vigorous PA may be unachievable.

2.5.2 Patients' understanding and beliefs about PA as a medical intervention

This theme related to patients' associations between PA and their health condition and provided insight into likely motives for taking part in a PA intervention. Nicholson and colleagues (2013) suggest that the extent of patients' understanding about the importance of PA for their condition could be an important barrier or facilitator to PA.

There was a balance of views amongst patients, around half connecting PA to condition-specific benefits and the other half relating PA to general health and wellbeing. Condition-specific benefits identified were typically responsive rather than preventative, for example offsetting weight gain (Craike, Hose, Courneya, Harrison, & Livingston, 2013; Emslie et al., 2007) or relieving symptoms such as pain (Clarke et al., 2015; Rastad et al., 2014) and fatigue (Donnelly et al., 2013). Factors associated with psychological coping with the health condition were also a common sub-theme (Malpass, Andrews, & Turner, 2009; Roaldsen et al., 2011; Van Uden-Kraan, Chinapaw, Drossaert, Verdonck-De Leeuw, & Buffart, 2013).

This theme (essentially the perceived health benefits or motives for PA) can be contrasted with the later theme "the reported consequences of PA on health", where patients described what they actually experienced as outcomes resulting from participation in PA. Previous research has been criticised for focusing on motives for PA but neglecting perceived gains (Ingledew, Markland, & Strömmer, 2014). The 'gains' patients reported included physical and psychological effects and were largely positive, although several studies highlighted that effects could be bi-directional depending on the individual. For example, some patients reported pain relief whilst others in the same study experienced exacerbation of pain (Kaptein et al., 2013; Larun & Malterud, 2011). Gains were not limited to programme participants; non-participants also described benefits of previous PA experiences.

2.5.3 Role and impact of the health professional regarding PA

Linked to patients' understanding of PA was the role of health professionals to educate and inform. Health professionals were seen by patients predominantly as a source of information (Bruun et al., 2014; Elley, Dean, & Kerse, 2007; Henriksson, Arving, Johansson, Igelström, & Nordin, 2016; Husebo, Karlsen, Allan, Soreide, & Bru, 2015; Joelsson, Bernhardsson, & Larsson, 2017; Jokar, Yousefi, Yousefy, & Sadeghi, 2015), as prescribers of PA (Cheville, Dose, Basford, & Rhudy, 2012; Roaldsen et al., 2011) and as a source of reassurance (Anderson et al., 2013; Heinen et al., 2007; Henriksson et al., 2016; Withall, Haase, Walsh, Young, & Cramp, 2016). Health professionals were described by patients almost entirely as a positive influence, with the exception of

patients in one study feeling 'judged' by health professionals for lifestyle choices including lack of PA (Hillsdon, Kersten, & Kirk, 2013). Effective interactions with health professionals were therefore an important determinant of patients' attitudes towards engaging with PA (Bäck et al., 2017; Moore et al., 2012). Nevertheless, the tendency of patients to see health professionals in an educational or informational role highlights the challenge for professionals in balancing advice-giving with conventional behaviour change principles that advocate a 'patient as expert' position.

Patients in a number of studies also described secondary benefits of health professionals' involvement during PA interventions that were not directly related to PA. Opportunities to spend increased amounts of time or interventions that provide greater access to health professionals gave patients an opportunity to ask questions that time allocated for routine consultations did not allow (Thorpe, Kumar, & Johnston, 2014) with patients developing greater coping or understanding of their condition as a result (Devi, Carpenter, Powell, & Singh, 2014; Mikkelsen, Hendriksen, Schiødt, & Rydahl-Hansen, 2016). This has onward benefits for patients' likelihood to adopt PA.

2.5.4 Barriers and facilitators to PA

With the exception of two studies, all the articles described barriers or facilitators to an extent, although depending on the purpose of the study this could be limited to one or the other.

Barriers to PA were wide-ranging and covered physical, psychological, environmental and social/cultural factors (see Appendix B for the range of factors). Peel and colleagues (2010) noted that removing barriers alone was unlikely to be sufficient to motivate PA. Facilitators and enablers of PA were identified as factors influencing uptake of PA such as the way an intervention was introduced (e.g. timing, referral processes), or the practical suitability of the intervention. There were also factors during the intervention that were perceived as facilitators to continued adherence. The strongest of these subthemes were group benefits including camaraderie, support and learning from peers (Bäck et al., 2017; Bruun et al., 2014; Burke, West, Grocott, Brunet, & Jack, 2015; Crank et al., 2017; Desveaux, Rolfe, Beauchamp, Goldstein, &

Brooks, 2014; Donnelly et al., 2013; Elley et al., 2007; Groven, Råheim, & Engelsrud, 2013; Hillsdon et al., 2013; Luoma et al., 2014; Mikkelsen et al., 2016; Missel, Pedersen, Hendriksen, Tewes, & Adamsen, 2015; Simonÿ, Pedersen, Dreyer, & Birkelund, 2015; Wong et al., 2016).

Barriers and facilitators were also bi-directional and varied by individual patient – a barrier for one person could be a facilitator for someone else. These themes highlight the diversity of opinion within patient groups and indicate either a need for flexible interventions (McPhail, Schippers, Marshall, Waite, & Kuipers, 2014) or as one article concluded, multiple interventions (Moore et al., 2012). Barriers were predominantly internal factors related to the individual, whilst facilitators were mainly external factors related to the intervention or supporting elements. Physical factors were more likely to be condition-specific than psychological factors but there was notable crossover demonstrating that patients with different conditions experience many of the same barriers and facilitators to PA.

2.6 Results of literature involving health professionals

2.6.1 Study characteristics

Table 4 provides details of the 10 full-text articles regarding health professionals' views and experiences towards PA that were retained for inclusion.

Research methods employed in the studies reviewed were semi-structured interviews (6 studies), focus groups (2 studies) or both (2 studies). 9 papers were excluded following full-text review because they reported only Likert-scale survey data on health professionals' views. The prevalence of survey use reflects a typical aim of articles in this review. This was to understand the nature and/or extent of health professionals' current PA promotion practices, which would benefit from a survey enabling a larger sample of health professionals. An alternative primary aim of the studies reviewed was to gather feedback on health professionals' experiences of delivering PA advice within an intervention or trial.

Sample populations in the articles reviewed were predominantly health professionals based in primary care (GPs and practice nurses), with only three of the studies involving allied health professionals. This reflects a focus towards primary care promotion of PA demonstrated within recent policy initiatives that have a preventative as opposed to rehabilitation emphasis.

Table 4

Reviewed articles exploring patients' views towards PA

	Authors	Date	Title	Journal	Country	Health condition / setting	Type of health professional	Method	Sample	Context
1	Bohman, Mattson, Borglin	2015	Primary healthcare nurses' experiences of physical activity referrals: an interview study	Primary Health Care Research & Development	Sweden	Primary care	Primary care nurses	Semi-structured interviews	12	Experiences of PA referral
2	Beighton, Victor, Normansell et al.,	2015	"It's not just about walking.....it's the practice nurse that makes it work": a qualitative exploration of the views of practice nurses delivering complex physical activity interventions in primary care	BMC Public Health	UK	Primary care	Primary care nurses	Focus groups and semi-structured interviews	11	Experiences of delivering in RCT
3	Crisford, Winzenberg, Venn et al.	2013	Understanding the physical activity promotion behaviours of podiatrists: a qualitative study	Journal of Foot and Ankle Research	Australia	Podiatry	Podiatry	Semi-structured interviews	20	Attitudes, knowledge and beliefs
4	Din, Moore, Murphy et al.	2015	Health Professionals' Perspectives on Exercise Referral and Physical Activity Promotion in Primary Care: Findings from a Process Evaluation of the National Exercise Referral Scheme in Wales	Health Education Journal	UK	Primary care	Primary care	Focus groups and semi-structured interviews	46	Experiences of referral

5	Heron, Tully, McKinley et al.	2014	Physical activity assessment in practice: a mixed methods study of GPPAQ use in primary care.	BMC Family Practice	UK	Primary care	Primary care	Focus groups	12	Experiences of using GPPAQ
6	Learmonth, Adamson, Balto et al.	2017	Investigating the needs and wants of healthcare providers for promoting exercise in persons with multiple sclerosis: a qualitative study.	Disability and rehabilitation	US	MS	Neurologists, OTs, PTs, nurses	Semi-structured interviews	44	Perceived needs
7	Mulligan, Fjellman-Wiklund, Hale et al.	2011	Promoting physical activity for people with neurological disability: Perspectives and experiences of physiotherapists	Physiotherapy Therapy and Practice	New Zealand/Sweden	Neurological disability	Physiotherapists	Semi-structured interviews	9	Experiences of promoting
8	Patel, Schofield, Kolt et al.	2011	General practitioners' views and experiences of counselling for physical activity through the New Zealand Green Prescription program	BMC Family Practice	New Zealand	Primary care	GPs	Semi-structured interviews	15	Experiences of prescription
9	Persson, Brorsson, Ekvall Hansson et al.	2013	Physical activity on prescription (PAP) from the general practitioner's perspective – a qualitative study	BMC Family Practice	Sweden	Primary care	GPs	Focus groups	15	Experiences of prescription
10	Searle, Calnan, Turner et al.	2011	General practitioners' beliefs about physical activity for managing depression in primary care	Mental Health and Physical Activity	UK	Primary care	GPs	Semi-structured interviews	15	Experiences of trial

2.7 Health professional themes

Analysis of studies involving health professionals supported five themes:

- Health professionals' perceptions of PA
- Intervention factors influencing effectiveness of PA promotion
- Socio-political and organisational factors influencing PA promotion
- Health professional characteristics associated with PA promotion
- Patient-related issues affecting PA promotion

Appendix C provides a table summarising themes, subthemes and related papers.

2.7.1 Health professionals' perceptions of PA

Studies reported differing attitudes of health professionals towards PA; positive perceptions but also ambiguity about the perceived benefits of promoting PA. Health professionals indicated that they base advice about PA on anecdotal knowledge of its benefits as opposed to an evidence-based foundation (Searle et al., 2012). One study identified a lack of confidence in the effectiveness of PA for particular health conditions, in comparison to other lifestyle interventions such as smoking cessation (Din, Moore, Murphy, Wilkinson, & Williams, 2015). Health professionals positioned PA as useful for secondary management (Patel et al., 2011) or secondary prevention (Persson et al., 2013) for various health conditions but did not promote it as a primary preventative measure (Bohman, Mattsson, & Borglin, 2015).

Although health professionals viewed PA as important for patients' health and wellbeing, they did not necessarily share the opinion that 'prescribing' PA was part of their role (Crisford, Winzenberg, Venn, & Cleland, 2013). Health professionals in one study considered their position as "gatekeepers" an unnecessary barrier (Din et al., 2015). Others saw promoting PA as a component of holistic professional practice (Crisford et al., 2013; Mulligan, Fjellman-Wiklund, Hale, Thomas, & Häger-Ross, 2011). Regardless of beliefs, the reported reality was that PA had low status and low priority in praxis (Persson et al., 2013).

2.7.2 Intervention factors influencing effectiveness of PA promotion

All studies described elements of a PA intervention or practices that influence the effectiveness of PA promotion and advice. Health professionals described strategies for expressing the value of PA to patients, for example sharing their personal experiences of being active (Persson et al., 2013; Searle et al., 2012). Issuing a written prescription which emulated a medical prescription was valued by professionals in one study (Bohman et al., 2015) to provide credibility and formality to PA advice, whereas in another study participants were cynical about the effectiveness of a formal prescription (Persson et al., 2013).

Lack of time for PA discussion was a commonly reported barrier (Crisford et al., 2013; Din et al., 2015; Heron, et al., 2014; Patel et al., 2011; Persson et al., 2013), resulting in an opportunistic rather than structured approach to engaging patients. Practical issues such as complex computer systems further hindered promotion (Beighton et al., 2015; Bohman et al., 2015). "Pragmatic amendments" to intervention protocols were one consequence of these time constraints, whereby health professionals excluded what they deemed non-essential parts of the trial that were not possible to deliver in routine care (Beighton et al., 2015). This has implications for treatment fidelity (Bellg et al., 2004) and the acceptability and ecological validity of interventions.

2.7.3 Socio-political and organisational factors influencing PA promotion

Within this theme, health professionals described factors that would potentially improve the prioritisation and delivery of PA promotion. Participants expressed a desire for clearer guidelines and more formal exercise promotion protocols (Bohman et al., 2015a; Crisford et al., 2013; Learmonth et al., 2017; Persson et al., 2013) within their services. This was expected to provide support for individual professionals as well as encouraging consistency in messages promoted to patients (Learmonth et al., 2017).

Primary care professionals highlighted "competing incentivisation" (for example smoking cessation) as a barrier to PA promotion (Din et al., 2015); it was suggested that raising the prioritisation of PA would require funding investment (Learmonth et

al., 2017). This would also necessitate a change in professional practices away from reliance on prescribing medication that offered faster-acting relief for symptoms to a longer-term approach valuing PA (Persson et al., 2013) which could only happen with collegial and managerial support (Bohman et al., 2015a). Normative influences such as the popularity of PA at conferences were suggested to influence colleagues' attitudes and practices (Crisford et al., 2013).

2.7.4 Health professional factors associated with PA promotion

Health professionals' personal PA levels were a key influence on their PA promotion behaviours; active professionals capitalised on the opportunity to be a positive role model whereas inactive professionals avoided promoting PA for fear of appearing hypocritical (Bohman et al., 2015a; Din et al., 2015). The main barriers cited by health professionals were lack of knowledge or skills to promote PA. Participants described insecurity about their knowledge of appropriate types and intensity of PA necessary to issue a prescription (Bohman et al., 2015a; Crisford et al., 2013). Knowledge of government recommendations (Mulligan et al., 2011) and local PA options (Crisford et al., 2013) were both facilitators, but fear of litigation was a deterrent (Crisford et al., 2013).

Health professionals were also unconfident about their behaviour change skills (Learmonth et al., 2017; Persson et al., 2013), although primary care nurses who had participated in a randomised controlled trial valued the skills they had developed and their transferability to other lifestyle interventions (Beighton et al., 2015). One study highlighted the absence of non-pharmacological interventions in medical training (Persson et al., 2013). It was noted that PA could be perceived as lower priority for early curriculum and was suggested to form part of graduate and professional training instead (Learmonth et al., 2017). Concerns about training also extended to the perceived suitability of exercise professionals, with one study of professionals working with MS patients highlighting the importance of exercise providers having appropriate knowledge of the condition (Learmonth et al., 2017) to strengthen referral processes.

Despite one study highlighting the role of exercise providers, only one article reported that "a few" participants advocated for a multi-disciplinary approach (Crisford et al., 2013). This could reflect that health professionals do not see PA promotion as the collective responsibility of professionals, or that they are generally accustomed to working independently.

2.7.5 Patient-related issues affecting PA promotion

In a number of studies, health professionals reported making subjective judgements when assessing patients' PA levels and deciding who to target with information, advice, prescription or referral. These judgements were based a number of factors including: the patient's presenting condition (Crisford et al., 2013; Din et al., 2015; Persson et al., 2013); age and medical history (Crisford et al., 2013); appearance (Crisford et al., 2013) and perceived receptiveness or motivation (Bohman et al., 2015a). One study indicated a rise in patients actively requesting a referral (Bohman et al., 2015a) whilst in another study participants argued that some patients were "not interested" in PA (Learmonth et al., 2017). Health professionals also made judgements about the perceived suitability of the referral options they could offer patients; they avoided making referrals if they perceived that it was not affordable for the patient (Bohman et al., 2015a; Din et al., 2015) or would have a negative impact on the patient (Searle et al., 2012).

2.8 Qualitative studies combining views of patients and health professionals

A total of 8 studies explored the views of health professionals and patients together (see Table 5).

Table 5

Reviewed articles exploring health professionals' views towards PA

	Authors	Date	Title	Journal	Country	Health condition / setting	Type of health professional	Method	Sample (patients/HCPs)	Context
1	Baert, Gorus, Mets et al.	2015	Motivators and barriers for physical activity in older adults with osteoporosis	Journal of Geriatric Therapy	Belgium	Osteoporosis	Mixed	Interviews and focus groups	15 / 6	Non-intervention
2	Booth, Lowis, Dean et al.	2013	Diet and physical activity in the self-management of type 2 diabetes: barriers and facilitators identified by patients and health professionals	Primary Health Care Research and Development	UK	Type 2 diabetes	Mixed	Focus groups and interviews	16 / 7	Non-intervention
3	Foster, Piggott, Riley et al.	2015	Working with primary care clinicians and patients to introduce strategies for increasing referrals for pulmonary rehabilitation	Primary Health Care Research and Development	UK	COPD	GPs and practice nurses	Participatory action research		Pulmonary rehabilitation setting

4	Hale, Smith, Mulligan et al.	2012	"Tell me what you want, what you really really want....": asking people with multiple sclerosis about enhancing their participation in physical activity	Disability and rehabilitation	UK	Multiple sclerosis	Mixed	Combined multiple qualitative studies	n/a	Non-intervention
5	James-Martin, Koczwara, Smith et al.	2014	Information needs of cancer patients and survivors regarding diet, exercise and weight management: A qualitative study	European Journal of Cancer Care	Australia	Cancer	Oncology	Focus groups	7 / 7	Non-intervention
6	Morris, Oliver, Kroll et al.	2015	From physical and functional to continuity with pre-stroke self and participation in valued activities: A qualitative exploration of stroke survivors', carers' and physiotherapists' perceptions of physical activity after stroke	Disability and rehabilitation	UK	Stroke	Physiotherapists	Interviews and focus groups	38 / 15	Non-intervention
7	Sutton, Hackshaw-McGeagh, Aning et al.	2017	The provision of dietary and physical activity advice for men diagnosed with prostate cancer: a qualitative study of the experiences and views of health care professionals, patients and partners	Cancer Causes Control	UK	Cancer - Prostate	Mixed	Interviews	16 / 10 (+7 carers)	Perceptions of current practices
8	Stretton	2013	Activity coaching to improve walking is liked by rehabilitation patients but physiotherapists have concerns: a qualitative study	Journal of Physiotherapy	Australia	Neurological conditions	Physiotherapists	Interviews	5 pairs	Observations of sessions

Almost half of these combined studies directly compared patients' and health professionals' views. For example, several studies identified a difference in the way health professionals and patients conceptualised PA (Baert, Gorus, Guldemont, De Coster, & Bautmans, 2015; Browne, Mihas, & Penn, 2016; Morris, Oliver, Kroll, Joice, & Williams, 2015), with clinicians focusing on physical and functional aspects of PA which Morris and colleagues (2015) described as “diverging social and biomedical constructions of PA”. Direct comparison of patients and health professionals may be problematic; the diversity of opinions identified within this literature review suggests that they are not homogenous groups.

In two studies, the reason for interviewing health professionals as well as patients was to provide a second voice for patients, assuming health professionals could describe any concerns that patients might be unable to articulate themselves (Booth, Lewis, Dean, Hunter, & McKinley, 2013; Morris et al., 2015). However, Sutton and colleagues (2017) identified that health professionals had perceptions about patients that were unsupported by the patients' interviews, for example the most suitable timing for patients to be ‘ready’ for advice about PA.

An alternative motive for including health professionals and patients together was recognition that the perspectives of both are critical during the development phase of interventions and that sustainability depended on the engagement of both groups (Browne et al., 2016). This included qualitative studies exploring perceptions of current provision of PA advice to inform feasibility and acceptability work for the design of future interventions (Sutton et al., 2017).

Two studies adopted participatory designs. For example, Foster and colleagues (2015) took a participatory action research approach to develop strategies to increase referrals and uptake to pulmonary rehabilitation, using questionnaires and practice audits to identify opportunities and a patient survey to evaluate their likely impact. Stretton and colleagues (2013) asked physiotherapists to observe a research physiotherapist providing their patient with an activity coaching session followed by interviews with patient and physiotherapist. This study highlighted a gap between

anticipated problems identified by the health professionals that were not reflected in the patients' experiences. This prompted the authors to reflect on the importance of health professionals' buy-in for the feasibility of interventions.

2.9 Application of qualitative findings to the design of current interventions

Articles reporting patients' or health professionals' experiences of an existing PA intervention provided insights into barriers and facilitators to engaging with the intervention. These included which elements were strongly or poorly delivered or received, and sometimes provided an overall 'verdict' on the feasibility of the intervention. In one case, these insights may be translated further into quantitative research to evaluate their strength as critical factors (Bäck et al., 2017). Other papers concluded with an endorsement of the programme but also recommendations for improvements (Desveaux et al., 2014; Smith, Hale, Mulligan, & Treharne, 2013).

It was rare for articles to report on whether programmes and interventions continued post-trial. In one case, health professionals explicitly stated that they would be unable to deliver the trial protocol within routine care (Beighton et al., 2015) but no account was given of any plans to address feasibility issues. Din and colleagues (2015) reported that the National Exercise Referral Scheme for Wales had been continued as a national programme but did not explain whether any adjustments or improvements were made as a result of the qualitative research carried out.

Studies exploring attitudes and beliefs about PA outside a trial or programme setting provide similar insights but from a perceived as opposed to realised position. In a minority of cases, authors explicitly acknowledged the role of the study in developing an understanding of users' needs that could influence intervention design (Clarke et al., 2015; Heinen et al., 2007). The majority of studies concluded by outlining broad recommendations, or considerations for promoting PA to the relevant group of patients. Although most papers discussed design implications (e.g. Slade, Molloy, & Keating, 2009), overall the recommendations were weak in terms of translation into practical service features and remained abstract summary points as opposed to clear

guidelines for action. Only one study (Withall et al., 2016) expressly stated that its purpose was to provide formative research in line with the Medical Research Council (MRC) framework on developing interventions (Craig et al., 2008). This study included presentation of three existing PA interventions to participants of focus groups for them to critique as well as encouraging the suggestion of novel features. Patients' views collected via focus groups informed detailed conclusions about the specific format and delivery of a future intervention.

A systematic review of the strategies used to optimise interventions has identified the MRC framework (Craig et al., 2008) and Intervention Mapping (Bartholomew, Parcel, Kok & Fernandez, 2011) as the most commonly used frameworks to develop interventions. The MRC framework advocates developing the intervention based on theory and evidence. It acknowledges the importance of local context and testing feasibility prior to full-scale evaluation, but this typically occurs after the development stage. Intervention mapping involves six stages, the first of which is a needs assessment. This can involve stakeholders, for example via interviews and focus groups but the approach is focused on ensuring that the intervention is underpinned by appropriate theory and evidence. User involvement is common in the development of mobile- and electronic-health interventions (mHealth and eHealth). Inspired by the culture of user testing in human-computer interaction research, product and software development these interventions use formative research involving the target audience (Fjeldsoe, Miller, O'Brien, & Marshall, 2012; Whittaker, Merry, Dorey, & Maddison, 2012). Strategies for the development of PA interventions that include the involvement of future stakeholders are now starting to be proposed (Colquhoun, Squires, Kolehmainen, Fraser, & Grimshaw, 2017; Huijg et al., 2015).

PA interventions are commonly associated with the concept of behaviour change and thus underpinned by associated theory (Hutchison, Breckon, & Johnston, 2009). Reviews have identified Social Cognitive Theory (Bandura, 1998) and the Transtheoretical model (Prochaska & Velicer, 1997) as the most commonly used theories to underpin PA interventions. They also point out generally weak links between theory and behaviour change techniques (Prestwich et al., 2014). Techniques of behaviour change are extensive and efforts have been made to develop taxonomies

(Michie, Ashford, et al., 2011) and models such as the behaviour change wheel (Michie, van Stralen, & West, 2011) to aid practitioners in selecting suitable intervention components. So far there is limited evidence concerning the practical application of these models to the development of PA interventions. Applying these models without sufficient involvement of users might also lead to interventions prioritising target behaviours and intervention components reflecting the aims of policy and intervention developers, rather than based on the perspectives and needs of patients and health professionals.

2.10 Summary of qualitative literature review

Qualitative research poses particular challenges to ensuring a comprehensive search because language and search terms can vary widely. The intention of qualitative synthesis is therefore saturation of themes as opposed to exhaustive search and retrieval (Doyle, 2003).

Similarity existed in some themes identified within health professional- and patient-focused literature but many were also exclusive to one group or the other. This supports the suggestion made in chapter one that patients and health professionals constitute important users of PA interventions whose views should be understood and considered. Studies involving health professionals and patients showed that health professionals do not always correctly assume what patients need or want. The review also highlighted the diversity in views amongst patients with the same health condition or health professionals working in similar roles demonstrating a need for flexibility within PA interventions.

Synthesis of the patient-focused articles reviewed was particularly challenging given the variation in contexts, for example the range of interventions and sample sizes. However, the review highlighted that although there were condition-specific themes, the majority of barriers and facilitators transcended health condition alone and could be experienced by patients from across healthcare settings. The development of future PA interventions might therefore benefit from prioritising these issues rather than condition-specific factors.

2.11 Aims of the thesis

2.11.1 Gaps identified in the existing qualitative literature

1. Involvement of patients and health professionals in the design of PA interventions

Qualitative literature has explored patients' and health professionals' views towards PA which has provided rich insight into preconceptions about PA and experiences of receiving or delivering existing PA interventions. What is unclear is how these views and/or experiences have been used to shape current and future PA interventions. Also lacking appears to be a substantial body of research documenting the direct involvement of patients and frontline health professionals in the design and development of PA interventions. It could be hypothesised that designing with patients and health professionals from the outset could encourage programmes that are likely to attract more patients and be more feasible for health professionals to deliver.

2. Understanding the PA pathway

Themes identified within the literature review addressed not just the content of a PA intervention (i.e. what activity the patient does) but many surrounding elements, for example the training and knowledge of health professionals, when the intervention is initiated during the patient journey, how patients are introduced to PA and referral and follow-up processes, as well as the challenges for health professionals of embedding PA interventions into routine care. Viewing PA in the context of a care pathway as opposed to a standalone intervention may provide insight that could enhance future implementation and sustainability.

3. Diversity of patients and health professionals' views

Findings within the current literature illustrate significant variability among patients' and health professionals' needs and preferences. Methods for understanding and responding to this diversity are needed to ensure that PA pathways are responsive, suited to local needs and widely accessible.

4. *Non- condition-specific focus*

Despite the range of perspectives on PA, many of the barriers and facilitators described in qualitative studies appear to be experienced across medical conditions. The Faculty of Sport and Exercise Medicine (FSEM) and the IOC have previously suggested a non- condition-specific approach (Jones et al., 2014; Matheson et al., 2013) to promoting PA. This thesis will therefore involve patients and health professionals from multiple health conditions exploring the extent to which a multi-condition approach can be applied to PA intervention design.

2.11.2 Research aims and objectives

The aim of this thesis is to explore the user-centred design of a PA pathway in usual NHS care. This will include identification of an appropriate research methodology, documentation and evaluation of the design process and recommendations for future practice.

Research objectives can be summarised as follows:

1	Explore patients' health aspirations and support needs in relation to PA pathways
2	Explore the training, resources and support needs of health professionals to effectively promote PA amongst patients
3	Involve patients and health professionals in the design a PA pathway which meets users' needs
4	Identify the likely barriers to implementation of a PA pathway and identify steps to reduce or resolve these barriers
5	Document and evaluate a user-centred approach to designing a PA pathway in NHS care

2.11.2 Setting for the thesis

The National Centre for Sport & Exercise Medicine (NCSEM) in Sheffield is one of three UK sites funded as part of the London 2012 Olympic legacy. In Sheffield specifically, the NCSEM forms part of a city-wide strategy under the banner 'Move More' targeting the local population's PA through a whole systems approach involving multiple sectors: communities, transport, schools, workplaces and healthcare providers. NCSEM

Sheffield includes the co-location of a range of NHS clinical teams and patients in three community-based leisure facilities across the city. Specialist secondary and community care NHS clinics supporting patients with a variety of health conditions deliver routine care from consulting rooms based at these sites. During the timeframe for this research, two of the three NCSEM Sheffield sites were accessible: Graves and Concord Leisure Centres (shown in figures 2 and 3).



Figure 2: NCSEM Sheffield - Graves Leisure Centre



Figure 3: NCSEM Sheffield - Concord Leisure Centre

The NCSEM Sheffield centres provide an opportunity for this research to engage patients and health professionals from multiple health conditions in the design of a PA

pathway that reflects local needs and priorities, whilst also providing valuable insights into the process of involving users. Further information on the NCSEM which includes some of the rationale for this thesis has been published elsewhere (Speake et al., 2016).

2.12 Chapter summary

This chapter presented a review of existing qualitative literature into patients' and health professionals' views towards PA. The review highlighted key themes and reinforced how both groups' views are likely to influence the uptake and/or delivery of PA interventions. Despite a dominance of post-intervention evaluations, there were examples of patients' and health professionals' views being considered outside of, or prior to the development of PA interventions. Nevertheless, these studies did not elucidate how such views are being used to shape and inform the design and implementation of PA pathways in healthcare settings. The overarching aim of this thesis was therefore defined as exploring the user-centred design of a PA pathway in NHS care. The following chapter will identify and outline the epistemological underpinning and methodological approach selected to address this aim.

Chapter 3: Theoretical and methodological underpinning of this research

3.0 Overview

This chapter describes the theoretical underpinning for this programme of research. It also provides the rationale for applying the UK Design Council's 'Double Diamond' (Design Council, 2007) (and specific methods therein), to explore the development of a PA pathway in NHS care, taking a user-centred design approach.

The research activities undertaken to meet the aims of this thesis were as follows:

- interviews with patients and health professionals
- a series of co-design workshops to generate solutions
- consultation with users and other stakeholders to test and refine solutions
- a final case study to develop and evaluate implementation recommendations

This chapter also describes how several design tools and methods were applied within each of these research activities, to ensure patients and health professionals (the end users of a PA pathway) were placed at the centre of the design process.

3.1 Background to the choice of methodology

Choice of methodological approach and research methods is guided by the context and purpose of the research (Crotty, 1998). Research traditionally has three possible purposes - to *explore*, *describe* or *explain* phenomena, but there can also be a fourth purpose: *action* (Robson, 2011). This is particularly important here given the purpose of the thesis is to go beyond simply *exploring*, *describing* or *explaining* PA pathways. Instead, the intention is to design potential solutions and initiate *action*, based on the values, experiences and needs of users (patients and health professionals) who will ultimately comprise the pathway itself. Reconceptualising health services and encouraging a move from 'problem defining' to 'solutions thinking' requires informal and socially-oriented methods (Carr, Sangiorgi, Büscher, Junginger, & Cooper, 2011;

Macdonald & Robert, 2014). Increasing value is also placed on researchers being socially embedded within the subject matter of the research so that knowledge is produced in context (Coghlan & Brannick, 2014). Since the author of this thesis is starting from an external position (i.e. not physically or socially based within the NHS), the methods used need to enable close working with participants from within the NHS setting.

3.2 Ontological and epistemological framework

A theory of knowledge contains assumptions about what human knowledge is and what status can be ascribed to it (Crotty, 1998). These assumptions influence the philosophical stance informing choice of methodological approach, and ultimately the methods of data collection and analysis employed to answer specific research questions.

The theory of knowledge and philosophical stance embedded in this thesis combine principles of realist-constructionism, pragmatism and participatory research:

Realist-constructionist principles:

- *an empathic approach attempts to understand social meanings from the perspective of participants, resulting in a co-constructed understanding between researcher and participants*
- *fallibility of what we know about 'real world' - the best we can hope for is 'multiple fallible perspectives'*
- *emphasise importance of context, complexity and diversity rather than seeking general rules independent of conditions*

Pragmatist principles:

- *meaning and knowledge are only useful insofar as they effect action and change*
- *research is intended to change practice but scientific knowledge should also be useful to share beyond the current situation*

Participatory principles:

- *recognise value of involving end beneficiaries from the outset*

3.2.1 Realist-constructionism

Ontology is the term used to describe the nature of reality - what types of phenomena exist and the relationships between them (Blaikie, 2007). Ontological positions are often framed as a dualism between relativism and realism (Burr, 2003). A relativist position proposes that what is 'real' depends on the subjective reality of the person experiencing it, whilst a realist position contends that a single external reality exists, external to individual experience (Willig, 2016).

Epistemologies, or theories of knowledge, differ in the extent to which they postulate that reality can be objectively known and observed. An objectivist position would claim that a meaningful reality existing independently of the human mind can be discovered with the right methods (Guba & Lincoln, 1994). In contrast, a subjective view sees all truth and meaning as individual and thus not available to be discovered outside the mind (Crotty, 1998). A constructionist position asserts that meaning is constructed through our minds interacting with the world, implying that influences such as culture can cause people to experience the same phenomenon in different ways (Mantoura & Potvin, 2013).

This thesis adopts a realist-constructionist position (Mantoura & Potvin, 2013); a realist ontology with a constructionist epistemology. This acknowledges that a real world exists, but can only be known partially and fallibly (Maxwell, 2012). The thesis takes an empathic approach (Cupchik, 2001), co-constructing an understanding of the meaning and experience of PA in the NHS with groups who are directly affected. The realist-constructionist position acknowledges that through experiential knowledge people might only be aware of a portion of their reality (Connelly, 2001). Research can therefore triangulate across "multiple fallible perspectives" (Trochim, 2001).

Whilst most types of research typically tend to suppress diversity in favour of generalisability, realist research highlights its importance and actively seeks to explore its consequences (Maxwell, 1995). Understanding and exploring context, complexity and conflicting voices is necessary to produce knowledge approaching 'reality'

(Mantoura & Potvin, 2013). Within this thesis, diversity is acknowledged not only through recruitment of people from multiple condition groups and a range of patients and professionals, but also by recognising how individuals within these groups can differ in their perspectives.

3.2.2 Pragmatism

Similar to the realist-constructionist position, pragmatist epistemology accepts that a reality can exist independent of human experience (Dewey, 1931) but asserts that knowledge is constructed to better manage existence (Rorty, 1980). The meaning of relationships and social structures is derived from action; ideas and concepts can be understood in terms of their practical consequences. Within this thesis, this principle is demonstrated in Chapter 5 where perspectives expressed in interviews with stakeholders are translated into insights for design based on their practical meanings.

In addition to meaning, action is also a way to change existence. Pragmatic research is thus carried out with the purpose of creating knowledge not for interests' sake but to create change. Pragmatic research can be carried out through various forms of action research. These methodologies enable the direct influence of local practices, but the pragmatic approach also argues that knowledge gained should be valuable for transfer and use beyond the immediate situation (Goldkuhl, 2008).

Pragmatism embraces the idea of "open systems" reflective of real-world contexts (Robson, 2011) and thus accepts that definite prediction is not possible, because people and structures are changing constantly. This thesis seeks not to identify general laws but to explore opportunities for action within the dynamic social and operational structures of the NHS and relevant communities.

3.2.3 Participation / User involvement

In the context of this thesis, the principles of realist-constructionism and pragmatism discussed so far cannot be realised without also embracing the participatory paradigm. Engagement between researcher and the relevant communities, triangulating between

multiple sources to construct knowledge and shared meanings, and creating the conditions for innovation and change, necessitate participative research methods (Murray, Caulier-Grice, & Mulgan, 2010). Participatory research has been described as "an umbrella term for a school of approaches that share a core philosophy of inclusivity and of recognising the value of engaging in the research process those who are intended to be the beneficiaries, users, stakeholders of the research" (Cargo & Mercer, 2008, p.326). Within this thesis, there is an acknowledgement that understanding and developing the role of PA in NHS care cannot be done without, and will likely be enhanced by, involvement of patients and health professionals.

3.2.4 Different approaches to participation

There is no consensus on the best way to involve users in research. Patient participation has been conceptualised as a scale on which different approaches are located by the amount of 'power' they afford patients (Arnstein, 1969) but this might be an oversimplification. Instead different approaches to participation are appropriate at different times during research. For example, distinctions have been made between approaches that advocate patient consultation, patient collaboration or patient control (i.e. patient-led), all of which can be realised through a diverse range of methodologies (Popay & Collins, 2014). Rather than maximising the use of participatory design elements, it is recommended that they are selected as appropriate, guided by practical as well as theoretical considerations (Bradwell & Marr, 2008).

In this thesis, the approach is not truly patient-led, because the research and its overarching aims have already been proposed by the researcher. As identified in the literature (chapter 2), patients are also not the only stakeholders in PA interventions. Healthcare professionals are important end users whose views and experiences influence the relative success of delivering and implementing PA programmes. This thesis seeks to strike a feasible balance between control, collaboration and consultation with patients and health professionals.

3.2.5 Involvement of the researcher - personal reflexivity

Cupchik (2001) asserts that all methodologies are "deconstructive"; merely identifying people, events and objects as sources of inquiry unavoidably disrupts the flow of everyday life. Selection is an immediate source of bias and distortion. Regardless of whether the researcher takes a detached, objective stance or aims to immerse and engage themselves in the context, any raw data is inevitably shaped by the researcher's frame of reference.

In this thesis, the researcher is positioned as both a facilitator and participant within the field of study rather than separate and objective. A process of reflexivity is thus necessary to examine the researcher's values and beliefs as they inevitably shape the research process (Stige, 2002). At the end of the final chapter, a short personal reflection section will be included that provides critical discussion of these assumptions and their possible impact on the research.

3.3 Design research methodology

Whilst science tends towards analysing pre-formed hypotheses and theories, design synthesizes information from multiple sources in search of new solutions (Roberts, Fisher, Trowbridge, & Bent, 2016) and advocates new ways of engaging and empowering stakeholders (Chamberlain, Wolstenholme, Dexter, & Seals, 2015). Design approaches are also increasingly being considered appropriate for research (Clune & Lockrey, 2014). Design research can be constructive (Cross, 2001) and pragmatic (Lee & Nickerson, 2010) (see Feast, 2010 for a discussion of alternative epistemological approaches to design). Frayling (1993) identifies different strains of design research: research *for* design, research *into* design, and research *through* design. Research generating knowledge usually tells us what is wrong, but without suggesting how to improve. 'Research through Design' generates *knowledge* and *change*, through active participation (Frayling, 1993) and is likely to produce theories which are provisional, contingent and aspirational as opposed to extensible and falsifiable (Gaver, 2012). This thesis therefore takes an inductive line of inquiry using Research through Design to explore and provisionally test theories in the form of the solutions generated.

User-centred design is a design approach involving techniques and methods to create products and services which meet the real-world needs of customers and users. In a health service context, the relations between things and actors within systems are the focus of the design activity, rather than the objects themselves. Principles and methods from these realms of design are now being applied to the redesign of complex services and systems including public services, health systems and public policy (Design Commission, 2013; Sangiorgi, 2015). The current thesis will draw on these applications of design, taking a user-centred, Research through Design approach that places patients and health professionals (the users) at the centre of the process. Rather than designing a PA pathway *for* those users, it will be co-designed (Sanders & Stappers, 2008) *with* them.

3.4 Double Diamond

As design approaches become increasingly popular guiding frameworks have been developed, particularly to assist non-designers navigate the principles and methods of design. Whilst maintaining an assertion that "design is not a process", the UK Design Council undertook a review of design practice identifying some commonality in approaches (Design Council, 2007). Four distinct phases were identified and incorporated into a Double Diamond model (see figure 4):

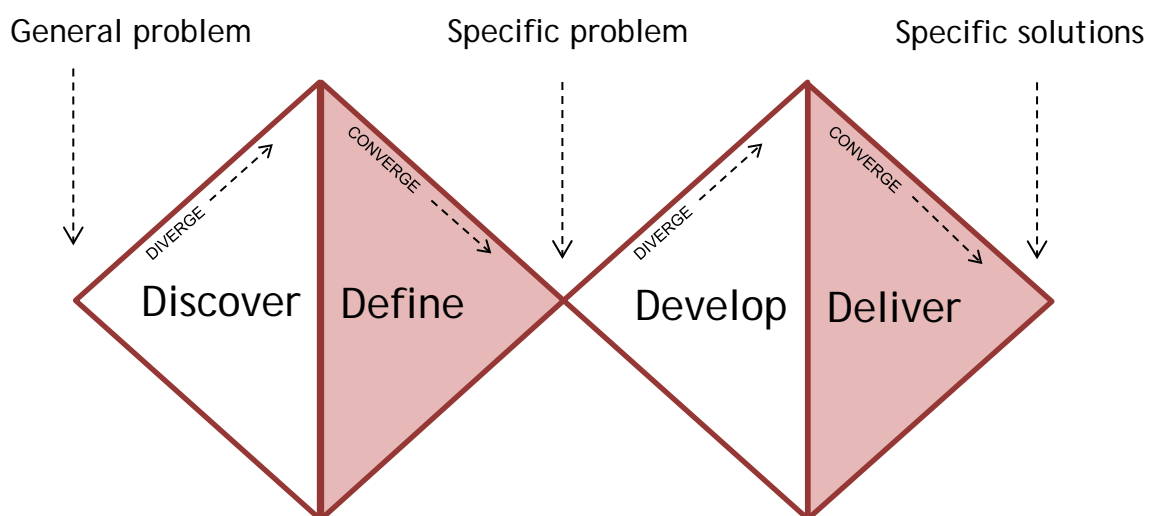


Figure 4: Double Diamond framework

The double diamond emphasises how design moves between convergent and divergent thinking. A design project might involve broad input from stakeholders initially, but those insights are gradually refined towards specific solutions. The four phases of the double diamond are as follows:

- **Discover** - developing empathy with users, gathering insights to give a broad understanding of the context for the project. This can include refining and testing existing knowledge to see whether your understanding echoes that of users
- **Define** - working with users, honing the insights gathered in the *Discover* phase. Here the framework narrows identifying specific problems to be solved and formulating a focused challenge for design
- **Develop** - based on the specific problems identified, generating and developing ideas. This opens the diamond up again before bringing these together to form a service
- **Deliver** - testing ideas out with users and modelling how the service might fit in context - bringing the focus narrow again

Design practitioners warn against jumping to conclusions about the specific problem, and thus possible solutions, too early in the process (www.designkit.org). In health service development, it has been suggested that the early exploration needed to define the 'problem space' is not always used to full benefit (Jun et al., 2014). Whilst many creative methods immediately begin at idea generation, an advantage of using the double diamond is the generous time it allocates to defining the problem, at least half the diamond. This is intended to result in eventual solutions likely to meet users' needs.

Trial and error is an important feature of the approach. Rapidly testing ideas and gathering feedback is essential to progressively refining services to ensure a good fit with context and users before implementation is attempted (Collins et al., 2006). It is widely accepted that in developing complex services and products, the entire diamond or any particular phase of it may be run through several times before successful implementation of the solution (Design Council, 2007).

The double diamond is frequently used by design practitioners as a guiding framework, but there is little empirical evidence regarding its use in academic research. This thesis can therefore contribute evidence regarding its use as a methodological framework in the design of healthcare services.

3.4.1 Flexible use of research methods to be applied within the double diamond

The double diamond is intentionally flexible. Consistent with a pragmatic approach, design research methodologies enable practitioners to use multiple methods as appropriate to the research question (Blessing & Chakrabarti, 2009). Some are more common in design than research, such as user journey mapping and persona building, and are considered tools in a toolkit rather than methods. Some tools are likely to be useful at particular phases of the double diamond, for example methods suited to generating ideas might be most useful at the define/develop phases (see www.bsbd.org.uk).

3.5 Specific methods applied in this thesis

For this thesis an iterative approach was taken to selecting appropriate methods at each phase of the double diamond, based on the objectives for different stages of the research. Whilst the specific methods are described in detail as they occur throughout the thesis, the objectives guiding their selection are outlined in Table 5.

Figure 5 illustrates the methods applied to each phase of the double diamond for this thesis with chapter numbers to guide where they appear in the thesis.

3.5.1 Methodological reflexivity

A methodological reflection section at the end of each chapter will consider the choice and application of specific methods at each stage of the double diamond. This will appraise how suitable each research method is for meeting interim objectives of the

thesis. It will also contribute to an overall evaluation of how appropriate the user-centred design approach and the double diamond framework are for the design of a PA pathway. The final chapter of the thesis (chapter 8) will include a critical discussion and recommendations regarding the application of user-centred design in this and similar contexts in the future.

Table 5
Research objectives at different phases of the Double Diamond

Double Diamond Phase	Objectives	Methods and tools	Corresponding chapter in thesis
Discover phase	to understand how the NHS currently promotes physical activity and the benefits and drawbacks of current approaches from user point of view	Literature review	Chapter 2
	to understand user perspectives towards physical activity and its role in NHS care and patients' lives	Interviews; user journey mapping	Chapter 4
Define phase	to analyse and translate user insights	Design workshops: Persona building; card sort exercise	Chapter 5
	to define the specific problems and opportunities regarding PA in the NHS Develop phase		
Develop phase	to generate ideas and solutions to the problems identified in the <i>define</i> phase	Design workshops: brainstorming; voting and clustering; storyboarding	Chapter 6
	to refine ideas with users	Prototyping, survey, patient consultations and leisure provider interviews	
Deliver phase	to develop plans for implementation	Final case study	Chapter 7
	to translate learning from the process into recommendations for promoting PA	Analysis and reporting Pathway map	

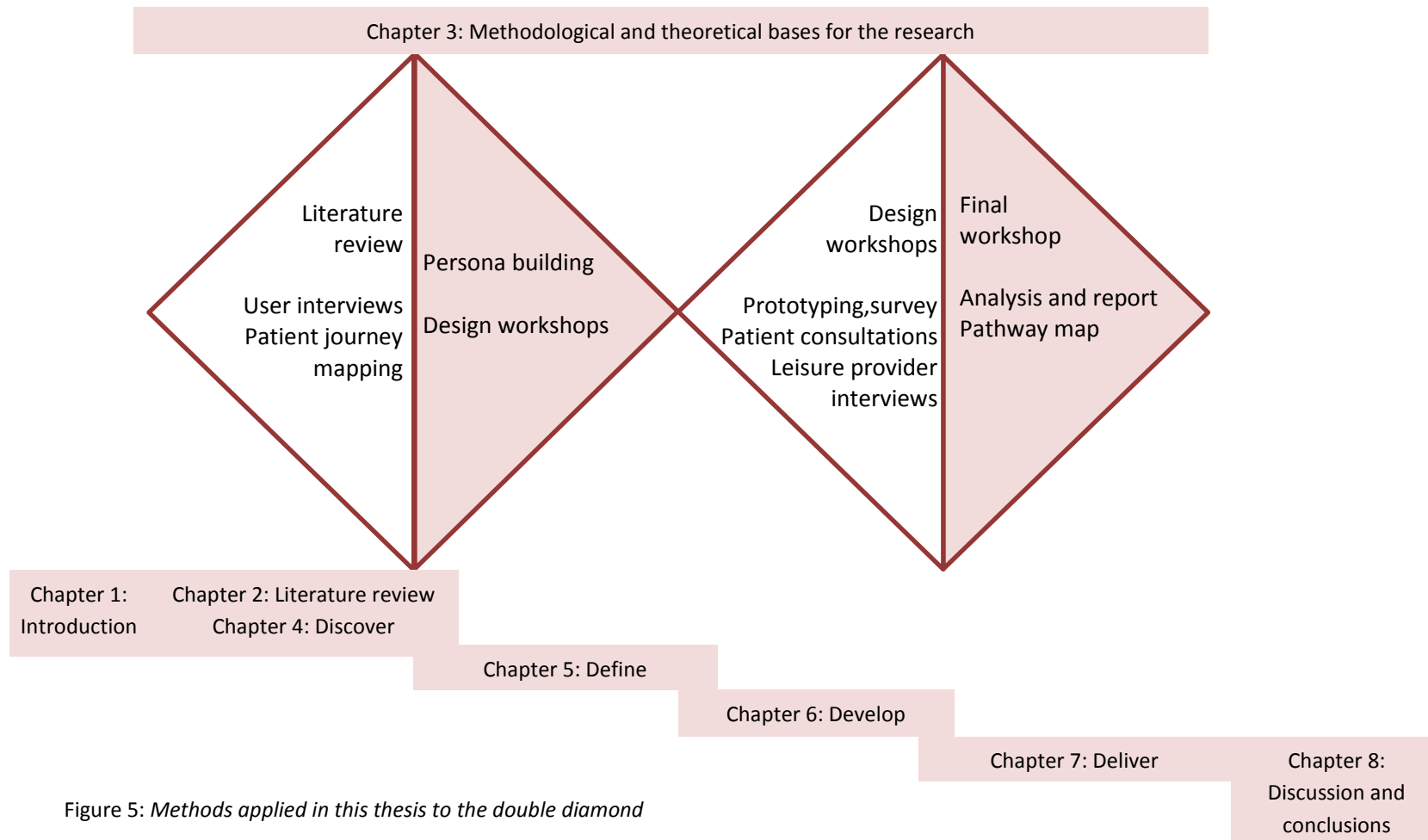


Figure 5: *Methods applied in this thesis to the double diamond*

3.6 Validity and scientific rigour

There is an on-going debate about the validity and rigour of evidence produced in design activities, in contrast with traditional research undertaken within a scientific paradigm (Chamberlain et al., 2015). Opinions differ over whether design should aim for scientific standards such as rigour and established criteria. In the context of human-computer interaction design, Gaver (2012) suggests that the scientific standardisation of design could threaten its richness of ideas, diversity of approaches and potential to challenge status quo thinking, leading to overly-restrictive "self-policing". In contrast, there is an argument that design should adopt standards satisfying academic criteria, particularly when it seeks to produce knowledge (Jonas, 2007). Results need to be developed and analysed systematically to be considered valid and reliable (Blessing & Chakrabarti, 2009; Glanville, 2015). Systematic evaluation can contribute to future research and ensure general lessons are learnt for policy improvement (Puttick & Ludlow, 2013). The different expectations in terms of standards might be more relevant in Research through Design as opposed to design practice, where ambiguity may have greater value. Within this thesis, where objectives are to generate knowledge and action, adopting standards of scientific rigor is deemed appropriate and necessary.

3.6.1 Issues of quality that apply to this thesis

The nascence of user-centred design and its application to health, alongside the encouraged flexibility of methods means that there is no consensus on quality standards for this type of research.

The philosophical stances of pragmatism and participation guiding this thesis place a focus on knowledge as it impacts action and the involvement of users. Quality measures applied in the domain of action research are therefore a useful guide. Quality in action research is measured looking at five types of validity (Reason & Bradbury, 2001):

- Outcome validity – the resulting solution of problems and improvements generated

- Democratic validity – the level of involvement of stakeholders
- Process validity – facilitating the process of learning for participants
- Catalytic validity – empowerment of participants to understand and change reality
- Dialogical validity – discussion of aspects of the research between researcher and participants

These elements have been used to develop evaluation and feedback forms following co-design activities (see chapter 6) and will be returned to later in discussions about the implications that user-centred design has on this research (chapter 7).

In qualitative research, validity can also be measured in terms of transparency of process (Sykes, 1991). Documenting evidence throughout the process can demonstrate that results are a product of 'organised experience' rather than biased by the researcher (Malterud, 2001), and thus contribute to perceptions of trustworthiness. This may be particularly important during the Define-Develop phases (see chapters 5 and 6), where workshops will generate less traditional 'data'.

Kvale (1996) suggests that qualitative studies should be evaluated not only within traditional notions of trustworthiness but on how well the knowledge developed can be understood (*communicative validity*) and implemented (*pragmatic validity*) (Kvale, 1996 cited in Stige, Malterud, & Midtgarden, 2009). This will be salient during the Develop-Deliver phases (chapters 6/7) where the ideas generated start to be shared with wider audiences and stakeholders, and plans for implementation are discussed.

A final validity issue concerns the representativeness of participants (Mantoura & Potvin, 2013); capturing the views and meeting the needs of a diverse group of users can be challenging (Bradwell & Marr, 2008). This is discussed further in chapters 5 and 8.

3.7 Chapter summary

This thesis follows an inductive, qualitative, Research through Design methodology. Pragmatism, user involvement and a focus on knowledge for practical action are guiding principles, and the double diamond framework has been adopted to allow flexibility in selecting appropriate methods to carry out this Research through Design. Reflections of how this approach impacts the research and its ability to meet its aim are included throughout the thesis as part of each chapter summary.

Chapter 4: Discover

4.0 Overview

This chapter describes the core objectives and activities undertaken during the Discover phase of the double diamond:

Phase	Objectives	Research method
Discover phase	to understand user perspectives towards PA and its role in NHS care	Semi-structured interviews

The chapter will present the preparatory work undertaken to involve and engage user groups in developing the research protocol for this thesis. An overview is then provided of the first phase of research; semi-structured interviews carried out with patients and health professionals to explore experiences relating to their health and NHS care generally, and PA specifically.

4.1 Preparatory work for the Discover and Define phases

4.1.1 Protocol development and patient-public involvement (PPI)

The participatory principles underpinning this thesis meant that it was important to engage NHS managers, health professionals and patients from the outset. Health professionals were consulted via service leads and/or contact members of staff for the services operating at the Concord site of the NCSEM (Graves was not yet operational). Participants provided feedback on the research idea and helped to shape the protocol. Given the current demands on NHS staff and resources, discussions focused on ensuring the protocol was feasible, and on securing agreement in principle from service leads that they would release staff and support the project.

Two patient groups were consulted formally during protocol development: Sheffield Teaching Hospitals Diabetes and Endocrinology Research Lay Panel and the SUN:RISE service user group organised by Sheffield Health and Social Care NHS Trust (for users of mental health services). Although patients were not being recruited directly from mental health services, there is a direct association between poor physical and mental

health and inactivity (The Health and Social Care Information Centre, 2012) and a high prevalence of mental health problems amongst people with long term conditions (Barnett et al., 2012). Lay advisory panels are in place to ensure that research being proposed and carried out within the NHS Trust is patient focused. They are made up of people from across the Sheffield and South Yorkshire area who become involved through multiple channels. STH NHS Foundation Trust thus believes that they provide opinions broadly representative of the wider patient group.

The rationale for the study and ideas forming a draft protocol were presented. Both panels welcomed the research as relevant and novel, and provided useful feedback on maximising patient recruitment, making documents comprehensible to lay audiences, and ensuring that the research was accessible and acceptable for patients throughout the research. Both groups engaged in avid discussions about their definitions of PA, its role in their health conditions and some of the barriers they experienced or anticipated to accessing existing PA provision.

The consultation with patients resulted in two significant changes to the protocol:

i) *Terminology*

Panel members had different reactions to the term "physical activity as medicine" in the protocol documents. One participant on the diabetes panel perceived this as positive for health and wellbeing, akin to taking medication every day. Another felt that the word 'medicine' had negative connotations; rather than promoting health, medicine was taken because something was wrong. To avoid confusion the phrase was removed from all project documentation.

ii) *Recruitment*

Members of both panels strongly disliked the suggestion that health professionals would act as gatekeepers to recruit patients. On reflection it was at odds with the spirit of the research, which was intended to value patients equally alongside other stakeholders. Although health professionals were still asked to make eligible patients aware of the project, emphasis was placed on self-referral and direct recruitment.

Following the consultations with study participants, a final protocol was developed which included the proposed interviews and subsequent design workshops. This was

submitted for review by NHS Research Ethics Committee (REC). The protocol was reviewed and approved by NHS East Midlands - Nottingham 1 REC (see Appendix D for REC approval letter).

4.2 Discover phase

The design council describe the *discover* phase as building a "rich knowledge resource" and "identifying the problems, needs and opportunities to be addressed by design" (Design Council, 2015). The objective of the interviews was to generate insights that would inform early discussions and provide focus for the forthcoming co-design workshops.

Specific objectives were:

1. to build empathy with patients, understand PA from their perspective and explore their wider health and care experiences
2. to understand the professional interests and concerns of health professionals and their views on the opportunities and barriers to promoting PA within current care pathways

4.2.1 Development of interview guides

Semi-structured interviews were identified as the most suitable method to explore patients' and health professionals' perspectives in detail (Patton, 2002). Orienting questions were appropriate to avoid gathering superfluous data (Miles & Huberman, 1994) but it was also important to allow individuals to express what was important to them. Both groups were asked open questions around common themes - but with an orientation towards the participant's particular experience (e.g. patients' care experiences OR clinicians' professional experiences).

4.2.2 Pilot interviews

Two initial pilot interviews with patients with long-term conditions were carried out to assess clarity of the questions, whether the interview would elicit information meeting the objectives of the study, and the flow of the interview guide. Questions about

existing models of PA promotion, designed to stimulate discussion about desirability and feasibility, were found to be leading participants to make 'either/or' choices on features which they may not have conceived if left unprompted. The interview schedule was revised to include open questions to determine patients' needs and expectations around PA without progressing into pathway design. In a second round of pilot interviews with two more patients, the content was more appropriate and elicited richer insight into values and experiences.

As a result of the pilot interviews with patients, the interview guide for health professionals was adjusted to remove similar prompt questions about pathway features. This resulted in pilot interviews only requiring minor adaptations to the phrasing of questions, and thus the two initial interviews with health professionals were retained for inclusion in the analysis. The final interview guides are attached at Appendix E.

4.2.3 Sampling and recruitment

Consistent with the aims identified in chapter 2, patients and health professionals across different clinical services were recruited with the intention of exploring general and diverse perspectives on PA rather than condition-specific issues. The services represented were musculoskeletal (MSK), diabetes, podiatry, chronic pain and continence. These services had all located a proportion of their clinics at NCSEM Concord and from a management perspective were open to exploring the role of PA in their services. Inclusion criteria was anyone aged 18-64 receiving or delivering care within one or more of these services. The upper age limit for patients was set at 64 to match the upper age limit for Chief Medical Officer (CMO) PA guidelines (Department of Health, 2011). UK CMO guidelines for adults aged 65 and above were different and it was possible that the needs of older adults might differ in terms of PA promotion.

Posters were displayed in relevant clinics in the South Yorkshire (or city) region, and health professionals were informed via email and team meetings of the eligibility and recruitment criteria. The researcher attended patient volunteer support groups to verbally promote the study amongst diabetes, podiatry, MSK and chronic pain patients

(there were no groups for continence patients). In practice, participants were successfully recruited when the researcher met people face-to-face. Although they were willing in principle to support recruitment, and prompt cards were displayed prominently in consulting rooms, only one health professional directly signposted patients, who were unfortunately over the age limit. Along with the PPI feedback that patients disliked health professionals as gatekeepers, this was a useful learning for future recruitment strategies.

4.2.4 Procedure

Patients interested in taking part were given a written information sheet and asked to provide contact details with the researcher or the clinic receptionist. They were followed up over the next 24-48 hours by telephone and given the opportunity to ask any questions. Those wishing to proceed then arranged a suitable time to take part in an interview either by phone or before/after their next appointment. Five patients opted to return to the clinic outside of their scheduled appointment times and were offered compensation for travel expenses; one person took this up. Health professionals either scheduled a suitable time for a telephone or face-to-face interview or met the researcher at an opportune time between appointments. All interviews were audio recorded and later transcribed verbatim. Example transcripts are attached at Appendices F and G.

4.2.5 Data analysis

Inductive thematic analysis based on the process outlined by Braun & Clarke (2006) was used to analyse the interviews. An inductive approach is intended to identify themes and patterns closely reflecting the data as opposed to meeting predetermined theoretical interests of the researcher (Patton, 2002). Firstly the audio recordings were transcribed then transcripts were read and re-read to develop familiarity with the data. The transcripts were then uploaded to QSR-NVivo10. Segments of raw data that were of interest in the context of the research objectives were highlighted and assigned an initial code. As further transcripts were analysed, the number of codes grew and diversified; when all transcripts had been coded, there were 141 lower order

themes. Re-reading the raw data extracts for each theme led to merging, refining or removing themes as appropriate. The next stage involved combining lower order themes under broader higher order themes. A variety of techniques including visual mind maps, tables and charts and manually sorting paper copies were used to "play around" (Braun & Clarke, 2006) with the data until meaningful groups had been created.

To encourage reflexivity, two other researchers read transcripts independently. Different interpretations of the data were discussed (Silverman, 1993) and suggestions were made to add richness to the themes identified (Braun & Clarke, 2013). A third researcher, independent to the study but with experience of qualitative research in a PA and health context, was provided with detailed descriptions and rich descriptive quotes to support each higher order theme. Discussion with this 'critical friend' (Creswell, Hanson, Plano Clark, & Morales, 2007) continued until it was felt that the themes provided a complex, albeit imperfect understanding of the issues.

4.3 Results from interviews with patients

19 patients (10 male, 9 female) were interviewed, aged between 31-64 ($M=50.73$, $SD=9.28$). 13 participants chose to be interviewed face-to-face, and 6 by telephone (see Table 6).

6 higher order themes were identified:

- Multiplicity of health concerns and their impact on everyday life
- The effects of care experiences on self-management and long-term outlook
- Social identity and confidence about PA
- Psychological factors influencing attitudes towards PA
- Variation in individual needs and preferences regarding PA
- Influence of social networks on PA adoption and maintenance

Table 6
Patient interview participants

Male/ Female	Age	Postcode	Ethnicity	Employment status	Service	Interview mode
Female	56	S4	British Muslim	Stay-at-home grandparent	Continence	Face-to-face
Female	53	S4	Pakistani Muslim	Unemployed	Continence	Telephone
Female	59	S35	White British	Early retired- ill health	Continence	Face-to-face
Female	54	S10	White British	Employed (sick leave)	Continence	Face-to-face
Female	46	S35	White British	Full-time employed	Diabetes	Telephone
Male	34	S35	White British	Self-employed	Diabetes	Telephone
Female	55	S12	White British	Full-time employed	Diabetes	Face-to-face
Male	59	S7	White British	Full-time employed	Diabetes	Face-to-face
Male	61	S35	White British	Part-time employed	Diabetes / Physio	Face-to-face
Female	61	S9	White British	Part-time employed	Pain management	Telephone
Female	39	S13	White British	Unemployed	Pain management	Face-to-face
Male	31	S1	Black African	Unemployed	Pain management	Face-to-face
Male	51	S6	White British	Part-time employed	Physioworks	Telephone
Male	46	S35	White British	Full-time employed	Physioworks	Face-to-face
Male	42	S5	White British	Full-time employed	Physioworks	Face-to-face
Male	63	S35	White British	Full-time employed	Physioworks	Face-to-face
Female	46	S5	White British	Unemployed / retired	Physioworks	Face-to-face
Male	51	S5	White British	Full-time employed	Podiatry	Face-to-face
Male	57	S5	White British	Disabled	Podiatry	Telephone

4.3.1 Multiplicity of health concerns and their impact on everyday life

Participants described a wide range of health concerns including sleep problems, concerns about weight and diet, work and financial stress. All but one participant was receiving NHS treatment for more than one health condition, which they described as having differing effects on their life. Many participants had been forced to change jobs, make adjustments at work or cease working altogether. Others were no longer able to

complete tasks such as housework, decorating and gardening, or unable to enjoy sports or days out with family.

Health conditions manifested in some predictable ways, for example diabetes patients talked about having to make dietary changes, and MSK patients discussed problems with reduced mobility. Still, for most participants there were also wider consequences, such as the impact on personal relationships, mood and mental health, energy and general impetus:

"...my body's that worn out all I do is feel, I feel ready for bed 24 hours a day. And then when I go there I can't sleep."

"Oh god yeah it affects everything. My partner, relationship, family, it just affects everything I do this illness, because I don't do much at all."

Participants taking long-term medication also described side effects:

"You see my husband gets aggravated with me because he says I'm slow at doing everything. But he don't realise my body has slowed down.... They found out that [medication] is a very good painkiller, that's why I take it you see, but I've got all these side effects."

Participants who worked shifts, long hours and physical jobs described its effects on their body and their health. Declining health was confounded by concerns about ageing, with people focused on paying off mortgages or preparing for retirement:

"...I don't claim any added benefits, I run my own car, do you know what I mean, I do everything.... So I'm just limping along until I've paid my mortgage off in three years, literally limping along."

Mental health was discussed in every interview. Participants either described having a clinical diagnosis of a mental health problem or having experienced symptoms of mild-moderate depression or anxiety. They saw physical and mental health as highly correlated, with each influencing the other:

“...when I do certain things I just get really bad pain which stops me from doing everything yeah. Then which makes me more depressed, I cry a lot and then that stops me from doing things”

Participants' health priorities were more complex than simply improving physical symptoms. Participants described wanting to reduce whatever the particular impact of their health problem was having on their life, for example reducing pain, or to improve their quality of life through improving their mood or losing weight:

“It would give me some of my life back. I think that's the only way I can describe it, because there's nothing happening just now. And hopefully if I am fitter in 18 months' time I shall be doing at least a bit of something I want to do. So I shall be getting some of my life back.”

4.3.2 The effects of care experiences on self-management and long-term outlook

Previous care experiences and communication with health professionals had a significant effect on how participants felt about their health. Continuity was important for patients with long-term conditions who valued having someone who knew their treatment plans and with whom they had rapport. Most participants described care experiences involving trial and error, either through consecutive referrals to different services or professionals, or from trying out different types of medication. Whilst participants generally accepted this as part of the 'system', they found it confusing and dispiriting:

“That's what I really want. I really want somebody to tell me what is wrong with me because I am not right. And the doctor when she sent that letter to this lady and put I almost felt, I mean I don't have access to my own records...but I almost felt that doctor's put 'this woman don't know what's up with her so you sort her out'. That's what I feel. That's how I felt that day.”

Participants varied in their confidence to seek a second opinion if they were unhappy with the diagnosis or treatment received. This was exacerbated by language barriers:

“Language is a barrier sometimes. Sometimes just being a woman is a barrier, so I think it’s difficult. I think the younger ones are better at it because they’ve got the language and they can go to the GP and say look I’m not happy with this diagnosis and the specialist clinic for younger people, you know, so they can go and get those kind of problems sorted out.”

These care experiences affected the perceived control patients had over their health and their consequent dependence on the NHS. Some participants felt powerless and placed all hope of recovery or improvement in medical interventions and the knowledge of the health professionals:

“So this is the thing that I don’t like just now, is that I can’t fight my way back to any sort of fitness that I’d like to, because my body won’t let me. And yet it’s my body that’s suffering because I can’t do it. So there’s no end to it as far as I’m concerned until I have my knees done.”

Other participants recognised the limitations of medicine and acknowledged there were things they could do to make a difference. This was associated with having clarity in diagnosis and information to act upon:

“And eventually when I did get diagnosed, I rang the support group and I got a lot of support from the support group. They gave me information that my GP couldn’t give me, and that sort of helped me through a lot. I found their advice really useful and I started to search out things for myself.”

For others, acceptance and an optimistic outlook was associated with a more positive attitude and perceived autonomy towards PA and lifestyle change:

“...one day I’d just had enough, because I’d put so much weight on, I thought right, I can’t do anything about neuropathy, I can’t do anything about arthritis in my back, but I can do something about my weight.”

4.3.3 Association between social identity and confidence and PA

When participants described what PA meant to them, they often talked in terms of their place in society and the community, and of wanting to feel ‘normal’. Definitions

of 'normal' included being able to do what you want, when you want, without worrying about being in pain later or having to consciously manage your condition. Going to work was a way to feel connected as well as providing a sense of self-worth. 'Getting out and about' was valued because it meant interacting with other people:

"I think it's getting up out of bed and giving myself that push to go out to do things, you know, go to lunch with a friend or go for a walk around the block. To put some makeup on, just go to Boots and just have a wander round the perfume counter and things like that, just to be part of the world do you know what I mean, be part of a community, be out and about."

Participants tended to make comparisons against how active they thought they should be for someone of their age, and what activities they felt were appropriate for them to be doing. They were also conscious of the effects of ageing on their future activity:

"...well obviously I'm a bit too old for sport anyway at the moment..."

"I mean 53 isn't old. I shouldn't be feeling old the way I do. My heart is young, but my body's just give in."

Participants recognised that going out had benefits but those who were experiencing anxiety or depression found it more challenging. These participants tended to be less active, self-conscious about exercising in public and were reluctant to engage in groups or environments with a lot of people, such as gyms, fitness classes and swimming pools:

"... when my friend, family comes and says are you coming out, it's just a dread of going out and just straight away I put a barrier up, no I'm not going and the more time I spend in the house I think the more depressed I get but I'm in a big circle..."

4.3.4 Psychological factors influencing attitudes towards PA

Thoughts and feelings about PA included the perceived benefits, motivations, readiness to be more active and commitment to maintaining PA. Participants talked about generally feeling fitter and healthier, as well as specific physical health benefits.

The majority emphasised the overall 'feel good factor' and mental health benefits of PA:

"It makes your mind much better, clears your mind, and we enjoy it."

"It just makes you feel better in yourself and everything."

There were a variety of personal motivating factors for being active. For some participants, losing weight was a priority, whereas for others, ageing well and preventing future ill health was important:

"I need to get fit. I'm getting to an age now where there's no turning back if I don't sort it now."

Despite widespread agreement amongst participants that they would like to be more active, particular barriers were fear of injury and exacerbation of current health conditions:

"I'd love to be able to do it I'm just really petrified that if I do, what's it going to do to me?"

Another significant barrier was embarrassment or social phobias. This was particularly salient for those patients who were experiencing mental health difficulties:

"I honestly feel anxious around places like gymnasiums and swimming pools and places like that. It brings back lots of memories of being the last one to be picked for the rugby team"

Participants prioritised PA differently. Some presented themselves as ready and committed, whilst others found it difficult to envisage being more active. A small number of participants thought that having someone to be accountable to, and making PA easy and accessible rather than a chore, would make them more likely to maintain it:

"In my opinion the easier you make it for somebody to turn up, the more chance you've got of them turning up; if you make it awkward for them to turn up, they're going to go it's raining, can't be bothered."

Signs of commitment included setting long-term goals and putting things in place to track progress. Participants who were trying to become more active described planning and preparation:

“So I planned to see you today so that I couldn’t get out of going. Whereas if I’d have stayed at home today and thought oh I’ll go swimming at some stage, I probably wouldn’t have done it. So I have to sort of plan it into my day.”

4.3.5 Variation in individual needs and preferences regarding PA

The types of PA that participants enjoyed doing, what they felt they could do, and what was accessible to them differed for each individual. Patients would like to feel in a position to choose something they enjoyed doing:

“I mean there could be a, there could be two or three options of events that’s available. You know, you could put inside events with perhaps a bit of gym work and badminton one night. You could perhaps have a swim with a bit of gym actual in there. And vice versa, you could mix it about a little bit...”

Perceived accessibility of PA was affected by a number of factors including time, cost, location and cultural appropriateness:

“I don’t want to go swimming at nine o’clock. They do do sessions, you can go to the gym at nine and ten. But I don’t think it’s for me. I don’t think it’s for a lot of women my age.”

In general, most activities were considered most enjoyable in the lighter, warmer summer months. Cold weather and dark evenings were a considerable deterrent to keeping active, with lots of participants describing themselves as becoming isolated and much more inactive during winter:

“It’s always easier, I seem to lose a lot more weight in the summer than I do in the winter, you haven’t got no energy sort of thing in the winter. But in the summer it’s warmer, it’s lighter. It don’t go dark until ten o’clock at night, so there’s plenty you can do like.”

A minority of participants had been offered a PA referral in the past, but most had declined based on a lack of confidence, practical barriers including time or cost, or due to complications from other comorbidities. The majority said they had not been supported regarding PA, or had only received cursory advice:

“But nobody’s ever given me any advice other than saying you must be a bit more physical for your health. But that’s just a proposal to you isn’t it really? It’s not helping you, it’s not telling you what to do or giving you advice on how to do it.”

The few participants who had received a referral to PA by a health professional described negative experiences, deeming the referral 'unsuitable' either because they had not been able to attend for practical reasons or had felt uncomfortable or unable to do the activity. This had deterred them from particular environments such as gyms and classes:

“I mean they send me for Pilates and things. Well, I went to class and she saw me performing, she says this ain’t for you, I think you’re going to hurt yourself.”

Researcher: “Oh really?”

“Yeah, so I didn’t go anymore.”

4.3.6 Influence of social networks on PA adoption and maintenance

Friends and family were those people with whom leisure time was spent and enjoyed. They also provided vital support when patients were ill or needed extra support. Particularly for female participants, family and friends could represent caring responsibilities. This took precedence over personal time to exercise:

“I mean by the time the evening comes about four or five o’clock I’m feeling raring to go, then it’s too late to do any activities. Because between four and six, well four and seven is family time, so time when the family get together and granddaughter goes to bed about half past seven. So for me to go out to do some activity I’m missing out on family time, and after that I’m too tired.”

Conversely, other participants thought that having a friend or relative as a "PA buddy" made it into a social event, keeping them motivated:

"We always put it down to me and [friend's name] having a good chat and airing all the problems out and you come out just feeling good. You know what I mean?"

Whilst being active with friends and family was primarily associated with enjoyment, being active with other patients was directly associated with PA for health and/or medical benefits. A small number of participants suggested benefits of being in a group with other patients including camaraderie and the opportunity to learn from other people in similar situations. Participants often felt that exercising in a group would be preferable where members were of a similar weight and fitness level:

"I often think it would be great if there were gym sessions where I'd feel comfortable, with people who'd always been rubbish at and never wanted to go to the gym..."

Professionals were seen as another source of support to provide safety advice and someone for the patient to be accountable to. Two things were important regarding the involvement of professionals – that they were suitably knowledgeable and could provide competent advice, and that they could provide adequate attention or support for the individual:

"Yes I think somebody who knows what they're talking about and advises you."

4.3.7 Summary of interviews with patient participants

Allowing participants the space to talk about their health and care experiences generally before asking any questions about PA built a picture of the complexity of health issues and concerns affecting their lives, and how these might influence their attitudes towards PA.

Previous care experiences were perceived as significant. Some patients maintained negative feelings about their previous dealings with health professionals. This could have been a motivating factor in agreeing to take part in the interview, because it provided them an opportunity to voice these grievances. Nevertheless, it emphasized the significance of health professionals' communication skills. Previous research has

highlighted the patient-professional relationship particularly in the context of delivering patient-centred care (Kitson, Marshall, Bassett, & Zeitz, 2013). However, a previous review of interventions to modify provider-patient interactions in diabetes care reported perceived difficulties with changing health professionals' consulting styles and a lack of evidence that this led to improved patient outcomes. This led to tentative conclusions that it was more effective to focus on changing patient behaviour (Van Dam, Van Der Horst, Van Den Borne, Ryckman, & Crebolder, 2003).

Patients differed in their expectations of the treatment they would receive and the extent to which they adopted a passive or proactive attitude to managing their health. This is consistent with research into 'patient activation', which has found that patients with the skills and confidence to engage with their care have better health outcomes and experiences (Hibbard & Greene, 2013). Knowledge of health conditions and the anticipated care pathway ahead seemed to be associated with more positive attitudes. Patients who felt pessimistic about the prognosis for their condition were likely to be less positive about increasing PA. This has implications for a 'risk-based' approach to promoting PA (i.e. highlighting the physical health risks of inactivity). There may be an opportunity to apply principles of assets-based approaches, which are gaining popularity in community-based public health promotion (Whiting, Kendall, & Wills, 2012). These approaches emphasize positive attributes of people and communities, and are reflective of the salutogenic framework focusing on people's capacity to create health rather than risks, ill health and disease (Lindstrom & Eriksson, 2005).

With the exception of two participants, patients reported that in principle they would like to be more active. Commonly, a key barrier was the risk of exacerbating a current condition or triggering reoccurrence of a health problem. This reflects previous qualitative research with patients with chronic conditions (e.g. Clarke et al., 2015; Kaptein et al., 2013). In the current study, patients with recurring and long-term conditions were particularly frustrated about their perceived health, but there were also participants who described reaching a pivotal moment of acceptance which made them seek out change. It has been suggested that acute health events or transitions, such as a cancer screening or diagnosis, or a cardiac event may create "teachable moments" whereby a person becomes more open to lifestyle change (McBride,

Emmons, & Lipkus, 2003). Future research could explore whether a similar concept might exist for patients with chronic conditions and how an understanding of this might be useful for promoting PA.

Patient participants indicated an association between PA and their social identity, such as their role in the community or family, and how physically able they were compared to age-related ideals. Research suggests that social identity may be a significant determinant of PA-related behaviour (Stevens et al., 2017). Patients also described the significance of social networks for maintaining activity in their lives. Currently, NHS PA promotion tends to focus on asserting the health benefits of PA, but evidence here suggests there is value in further promoting the social benefits explicitly. This also has implications for the types of activity that are being recommended through the NHS, for example providing access to activities that patients can incorporate into their social lives and/or involve family and friends.

4.4 Results of interviews with health professionals

Interviews were carried out with 22 health professionals (4 by telephone; 18 face-to-face). Table 7 shows the job roles and years of experience of those interviewed.

5 higher order themes were identified:

- The impact of professional working style and perceived responsibilities on PA promotion behaviours
- Organisational barriers and facilitators influencing PA promotion behaviours
- Approaches and motivations for empowering patients
- One size does not fit all - recognising the need to tailor advice and support to the patient
- Positioning PA within wider NHS system and objectives

Table 7
Health professionals interviewed

Male/ Female	Job title	Relevant clinical area	Years qualified	Years in current role	Interview mode
Male	Clinical specialist in pain management	Chronic pain	16 years	2.5 years	Telephone
Female	Clinical specialist in pain management	Chronic pain	15 years	3 years	Telephone
Female	Clinical specialist in pain management	Chronic pain	30 years	3.5 years	Face-to-face
Female	Clinical specialist occupational therapist	Chronic pain	26 years	13 years	Face-to-face
Female	Continence specialist nurse	Continence	23 years	4 years	Face-to-face
Female	Specialist physiotherapist - continence service	Continence	8 years	less than 1 year	Face-to-face
Female	Diabetes specialist nurse	Diabetes	14 years	4.5 years	Face-to-face
Female	Diabetes specialist nurse	Diabetes	7 years	6 months	Face-to-face
Female	Diabetes Consultant	Diabetes	31 years	18 years	Face-to-face
Female	Specialist diabetes dietician	Diabetes	21 years	19 years	Face-to-face
Male	Advanced specialist podiatrist (MSK)	MSK	9 years	8.5 years	Face-to-face
Male	Specialist physiotherapist (MSK)	MSK	15 years	6 years	Face-to-face
Male	Specialist podiatrist (MSK)	MSK	8 years	less than 1 year	Face-to-face
Male	Orthopaedic trauma and recon fellow	MSK	.	.	Face-to-face
Male	Consultant orthopaedic surgeon	MSK	.	15 years	Face-to-face
Female	Consultant orthopaedic surgeon	MSK	15 years	8 years	Telephone
Male	Enhanced role physiotherapist	MSK	12 years	5 years	Telephone
Female	Spinal extended scope practitioner	MSK	16 years	10 months	Face-to-face
Female	Enhanced role physiotherapist	MSK	33 years	24 years	Face-to-face
Female	Advanced physiotherapist in musculoskeletal and pain management (split role) / IAPT wellbeing practitioner	MSK / Chronic pain	10 years	1 year	Face-to-face
Female	Podiatrist	Podiatry	19 years	15 years	Face-to-face
Female	Podiatrist & Forensic Podiatrist	Podiatry	3 years	2.5 years	Face-to-face

4.4.1 The impact of professional working style and perceived responsibilities on PA promotion behaviours

Health professionals described a duty of care to patients and a desire to maximise patient satisfaction. They recognised the potential of their decisions and actions to influence patients' experiences of the care pathway. Whilst many professionals described patients' expectations of coming to the NHS for a specific "fix", most health professionals took a holistic view of medicine:

"...from years of experience I think you have to look at the person holistically to get a decent outcome for them."

Although health professionals recognised differences between a medical versus a holistic approach, this was not a dichotomous relationship. Often there was a tension between acknowledging broader determinants of health and subsequent needs, yet also the limits of their role:

"They've got a lot of problems, psychological, family, social, financial, and so the pain is often what they go to the GP for, but we find more often than not the pain isn't potentially the main issue. But that's the easy symptom..."

Taking a wider view of patients' health and wellbeing was associated with a rationale for promoting PA and other lifestyle behaviours:

"...for me physical activity is so important beyond the physical, you know? And I think that's the thing that we as, if we can get anything out of this for people is helping them to provide something that actually will help people transform not just their physical health but their emotional health as well."

For many health professionals, this complicated PA promotion, because recognising the whole person necessitated a consideration of comorbidities, mental health issues and other factors that health professionals didn't always feel equipped to deal with:

"So yeah, it's becoming more difficult because I think more and more people since I've been doing the job suffer with mental health problems. I also think mental health services' finances have been cut, so we're seeing more of them in

the service as opposed to them going to the mental health physio that used to exist."

This complexity resulted in varying views between health professionals about their perceived role in promoting and supporting patients regarding PA. This was heightened by a general risk aversion and concerns about liability. Health professionals at times reconciled this by reverting to their medical training and concluding that they weren't qualified to give detailed advice about PA:

"I think I probably could, but no, because I haven't had specific training and I wouldn't want it to come back on me."

Health professionals described specific examples of patients who had standout positive or negative experiences of PA. Those negative experiences resulted in them becoming increasingly sensitive and aware of risks:

"I also see patients that throw themselves in too quickly...her Achilles tendons both snapped and actually she needed them surgically repairing... so yeah, we need to be careful with patients as well."

Health professionals were also conscious of how their own attitudes and behaviours around PA might impact patients. They recognised that presenting themselves as being extremely active could make them less relatable but also believed that they should be role models for healthy behaviours:

"I think that's really, the credibility of the message giver is really important as well. And I think in the healthcare profession we do have a responsibility to look after ourselves and lead by example."

4.4.2 Organisational barriers and facilitators influencing PA promotion behaviours

Health professionals were notably conscious of cost and resources. This included a broader awareness of the limitations and challenges of funding and resources within the NHS and the need for services and care delivery to be respectful of the current context. It also related to the cost of resourcing and delivering PA support:

"... would it get commissioned appropriately and will that be a continuation, so there's all sorts of factors within that, but a lot of it comes to cost I suppose, cost-benefit ratio from an organisational point of view."

Unfortunately, time constraints often meant that PA dropped off the list of priorities in consultations:

"I think it's partly because there are several different tasks that we must do in the diabetes clinic, you know, and I actually had [PA] on our proforma and it got taken off....I think it's almost that there are so many different things to cover at annual review that it gets missed."

Most health professionals agreed that to tackle PA required time and prioritisation of the issue:

"And when you actually spend the time to explain why we need to do this, the benefits, the negatives, looking at some of the motivational interviewing things, what are the outcomes if you don't engage in this, or what are the outcomes if you do engage in this? And all that kind of thing. That works. Or it won't work if I just prescribe 10 minutes walking every day and I'll see you next week. People just do not do it. So I think exercise prescription without adequate explanation and onboarding in patients with low self-efficacy is a waste of time."

Meanwhile, several health professionals called for simplicity and streamlining of referral processes for PA, indicating that in the past they had been deterred from referring due to complicated or time-consuming processes. This highlights a tension among health professionals between valuing the enhanced intervention yet wanting processes to be streamlined due to a lack of time.

Health professionals' confidence and skills in behaviour change influenced how they approached conversations about PA. Those with confidence thought it was important to avoid an overly prescriptive approach:

"For me it's not so much when, it's how it's introduced. Whether it's done in a way that empowers people and makes people confident or whether it's done in a way that's again quite punitive really."

Others were less confident in their behaviour change skills:

"And actually I think physical activity is the easy part. I find doing the convincing and the psychology the harder part."

Having a specialist health professional (within a clinic) to promote the PA message was suggested by many professionals as desirable. This would provide confidence within the team that PA was being promoted by appropriately qualified and knowledgeable staff and compensate for the general lack of time in routine appointments.

Professionals were unsure whose responsibility this should be or how it might practically work:

"Yeah, if I was in charge then I would probably be wanting to employ people that specialised in sports and exercise, because I think that to increase the confidence of the team, to look at ways of promoting activity, and then also to provide that specialist support for patients.... And just someone to keep on top of everything that goes on, to keep everybody up to date with what services are available, how we refer, what things are asked. Like if we've got a psychologist in the team and you've got someone with mental health problems then you'll go to them and discuss what's best for that person. And so it'd be nice to have that opportunity, you know, to have someone who specialises in PA to do that with for individual cases."

4.4.3 Approaches and motivations for empowering patients

Health professionals were generally in agreement that their role was to support patients to develop the skills to manage their own health. They had different motivations for 'empowerment', for example minimising the patients' need for further care and thus reducing burden on the NHS, versus doing it because it was morally and ethically right.

Health professionals cited a number of things they could do to empower patients. Managing expectations of the care pathway and likely outcomes, and giving them the power to make choices about their own care was important:

"...but I think it often depends a lot on the person's expectations as well of what they can do at our service or the experience that they're having, what they were expecting. Has anyone talked to them about that and what's available? And I think communication often can make a big difference"

Medical labels (e.g. diabetic, back pain patient) were suggested to be disempowering, because they undermined the patients' perception of self-control:

"But how do you get rid of that label when it's in your GP notes, or someone will refer back to it... They feel well that's what I am now, and this is what I've become....But they can if they were educated and helped at that point."

Health professionals identified that patients who accepted that their health condition was long-term and therefore may not have an ultimate 'cure' were often more likely to engage with self-management:

"...you see them come in and they're sort of transformed in terms of their attitude about it. They come in freer; they don't seem so burdened by it. At that point you know that they're capable of coping with this on their own...it's almost like you've given them the capacity to manage their condition."

Many health professionals discussed the benefits of peer support, based on their experiences of running small groups. The setting was considered to be important, especially for patients with mental health difficulties, to make the group as unthreatening as possible, and it was acknowledged that groups were not comfortable for everyone. The main benefits identified were social support and sharing of experiences, as well as appreciating that your situation 'could be worse'. A number of participants also thought that peers were more relatable than health professionals:

"I think we do various group education things and I think people are helped very much by group work...maybe sometimes it's easier to be influenced by somebody that you can connect with as having a similar experience than a distant health care professional."

In terms of PA specifically, health professionals recognised that they could empower patients by helping them to address fears and concerns:

"they've been frightened to move or, there's a lot of myths about how to move when you've got a back problem, like don't bend, and these kind of perpetuate the problem....if someone had actually been able to speak to them and advise them what to do in the early onset...they probably wouldn't be at this point".

4.4.4 One size does not fit all - recognising the need to tailor advice and support to the patient

Health professionals acknowledged the variation in levels of support needed by patients when adopting increased PA as part of their health care. This could be a result of other comorbidities, the duration of a person's poor health, the amount of psychosocial input needed and/or their individual self-efficacy and coping skills. They described learning from individual patients to evolve their practices but also to develop a flexible service, responsive to individual needs.

Specific to PA, it was felt that to reflect the variety of patient needs and preferences, any advice and/or referral systems must also be flexible. This would include recommending different types of PA, providing different levels of support, and allowing for changes in other conditions including fluctuating mental health. PA promotion should include identifying what patients need to do functionally in everyday life, and using PA to help them achieve this:

"So it can be anything from making a cup of tea, putting your socks on, to going out and having a walk, to running a marathon. So really there's a massive range of, it's just moving in general....But I think I'm tending to go with things that are important to that person, things that they want to be doing and trying to link that with activity."

Health professionals recognised that for PA advice to be effective, patients needed to see it as realistic otherwise they would be deterred or overwhelmed. Developing physical tolerance to movement alongside confidence and physical awareness was a

gateway to more challenging activity later on; this required patience and investment. A graded approach was commonly suggested, particularly for very inactive patients or those with significant barriers:

"So I think a lot more very, very low grade starting points for people who just wouldn't think about doing exercise."

Despite wanting to offer greater variety and choice, many health professionals felt they lacked the necessary knowledge to confidently refer. They wanted to be clear when signposting, and to provide specific information about what to expect, but it was impossible to keep up-to-date with local provision:

"...there's so many pockets of things available, it's sometimes quite confusing to know what service to send to and when and what their rationales are and their inclusion criteria and their exclusion criteria."

A small number of health professionals suggested that working in closer collaboration with other professionals and agencies was useful for bridging these gaps:

"... I think we're definitely networking better than we were, and we're finding services like the health trainers, like Activity Sheffield, IAPTs as well are good at signposting and finding out what's locally around our surgeries a bit better as well. But I still think there's definitely room for improvement."

Another problem was that what was currently offered in terms of PA referral was often considered to be unsuitable, and health professionals felt uncomfortable offering it because it didn't fit with patients' expectations or needs:

"I know people have to go for walks, and there are some groups and things around it really, but I do think people do get a lot of benefit from things like swimming and the gym, and actually it is biased at the moment and not a lot of people can afford that."

"And the time might not suit them, they might have work commitments, they might work nine to five, Monday to Friday, they might not be able to come when it is ...and all of that."

4.4.5 Positioning PA within wider NHS system and objectives

In principle, for most health professionals PA was something the NHS should be promoting as part of a culture of preventative medicine:

"given the NHS is going down the routes of preventing disease rather than responding to it once it's happened, I think physical activity is one of the things that can help prevent some mental health problems."

Advocates for PA felt that the NHS lacked consistency and commitment in PA promotion:

"...one person could see the whole team and we want for everyone to say the same thing really. So definitely everybody needs to be promoting it, because if you haven't got that joined-up approach from everybody, it can just be like one sentence from one health professional who just undoes all the good and the motivation that you've worked with someone to do to try to get them to be more active."

One diabetes professional highlighted incongruence between the promotional efforts underpinning pharmaceutical interventions and PA:

"...you've constantly got drug companies coming in here telling us how wonderful their latest medication is at the moment... And yes people know generally that physical activity is good, but I think it really just needs to be out there all the time...all the evidence and really reminding health professionals of that."

Health professionals were unanimous in the view that ideally, PA should benefit patients' health over the long term. Many suggested therefore that the NHS should invest in supporting patients to maintain PA beyond initial adoption. Health professionals acknowledged that potential outcomes were wide-ranging, psychological and physical, and should be tailored to the patient (although many were mutually beneficial for the NHS).

4.4.6 Summary of interviews with health professionals

Health professionals recognised the need to personalise support and advice about PA to individual patients. For most, promoting PA was about empowering not prescribing, but this conflicted health professionals who were accustomed to treating patients' symptoms within a 'medical model' culture. Similar tensions for physiotherapists between taking an 'expert' role and empowering patients have been highlighted by Robinson and colleagues (2014). Previous research has suggested that empowerment may exist on a spectrum (low-high) and could be measured using indicators including patients' states, capacities and behaviours (Bravo et al., 2015). Empowerment as a concept is also thought to be associated with other constructs such as self-management and health literacy (Bravo et al., 2015). This is consistent with views expressed in the current study by patients which indicated that better understanding about one's health condition and capacity to self-manage were associated with greater self-efficacy towards PA.

Health professionals described a range of organisational challenges including a lack of time and prioritisation of PA and complicated referral processes, which echo previous research (Beighton et al., 2015; Jackson et al., 2014). Whilst a small number of health professionals acknowledged the value of collaboration with other services and professionals there was little evidence of this happening in practice. Many health professionals thought that giving clear and specific advice about PA might influence patients more positively than general 'healthy lifestyle' messages. A prerequisite of being able to do that was having accurate knowledge and confidence in what was being recommended. This was in terms of the evidence-base behind it and knowing what was available locally - being able to make a specific referral to a named contact rather than generally signposting to an activity. There is an on-going debate about the relative benefits of 'brief advice' versus an enhanced intervention. NICE currently recommends brief advice (NICE, 2013) as being cost-effective for delivery in primary care, although the guidance is ambiguous about what this should include and where the boundaries lie with enhanced interventions (in terms of the information and support provided). The lack of time identified by health professionals has clear implications for the level of intervention they think is feasible to deliver.

Historical changes to exercise referral processes in Sheffield had left an impact on health professionals (particularly from the MSK services), deterring them from making future referrals due to lack of confidence in the system or despair at numerous changes to protocols. Considering that implementation science literature estimates successful implementation of new health practices takes between 2-4 years (Fixsen et al., 2009) it seems health professionals are justified in calling for stability in working systems to allow referral practices to become embedded.

Health professionals displayed an attitude of caution around PA, although this differed somewhat by role. Nurses and podiatrists tended to be less confident giving instructions about what PA a person could or should safely engage in, although there were individual differences within these groups. Physiotherapists (traditionally a group considered confident to give advice on PA) still described concerns, mainly about organisational liability. This reflects previous research by Morris et al. (2015) which has suggested that professional risk aversion may be "rooted in health service safety culture". This risk culture, along with the professional and organisational pursuit of evidence-based practice, highlights the need for evidence to demonstrate that PA is an effective and safe behaviour for health professionals to promote.

4.5 Feedback to participants

The majority of participants were interested to hear how their interview would contribute to the ongoing design project. In fact, one female patient commented before the interview that she was often asked to participate in surveys and community consultations, but had never received any feedback on how her views had been used. The challenge was to communicate a comprehensive thematic analysis in a way that was accessible yet informative. Participants indicated that they would like to hear how their views were similar or different to other interviewees, and to see how their views were being used to inform the ongoing research. A report was written (see Appendix H) that outlined the main themes with illustrative quotes, and a summary of practical implications in the form of "key points" that might inform the next stage of the research. All participants who had consented to being contacted after their interview

were sent the report (along with details of the recruitment process for the co-design workshops) and invited to give feedback.

4.6 Discussion and reflections

4.6.1 Non condition-specific sampling

This study explored the views of patients from across several health conditions. The themes identified were not exclusive to participants from any particular care group. There were some obvious and perhaps expected differences in the issues raised (for example, physiotherapy patients experienced more mobility concerns and diabetes patients talked more about dietary considerations) but these issues were also relevant to some patients with other conditions. Individual variation in needs thus reflected that experiences could be similar between patients but were also diverse and wide-ranging. Previous research in long-term conditions has identified patients' characteristics including comorbidities, attitudes, disease duration and age as possible "effect modifiers" of diabetes treatments (Elissen, Hertroijs, Schaper, & Ruwaard, 2016). Consistent with previous arguments proposed by FSEM (Jones et al., 2014) and the IOC (Matheson et al., 2013) these interviews indicated that a combination of biomedical and non-biomedical characteristics would be appropriate to group or differentiate patients regarding PA.

When patients directly raised the subject of peer group exercise classes, it prompted a natural question about the makeup of such groups. Participants said that it was important for them to be in a group with others of similar physical fitness or weight, but not necessarily matched by health condition. Existing PA interventions commonly group patients by condition and attendees have cited the benefits of informal peer education as a method to manage conditions. It is possible that the nature of patients' conditions in the current sample (e.g. MSK) were more diverse and didn't necessitate a support culture in the same way as traditional exercise groups where experiences or symptoms might be similar (e.g. cardiac, stroke and cancer rehabilitation).

Amongst health professionals, there were some differences by role in terms of the extent that they took a holistic approach to their patient. Some perceived a broader

remit was required to address the patient's lifestyle, whilst others focused narrowly on their medical speciality and believed their role was to fix or treat specific symptoms. In general, health professionals from the chronic pain and physiotherapy services (who tended to be occupational therapists and physiotherapists) worked more holistically, whilst continence, diabetes and podiatry (primarily nurses and podiatrists) tended to be more specialised. Nevertheless, as with the patients, individual differences within the services also varied widely. The different characteristics and professional attitudes of health professionals appear to be a significant factor in determining how PA is promoted.

4.6.2 Methodological reflections

Semi-structured interviews provided a rich understanding of patients' and health professionals' experiences. Patients were particularly grateful for the opportunity to share their experiences and many made special trips to return to the clinic to do so. It helped recruitment to invite people to talk about their health and care experiences and then PA, rather than promoting the research as an interview about PA. This opened the interview up to be more personal and enabled an open discussion of PA later.

There was a limit to the number of interviews that could be conducted, from a practical point of view. There is also a risk of self-selection bias amongst patients and health professionals who agreed to take part, which is difficult to avoid in research of this nature. Nevertheless, 42 interviews was a significant sample for a qualitative study, consistent with or larger than the majority of studies considered in the literature review (chapter 2). Steps were taken during recruitment to ensure that a diverse range of views were captured. All eligible patients were approached; few declined to participate. Participants did not express wholly positive views towards delivering or receiving PA advice which provides reassurance that there were a variety of viewpoints represented. There was an even split of men and women interviewed spanning a broad age range, although there were no younger patients in their 20s. The patient sample was predominantly white British which was reflective of the typical patient population at Concord but not of the population of Sheffield. Although issues

specific to BME groups were highlighted, it is likely that findings were influenced by the demographic of the sample. Health professionals described challenges facing BME patients that can be used to counterbalance this limitation to some extent. The following chapter (section 5.3) describes how personas were developed based on the views of patients and health professionals in an attempt to encompass a wide range of possible perspectives. These included patients from local BME groups and different socio-economic and demographic groups that might represent some of the voices not heard in these interviews.

Choice of semi-structured interviews conducted by one researcher had consequences for the next phase of the research - the *define* phase - and the sharing of insights with members of the design group. Ideally, rather than working alongside other researchers to develop the themes, this would have been carried out with the co-design group, so that a shared understanding and interpretation of the data could be constructed. Realistically, it was not possible to ask health professionals and patients to read the transcripts themselves, as this was beyond the scope of their agreed participation and required previous experience of qualitative research. Nevertheless whilst the interviews provided the researcher with an in-depth understanding of the issue as it was seen by patients and health professionals, this posed a particular challenge about how to share these insights with others. The following chapter (particularly section 5.4) discusses how the interview data was translated to be useful for other users and taken forward further into the co-design process.

4.7 Chapter summary

The overall aim of the *discover* phase was to generate insights that would inform early discussions and provide focus for the forthcoming co-design workshops. Within this there were two objectives: 1) to build empathy with patients, understand PA from their perspective and explore their wider health and care experiences and 2) to understand the professional interests and concerns of health professionals and their views on the opportunities and barriers to promoting PA within current care pathways. Semi-structured interviews provided a rich insight into the varying needs, barriers and

facilitators around PA for members of both these groups that can be taken forward and translated into the next phase of the double diamond - the *define* phase.

Chapter 5: Define

5.0 Overview

This chapter describes the objectives and activities for the *define* phase of the double diamond:

Phase	Objectives	Research methods
Define phase	To analyse and translate user insights	Co-design workshops: persona building; card sort exercise
	To define the specific problems and opportunities regarding PA in the NHS	

The chapter will describe the recruitment and formation of co-design groups and the activities undertaken in the early workshops. An explanation is provided of the process used to develop and refine patient personas. This is followed by discussion of how insights from the interviews with patients and health professionals (*discover* phase, chapter 4) were translated into specific problems and opportunities to be addressed by a PA pathway using a card sort exercise. The chapter concludes with methodological reflections regarding this *define* phase.

5.1 Co-design workshops

Regular workshops were chosen as the best approach to facilitate meaningful involvement of users in the development of a PA pathway. These workshops spanned the *define* and subsequent *develop* phases (see chapter 6) of the double diamond, aiming to establish priorities and generate solutions. Although it was not critical that members attended every workshop, commitment from a core group of regular participants was necessary to ensure flow and continuity of the design process.

5.1.1 Workshop recruitment

All interview participants from the *discover* phase (chapter 4) were offered the opportunity to join the workshops. Information was distributed along with the participant feedback reports on the interview findings (see chapter 4, section 4.5) and participants responded expressing their interest by telephone or email.

The original intention was that one member of staff and one patient from the MSK, chronic pain, diabetes, continence and podiatry services would attend. 10 participants were considered to be a manageable number of participants to allow group members to meaningfully contribute. Due to maternity leave and restructuring, the continence service was unable to release a member of staff to attend the workshops, leaving space for two members of staff from the diabetes team to attend. One female patient who intended to participate experienced a change in circumstances close to the first workshop preventing her from attending. As there was not time to recruit a replacement, the workshops continued with 4 patients.

According to one service design toolkit: "motivated participants yield more valuable contributions than your average, hardly interested citizen" (www.servicedesigntoolkit.org). So that the workshops could progress quickly, it was important that participants for the workshops already acknowledged some benefits of PA, would be willing to participate in discussions and were open to hearing others' views. Telephone conversations took place with each participant before the first workshop to establish a mutual understanding of expectations.

Tables 8 and 9 summarise the participants for the health professional and patient workshops respectively:

Table 8
Health professionals taking part in design workshops

Male/ Female	Job title	Relevant clinical area	Years qualified	Years in current role
Female	Diabetes specialist nurse	Diabetes	14 years	4.5 years
Female	Specialist diabetes dietician	Diabetes	21 years	19 years
Male	Enhanced role physiotherapist	MSK	12 years	5 years
Female	Advanced physiotherapist in musculoskeletal and pain management (split role) / IAPT wellbeing practitioner	MSK / Chronic pain	10 years	1 year
Female	Podiatrist	Podiatry	19 years	15 years

Table 9
Patients taking part in design workshops

Male/ Female	Age	Postcode	Ethnicity	Employment status	Service
Female	56	S4	British Muslim	Stay-at-home grandparent	Continence
Female	61	S9	White British	Part-time employed	Chronic pain
Male	46	S35	White British	Full-time employed	MSK (podiatry)
Male	42	S5	White British	Full-time employed	MSK

5.1.2 Separation of patients and health professionals into two groups

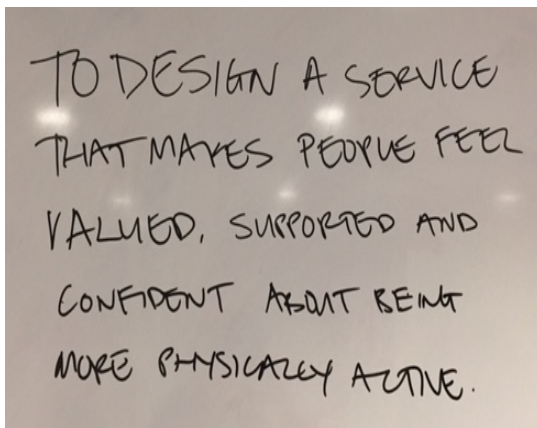
Rather than having a mixed group of patients and health professionals, the decision was taken to run two separate workshop groups. To accommodate patients working full-time their workshops needed to be later in the day, whereas health professionals were easier to release from clinics in the morning. The interviews had also highlighted some differing priorities and it was also hypothesised that separate groups might encourage frank and productive discussions. Possible negatives to this approach were the lost opportunity for participants from different groups to learn from others' experiences, and for tensions between differing priorities to be ironed out explicitly. Discussion and reflections in the final chapter (chapter 8) will explore the impact of this separation.

5.1.3 Co-facilitators

A co-facilitator was recruited to join each of the groups to provide support and an alternative viewpoint. Involvement of people outside the healthcare system has been useful in previous healthcare design projects to facilitate innovative thinking (Bowen, Dearden, Wolstenholme, Cobb, & Wright, 2011). It was important that co-facilitators' involvement did not reduce the contributions or engagement of other participants in the process. For the patients' workshops, a sports engineer with experience of the user-centred design process and PA research projects was recruited; for the health professionals' group, a researcher with several years of experience facilitating participatory research in public service projects. Co-facilitators were asked to position themselves in the role of 'reflexive participant', as discussed in chapter 3.

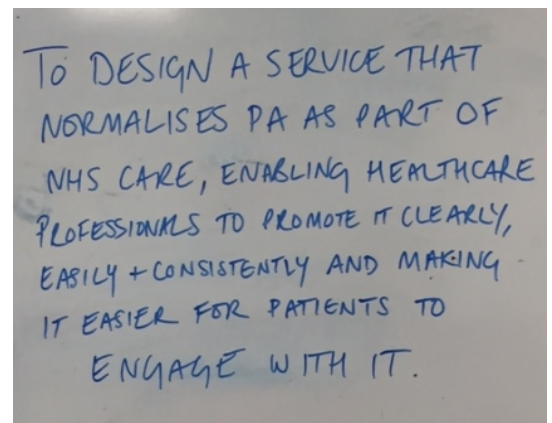
5.2 Orienting participants to the design thinking mindset

The objective of workshop one was to familiarise members with principles of user-centred design and develop rapport between the group. An overview of the user-centred design process and how this would inform the next five workshops was provided by the researcher and co-facilitators. Participants discussed their hopes and fears for the project which were amalgamated and refined to provide group objectives (figures 6 and 7). Notable was the difference in language between the groups. The patients' objective focused on how the pathway would make people feel, whilst the health professionals' emphasised how the pathway would be used and applied.



TO DESIGN A SERVICE THAT MAKES PEOPLE FEEL VALUED, SUPPORTED AND CONFIDENT ABOUT BEING MORE PHYSICALLY ACTIVE.

Figure 6: Patients' group objective



TO DESIGN A SERVICE THAT NORMALISES PA AS PART OF NHS CARE, ENABLING HEALTHCARE PROFESSIONALS TO PROMOTE IT CLEARLY, EASILY + CONSISTENTLY AND MAKING IT EASIER FOR PATIENTS TO ENGAGE WITH IT.

Figure 7: Health professionals' group objective

Both groups then embarked on a mini-design challenge to design an ideal GP appointment. This was intended as a fun exercise to stimulate creative thinking and encourage group working. Members of both groups engaged well with the challenge and particularly enjoyed the freedom that came with thinking 'outside the box'.

It was evident early in the first workshop that some patients had strong personal agendas and/or particular concerns to promote. It has previously been suggested that some participants of user involvement initiatives are likely to be "single-issue campaigners" (Pearce, Baraitser, Smith, & Greenhalgh, 2011). It is acknowledged that at times the concerns of patients may fall beyond the remit of the project, but important to appreciate that patients' agendas might seem irrelevant "until you

unlearn the rules for what is relevant" (Woodard, Bovill, & Freedman, 2011). The co-facilitators endeavoured to strike a sensitive balance between allowing these agendas to be voiced yet orienting them towards the group objective. In subsequent workshops, additional time was allocated to persona development (see 5.3) to encourage the group to empathise with multiple patient perspectives.

5.3 Patient personas

Personas are a common tool used to orientate design projects to the different types of likely users. Personas are fictional representations of users designed to encourage empathy and visualise how ideas might impact on real people (LUMA Institute, 2012). Personas are recommended as a tool to encourage adequate exploration of users' genuine needs and problems prior to the development of solutions, which has previously been identified as a weakness in health service development (Jun et al., 2014). One empirical study also found that priming before idea generation using personas increased the originality of ideas (So & Joo, 2017). Sport England has previously used personas to characterise adults and young people as a means of 'segmenting the market' to understand and increase participation in sport (<http://segments.sportengland.org/querySegments.aspx>). For this thesis, personas were created to reflect the diversity of interests and values towards PA demonstrated in the interviews. Although not a substitute for participation, they also aimed to help the workshop groups consider the viewpoints of some patients who might be customarily difficult to recruit to research of this kind.

5.3.1 Persona development

During analysis of the interview data, a note was made whenever health professionals alluded to a significant characteristic or concern, but on which individual patients might vary. These were cross-referenced with the patient interviews and additional characteristics added. Duplicates and similar issues were merged and refined, and the list was grouped into three categories: cognitive, medical and practical characteristics.

User-centred design toolkits contend that designs meeting the needs of users at the extremes will almost certainly meet the needs of those in the middle (www.designkit.org). For each characteristic listed, an extreme at either end was created, based on examples that had been described in the interviews. An example of this is shown below:

Extreme	Characteristic	Extreme
Simple health needs - clearly focused treatment and anticipated outcomes	Complexity of health circumstances	Multiple comorbidities, mental and physical - possible contraindications to PA

The full list of characteristics and extremes is attached at Appendix I. Personas were created by selecting extremes of multiple characteristics that were likely to occur together. Background information including age and marital status was added with three other factors 1) what was the most important thing for this person? 2) what were their needs and motivations? 3) what were their goals likely to be? Five draft personas were created reflecting a range of different patient types. One of the PhD supervisors, a medical consultant with an interest in PA medicine, reviewed and sense-checked the drafts and they were then taken into the second workshop to be discussed and adapted by the participants.

5.3.2 Persona refinement - changes and additions

Patients could identify parts of themselves in each persona, saying for example "I think I'm most like Pete", or "I'm a bit of Bob and a bit of Ameera". To develop empathy and familiarisation with the personas, participants matched raw data quotes from the interviews to each persona, as shown in figure 8.

The exercise prompted useful discussions about how a quote might have different meanings for different personas. One persona was adjusted to reflect the significant language barriers facing some non-English speaking patients.

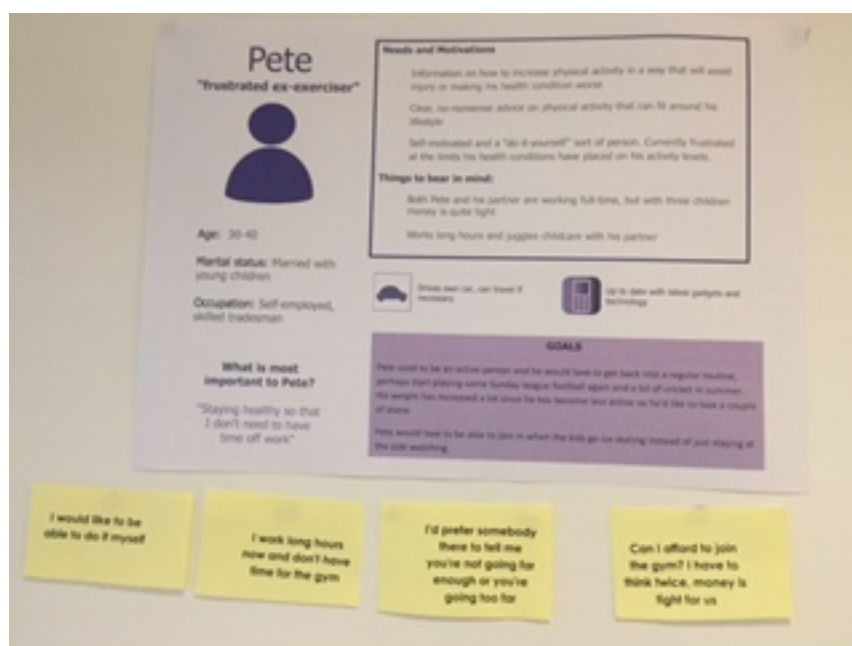


Figure 8: Matching interview quotes to the draft personas

Health professionals recognised each of the personas as people they were likely to see in their everyday clinics but decided to emphasise characteristics in certain personas such as disinterest in PA, language barriers and caring responsibilities. The change to caring responsibilities on one persona reflected the health professionals' perceptions of the impact of an ageing population. They identified patients who found themselves caring for young children and ageing parents simultaneously, resulting in the neglect of their own health. They also added two further personas which they felt reflected 'emerging trends' in healthcare. One of these personas was a young man who spent all his time online making him vulnerable to isolation, mental health issues and physical health problems associated with a sedentary lifestyle. The other addition was a young woman from a particular minority ethnic community in Sheffield local to the NCSEM Concord clinic, who health professionals found hard to engage and with particular cultural barriers to PA. For these ladies, being overweight was a sign of wealth and therefore status, rendering typical health promotion messages (such as linking PA to weight loss) inappropriate.

5.3.3 Final personas

The patient group agreed on 5 final personas and the health professionals on 7 (shown below).

Pete

"frustrated ex-exerciser"



Age: 28-40

Marital status: Married with young children

Occupation: Self-employed, skilled tradesman

What is most important to Pete?

"Staying healthy so that I don't need to have time off work"

Needs and Motivations

Information on how to increase physical activity in a way that will avoid injury or making his health condition worse

Clear, no-nonsense advice on physical activity that can fit around his lifestyle

Self-motivated and a "do-it-yourself" sort of person. Currently frustrated at the limits his health conditions have placed on his activity levels.

Things to bear in mind:

Both Pete and his partner are working full-time, but with three children money is quite tight

Works long hours and juggles childcare with his partner



Drives own car, can travel if necessary



Up to date with latest gadgets and technology

GOALS

Pete used to be an active person and he would love to get back into a regular routine, perhaps start playing some Sunday league football again and a bit of cricket in summer. His weight has increased a lot since he has become less active so he'd like to lose a couple of stone.

Pete would love to be able to join in when the kids go ice skating instead of just staying at the side watching.

Keira

"resistant and needs convincing"



Age: 30-55

Marital status: Divorced

Occupation: Works full time in an office

What is most important to Keira?

"Enjoying my life and having fun with friends"

Needs and Motivations

Needs help understanding of how physical activity can benefit her particular health condition(s)

Needs to see or feel the benefits of any treatments quickly - she would prefer it if there was a "magic pill" the doctor could give her

Things to bear in mind:

Negative previous experiences have put Keira off the idea of physical activity. She is convinced she is "not built for exercise" and really doesn't enjoy it

Tends to drop out of things or lose focus easily

Intimidated by group settings where people appear to be much fitter or thinner



Drives own car, can travel if necessary



Big user of social media

GOALS

Keira's GP is always nagging her to lose weight - he has told her that she may have to go onto injectable medication and she definitely wants to avoid that. She would also like to get her blood pressure down.

Currently she has to see the GP quite often and she would like to be in better health so that she didn't need as many appointments.

Bob

"low confidence in physical ability"



Age: 55-65

Marital status: Married

Occupation: Works part-time as a driver

What is most important to Bob?

"Staying young! Or at least ageing well"

Needs and Motivations

Believes that physical activity is clearly linked to health outcomes

Needs reassurance and advice on how physical activity can be done safely within the limits of his condition

Frustrated about the number of health conditions he has to deal with and the number of appointments and different services he has to attend

Things to bear in mind:

A lot of movement or overdoing it can sometimes cause pain and immobility

Low confidence in his physical health and worried about future deterioration

Low mood - lost the motivation to do things he used to enjoy



Comfortable financially



Lots of free time in the afternoons and evenings

GOALS

Bob is worried lately that he is 'falling apart' and thinks it is now or never to take charge of his health. He wants to be able to do more without pain and get back to moving about comfortably.

Bob does not like the fact that he has to ask other people to do things for him at home like decorating his new extension and gardening. He would like to be able to do some of these jobs himself.

Ameera

"curious but hesitant"



Age: 25-45

Marital status: Married with young children

Occupation: Full-time carer (unpaid)

What is most important to Ameera?

"Taking care of my family"

Needs and Motivations

Sees health professionals regularly but usually in the role of a carer. Doesn't consider own health a priority

Deteriorating health as a result of increasing caring responsibilities and family pressures.

Social, friendly person who does enjoy meeting people and having a good chat

Things to bear in mind:

Lack of time is a big factor – Ameera has three young children plus she is taking care of her elderly parents who are increasingly unwell. From her point of view, the last thing she has time for is exercise!



Prefers women-only facilities or groups



Lack of free time

GOALS

In an ideal world, Ameera would love to have more "me-time", although currently she doesn't see how that is possible.

She would like to lose weight and have more energy – at the moment she doesn't sleep well and always feels tired. She would also like to get rid of the niggling aches and pains she keeps feeling.

Clare

"high support needs"



Age: 25-35

Marital status: Living with long-term boyfriend

Occupation: Not working - currently receiving ESA

What is most important to Clare?

"Re-connecting with people-seeing more of friends and spending quality time with my partner"

Needs and Motivations

Benefits from continuity with health professionals; needs to feel comfortable and develop trust

Needs a high level of support to act on lifestyle and self-management advice

Things to bear in mind:

Long term health conditions have led to Clare becoming very depressed and withdrawn. She finds it hard to get the energy and confidence to go out in public

Multiple long-term health problems - physical activity plans would need to take these into account



Low income



Not confident to drive or use public transport

GOALS

Improving her mental health would mean Clare is able to get out and about and feel better about herself. She feels that her physical health problems would be easier to cope with if she was less depressed.

She would like to be able to contribute more to activities at home like cleaning and cooking as she feels that would also improve her relationship.

Natalia

“being thin = being poor”



Age: 20-35

Marital status: Married with four children

Occupation: Housewife

What is most important to Natalia?

“Taking good care of my family”

Needs and Motivations

In Natalia’s culture, being overweight is seen as a sign of wealth. She would benefit from being educated about the health benefits of physical activity from someone who understands these cultural beliefs.

Used to passive treatments e.g. medication – needs to understand the role of physical activity in self-management

Things to bear in mind:

Family is very important and she relies heavily on them when she is unwell

Historically not very good at following health professionals’ advice. Inconsistent with her attendance of healthcare appointments.

Low confidence – not comfortable at going to new places without her husband



Not used to taking public transport



Needs an interpreter, doesn't speak good English

GOALS

Natalia would like to improve her physical health and mobility so that she can look after her family better and enjoy more days out with her husband and children.

She is very house proud and would like to be able to do a better job at keeping the home clean and tidy for when extended family and other guests come over.

Luke

“lives online”



Age: 18-30

Marital status: Single, living at home

Occupation: Attends college part-time

What is most important to Luke?

“Getting a really cool job in the future”

Needs and Motivations

Respects and trusts the advice of healthcare professionals

Needs some help and education on different ways to be physically active – not just ‘sport’

Health declining due to highly sedentary lifestyle but does not necessarily recognise the risks associated for long-term health

Things to bear in mind:

Low social confidence – usually comes to healthcare appointments with a relative. Not great at communicating face to face.



Still dependent financially on his parents



Up to date with latest gadgets and technology – prolific online gamer

GOALS

Luke’s dream is to get a job in the digital world. He wishes he had the confidence to apply to work at one of the big firms in that industry, but it would mean that he had to travel by train every day to another city, or might even have to move.

He would like to improve his physical health because he feels that his current health problems are inhibiting him at the moment.

5.4 Translating interview data into key points for design

The five-step thematic analysis process used to analyse the interview data (Braun & Clarke, 2006; see chapter 4) had produced a conventional set of qualitative 'themes' that was detailed, text-heavy and impractical for use in the workshops. There were two key challenges:

1. How to share rich and complex insights gathered from 40+ interviews in a brief enough format without oversimplifying or losing meaning
2. Drawing out some key points but avoiding leading the group too much and preserving their autonomy to prioritise which issues to take forward

The report generated to provide feedback to participants after the interviews (Appendix H; see section 4.5) was useful in this instance. Key insights identified in the report were translated into high-level yet practical 'features' of a PA pathway. For example:

"Health professionals believe that working collaboratively with the patient to develop shared goals around physical activity is most effective"

became:

"Ensure that professionals work together with patients to agree physical activity goals and strategies".

This was repeated with all insights from the report. The final list of statements was reviewed by the researcher to ensure they were reflective of interview participants' original meanings.

5.4.1 Card sorting exercise

Card prompts have been used in previous design research to encourage participants to select and arrange design features into most or least useful (Wherton, Sugarhood, Procter, Hinder, & Greenhalgh, 2015). The key points from the thematic analysis report were transferred onto individual cards, with duplicates or similar points merged and removed as necessary. This provided a set of 35 cards.

Each participant in the group took several cards. Taking turns, each participant pitched to the group whether they considered the point on their card to be either 'need to have', 'nice to have' or 'not important/outside current scope'. If the group agreed, the card was placed on the appropriate board. If not, the point was debated until consensus or compromise was reached. As points were added to the board, they were also grouped in similar themes. Figures 9 and 10 show examples of this grouping:

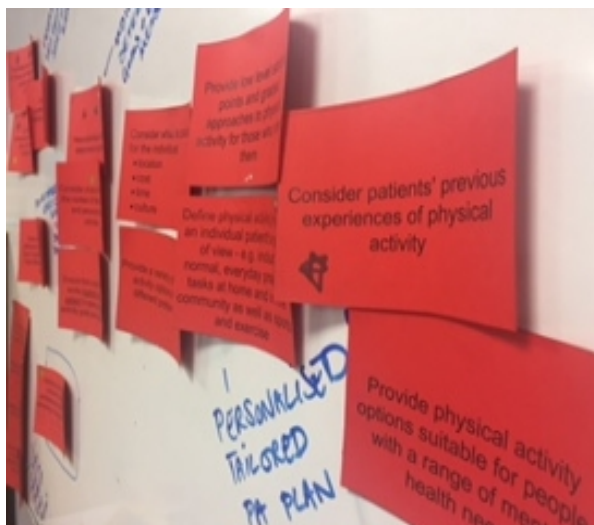


Figure 9: Card sort exercise

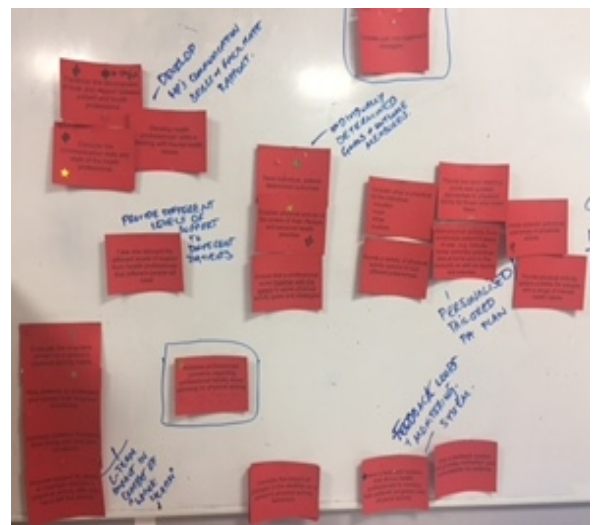


Figure 10: Clustering of cards

5.4.2 Card sorting results

The full results of the card sort are included at Appendix J with notes about cards that prompted significant discussion. Both groups categorised most points as 'need to have'. The patient group was less decisive about ranking issues as 'not important', only placing one card in that category.

5.5 Core design requirements

At the end of the exercise, the cards marked 'need to have' were retained in their groups and given a group name, for example "long term impact". Although the exercise was undertaken separately, patients and health professionals had created similar groups. These groups provided 9 core design requirements around which ideas could be generated in the subsequent *develop* phase. They could also be arranged into

a crude but logical sequence reflecting the order they might be addressed in a PA pathway (illustrated in figure 11):

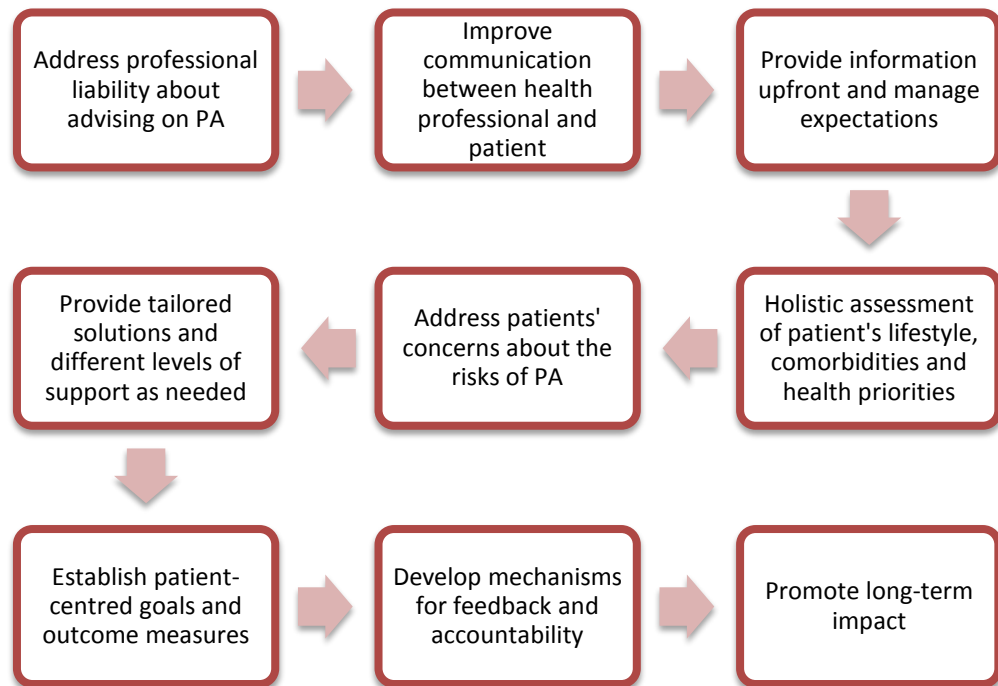


Figure 11: Core design requirements

5.6 The end of the first diamond - establishing specific problems

According to the double diamond framework, the *discover* and *define* phases are intended to identify the specific problems (and consequently, opportunities) to be addressed from the perspective of users, and around which solutions should be generated (figure 12):

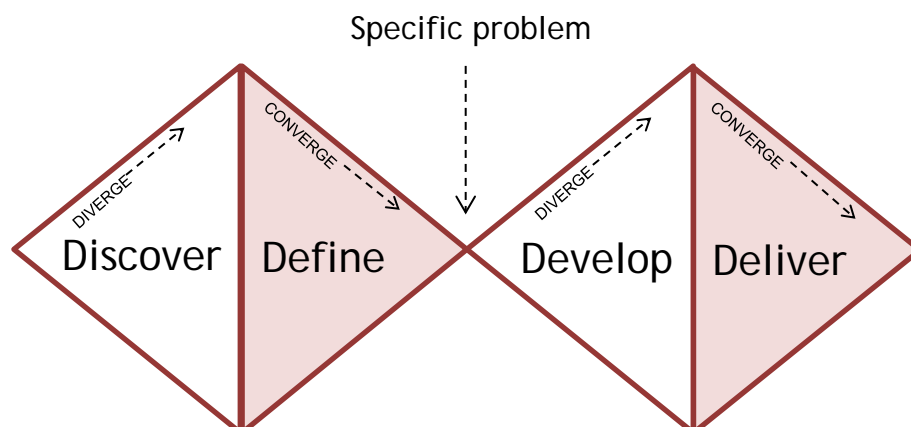


Figure 12: Double diamond

In reality these phases were not discrete, and identification and definition of problems continued into the *develop* stage. Nonetheless at the end of the first diamond a set of specific problems had been identified. These fell within each of the 9 core design requirements (see figure 11) and are discussed below.

5.6.1 Addressing professional liability

Lacking credibility and evidence base for PA

Discussions during the interviews and early workshop activities highlighted that for some health professionals there may not be a clear mandate for promoting PA as part of NHS care. Some health professionals lacked a 'belief' in PA as a productive investment of their time, efforts and resources. Others trusted that in principle PA was good for patients but there was a sense of lacking an evidence-base; problematic for professionals trained and working within a culture of evidence-based medicine. This perceived lack of information about PA generally, as well as what was provided locally, undermined professionals' confidence to promote it.

No requirement to discuss PA as standard practice

In none of the services involved in the research was there any requirement for PA to be discussed as standard. This meant that discussions about PA were opportunistic and/or initiated by the patient or health professional.

Health professionals cannot advise on contraindications outside their specialism

Symptoms or previous healthcare conditions (particularly pulmonary or cardiovascular) that were outside the scope of the health professional's training were considered a risk that health professionals felt unable to manage and acted as a barrier to giving specific advice to patients about type and intensity of PA.

5.6.2 Good communication and rapport between health professional and patient

Impact of different health professionals' attitudes, behaviours and communication skills

For some patients, the perceived attitude of the health professional and the extent to which they felt listened to, respected and supported were fundamental. Many health professionals also recognised how important and potentially influential this relationship was. Nevertheless it was clear from interview and workshop discussions that there was variation in individual professionals' working styles and attitudes that might need to be considered in training or implementing new working practices around PA.

Perceived lack of time within consultations for behaviour change

Health professionals tended to believe that to discuss or facilitate behaviour change required rapport with the patient and time for a holistic discussion about their needs. The majority of health professionals thought that there was insufficient time to deliver this within routine consultations.

Challenge to engage people with mental health barriers

Mental health-related problems were common amongst patients with long-term conditions and presented particular barriers to increasing PA. Health professionals recognised that these barriers existed but found it challenging to overcome them given their lack of time and specialist mental health training.

5.6.3 Information upfront - managing expectations

Patients are not primed to expect discussion of PA

Patients' expectations of the care and support they would receive had implications for their subsequent engagement and satisfaction. Health professionals found it difficult to introduce the subject of PA if they perceived that patients would not be expecting it.

Some patients expect passive treatment rather than active self-management

Whilst many health professionals endorsed principles of patient empowerment, autonomy and self-management, the limits of time and the expectations of many patients to receive passive treatment made it tempting to slip into a medical model whereby the health professional was the expert, which could constrain discussions or action on PA.

5.6.4 Holistic assessment

Medical framing of PA versus social and lifestyle aspects

Health professionals acknowledged that PA was associated with more than just a person's physical health but within the current context, providing a physical health rationale for increasing PA may seem to be the most relevant and accessible. However, focusing on this alone neglected some of the wider psychosocial and lifestyle factors influencing a patient's motivations and barriers.

5.6.5 Address patient concerns about safety and risk

Parallel concerns about risk create a void in advice being delivered

There was a 'fear of the unknown' for some patients: what will happen?, what will I be asked to do?, who will be involved?, concurrent with many patients also fearing injury or exacerbating their symptoms in some way. Some health professionals lacked knowledge and confidence to allay patients' concerns creating a potential gap for promoting PA.

5.6.6 Patients require different levels of support

Tension between meeting individual needs and standardising processes

Patients had widely varying preferences and support needs regarding PA. Whilst it was recognised that best practice was to tailor advice and support, health professionals also needed simple, efficient and standardised processes to enable them to deliver support within the constraints of every day practice. This potentially limited the ability to fully explore patient choice.

Initiating PA: gap between referral and readiness

There was a perceived gap between the starting level of existing PA referral programmes and the functional ability and/or confidence of some patients with regards to PA participation. Some patients may need extra time to develop confidence and understanding around mobility, movement and pacing.

Cost and type of PA: lack of non-facility based PA promotion

Cost was a significant perceived barrier for patients and health professionals. Free or low-cost options and a better understanding of how to effectively promote everyday PA beyond sport and exercise were needed to improve accessibility of PA for patients.

Social support should be considered on an individual basis

Many patients responded well to being physically active with other people, either from their own social networks or peer groups. Yet there were also patients for whom this was not appropriate or desirable, highlighting that individual preferences must be taken into account.

5.6.7 Patient-centred goals and outcome measures

Goals and outcomes will not be the same for every patient

Patients had very individual motivations for PA and aspirations for their health; these were not always reflected in standardised outcome measures.

5.6.8 Feedback and accountability amongst health professionals regarding patients' PA progress and maintenance

Lack of feedback to health professionals following referral

When health professionals made a referral, they may not receive any feedback on the patient's progress or outcomes. This made it difficult to ascertain whether referrals were being made appropriately and undermined motivation to make future referrals.

Unclear roles and responsibilities

There was no clear consensus amongst health professionals about whose role it was to promote PA and the boundaries and responsibilities of that role. As a result there was significant perceived variation amongst health professionals' practices in promoting PA along with inconsistency in the messages being broadcast throughout the NHS.

5.6.9 Long term impact of NHS support on patients' PA behaviour

Trying to achieve long-term impact on PA within potentially limited contact time

Some services had a limited number of allocated appointments within which to treat patients before referring onwards or back to primary care. This led to a prioritisation of immediate symptoms over lifestyle change and posed a challenge when patients needed enhanced behaviour change support.

Lack of ongoing community support

PA habits took time to develop and maintain and were highly susceptible to relapse based on a wide variety of factors. Ongoing accountability and support was needed but there was a perception that this was limited in current PA referral programmes typically lasting between 6-12 weeks. Health professionals felt disconnected from local community providers, other professionals, support agencies and voluntary groups who could potentially form that support community.

5.7 Discussion and reflections

As a result of the activities carried out in this *define* phase, a detailed understanding evolved around the particular challenges that a PA pathway should address. Rather than identifying one specific problem to address, it highlighted a series of problems. This was indicative of the complexity inherent in developing a PA pathway but also the opportunity for multiple solutions to be developed.

5.7.1 Methodological reflections - personas

Developing personas was a useful method for capturing the diversity of patients' needs and characteristics that might influence their uptake. It also highlighted the specific considerations a health professional might need to make when delivering advice about PA. It was important to be reflective during the persona development to ensure that these did not simply resemble the patients involved in the interviews and co-design groups, and also did not become stereotypical 'caricatures' of patients.

Health professionals were able to offer more ideas to developing the personas than patients. This is perhaps unsurprising given health professionals' experience working with patients every day. Patients were nevertheless important contributors to the

personas, ensuring that they were developed from a patient-centred position and providing real-life examples of some of the particular challenges being incorporated.

5.7.2 Methodological reflections - sequencing the core design requirements

The card sort activity provided an opportunity to prioritise key points from the interviews, and for deep discussion and interpretation of the interview data. Combined with group members' personal views and experiences this contributed to a collective set of core design requirements and a comprehensive understanding of the problems to be solved. There is a risk that grouping the cards into 9 core requirements may have lost some of the complexity or diversity of individual issues discussed in the interviews. An alternative would have been to retain each card as a specific problem to solve, but this would have been unfeasible given the scale of the project and the number of cards rated as important by the participants. The 9 core design requirements, although broad and abstract provided a wide base for the generation of ideas without limiting potential solutions.

5.8 Chapter summary

The *define* phase took a pragmatic approach to considering and converting the insights gained during the earlier *discover* phase, about patients' and health professionals' needs and experiences, into practical 'problems'. These specific problems, grouped within 9 core design requirements, provide the basis for generating and developing solutions in the *develop* phase of the double diamond which follows in chapter 6.

Chapter 6: Develop

6.0 Chapter overview

This chapter describes the objectives and activities for the *develop* phase of the double diamond:

Phase	Objectives	Research methods
Develop phase	To generate ideas and solutions to the problems identified in the <i>define</i> phase	Co-design workshops: ideation; voting and clustering; storyboarding
	To refine ideas with users	Prototyping survey, patient consultations and PA provider interviews

The chapter will describe how participants generated ideas to address specific problems identified in the previous *define* phase, and the selection of ideas to prototype further. An explanation of how new participants are recruited to give feedback on prototypes is provided, including the identification of local PA providers as an additional stakeholder group. Findings from the prototyping stage are presented along with points for action.

6.1 Ideation stage

6.1.1 Preparing for ideation (developing 'how might we' statements)

"How might we" (HMW) statements (Stanford University, 2017) are short questions designed to structure brainstorming (Osborn, 1953). They stem from reframing a design problem as an opportunity (LUMA Institute, 2012) and should encourage focused solutions to be generated without limiting creativity.

In this research, HMW statements were created based on the core design requirements identified in the *define* phase (chapter 5). A separate list of statements was established for the patient and health professional co-design groups to reflect the typical language used and their views towards each issue. An example of how the statements differed for each group is provided here:

Core design requirement	HMW statement for patients workshop	HMW statement for health professionals workshop
Good communication and rapport between health professional and patient	How might we develop health professionals' communication skills and facilitate good rapport between patients and professionals in every interaction?	How might we optimise good communication between health professionals and patients?

Appendix K shows the full list of HMW statements for the two groups.

6.1.2 Brainstorming (and ranking exercises for each group)

In the co-design workshops, participants split into smaller groups to consider each HMW statement, discussing the problems to be addressed and possible solutions. Participants were encouraged by the facilitators to record every idea regardless of how simple or radical. Figures 13 and 14 show examples of the brainstorm results:

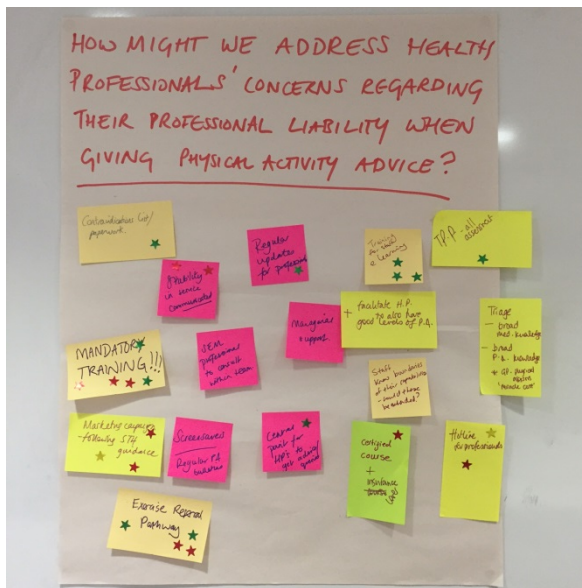


Figure 13: Brainstorming ideas for one HMW statement Figure 14: Multiple HMW statements after brainstorm

Appendix M shows the full list of ideas generated by each workshop group during the brainstorm.

6.2 Shortlisting ideas

Across both co-design groups (patients and health professionals) several ideas appeared repeatedly across multiple HMW categories. These recurring ideas were highlighted and discussed by the groups in the workshops. Participants identified which ideas they perceived could have the most impact in making it easier for them to take up (patients) or promote (health professionals) PA. At this point, some ideas were suspended because they were already being addressed by other initiatives or because they were considered unachievable within current NHS policy. For example, increasing the duration of patients' appointments to allow extra time to discuss PA was desirable, but not feasible given current constraints and increasing demand. Both co-design groups found it difficult to envisage which ideas could be realised in practice. This is discussed further in the methodological reflections at the end of this chapter (section 6.12.1). The groups preferred to focus on solutions that were more likely to have an impact as opposed to aspirational ideas that were unlikely to be implemented.

Each group considered their selected ideas in turn, aiming to establish a very rough prototype. Prototyping is encouraged in Research through Design to gather early feedback and start to think about how an idea might work in practice (www.designkit.org). It is recommended that prototyping is done quickly to avoid spending time on ideas that later turn out to be impractical or unsuitable (www.designkit.org). The nature of prototypes in the workshops varied depending on each idea but included sketches, lists of key features, and discussions about how they might address the problems identified. Examples of similar ideas being used in analogous situations were collected and used as inspiration. Table 10 shows the ideas taken forward to be prototyped further.

Table 10
Ideas shortlisted to be prototyped

Specific problem / opportunity	Solutions suggested
Patients not primed to expect discussion of PA so it's harder for health professionals to introduce it	i. Priming patients via their appointment letter ii. Nudges to discuss PA via signage in waiting areas
Making assessment easier for health professionals	iii. Pre-appointment measures iv. Decision tool
Improving awareness of and access to local PA options	v. MoveMore website online activity finder
Supervised, low level introductions to PA	vi. Supervised low level groups vii. Joint sessions run by health professionals and exercise professionals
Making referral easier for health professionals	viii. Directly bookable PA appointment slots with providers ix. Inter-service referral to existing PA groups x. Approved provider quality mark
Raising and formalising the priority and profile of PA	xi. Recording of PA conversation and actions on electronic medical records systems xii. Feedback loops from provider back to health professional

6.3 Engaging other stakeholders in feedback

To sense-check and refine ideas so that they would ultimately be more feasible, it was appropriate and necessary to gather the views of patients and health professionals outside the workshop groups. This would contribute to the second objective of the *develop* phase ("to refine ideas with users"). It was also apparent that some of the ideas shortlisted for prototyping involved exercise referral providers and local voluntary groups providing PA. Sections 6.4 to 6.7 describe how feedback from patients, health professionals and exercise providers was gathered and combined to shape the ideas generated by the co-design workshops into refined solutions. Methods for gathering feedback from each of these three groups are now described, followed by a discussion of the twelve shortlisted ideas. This discussion includes the views from within and across patients, health professionals or PA providers as appropriate to each

of the shortlisted ideas. Each group was consulted only on the ideas that were most relevant to them.

An application for major amendments was submitted to the NHS REC committee who had originally approved the project (East Midlands - Nottingham 1) to allow recruitment of new participants into the research. This amendment to the original protocol included the collection of feedback data from health professionals and patients who had not previously participated in the research. The application was accepted and approved. Institutional ethics was sought and approved from Sheffield Hallam University to enable PA providers (whose participation was not subject to NHS ethics) to be recruited.

6.3.1 Feedback from health professionals: prototyping survey

The researcher attended in-service training days and meetings of service leads connected to the NCSEM Concord and Graves, to present initial ideas to health professionals who had not yet participated in an interview or co-design group. Due to constraints on health professionals' time, further workshops or focus groups were not feasible. A survey was therefore created using Qualtrics software to gather feedback on shortlisted ideas that impacted health professionals. This could be completed at the professional's discretion, in confidence and without the need to take time out of clinical delivery. The survey included a number of rough prototypes, for example an amended appointment letter designed to prime patients to the notion that PA might be discussed as part of their appointment. Free text responses allowed professionals to give their views on how useful the prototype might be and how it could be made more user-friendly. A full download of the survey questions is included at Appendix L.

The survey was piloted with two health professionals from the co-design workshops to confirm that the questions were clear and comprehensible. A link to the survey was circulated via email by service leads for MSK, podiatry, chronic pain and diabetes, by NCSEM receptionists and via participants from the *discover* phase interviews (chapter 4).

Tables 11 and 12 provide a summary of the survey participants by service and by role.

Table 11
Survey participants by service

Service	Number of respondents
Continence	1
Pain management	1
MSK	17
Podiatry	7
Other	2

Table 12
Survey participants by role

Job Role	Number of respondents
Manager / service lead	4
Physiotherapist	15
Podiatrist	7
Occupational therapist	1
Consultant	1
Registrar	1

Notably, there were no responses from diabetes and only one response from the pain and continence services. This appears to be because the link was not circulated amongst staff rather than staff choosing not to participate, although this could not be confirmed. Findings are therefore more directly applicable to MSK and podiatry services.

6.3.2 Feedback from patients: informal engagement at clinics

The researcher approached patients in NCSEM clinic receptions to gather feedback on some of the ideas being prototyped. Taking into account NHS Health Research Authority guidance on applying proportionality to seeking consent (HRA, 2017), formal written consent was not collected from patients. This was to make it easier for them to participate while they waited for their appointment. Participation was optional; patients gave verbal feedback and the researcher made notes on likes, dislikes and

suggestions regarding any of the ideas presented. Given that these patients did not have a detailed background to the research, feedback was primarily sought on the more tangible or visual ideas as opposed to abstract concepts that required fuller explanation of context.

6.3.3 Feedback from PA providers: semi-structured interviews

Some of the ideas generated by the co-design workshops involved PA providers and local voluntary organisations, whose perspective had not yet been explored in the current research. To date, research involving PA providers has been scarce and has considered health professionals' views towards referring as opposed to providers' views on receiving patient referrals (Huijg et al., 2014). With this in mind, the aim of the interviews was to understand how those prototypes that directly affected PA providers would be received and/or used, contributing to the refinement of ideas that would be easier to implement. As PA providers had not yet been engaged in the research, semi-structured interviews were identified as the best method to thoroughly explore these views.

An interview guide was developed based on the Qualtrics survey being disseminated to health professionals. This included rapport-building and background questions (King & Horrocks, 2010) to develop an understanding of the organisation's current working relationships with NHS professionals and patients, followed by questions designed to elicit opinion on ideas from the co-design workshops.

Participants were purposively sampled based on the researcher's knowledge of local PA providers, developed through working on other community PA research projects. Current exercise referral providers in Sheffield were included along with some voluntary organisations providing low-level PA in the community who had less formal NHS referral arrangements in place. The researcher contacted relevant organisations and invited them to take part in an interview and/or to nominate relevant members of staff. 10 participants took part in interviews (summarised by table 13).

Table 13
PA provider interview participants

Type of organisation	Formal NHS exercise referral partner yes/no	Type of PA offered	Job role
Leisure Centre	Yes	Gym, swimming, fitness classes	Exercise referral manager
Leisure Centre	Yes	Gym, swimming, fitness classes	Exercise referral instructor
Leisure Centre	Yes	Gym, swimming, fitness classes	Health and wellbeing manager
Leisure Centre	Yes	Gym, swimming, fitness classes	Exercise referral instructor 2
Community wellbeing centre	Yes	Gym, swimming, fitness classes	Chief Executive
Community wellbeing centre	Yes	Gym, swimming, fitness classes	Exercise referral instructor 3
Voluntary group	No	Walking for health	Volunteer Walk Leader and Chair
Voluntary group	No	Gardening for health	Director
Local football community foundation	No	Walking football Urban gym	Community Health Coordinator
Local authority PA and sport team	No	n/a	Community Project Officer

Data from the PA provider interviews was initially analysed inductively using thematic analysis (Braun & Clarke, 2006) similar to the approach used in the earlier *discover* phase (chapter 4). Interviews were transcribed and entered into NVivo11. After re-reading the transcripts, codes were assigned to raw data extracts. Similar codes were grouped and/or merged to form meaningful lower-order themes. These themes and the corresponding raw data extracts were discussed with a researcher independent to the study (a PhD student in sport psychology) to encourage critical reflection on their meaning. Minor adjustments were made to the grouping and naming of themes as a result of this discussion. In addition to giving their views on the selected prototypes, PA providers described their motivations for receiving NHS referrals, and how they managed patients. The interviews highlighted commercial sensitivities associated with providing PA support such as the need to cover costs, and competition between

providers. These general themes are not presented below, but are included at Appendix N.

6.4 Combining data from patients, health professionals and PA providers

A deductive approach was used to amalgamate the data gathered from patients, health professionals and PA providers against the 12 shortlisted ideas from the co-design workshops. A framework based on Table 10 was created in NVivo11; nodes for each problem/opportunity (Column 1, Table 10) and sub-nodes for each idea/solution (Column 2, Table 10). Data extracts from the researchers' notes on patient feedback, the Qualtrics survey of health professionals and the PA provider interview transcripts were coded against the corresponding node and/or sub-node. Additional sub-nodes were created for novel solutions suggested by participants that did not fit the initial framework, plus a node for general comments.

When all data sources had been coded, the researcher re-read and analysed each node and sub-node and merged data extracts where appropriate. This provided an overview of all relevant comments from each of the three groups (patients, health professionals and providers) towards the shortlisted ideas. The data was analysed to identify key points pertinent to acceptability or feasibility for the relevant stakeholders (i.e. patients, health professionals, PA providers or a combination). Views on each idea are presented, including suggested iterations or actions needed to make them feasible prior to implementation.

6.5 Priming patients about PA as part of routine appointments

Health professionals found it difficult to raise the topic of PA if patients did not expect it as part of their routine appointments. Suggestions were therefore made to test out subtle ways of priming and nudging patients in an attempt to 'normalise' the topic of PA.

6.5.1 Prototype 1: Priming patients via their appointment letter

A brief paragraph was added to standard appointment letters to prepare patients that their health professional may discuss PA with them. The proposed change is shown in figure 15:

Dear Mr Xxtestpatientafnz-Testf **NHS Number:** 999 001 4574

An appointment has been made for you to attend the PhysioWorks Service as follows:

Date/Time:

Location:

Clinician:

What to expect:

Your appointment will include assessment and treatment by your clinician which is appropriate to your individual needs. We will also discuss your general physical activity habits and provide advice and support for your health and wellbeing.

If this appointment time, date or location is inconvenient the Single Point of Access (SPA) booking service will rearrange it for you. **Please call 0114 305 1460 from 8.00am to 8.00pm seven days a week.**

If we have your mobile telephone number we will text you to remind you of your appointment. If you do not wish to receive text reminders please inform SPA.

You must inform SPA at least 24 hours before your appointment if you wish to cancel, this enables us to offer an earlier appointment to another patient. If you do not attend your appointment, you will be discharged back to your GP.

Yours sincerely
Patient Choice Officer
Single Point Access




Figure 15: Amended patient appointment letter

The majority of health professionals commented positively on the proposed change to appointment letters, noting that it would help to set patients' expectations and set any discussions about PA in context:

"I think it is essential as it pre-empt's discussion. The more information a patient receives the more likely they will break down their own ideas about what their appointment should entail and therefore not be surprised / upset / or disengaged to discussion on exercise" (Podiatrist)

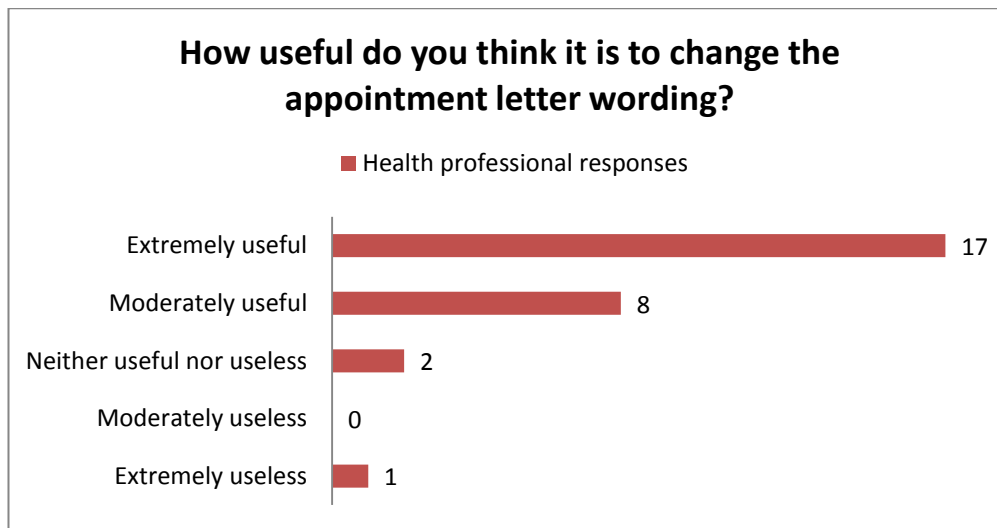


Figure 16: Responses about appointment letter wording

A smaller number of health professionals highlighted that the letter could risk deterring some patients from accessing care:

"My only concern would be that some patients (maybe those who know they don't do enough physical activity or who feel ashamed by how little they do) may be put off engaging with the service or may not turn up for their appointment." (Physiotherapist)

On balance, most health professionals felt the letter was useful and the risk was worth taking. Some minor changes to the language were suggested, these are highlighted in the following text boxes:

What to expect:

*Your appointment will include assessment and **treatment advice** by your clinician which is appropriate to your individual needs. We will also discuss your general physical activity **habits levels** and provide advice and support for your health and wellbeing **where appropriate**.*

A separate version of the wording was suggested for pain clinic patients, to reflect that the term "physical activity" might be intimidating and "movement" was suitable language:

What to expect:

*Your appointment will include assessment and advice by your clinician which is appropriate to your individual needs. We will also discuss ~~your~~ **general physical activity habits** **how well your body is able to tolerate movement** and provide advice and support for your health and wellbeing.*



Patients were shown the amended letter at NCSEM Concord reception and asked for their views on the proposed changes. All reactions were positive; patients said they appreciated being informed of what to expect in their appointment as this helped them prepare what to say and/or questions to ask their health professional. One female patient suggested the wording could be specific about addressing motivation to be active and recognising the links between stress and activity levels. The same patient also suggested that not everyone wanted to talk about their general health and wellbeing, particularly if they were struggling with their mental health, but at the same time she did not consider the letter to be a deterrent to attending appointments.

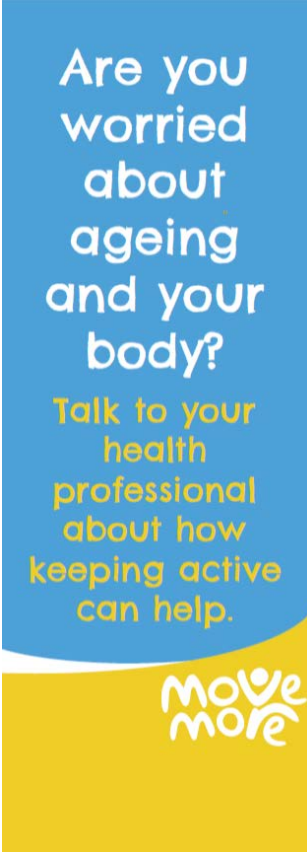

6.5.2 Prototype 2: Signage prompts in waiting areas


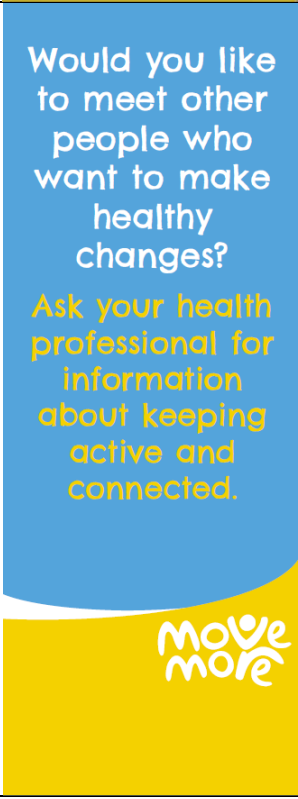
The rationale behind this idea was that there was space in waiting areas that could be filled with signage and information designed to normalise the subject of PA. Messages were created based on patients' comments during the *discover* phase interviews to reflect common motivations and/or concerns about PA. Mock-ups of the signs were created and shown to patients at NCSEM Graves to gather feedback.

Overall the response was positive; several patients commented that the signs might prompt them to initiate a conversation with their health professional about PA. Table 14 shows the original messages and how they were amended to reflect patients' feedback.

Table 14
Priming signage

Draft message	Feedback from patients	Final version
<p><i>Want to get more active but finding it hard to get started? See how we can help.</i></p>	<ul style="list-style-type: none"> - Very popular "you just need that extra oomph... I walk my dog but I know it's not enough" - Patients wanted more specific guidance on what to do if the sign caught their attention - e.g. who to speak to 	
<p><i>Being active doesn't have to be painful! Ask your clinician for advice on keeping healthy and active without hurting yourself.</i></p>	<ul style="list-style-type: none"> - Patients liked this and said it addressed their fears around hurting themselves - Suitable for some clinics more than others e.g. more appropriate for rheumatology waiting area than diabetes - Patients did not understand 'clinician', some said it sounded too medical and implied there was "something wrong with you". They suggested "ask us" instead. 	

Draft message	Feedback from patients	Final version
<p><i>Are you worried about ageing and your body? Talk to us about how keeping active can help.</i></p>	<ul style="list-style-type: none"> - Popular with many patients - Some patients wanted more information i.e. talk to who? where? They suggested "we are happy to discuss X with you" instead - Older patients wanted information not limited to website links - ideally some of the signs would point to a unit with leaflets for further information. These should cater for different age groups and abilities. 	
<p><i>Do you need more "me time"? Get some ideas here</i></p> <p><i>Find something you can do with the whole family. Get some fun ideas here.</i></p>	<ul style="list-style-type: none"> - One busy mum laughed at this message, commenting that 'me-time' was out of the question. She pointed instead to the 'getting active with family' draft as more realistic and relatable. - Someone suggested this could also link to leaflets - one person thought it was too unrelated to their appointment to raise with their health professional - This was popular with patients who appreciated the simplicity and relevance of the message 	

Draft message	Feedback from patients	Final version
<p><i>Being active doesn't have to be expensive! Ask your clinician for advice on keeping healthy and active on a budget.</i></p>	<p>- this was suggested to be useful if it was accompanied by PA literature, leaflets, posters etc.</p>	
<p><i>Keep connected by keeping active. Find out how to meet other people who want to make healthy changes</i></p>	<p>- popular particularly with male patients - one female disliked the message suggesting she was "not a joiner"</p> <p>- it was suggested that "keep active by keeping connected" was not clear and could be reframed as a question: "would you like to meet other people...."</p>	
<p><i>Do you think of yourself as an "active" person? Talk to us about what it means to be active and how we can support you to get more out of life.</i></p>	<p>- Patients didn't understand the purpose of the message: "If I thought of myself as active, why would I want to talk about it?"</p>	<p>Not taken forward.</p>

6.5.3 Additional suggestions re: priming

Health professionals and patients called for improved access to leaflets and educational materials defining, and outlining the benefits of, PA. Participants emphasised that such materials must be available across all NHS locations in Sheffield, not just NCSEM clinics and should include electronic, hard copy and community language versions to increase accessibility.

6.6 Making it easier to discuss PA within limited time in consultations

Patients and health professionals welcomed a personal approach to PA advice taking into account individuals' needs, barriers and personal circumstances; this was hard to achieve within the duration of routine appointments. Two solutions were proposed in response to this challenge: asking patients to complete pre-appointment measures that would provide health professionals with information to tailor their approach to the individual, and a decision tool that would help health professionals make quick decisions about which route or advice would suit the patient.

6.6.1 Prototype 3: Pre-appointment measures

Although early prototyping discussions considered the development of a custom pre-appointment questionnaire, it was important for health professionals that measures were validated. As there was not time within the current study to develop and validate a new measure, four existing measures were selected for health professionals to consider. These were:

1. A brief measure of Patient Activation - PAM (Hibbard, Stockard, Mahoney, & Tusler, 2004)
2. A measure of current PA levels - IPAQ short form (Craig et al., 2003)
3. A measure of self-reported "physical activity readiness" i.e. physical contraindications - PAR-Q+ (Warburton, Jamnik, Bredin, Gledhill, & PAR-Q+ Collaboration, 2011)

4. A stages of change questionnaire based on the transtheoretical model of change (Prochaska & DiClemente, 1983)

Health professionals rated the four measures based on how useful the information they provided would be for the health professional and/or whether they would be suitable for patients to complete. Each measure was rated from 1-5 (1 being not useful, 5 being very useful). Table 15 shows the mean rating of each measure:

Table 15

Mean rating for pre-appointment measures

Suggested measure	Mean rating by health professionals
Patient activation measure	3.23
IPAQ short form	3.65
PAR-Q+	2.81
Stages of change questionnaire	3.12

The PAM and IPAQ were most popular, with acknowledgement from health professionals that they could help facilitate a tailored discussion reflecting whatever PA meant to the patient. Some health professionals felt that the measures should be more reader friendly, or were concerned that some patients would not want to complete long questionnaires:

"Often patients who are overwhelmed by exercises are overwhelmed by surveys talking about their activity levels" (Physiotherapist)

The PAR-Q questionnaire was the least popular measure with several health professionals noting that it might have a negative impact on PA discussions:

"the PAR-Q looks like it gives people an opportunity to put up barriers to exercise before you talk to them" (Physiotherapist)

The PAR-Q has been described as "purposefully conservative" and it has been acknowledged that it may generate 'false positives' particularly in populations for whom increasing PA may be particularly beneficial (Warburton, Bredin, Jamnik, Shephard, & Gledhill, 2016). Nonetheless it remains widely used in leisure, community

and occupational exercise and PA settings (Warburton et al., 2016). In light of its unpopularity in this study, future research may be appropriate to explore the impact of PAR-Q use in these settings.

Patients at NCSEM Graves and Concord waiting areas were shown the IPAQ and PAM in paper form. All were comfortable with the idea of being asked to complete a questionnaire prior to their appointment, but they differed in terms of which questionnaire they preferred. Patients without long term conditions or not taking medication found it difficult to see the relevance of the PAM, yet it was considered more reader-friendly and simple to complete. There is mixed evidence regarding the effectiveness of the PAM for predicting PA behaviour. Whilst studies have found that more 'activated' patients are more likely to undertake PA regularly (Rask et al., 2009) others have found no significant association between activation and PA (AuYoung et al., 2016). One patient commented that the IPAQ might cause her to feel guilty about her lack of moderate or vigorous PA: "*I'd be thinking, oh dear, I don't do any of that*". This suggests that the IPAQ might be a useful prompt for patients to consider their current PA levels before attending an appointment, which could be useful to health professionals initiating PA conversations. Further research could explore whether the format in which the measure is provided or collected (e.g. paper, electronic) might influence completion. Taking into consideration the evidence available and the feedback from patients, the IPAQ was selected as the most useful measure in this context.

6.6.2 Prototype 4: Decision tool

Early prototyping discussions in the co-design workshops had identified three key factors on which health professionals modify advice about PA: 1) patients' current PA levels, 2) physical risks or contraindications, and 3) their psychological engagement or readiness. The idea was to develop a decision tool based on these three factors. Previous similar initiatives include the development of a decision tool for the safe and effective prescription of exercise in COPD (Camp et al., 2015) and the development of a multivariate clinical prediction rule to classify patients with non-specific neck pain who might benefit from exercise-based treatment (Hanney et al., 2013). Designing and

honing these tools has taken multiple rounds of consensus with experts and stringent empirical testing. This would not have been feasible within the current study, so a basic prototype to canvass health professionals' opinions on the general concept was created by the researcher. The prototyped decision tool differed from existing stratification and pre-participation screening measures in that although it addressed possible contraindications to PA, it also considered two other factors: the patient's current PA levels and their attitudes or psychological readiness for PA. The tool was intended to provide reassurance to the health professional by considering physical risk, but equally to find what was right for the patient, by directing the consultation to the most suitable referral or signposting option(s) based on all three variables. Figure 17 shows the prototype decision tool.

Most health professionals welcomed the tool as a guide to signposting patients appropriately into services and useful for targeting conversations in the context of limited time. Negative comments related to a dislike of the language used (e.g. "resistant"). Some health professionals didn't understand how the tool should be used, or thought that they would struggle to make use of it in consultations. One suggestion was to link the tool to pre-appointment questionnaire responses so that it was automatically completed.

		Patient's engagement/readiness		
		No engagement or resistant	Some engagement but concerns or hesitation	Strong engagement and willingness to increase physical activity
Cardiac contraindication to PA	Current activity levels HIGH			
	Current activity levels MEDIUM			
	Current activity levels LOW			
Other possible contraindications or not known	Current activity levels HIGH			
	Current activity levels MEDIUM			
	Current activity levels LOW			
No contraindications to PA	Current activity levels HIGH			
	Current activity levels MEDIUM			
	Current activity levels LOW			

Figure 17: Decision matrix prototype

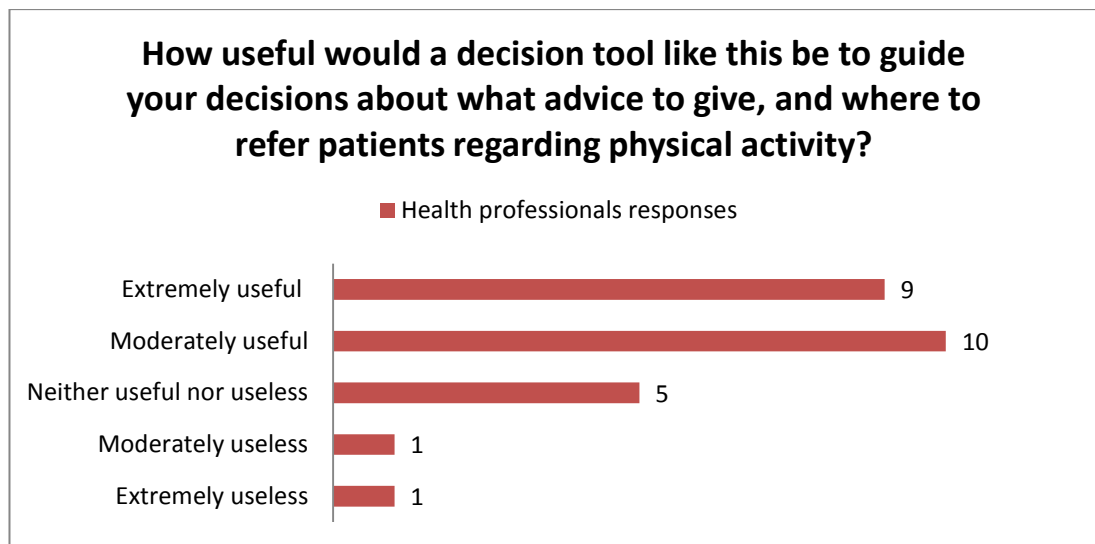


Figure 18: Survey responses about the use of a decision tool

6.6.3 Other suggestions re: making the conversation easier

Health professionals made additional suggestions about how to enable conversations about PA within routine appointments. These either took an informative stance, educating patients about the benefits of PA and providing them with a physical or medical reason to increase PA, or an empathic stance, using motivational interviewing (MI) techniques such as decisional balance (Rollnick, Miller, Butler, & Aloia, 2008) to help patients identify their own reasons for increasing PA. However, evidence suggests that not all MI techniques are appropriate. Decisional balance may decrease commitment to change in an ambivalent patient, and evocation of reasons for change may be more appropriate (Miller & Rose, 2013). Health professionals with limited training or experience with MI may benefit from more sophisticated understanding about the subtleties of the approach.

6.7 Improving awareness and access to local PA options

6.7.1 Prototype 5: MoveMore online 'activity finder'

Recognising that PA needs and preferences were individually determined, health professionals and patients had expressed a desire for increased knowledge of local PA provision. This was difficult to keep track of across Sheffield, so a central portal to manage information regarding eligibility, time, cost and referral or joining instructions was suggested. Similar existing portals include the PHE 'One You' website (www.nhs.uk/oneyou), set up to promote PA along with other public health issues such as smoking, alcohol consumption and stress. This includes a "Get Moving Now" section with a link to the "BBC Get Inspired" website, whereby the public can search for sports and activities in their local area. The MoveMore website included a Sheffield-specific 'activity finder' with the function to search for activities by postcode (see figure 19) and detailed information about cost, timing and access. The website has potential to be populated with locally-relevant information including smaller community groups.

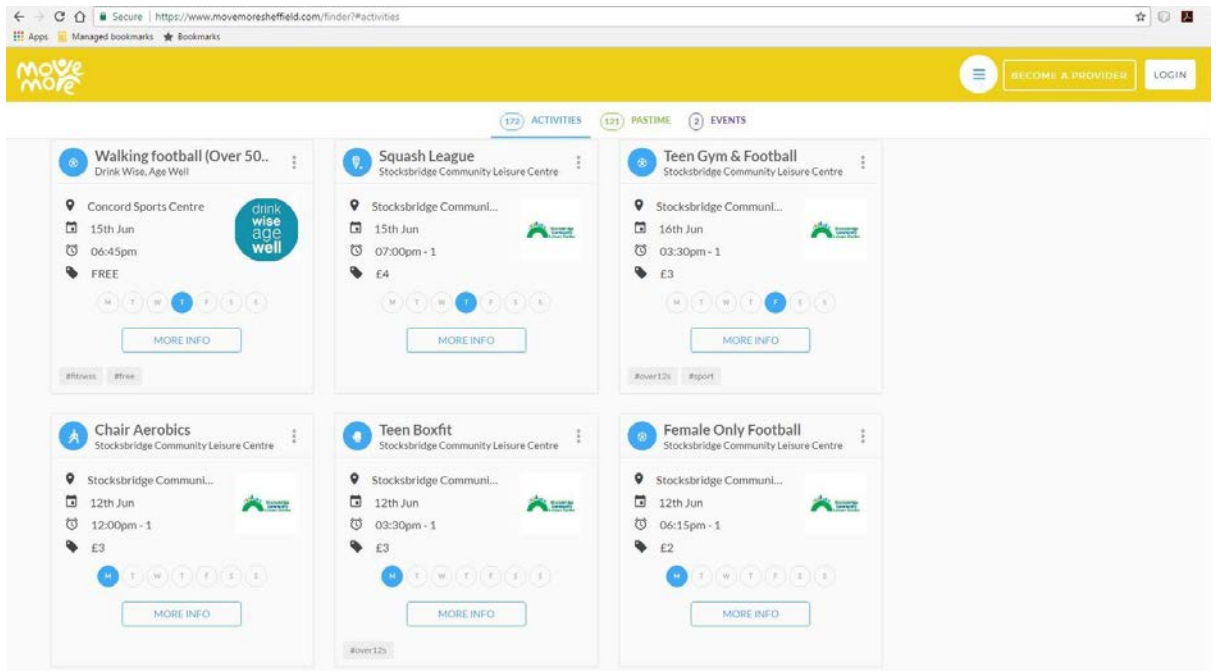


Figure 19: MoveMore website activity finder

Health professionals and exercise providers were asked how they might use this online tool in patient consultations to aid referral or signposting (figure 20).

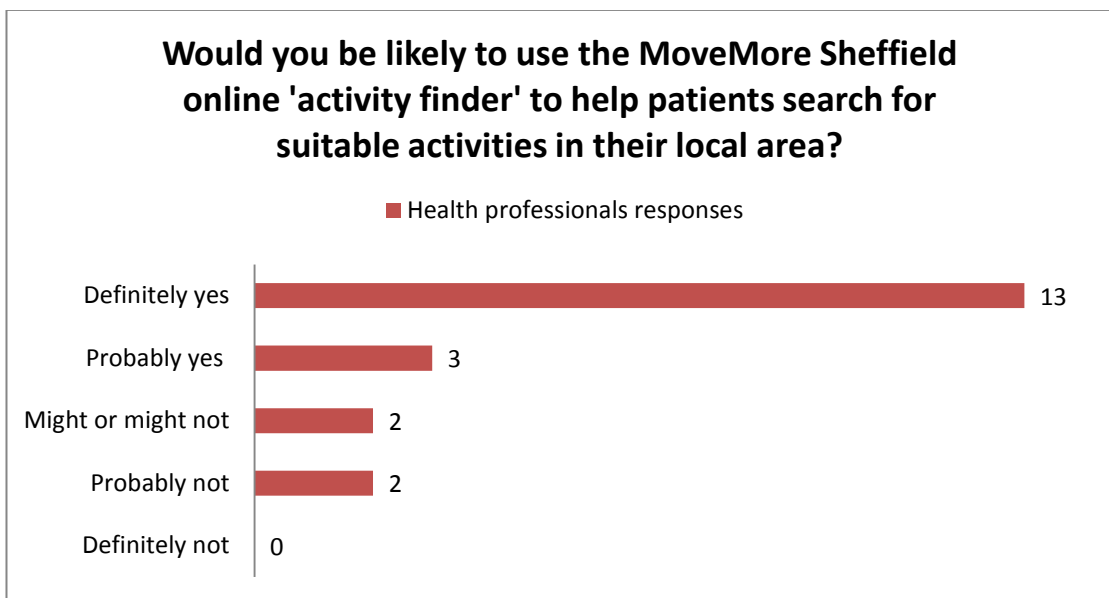


Figure 20: Survey responses regarding the online activity finder

Some health professionals commented that they had insufficient time to use the activity finder during consultations, whereas others said they welcomed it. Health professionals suggested they would use the tool in different ways: some would ask patients to connect to the website at home as 'homework' to discuss at their next

appointment; they would find it useful to have a card with the website address to hand out. Others would like the option to print information directly from the website for their patient to take away. Nevertheless, it was suggested that the tool may need to be "sold" to staff:

"It may need reselling to staff and ring fencing to ensure people use it with more confidence." (Physiotherapist)

PA providers appreciated the benefits of mapping provision across the city along with the opportunity to raise awareness of their own services. One interviewee stressed that success required collective buy-in from all providers and commitment to a central hub, but acknowledged an element of competition between providers:

"there's something about getting behind one brand, one approach and if everyone does that, if there's that genuine collective approach, you know and that buy-in, then I think it could be something that's really valuable. It's that sort of, underneath it we've talked about it informally, that commercial element, the competitive element." (Chief Executive, Community wellbeing centre)

Most health professionals suggested that they would like to see more activities and providers listed on the website to provide a genuine menu of options, particularly gentler forms of PA. They also wanted more filters, for example to search by intensity of activity to match with the patients' current fitness or ability, and for listings to specify which health conditions were suitable or unsuitable for that activity. Whilst this may result in greater patient choice, these suggestions were motivated primarily by a prescriptive approach to PA promotion that carried concerns about risk and liability.

Providers were supportive of widening the options that were available on the website but noted that it was time-consuming to populate:

"... we have up to 60 sessions, it might take two weeks to input. But then that's automatically out of date in 10 weeks... similarly we do have programmes that have been here for years and they can stick, so we're invested in making sure that's as up to date as possible. But there are sessions or cohorts of classes that

it might not be possible to update all the time" (Health and wellbeing manager)

To limit time spent inputting information, some providers suggested that the activity finder simply directed people to their own website:

"What we wanted from MoveMore was to be able to link our website with theirs" (Volunteer walk leader)

For health professionals, a key addition to the website would be information about how to join activities, referral instructions and ideally, the option to directly refer from the site. Linking the website with the patient medical records system was proposed as a way of saving time:

"Short clinic slots mean minimal time to search. The search engines therefore need to be slick. They need to link directly to referral paperwork and system one autocompleted forms would help too." (Physiotherapist)

Providers exhibited a similarly cautious approach to handling referrals that again centred on concerns about safety. Whilst some providers welcomed greater connectivity in referral systems, they also expressed hesitation about triaging and managing referrals. For some providers, matching patients with an appropriate staff member was paramount. This required knowledge of the patient's medical history and could be difficult to manage in a direct referral system:

"Because not all our instructors are as equally qualified, so they can only see certain patients. I mean if that was on the website, that this person can see 'so and so person... but I think there's a lot of work that would have to be needed to actually put something like that in place." (Exercise referral instructor)

Health professionals underlined the importance of equal access to the activity finder and the ability for patients to use it independently. Some suggested that non-electronic versions of the activity finder could be made available for patients without internet access. Providing access to the information in waiting rooms was also recommended via posters, screens or tablets:

"Difficult in our clinics to do this? Interactive screen in reception for people to look themselves?" (Physiotherapist)

6.8 Supervised, low level introductions to PA

6.8.1 Prototype 6: Low level PA group

Through the *discover* and *define* phases, patients and health professionals identified the need for a graded introduction to PA. They suggested that low level starting points and support and supervision where needed would allow patients to work through their concerns around PA, particularly fears of injury or exacerbating symptoms. Health professionals and providers were asked for their views on how low level PA groups could be delivered.

Health professionals welcomed the concept for its benefits in providing a stepping stone for patients for whom traditional exercise groups might be overwhelming:

"this sounds ideal... particularly when a referral via PARS might be too much of a jump for them." (Physiotherapist)

One health professional suggested that nervous patients would not access a group setting and would need individual support first. Others thought that many patients could benefit from such a group if it was pitched at the right level:

"I have a lot of patients that would consider exercise if it was less intimidating, they had more support and they were surrounded by people of a similar fitness. I would use a group like this a lot." (Physiotherapist)

Health professionals suggested that such groups would need to be small and flexible; patients attending were likely to have specific questions and/or concerns to be addressed and would need significant one-to-one attention. Such a group was considered to offer benefits in tackling social isolation, particularly for older patients and non-English speaking patients:

"Non-English speaking patients would benefit from this type of group- they may come from a culture with very different health beliefs. They may not have a good support network." (Physiotherapist)

PA providers generally considered themselves to be capable and in most cases, already offering a variety of low level PA options. Most adjusted their sessions to whoever attended, and felt that they could tailor their existing provision to most levels of ability:

"Yeah I would say we already do it in some shape or form. So whether that's we've got older peoples circuits but we're trying to really tailor them to make them if you like as appropriate as possible." (Chief Executive, Community wellbeing centre)

The larger providers focused on having appropriately qualified instructors. As a result, they needed assurance that there was sufficient demand to offset the resources needed to run specific classes:

"We have got a chair aerobics instructor on the team. So there's always the possibility of putting sessions on. It's again it all comes down to cost so if you've only got one person that really needs that they're not gonna put a session on." (Exercise referral instructor)

There was a perceived gap in provision for patients needing support getting to venues. Outreach services and transport were only offered by two of the voluntary organisations, relying heavily on the goodwill of volunteers. One exercise referral instructor noted that large centres could be intimidating for patients taking that first step and smaller local venues might be more accessible:

"It's hard to tell somebody that you're gonna get referred into a class here...because that's what it's seen as, it's seen as a gym... So the in-between part that you know it might be in a church hall, or a local village hall...you're able to get transport to and from the door, you're sat down in a chair but you're moving, you're interacting with people all the time, you're talking to people, it's getting you out of your house for an hour and a half, yeah so just from there it then starts to build those steps up." (Exercise referral instructor 2)

Existing PA referral schemes tend to offer circuits-style exercise (James et al., 2008) whereby the instructor can tailor the intensity of the activities to individual participants' needs, which can start at a low level and progress. These are nonetheless

likely to incline towards 'exercise' in format and delivery, due to their location in gym facilities and the exercise training background of the instructors. Programmes specifically promoting gentle 'movement' for example tai chi or Qigong (Desrochers et al., 2016; Holmberg, Rappenecker, Karner, & Witt, 2014; Holmberg, Farahani, & Witt, 2016) tend to be delivered as classes distinct from general referral schemes and often targeted at chronic pain patients (as was the case in Sheffield). The views of participants expressed in the current study suggest that such groups may be appropriate for a broader range of patients and could be offered as a formal referral option.

6.8.1 Non-PA specific group

Health professionals were asked via the survey whether a non-PA specific group (designed to build social confidence with a view to moving patients towards readiness for PA at a later date) would be useful. Although the idea was welcomed, most were uncertain whether there was a group of patients distinct enough from those that would access a low level group, and/or how it would be sold to patients:

"I would need to be sure what the purpose of this was in order to be able to explain to people why they might like to come, if not feeling able to commit to the low level physical activity group, could they get more of an idea here. The step to attending groups is not easy for some? Regular group/ drop in/ no commitment needed??" (Service lead, MSK)

6.8.2 Prototype 7: Jointly run sessions

To make low-level groups accessible, health professionals in the co-design workshops had suggested that sessions run jointly between health professionals and exercise professionals presented an opportunity to develop both parties' professional knowledge. The presence of a health professional could also provide reassurance to nervous patients, as has previously been reported by patients in cancer and cardiac rehabilitation programmes (Bäck et al., 2017; Bruun et al., 2014; Missel et al., 2015).

Several providers gave examples of joint sessions that were already demonstrating

benefits in developing stronger working relationships and encouraging consistent referrals:

"So yeah, I think the participants like it when someone they know is actually joining in and taking part and doing something with them." (Community health coordinator)

Health professionals welcomed the concept but were mainly concerned with cost; the session should be free for patients, and a business case was needed to justify the health professional's time. Some health professionals suggested that the likely benefit was continuity between NHS and community provider, which was already being addressed through the co-location model of the NCSEM. Another health professional suggested that joint sessions were counterproductive to encouraging self-management:

"very good idea my only concern is for a lot of patient we want to de-medicalise their physical condition or stress problem so it's good to transfer them to fitness staff, it would be good to take some MSK conditions and try cutting out the physio so they could go straight to fitness - some back and pain problems would be best managed this way but that may be a bit radical for NHS."
(Physiotherapist)

6.9 Making referral processes easier for health professionals

These ideas aimed to guide and streamline patient referrals into existing PA support within the NHS or community.

6.9.1 Prototype 8: Directly bookable PA appointment slots with providers

It was suggested that health professionals should be able to book their patient directly into an appointment with a provider, so that they could leave their NHS appointment with a specific date and time already agreed to discuss PA further. This is similar to core standards for cardiac rehabilitation that recognise the importance of quick referral. Recommendations include minimising the waiting time prior to a the first assessment appointment to maintain patients' interest (BACPR, 2017).

Health professionals and providers welcomed this idea as it potentially saved on administration time. The main benefit identified was maintaining momentum when a patient was motivated to increase PA:

"The hardest thing is when you've got the persons details and you've got to ring them up and try and book them in. Whether they leave you an email address, a mobile, whatever. Sometimes it can take weeks to get hold of people, and meanwhile that motivation has diminished, it's gone." (Exercise referral manager)

Ensuring a referral was right for the patient was critical for this system to work. Health professionals and providers noted that possible contraindications to PA and the suitability of the type of group for that patient needed be considered on an individual basis. For this reason, some providers were hesitant about taking direct bookings for fear of receiving too many inappropriate referrals:

"That's got so many potentials to go wrong. What happens if we're sent somebody who is contraindication? If we've got the paperwork in front of them we always triage before we ring people... We're looking to make sure that we're not dragging people in for no reason." (Exercise referral instructor 3)

One health professional also suggested this system could result in non-attendance. To manage these concerns, a solution would be to allow directly bookable slots, but retain a pre-appointment call from the coordinator to ensure suitability and encourage attendance. Appointment cards or an electronic notification might formalise the booking from health professionals' point of view in the same way that appointment letters were currently sent for NHS appointments.

Patients were asked how they would feel about their health professional making them a direct appointment with a PA provider. They welcomed the idea as a positive way health professionals could support them with increasing PA and perceived it as a NHS "perk".

6.9.2 Prototype 9: Inter-service referral

Discussions with participants highlighted that there were a number of PA-related groups running within several of the services, for example a DESMOND programme for type 2 diabetes (www.desmond-project.org.uk), several condition-specific groups run by the physiotherapy service including a back pain and shoulder group, and educational and support groups for pain management. Allowing inter-service referral was suggested as one way to ensure these groups were used to their full potential. Health professionals agreed that this would be helpful, and emphasised the importance of clear referral criteria, electronic referral via existing systems, and communication between teams.

6.9.3 Prototype 10: Approved provider quality mark for PA providers

All providers welcomed this as beneficial to give assurance to health professionals and patients, and to provide them with basic standards of good practice to follow. The challenge was to ensure that this did not exclude smaller, local providers with specific community links in favour of larger organisations with greater capacity to meet accreditation criteria:

"I think the big but is... is it cost prohibitive for some of the providers? Does it create a kind of mono-market? So the danger is at the moment you start to move to a single provider providing everything because they've got the scale to do, and you lose something fundamental there." (Chief Executive, Community wellbeing centre)

Currently there is no formal accreditation system for exercise referral providers, although BHF has developed a toolkit for the development and evaluation of schemes (BHFNC, 2010) and NICE (2014) recommends that schemes are only commissioned if they meet particular criteria.

6.10 Raising the priority and profile of PA

Prototypes 11 and 12 relate to strategies intended to raise the profile of PA amongst health professionals.

6.10.1 Prototype 11: Electronic recording of PA conversations via medical record

Having a formal place to record PA-related information on the patient record was proposed as a prompt to remind health professionals to include it in routine appointments. It would also create an ongoing record of conversations with the patient that health professionals in subsequent appointments could draw from. Figure 21 shows an example of proposed fields to be added to electronic patient records. This was based on early prototyping discussions with the health professionals co-design group and developed into a rough prototype by the researcher for the purposes of the survey.

There were mixed views from health professionals about this idea. Some welcomed it as an opportunity to give PA formal status within routine consultations but others felt they would not have time to complete it. There was disagreement about the most appropriate time to populate the information, with assessment appointments being suggested as the wrong time and the right time by different survey respondents. There was, however, consensus on the usefulness of quick tools such as drop-down menus and the need to simplify the template. Some health professionals suggested it would be useful to print goals or actions directly from the template in the patient's first language.

Physical activity quick entry

Current PA
 IPAQ score

Discussion notes: physical activity habits, barriers, benefits relevant to symptoms

Goals set*

Drop-down menu	Mins per day	Mins per week
Increase walking		
Household physical activity		
Increase minutes of moderate-vigorous activity (examples:.....)		
Etc. (please add suggestions)		

Action agreed

Drop-down menu
Physical activity information leaflet given
Referred to Sheffield Physical Activity Referral Scheme
Referred to other provider
Referred to NCSEM coordinator
Referred to shoulder/back pain group
Referred to DESMOND
Referred to pain group
Self-directed or home-based physical activity plan agreed*
Etc. (please add suggestions)

*option - printable templates for agreed physical activity plan/goals for patient to take away

Figure 21: Suggested PA fields for health professionals to consider adding to patient record

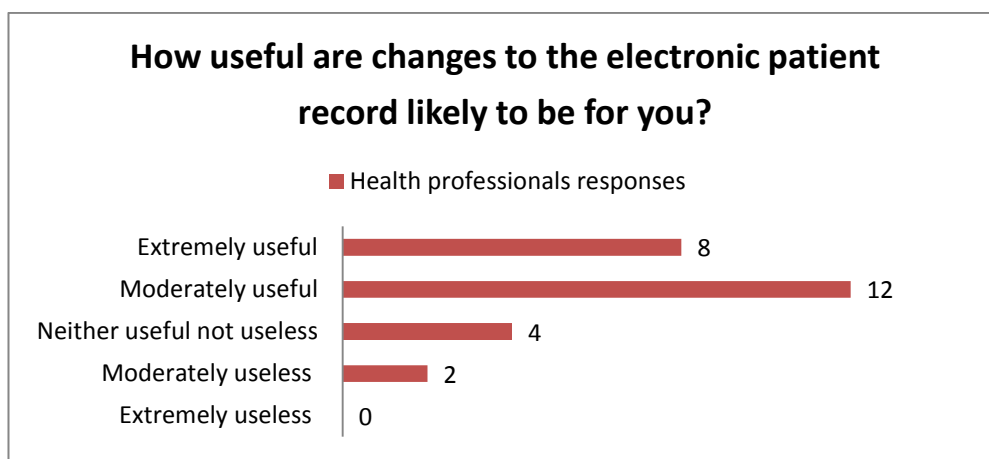


Figure 22: Survey responses regarding changes to the electronic patient record

6.10.2 Prototype 12: Feedback loops between providers and health professionals

A formal mechanism was proposed to allow providers to feed back to health professionals about patients' progress and outcomes. Providers were all in agreement about the benefits of feedback but larger centres struggled to do this currently because it was time consuming for large numbers of patients. Voluntary organisations felt unable to measure objective changes in patients' fitness or health markers, but were happy to administer and share results from self-reported measures. Due to the administrative effort involved, providers sought reassurance that health professionals would value and make use of the feedback.

One provider suggested that if the main benefit for health professionals was evaluating the effectiveness of the scheme and reflecting on whether they were making appropriate referrals, a selection of positive and negative case studies could provide the same information and would be more feasible for providers than providing information on every patient. This would need to be considered in detail to ensure that feedback was representative and would achieve the desired benefits.

6.11 Summary of solutions

The objectives of this *develop* phase were to generate ideas and solutions to the problems identified earlier in the double diamond, and to work with users to prototype and refine those ideas. Gathering feedback on the solutions and prototypes from patients, health professionals and PA providers through surveys, consultations and interviews offered a better indication about the likely effectiveness and feasibility of each of the shortlisted ideas and their suitability for implementation. Some ideas could be immediately acted on, whilst others needed reconsideration or further development.

Table 16 summarises the conclusions drawn about each of the ideas. A 'traffic light' colour coding system (see key) has been used to highlight the whether the ideas were

considered suitable for action, requiring further work, or not recommended to be taken forward:

Key:

	Suitable for action
	Support for action but requiring further work with stakeholders
	Not supported by stakeholders / not recommended to be taken forward

Table 16
Summary of actions and iterations for shortlisted ideas

Shortlisted ideas	Summary and action points	Code
Priming patients via their appointment letter	Health professionals and patients considered this useful. With minor changes to wording, recommend to service leads that this be implemented.	
Nudges to discuss PA via signage in waiting areas	Patients liked the signage. Recommend to NCSEM operations manager that signs be implemented using patients' preferred wording.	
Pre-appointment measures	To suit all patients, the IPAQ seems to be most appropriate - recommend introduction as a pre-appointment questionnaire. Health professionals would require training/information on how to interpret results. Recently within MSK services the IPAQ is being delivered as a pre-appointment measure via new technology application whereby patients register and are sent appointment reminders, information and questionnaires via the app. Further consideration may need to be made about making this accessible to all patients (those who are not IT literate or do not read English well).	
Decision tool	Considered by some health professionals to be useful (particularly if linked to completion of pre-appointment measures) as a guide to the various options regarding PA e.g. advise, refer, signpost. Expert input needed to refine the tool - current research on risk stratification should inform development.	
MoveMore website online activity finder	Not all providers want to update detailed information on classes and services, whereas health professionals would like more information on the website. Explore the possibility of adding capabilities e.g. printing directly from the website, additional filters on existing information then test with sample of health professionals how useful within appointments. 'Business cards' with website address for health professionals to hand out to patients. Consider how the same information can be shared with patients without internet access or non-English speaking.	

Shortlisted ideas	Summary and action points	Code
Joint sessions run by health professionals and exercise professionals	Health professionals and providers agree benefits for referral and patient support. Next step - work with service leads to identify specific patient cohort that would benefit from jointly run sessions.	
Supervised low level groups	Providers have capacity to provide within their venues. Next step - connect service leads and providers to determine likely demand and target groups. Patients are likely to struggle with attendance more than average - consider additional support mechanisms that can be put in place.	
Directly bookable PA appointment slots with providers	Providers, health professionals and patients all welcome this in principle. Recommend trial with small number of health professionals - providers set aside a specific number of appointment slots, NCSEM receptionist holds booking. Health professional can walk patient to reception after appointment where receptionist can book them in. Suggest NCSEM Concord best place to trial.	
Inter-service referral to existing PA groups	Health professionals see this as valuable. Next step - mapping exercise of existing services and patient eligibility/referral criteria. Explore whether electronic referral is possible from other services via electronic medical record system.	
Approved provider quality mark	Providers agree this is desirable but must be inclusive for smaller organisations. Map existing accreditations and consider local-specific mark of recommendation - under MoveMore brand? Discuss with local authority.	
Electronic recording of PA conversation and actions on assessment and system templates	Health professionals have mixed views. Not all would wish to complete additional records but it may encourage inclusion of PA in routine appointments. Further discussion with health professionals to ensure value without additional burden. Possible options would be simplification of fields and printable action points so the health professional can see benefit of completion.	
Feedback loops from provider back to health professional	All agree with principle. Next step - develop standard reporting mechanism with providers and health professionals - which information, how collected and how shared confidentially.	

6.12 Discussion

Several of the ideas and solutions proposed in this *develop* phase may be useful considered collectively as a 'toolkit', from which health professionals could select as

appropriate based on the needs of their individual patient. Incongruence amongst the views of health professionals highlighted that whilst some found them useful, others would be reluctant to use them if implemented in the service. This reflected differences highlighted in the earlier *discover* and *define* phases between individual health professionals' attitudes towards promoting PA. Previous research has highlighted several possible reasons for differences in health professionals' approaches to PA promotion. These include the health professionals' own PA habits and perception of themselves as a positive role model or not (Bohman, Mattsson, & Borglin, 2015b; Din et al., 2015) and their perceptions about whether prescribing PA was part of their role (Crisford et al., 2013; Din et al., 2015; Persson et al., 2013). As views in the current study were gathered primarily from physiotherapists who were typically very active, uncertainty about roles may be a more useful explanation for those individual differences.

Interviews with PA providers indicated that capacity existed within Sheffield to offer some of the services called for by patients and health professionals, such as low level PA support. Health professionals are in a position to act as an intermediary between patients and PA providers. The challenge appears to lie in improving communication between providers and health professionals, conveying demand so that providers can respond accordingly. An alternative is to create a mechanism for PA providers to communicate directly with patients. Existing provision appears to be determined by perceived "need" based on objective values such as the numbers of 'eligible' patients, but a lack of research involving providers or outlining the decisions underlying the design of PA interventions prevents a fuller understanding of why PA provision takes the format it does.

There was support for formalising referral partnerships, for example through quality assurance markers and allowing direct booking into providers' appointments. A key concern within this was to ensure that any standards or new practices were achievable for smaller organisations, who have important local knowledge and experience to tailor services to patients' needs. The latest available guidance from NICE (NICE, 2014) focuses on the commissioning and evaluation of exercise referral schemes, although the BHF toolkit on exercise referral (BHFNC, 2010; currently under review) provides

comprehensive recommendations on design and delivery. These recommendations could provide a basis on which to develop a local quality standard.

Providers and health professionals expressed a need to limit additional work and administrative burdens. This could hamper implementation of some ideas. Previous research has also identified a desire amongst health professionals for greater simplification of processes for issuing PA prescriptions and incorporation into existing systems (Bohman et al., 2015; Heron et al., 2014). Studies have shown that health professionals welcome decision support software that includes patient-specific, evidence-based pop-up reminders generated at the point of care to prompt clinicians' discussions (Foster et al., 2015; Moja et al., 2016). Several of the solutions (such as the pre-appointment measure of current PA, the PA decision tool and the direct booking with PA providers) would benefit from utilising new and existing technology to link patient-completed information into electronic medical records systems. Although this would require significant upfront investment, linking patient-completed measures, medical records and booking systems has the potential provide significant efficiencies saving time and effort for all stakeholders.

A recurring theme throughout each stage of the double diamond thus far was a prevailing sense of risk aversion and caution amongst many health professionals and PA providers surrounding PA. This included concerns about causing harm or inconvenience to the patient, professional liability, lack of knowledge and/or resources. These all have a negative impact on the ability of stakeholders to deliver a PA pathway. There is a contradiction for health professionals between providing the necessary reassurance and confidence for patients to engage with PA whilst also developing their self-efficacy and reducing dependence on the NHS. This raises an important question about whether developing PA pathways via health care professionals unintentionally undermines patients' autonomy and confidence by creating a medicalised set of motives for PA which simultaneously create restrictions. Referring patients on to a supervised PA programme run by an exercise professional with qualifications specific to the patients' health condition (and with concerns of their own about contraindications), with a group of other patients with the same condition, extends this risk focus further. Reflecting on patient-centred care, Berwick (2009)

suggests that safety and effectiveness is a key mediator between a "radical consumerist" viewpoint (i.e. patients are customers who are always right) and "classical professionalism" (which sees health professionals as being best placed to make decisions in the patients' best interests). In this context, it appears that a "health service safety culture" (Morris et al., 2015) poses an obstruction to the delivery of a patient-centred, holistic approach to lifestyle change in the NHS. Whilst there are many circumstances in which patients might welcome tailored advice and support to manage PA alongside their health condition, as early as possible in this process patients need to be empowered to make everyday decisions about PA to develop the self-efficacy to incorporate and manage PA in their lives going forward.

The prevailing emphasis on perceived risk of adverse events amongst health and exercise professionals may also be out of proportion to the actual risk. A trial of community-based walking and gym-based exercise in a GP referral scheme reported no difference in terms of visits to primary care between intervention and control participants, no recorded instances of cardiac event and no significant increase in consultations based on 'aches and pains' (Isaacs et al., 2007). A review by Warburton and colleagues (2016) concludes that whilst there are some increased short-term cardiac and MSK risks associated with vigorous intensity activity, the health benefits of regular moderate activity (including reduced risk of multiple NCDs) far outweigh the risks. Given that the greatest physical health benefits are associated with the most inactive patients modestly increasing their activity levels, and therefore unlikely to be doing 'vigorous' activity, the risks are likely to be reduced further in this context.

6.12.1 Methodological reflections

The NHS as a constraint on innovation

The groups found it very easy to envisage a wide range of solutions and ideas in the brainstorming activity. However, they struggled to envisage how these ideas could be translated or realised within the existing NHS system. As explained in section 6.2, this resulted in the discarding of some novel ideas in favour of those that were viewed as most achievable. Suggestions that had been popular in the brainstorm were suddenly met with a "can't do" attitude. According to a previous systematic review, structural

determinants of innovativeness include large, mature organisations with functionally differentiated departments and specialised professional knowledge (Greenhalgh, Robert, Macfarlane, Bate, & Kyriakidou, 2014), characteristics that all apply to the NHS. However, another determinant identified by the same review was the need for slack resources to channel into new projects, which the NHS lacks. Whilst NHS staff should be accustomed to an environment of regular change (the nature of their work being sensitive to medical development and policy changes) NHS culture was not conducive to experimentation and risk-taking. In their review, Greenhalgh and colleagues (2014) also identified the value of having visionary staff in pivotal positions. It would be interesting to explore whether the presence of a senior member of staff in the co-design group (who might be deemed in a position of influence) would have affected which ideas were taken forward.

Patients started to feel overwhelmed at this stage too. They were unfamiliar with NHS systems and felt unable to make judgements about what was realistic or how changes could be initiated. Although the co-design workshops were reaching their natural end, one patient commented that she would have felt unable to continue the process as she had contributed all she could and was starting to feel out of her depth. It may have been useful to combine the workshop groups at this stage to allow participants to compare ideas and patients to benefit from the enthusiasm in the health professional group. Unfortunately this was not possible due to availability of individual participants. Nevertheless, the current 'system' of the NHS seemed to act as a constraint for both co-design groups, resulting in a tendency to design principally for the needs of the existing system.

Prototyping challenges

Prototyping a number of different solutions was not easy. The service elements were difficult to set up as prototypes, as opposed to tangible artefacts and it was not possible to go back and forth between users with quick iterations because there was only one opportunity to survey the views of health professionals (the stakeholder group who influenced the majority of the prototypes). Multiple iterations were also impractical for the researcher to carry out alone for multiple prototypes. There was no 'product' to show incremental improvements or versions, rather the researcher was

tasked with communicating concepts and speculative service features. The NHS context did not lend itself to the rapid testing of ideas inherent in traditional design research; meetings took significant time to organise and the availability of staff was limited. An alternative approach could have been to focus on a smaller number of prototyped ideas, narrowing the research away from a whole pathway to a smaller number of specific problems and solutions.

Reflections on data collection methods at this stage

Gathering feedback via electronic survey allowed a greater number of health professionals to participate in the research who had not previously been involved. For some of the ideas, such as the MoveMore online activity finder, it would have been preferable for health professionals to interact with the tool before commenting on its usefulness, and feedback would ideally have been gathered via participative sessions. The number of responses to the survey was significantly below the number of health professionals in each service. Respondents may have been to some extent self-selected based on an interest in promoting PA and thus may not be representative of every member of staff; future implementation work would need to consider this. Nevertheless, the survey provided a pragmatic method for gathering health professionals' views in the context of significant time constraints.

Consistent with earlier stages of the research, patients were pleased to be asked their views and happy to provide feedback. Speaking to patients at random in clinic receptions meant that views were not biased towards only those with the interest or inclination to participate in a research study, but it did pose a challenge in providing enough background context for patients to provide informed feedback and limited which ideas were presented to them.

Combining the views of providers, health professionals and patients to identify opportunities and challenges for realising some of the ideas in practice was particularly valuable in this phase. This encouraged reflection on the competing priorities of different stakeholders, which would need to be reconciled for these ideas to work. Typically, views differed on many of the ideas presented. Drawing conclusions about whether and how to take the ideas forward thus required an acceptance that not

every suggestion can be acted on, and that not every decision would please every individual.

6.13 Chapter summary

The *develop* phase took the core design requirements identified in the earlier *define* phase and used these as a framework to help generate and shortlist possible specific solutions. Sharing these solutions with patients, health professionals and PA providers allowed decisions to be made about the feasibility and acceptability of solutions and how they might need to be shaped to work in practice. The following *deliver* phase considers next steps to testing and implementing some of these ideas in NHS care.

Chapter 7: Deliver

7.0 Overview

The final phase of the double diamond (*deliver*) focuses on the delivery and implementation of proposed solutions. This chapter brings together ideas and viewpoints gathered in the previous *develop* phase of the double diamond in the form of a pathway map. An explanation is provided about how the pathway map was created. The map is then appraised in two ways: first, the community MSK physiotherapy service, *Physioworks* is used as a case study to consider the feasibility of implementing such a pathway in the future. The case study findings are considered using normalisation process theory to identify areas needing attention prior to implementation. Second, the co-designed pathway map is compared against two existing PA initiatives to consider whether it provides any novel elements for promoting PA.

Phase	Objectives	Research methods
Deliver phase	bring solutions together as a pathway or service blueprint	Pathway map Case study interviews
	to consider actions necessary for the implementation of solutions and/or PA pathway	
	to translate learnings from the process into recommendations for promoting PA	

7.1 Storyboarding a pathway

Following the ideation workshops, the health professional group spent time creating a 'storyboard' of a PA pathway. Storyboarding is used in user-centred design to organise key frames and interactions of a service into a meaningful sequence of events (LUMA Institute, 2012). Its use here was intended to help visualise the patient journey through a PA pathway and identify the key interactions between health professionals and patients, to ensure that the ideation phase had covered all elements of the pathway. The storyboarding was also intended to understand these stages in the language of the workshop groups, ascertain who would be the key actors in each stage, and where and when each stage should/could take place. Only one patient was able to attend the co-

design workshop where this task was planned, due to other members experiencing personal illness and family bereavement. This meant that the patient group did not complete their own storyboard.

7.1.1 Creating the storyboard

The storyboarding workshop began with a blank storyboard template similar to the one shown in Figure 23:



Figure 23: *Example blank storyboard template*

The facilitators initiated a discussion about the 'stages' that a patient would go through in an ideal PA pathway. One of the health professionals was asked to take responsibility for filling out the template with notes and/or drawings as the discussion went along. To aid the group in getting started, the researcher provided an electronic version of rough sketches that had been drawn by one of the facilitators during previous workshop discussions, such as the one shown in Figure 24.

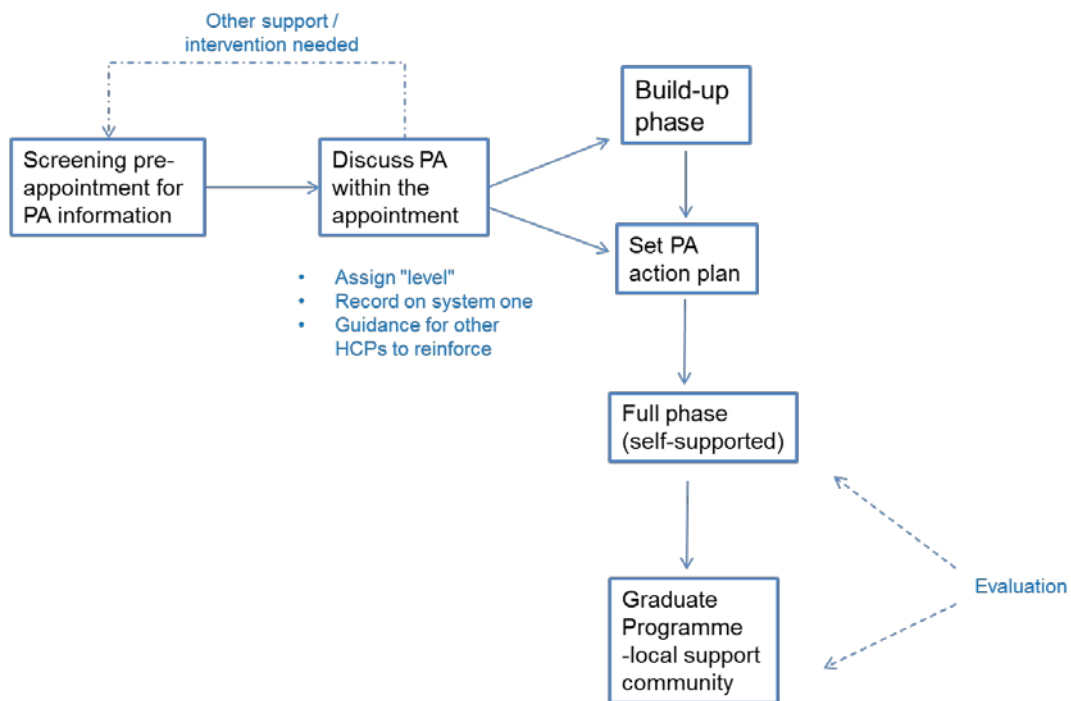


Figure 24: Patient journey sketch from early workshops informing the storyboard task

Health professionals worked through the blank storyboard template identifying from start to finish the key stages they thought were necessary to comprise a patient PA pathway. The facilitators encouraged the group to develop a description of each stage of the process, identifying who would deliver it and where or when it might take place. This was not without its challenges (discussed in section 7.1.2) but nevertheless a series of stages were identified. Solutions that had been shortlisted during the *develop* phase were allocated to the stage at which they would be most relevant. Figure 25 illustrates the rough storyboard that was created.

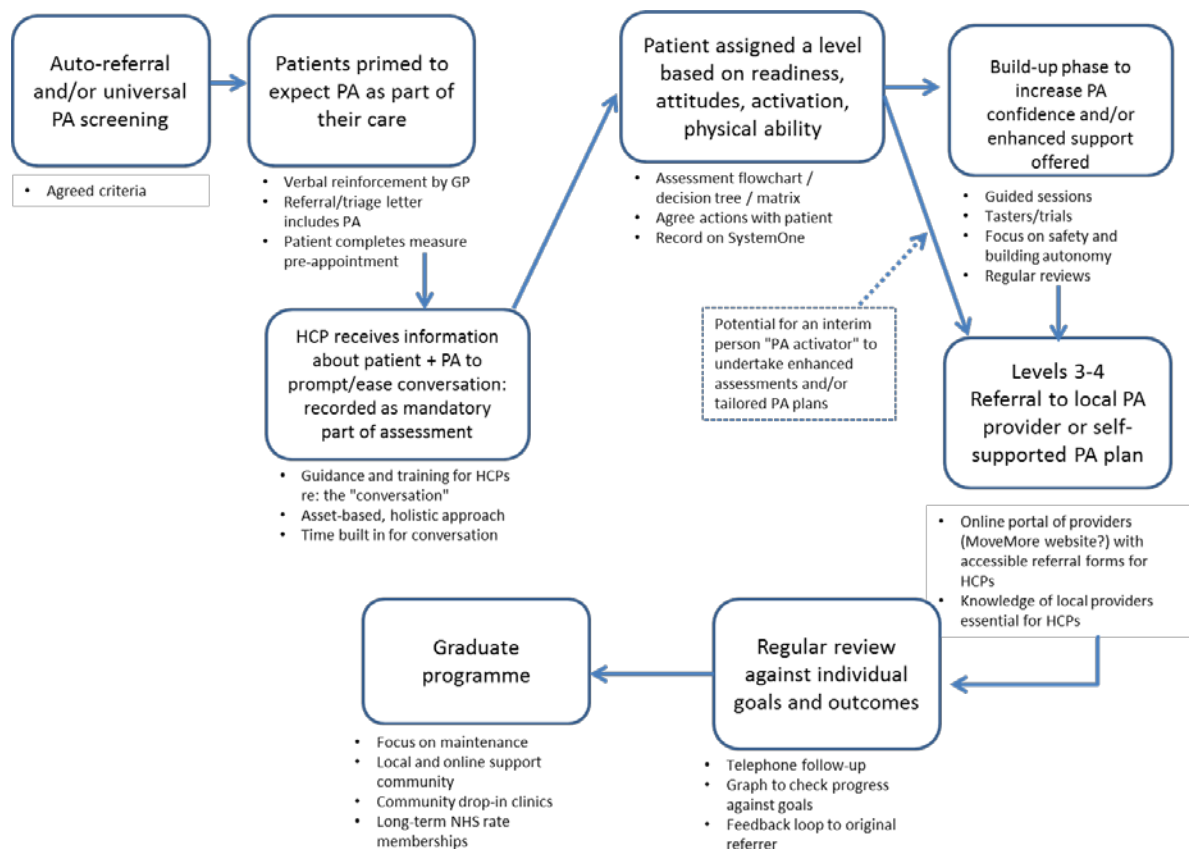


Figure 25: Physical activity pathway storyboard

7.1.2 Challenges and observations during the storyboarding task

Although health professionals had aspirations about what ideal stages should be offered to patients, there was reluctance to commit their own service (and its resources) to delivering those stages. Amongst the health professionals there were different ideas about who should initiate and hold responsibility for the patient's journey, where and how it should end and the extent of support appropriate from an NHS perspective. Primary care professionals, particularly GPs were proposed as being responsible for initiating and managing the PA pathway. The facilitators challenged this suggestion; GPs were not represented so assumptions could not be made about their likely role. Lack of time, resources and the capacity of existing staff were recurring barriers raised at all perceived stages of a pathway. Discussions drew attention to the negative impact of funding cuts on existing services, leading to pessimism about applying ideas in practice.





There were differences in opinion about the level of involvement that individual group members ascribed to themselves in a PA pathway. For example, one group member saw her role only as signposting or referring patients out of the service, whilst others envisaged changes to existing care to incorporate an active role in promoting PA. This made it difficult to agree the extent to which the pathway should be managed by community PA providers or NHS staff.

7.1.3 Constructing the pathway map

Ideas, draft storyboards and feedback generated throughout the earlier phases of the double diamond were combined by the researcher to form a complete pathway map (see figure 26). Key interactions between patients and health professionals were grouped as different stages of the pathway (for example before appointments, during or afterwards). Colour coding was also added to distinguish actions that would be initiated or completed by patients, professionals or were system-led (see key).

The pathway map starts at top left and follows through a series of stages. There are points at which a patient may take one of several different routes, shown by multiple arrows. Dotted lines show when a patient might return to an earlier phase of the pathway. Rather than being a rigid model to be applied to every patient appointment, the pathway illustrates the basic stages that a patient might pass through, if and when appropriate to them. The large yellow and blue box demonstrates where health professionals might apply some of the prototypes discussed in the previous *develop* phase, and the variety of onward signposting and/or referral options that might be applicable depending on the patients' needs. Patients should move through the pathway at their own pace, across the duration of care (or perhaps multiple episodes of care).

Pathway Key:

	Patients
	Health professionals
	System
	Decision point

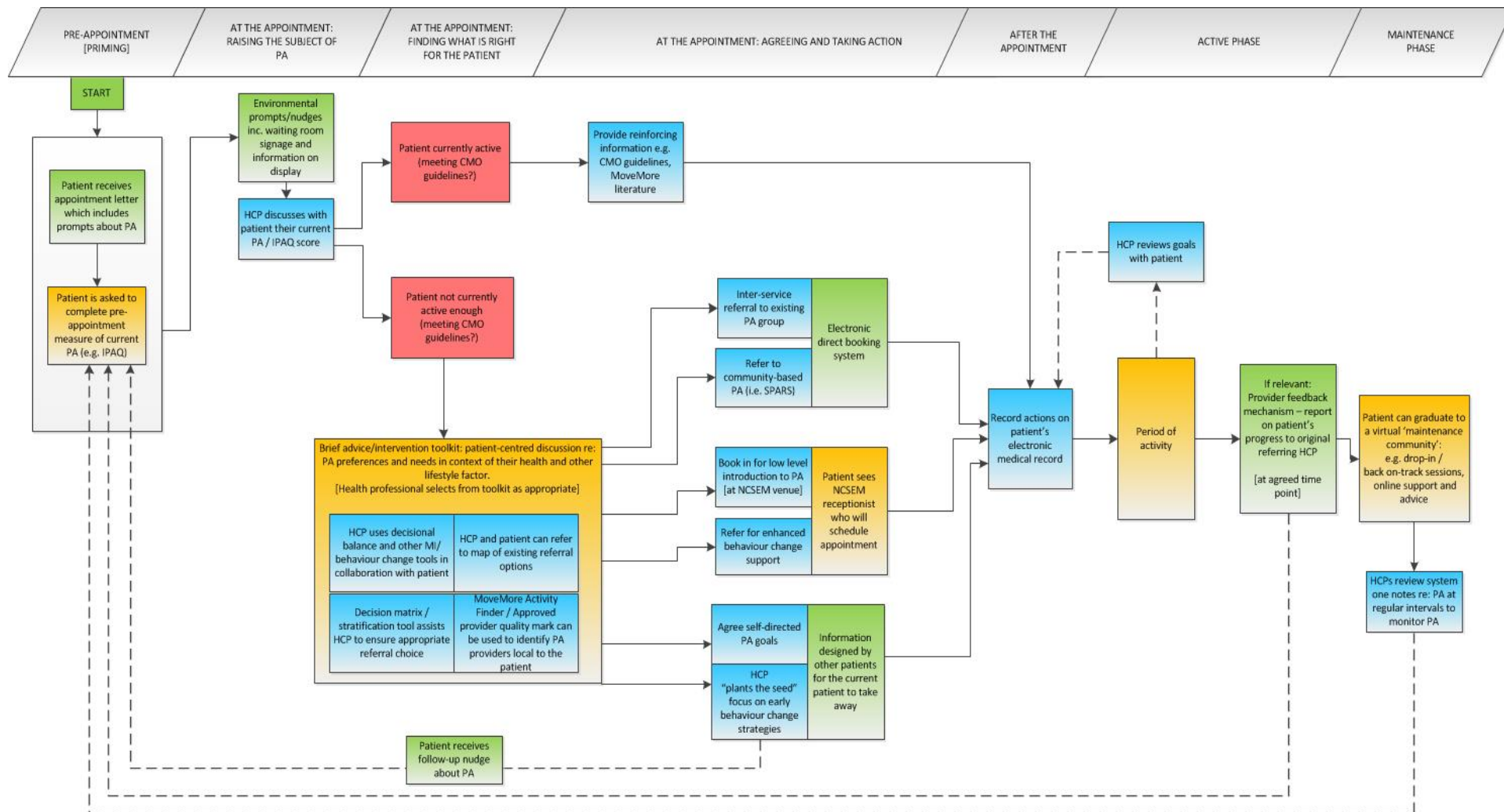


Figure 26: Pathway map created during deliver phase

7.2 Considering implementation using a case study approach

The overarching question for this *deliver* phase was: *how might this pathway be applied and implemented within routine NHS care?* To enable sufficient consideration of context, a case study approach was taken to explore this question from the perspective of a specific service. Case studies are considered a valid research method (Yin, 2014) to explore complex issues where human behaviour is central to understanding (Harrison, Birks, Franklin, & Mills, 2017). The approach adopted in this chapter draws upon Merriam's (1998, 2009) qualitative case study approach which aims to understand an issue in context and from the perspective of participants. Consistent with the focus on users throughout the thesis, the perspective of frontline health professionals and patients was prioritised in considering implementation of the pathway.

7.2.1 Selecting a case study

Merriam's pragmatic-constructivist approach suggests that cases are selected based on the research question and what they can reveal about the phenomenon of interest (Merriam, 1998). Of the services involved in the research to date, the MSK physiotherapy service Physioworks provided the most suitable case study. Patients, staff members at varying levels of seniority as well as service leads had been engaged throughout the research and had made significant contributions to the development of solutions in the previous *develop* phase. At the same time, health professionals in the service had expressed varying opinions and motivations towards PA which could be explored in terms of their potential influence on the implementation of the pathway.

Physioworks is a community MSK service providing treatment to reduce pain or improve movement in joints, muscles or soft tissues. The service has 55 members of clinical staff: specialist physiotherapists, podiatrists, doctors and therapy assistants. Treatment can include manual therapy, acupuncture or pain relief injections; patients typically receive between three to six appointments and can be invited to attend exercise group sessions for up to six weeks. In the region of 2000 new patients are seen each month.

7.2.2 Data collection

Use of multiple data sources in case study research aims to provide a comprehensive view of the issue being studied (Flyvbjerg, 2011). Primarily, interviews took place with three members of Physioworks staff to discuss the pathway map in Figure 26 (two together, and one individually). Other data sources were:

- Interview with service lead
- Observations/notes from a Physioworks in-service training day where the pathway research and interim storyboards were presented for discussion and questions from staff
- Responses from Physioworks staff to the Qualtrics survey discussed in the previous phase (Chapter 6, *develop*)
- Email exchanges about the pathway map with an enhanced role physiotherapist who had participated in the co-design workshops

Interview participants were sent the pathway map in advance to allow time for them to consider it fully and save time during the interviews. They were asked to consider three broad questions:

- How does this fit in with what you already do, and what effects might it have on the way you work?
- What would need to happen for this to be implemented?
- What could make this difficult to implement?

The interviews were audio recorded and later transcribed.

7.2.3 Data analysis

Inductive thematic analysis (Braun & Clarke, 2006) consistent with the analyses used throughout the thesis was employed to analyse the data. Interview transcripts and other data sources were entered into NVivo11. Data was read and re-read to develop familiarisation then raw data extracts relating to the research question were highlighted and assigned an initial code. These were subsequently reviewed again and

renamed or merged as appropriate. Mind-maps were used to identify patterns and potential themes, and codes were sorted and grouped appropriately. Themes were reviewed to ensure they made sense and discussed with an independent researcher to ensure that alternative interpretations of the data were considered before main themes were defined.

7.3 Case study findings

Analysis of the data sources generated three themes regarding implementation of the co-designed PA pathway within Physioworks, from the perspective of health professionals working within the service:

- Appraisal of the pathway: does it make sense, differentiating it from existing practice, its perceived value (benefits and disadvantages for patients and health professionals)
- Engagement/Buy-in: how willing staff are to use the pathway or deliver what it requires of them, what will deter or encourage them from buying into it
- Incorporating the pathway into existing practices: what actions will help to make the pathway a routine part of the service

Appendix O details the higher and lower order themes with examples of corresponding data extracts.

7.3.1 The context for implementation within Physioworks

A significant amount of change had been experienced within the service over the last 12 months and was still on-going. Implementation of a new pathway needs to be considered with these organisational and contextual issues in mind. For example, almost a third of Physioworks' delivery had been relocated to NCSEM sites, providing a new working environment for staff that included increased access to exercise and PA facilities for their patients and opportunities for inter-service collaboration with other health professionals. New technologies had been launched within the service including a "MyPathway" mobile app whereby patients could manage their appointments and receive referral and signposting information electronically from the

health professional directly on their smartphone. Physioworks had expanded the number of PA groups being run by staff members for their patients as well as using new biomedical lab facilities at NCSEM Graves for treating sports injuries. Meanwhile, staff surveys over the previous year indicated high levels of stress amongst staff. Changes within the service were hoped to address this, for example the allocation of each individual to a Pathway Team to create more opportunities for peer support.

7.3.2 Appraisal of the PA pathway

The PA pathway might be overwhelming for some health professionals on initial presentation as a whole map. The two physiotherapists interviewed together disagreed about whether it was too complicated:

(Physio 1): *"It's just too busy for me so I wouldn't be able to understand it."*

(Physio 2): *"It's not that busy, I think a lot of people could take that on board."*

The pathway was seen as comprehensive, and broken down it made sense to health professionals, but it may need to be presented in stages to avoid daunting health professionals. The service lead's view was that presenting staff with the whole pathway was necessary to ensure a collective understanding of its value and allow health professionals to take from it whatever was relevant to them:

"If some people know about this bit, some people know about that bit then everybody realises that they don't really understand what's going on. Whereas if everybody's got the big picture... I think more staff will utilise bits of it in different contexts." (Service lead)

A reconsideration of the format in which the pathway is presented may be useful to reconcile these points of view.

The pathway was not considered a major departure from current practices, particularly for those who participated in the research, who were motivated, regular promoters of PA. For these health professionals, the pathway was seen as a formal and detailed version of what they already did with selected patients, although by their own admission this was not necessarily routine:

"It doesn't completely mirror what we do at the moment, but we do certain elements of it." (Physio 2)

This was supported by the service lead who suggested that it encapsulated best practice and a way of working that the service had been evolving towards.

"... if you'd have asked me a year ago and I know you probably did, I think I'd have been 'optimistically' saying this doesn't look distinctly different to what we do. I think now we do it much more because we've been able to develop the beginnings of things much further. If you asked me again in another year I would hope to be saying yeah we definitely, this really does reflect what we do."
(Service lead)

Nevertheless, the pathway would need to be differentiated explicitly from existing referral practices such as the Sheffield Physical Activity Referral Scheme (SPARS) to ensure that health professionals saw its value. There were some aspects of the pathway that were considered novel, such as the initial priming stages, the electronic recording of PA actions and the feedback on patient's progress from PA providers. These elements should perhaps be emphasised:

"I like the sort of pre-emptive stuff, using signage and videos in the waiting area." (Physio 3)

"One of the things that's important is the provider feedback mechanism and reporting on the progress. That's the bit that we haven't had before." (Service lead)

One appeal of the pathway was its potential to make existing PA promotion practices routine by providing a formal process, but this was at odds with uncertainty about whether all patients would benefit from a universal approach. Health professionals were conscious that the pathway must be pitched at the right level for each patient. A measured consideration of whether it would be too much for patients either physically or psychologically was still needed:

"But it might make their symptoms worse it might make the problem worse that they've got already....quite a lot and probably 50% of our people we see

they're just not active at all and they're quite scared of activity. And so suggesting it early could be, it could be a little bit detrimental if it's not put in the right context." (Physio 1)

The service lead raised concerns that health professionals should not be penalised for exercising clinical judgement not to initiate the pathway with patients for whom PA was not the right priority for their health condition or in their personal life:

"I don't want to get to a position where staff are being criticised for not having followed the pathway for a group of patient where it is clinically justified, or personally justified for that person..." (Service lead)

Health professionals saw the pathway as adding value for different patients in different ways. For patients with relatively low need for behaviour change support, the pathway would provide formal structure and increased referral options to suit individual needs and preferences. Patients who were less ready or resistant to the idea of PA might benefit more from the 'priming' and 'planting the seed' stages of the pathway. Health professionals may differ in the extent to which they saw any benefit for themselves directly, particularly if they considered the pathway to create an additional burden of work:

(Physio 1): *"We always seem to get every month something else added. And I think it's how you take it as a clinician."*

(Physio 2): *This is to help us though isn't it?*

(Physio 1): *No I know it is, this is to help a patient though. The whole goal of this is not to help a physiotherapist, it's to make a change to [the patient]"*

7.3.3 Engagement and buy-in

Although many health professionals in Physioworks acknowledged that they would like to promote PA more regularly, they also believed they were doing as much as they could within current resources. Whilst health professionals bought into a need for care that supported long-term health improvement, their priority was addressing immediate or acute symptoms. Lack of time remained the primary barrier to

promoting PA and so whilst the majority of the pathway was seen to be useful, it was also seen as extras that there was simply not time for:

"it's definitely more in depth than what we're doing at the moment, because we just haven't got the resources to be, you know, looking at every certain area here." (Physio 1)

Solutions requiring minimal effort and improved automation using existing IT systems would therefore greatly increase adoption:

"Having drop down lists may make this task quicker" (Survey response)

"Needs to be very easy to do - within system one so no extra admin otherwise it won't happen" (Survey response)

Individual health professionals within Physioworks had their own ways of working based on what they were comfortable and familiar with. Comments in the survey and the interviews suggested that health professionals found their own way to manage patient records and administer referrals, and there was no obligation for them to use certain systems - decisions were made at an individual level about whether or not there was time:

"I don't use the System One templates" (Survey response)

"...people would just basically scrap it and think 'I haven't got time'." (Physio 3)

This depended to some extent on individual conceptualisations of what the package of care should look like and the extent to which PA was considered part of their core role as opposed to an added option. The service lead suggested that staff engagement could be facilitated by encouraging health professionals to apply the pathway to their own caseload and to explore how they might use it flexibly with different patients and contexts:

"...get people to go into their pathway teams and think about which part of it would be most applicable to their caseload or their group of patients... And that helps them to apply it next week." (Service lead)

If health professionals were to willingly apply the pathway to their work, it needed to be presented as something simple, that would save time rather than create additional work. Staff needed to be aware of the pathway and understand what it required of them. Email was an ineffective way to communicate information about the pathway due to the lack of time clinical staff had to read and digest emails during clinics, and the volume of incoming information meant messages could get lost. Face-to-face team training was the preferred mode of communication:

"I think sending stuff by email is difficult for us to get our heads around.

Because we kind of check our emails in between patients and you can half read it, and then your next patient comes... you need to have some sort of team training session for us." (Physio 3)

Discussions with Physioworks staff illustrated that they saw themselves in a passive role in terms of implementation, regarding the pathway as something being offered to them which they could choose to embrace or not. This autonomy appeared to be important and should be reflected in the way the pathway is introduced:

"What is really demoralising for staff is to feel that somebody is telling them they have to do something which means that they no longer feel like they've got the clinical discretion which they are due." (Service lead)

The service lead suggested that the service would fully support a launch of the pathway, but it was clear that this would need to be researcher-led as opposed to initiated from within the service. That the researcher was familiar to staff as a result of the co-design methodology and having involved them throughout the PhD at multiple points was considered beneficial as the pathway would be interpreted as 'evidence-based practice':

"I think they really value the fact that this has come from research, it's been really carefully looked at...They've all met you before, apart from the new people. They often like to know well if we've invested to this point what happened with it. So yeah I'm sure they'd like to see you at some point."
(Service lead)

7.3.4 Incorporating the pathway into practice

The tendency of the health professionals to rely on, or revert to those practices with which they were comfortable indicated that increased support was important until using the pathway had become familiar:

"It just needs to be made simple and easy, otherwise people just go back to the stuff they're happy doing and they've always done... (Physio 2)

"...it's a case of getting the time to get your head around it. Once you've done this stuff a few times and get your head around it you're fine, it's getting people to do it the first couple of times and understanding how to do it." (Physio 3)

After the pathway was introduced reminders or refreshers of key information were needed to prevent it being forgotten or overshadowed and reinforce its priority:

"...we cover a lot in in-service training so it will get forgotten about probably by some people. But if it keeps getting reinforced every few months this sort of thing will gradually get incorporated into our practice probably." (Physio 3)

The service lead would be supportive of a 'drip-drip' approach engaging staff via multiple avenues including in-service training, quarterly pathway team meetings and distribution of practical resources such as business cards. Equality of access and standardisation of the pathway across all clinics in Sheffield would strengthen the status and usability of the pathway and make it more likely to become a mainstream practice of staff throughout the service:

"Systems which work across all venues not just Graves and Concord." (Survey response)

Physioworks staff described feeling somewhat isolated in their clinics with few opportunities to discuss practice with colleagues:

"The problem with our service is that we're all working as individuals in individual clinic rooms. If we all spent more time together these sorts of things would get shared between us. But you're kind of swimming alone a lot of the

time and you're trying to sort of manage your caseload, and you forget about stuff like this." (Physio 3)

The service lead acknowledged this and described measures to increase contact-time between staff members. Informal sharing of practice did take place during opportune meetings and corridor discussions. Some staff were proactive in creating opportunities through lunchtime walks and use of public spaces such as cafes within the NCSEM facilities, although these were not ideal for discussing clinical issues and could be enhanced. Physiotherapists in the interviews described how specific team members promoted and shared ideas and how staff collectively appraised new practices between peers. These champions needed to be identified and engaged prior to implementation as they could be useful allies for embedding the pathway. The service lead confirmed that potential "super-users" could be easily identified and would be a recommended way to support the ongoing incorporation of the pathway into routine practice:

"... I would definitely go with having a super-user and I know who's already engaged with using the [Sheffield physical activity referral scheme], I know who are the movers and shakers when speaking to staff and who go into things with positive attitudes so yeah I would be able to give you some link people who would be the people who would speak about it, send emails out about it, talk to people about it, remind people in their training sessions and supervision."

(Service lead)

7.4 Interpreting the case study using normalisation process theory

Implementation science is a growing field of research which focuses on strategies and theories to embed interventions in clinical and public health (Lobb et al., 2014). Normalisation process theory (NPT; May & Finch, 2009) is a mid-range implementation theory that considers how an intervention fits with the overall goals of an organisation, how it is received by and impacts upon stakeholders and any actions that promote or hinder its incorporation into existing systems of work. NPT has proven to be an appropriate theory to use prospectively in the development of interventions, by identifying obstacles to implementation that might otherwise arise later (Bamford,

Heaven, May, & Moynihan, 2012; Murray, Caulier-Grice, & Mulgan, 2010). Within NPT the practice of embedding complex interventions is explained using four generative mechanisms, each made up of four components. Figure 27 illustrates the core constructs and their components.

The three themes identified in the case study of Physioworks health professionals correlated to three of the four constructs of NPT, illustrated in table 17:

Table 17

NPT constructs relevant to the case study

Inductive theme	NPT construct
Appraisal of the pathway	Coherence
Engagement/Buy-in	Cognitive Participation
Incorporating the pathway into existing practices	Collective Action

Considering the case study themes in terms of these constructs and their constituent components is useful to identify areas needing attention prior to implementation. For example in terms of *coherence*, the case study highlighted that judgements about the value of the pathway would be made by health professionals in terms of its benefit for the patients in their caseloads. Whilst it is considered to largely reflect 'best' current practice which some health professionals may feel they are delivering, the formality of the pathway and some specific elements (priming, feedback from PA providers) are novel. Nevertheless, implementation may benefit from explicitly differentiating the pathway from existing practices to substantiate the value for health professionals of adopting any new processes.

In terms of feasibility, health professionals need to be convinced that the pathway does not present a burden of additional work (*individual specification*). Familiarity with processes associated with the pathway needed to be developed within the health professionals' comfort zone (*skill set workability*) and with appropriate support (*contextual integration*).

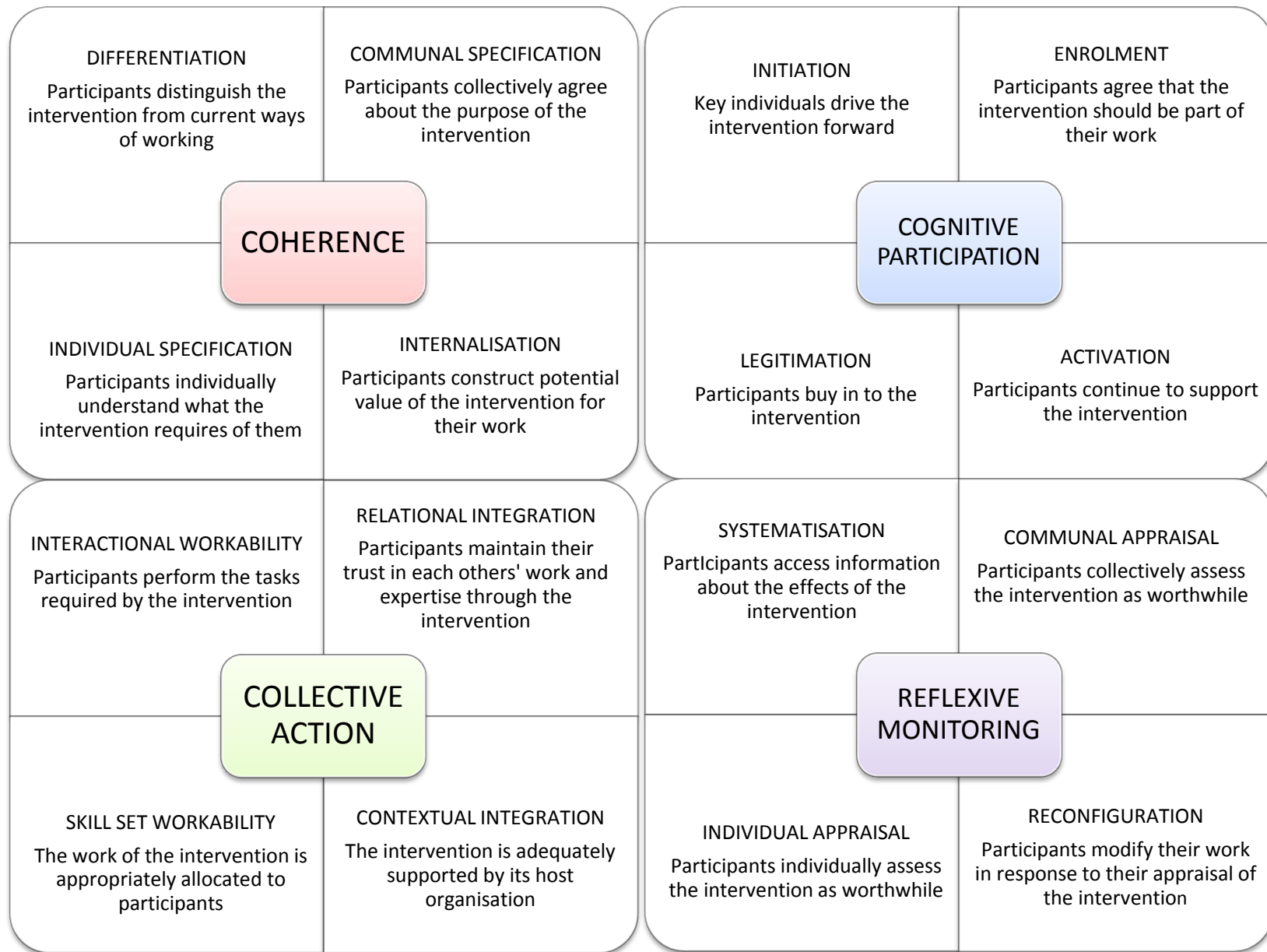


Figure 27: Normalisation process theory constructs and components

The case study indicated that the individual working patterns and lack of peer learning opportunities might undermine the extent to which collective processes might support implementation of the pathway (e.g. *communal specification, relational integration*). Facilitating opportunities to critically appraise the pathway with peers and identifying key individuals (e.g. super-users, in-service champions) to drive adoption and implementation of the pathway (*initiation*) may be significant in its incorporation into practice but the researcher is also considered key to implementation.

7.5 Patients' perspective of the pathway

The researcher met with two participants from the patient co-design group to discuss the pathway map and their thoughts about future research. Both had been previous users of MSK services.

The participants agreed with the layout of the map and were satisfied that it was representative of the co-design group's collective views. They particularly liked the option to refer to low level groups for patients who had never done any PA before and valued the priming ideas including the completion of a PA measure pre-appointment. Participants reinforced that it was important to keep considering accessibility to the pathway for older people, those who were not IT literate and those with limited finances, plus the need for seasonal adaptations.

Each participant considered how the pathway might impact them personally, and what route they might take through it, with one commenting that as she was not currently doing much PA she would "*have to go the long route I suppose!*" Whilst they were positive about seeing the pathway introduced they took a conservative view of how long implementation would take, with one suggesting it could take up to 10 years to implement and was dependent on health professionals being willing to deliver it.

7.6 Revisiting personas

The seven patient personas developed in the earlier *define* phase were used throughout the design process to provide ongoing accountability to ensure that ideas being developed would work for a range of different patients' needs. In the *deliver*

phase they were used to model how different patients might take different routes through the pathway and highlight any areas of strength or weakness from a patient's perspective. Tracing a route through the pathway from the perspective of each persona highlighted whether it addressed the varying needs of patients that the personas set out to encompass. Figures 28 to 30 illustrate a hypothetical route through the pathway for three personas: Pete, Ameera and Natalia.

The modelling exercise showed that the pathway worked (in theory at least) for the majority of the personas. The different routes taken by each persona (and for some personas, multiple possible routes) justified the selection of referral options in the "taking action" section and the feedback loops were well used. The modelling exercise highlighted where collaboration with other services or organisations would add value, for example "Clare" had significant mental health needs that would benefit from an approach that connected her with IAPT. However, the pathway was less effective for the personas with language or cultural barriers. For "Natalia" in particular, who might require a significant amount of behaviour change counselling but also required the use of an interpreter at healthcare appointments, the pathway would be difficult to deliver. The pathway also did not explicitly address financial barriers. The patient representatives commented that it was unlikely that all patients would be able to take advantage of the pathway if it required a financial contribution. Reviewing the model in partnership with PA providers may therefore be appropriate to identify possible financial options.

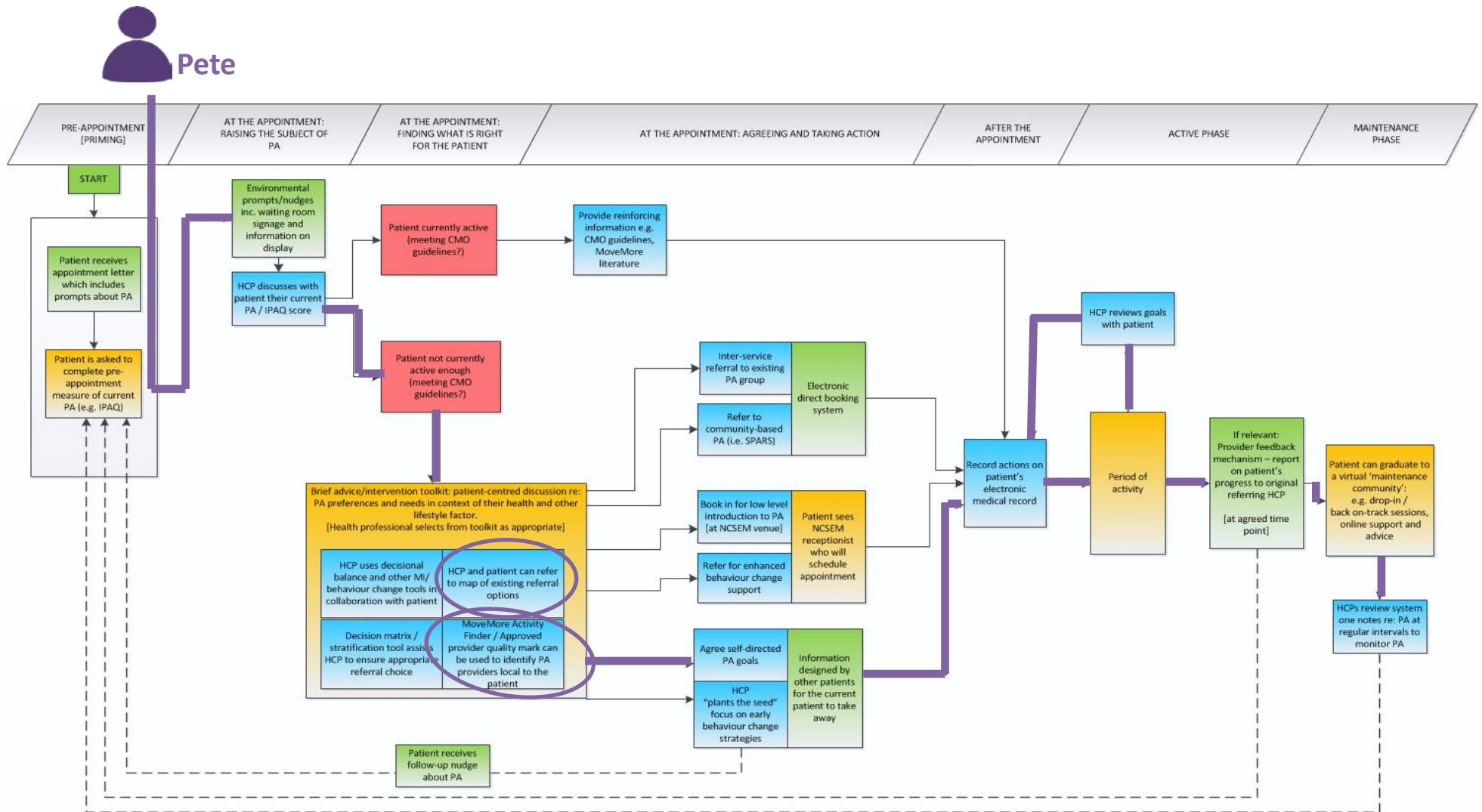


Figure 28: Pathway map modelled using "Pete" persona

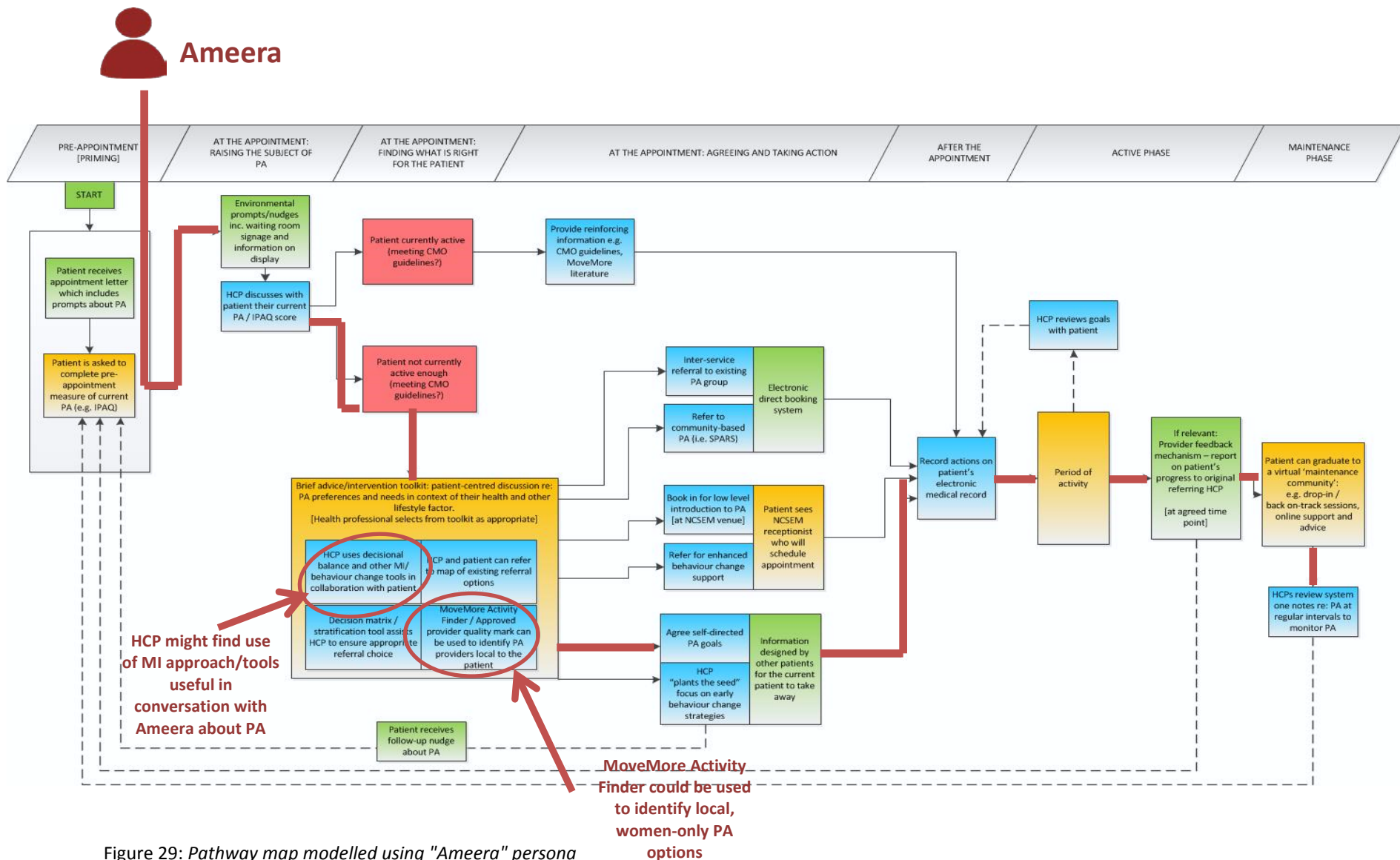


Figure 29: Pathway map modelled using "Ameera" persona

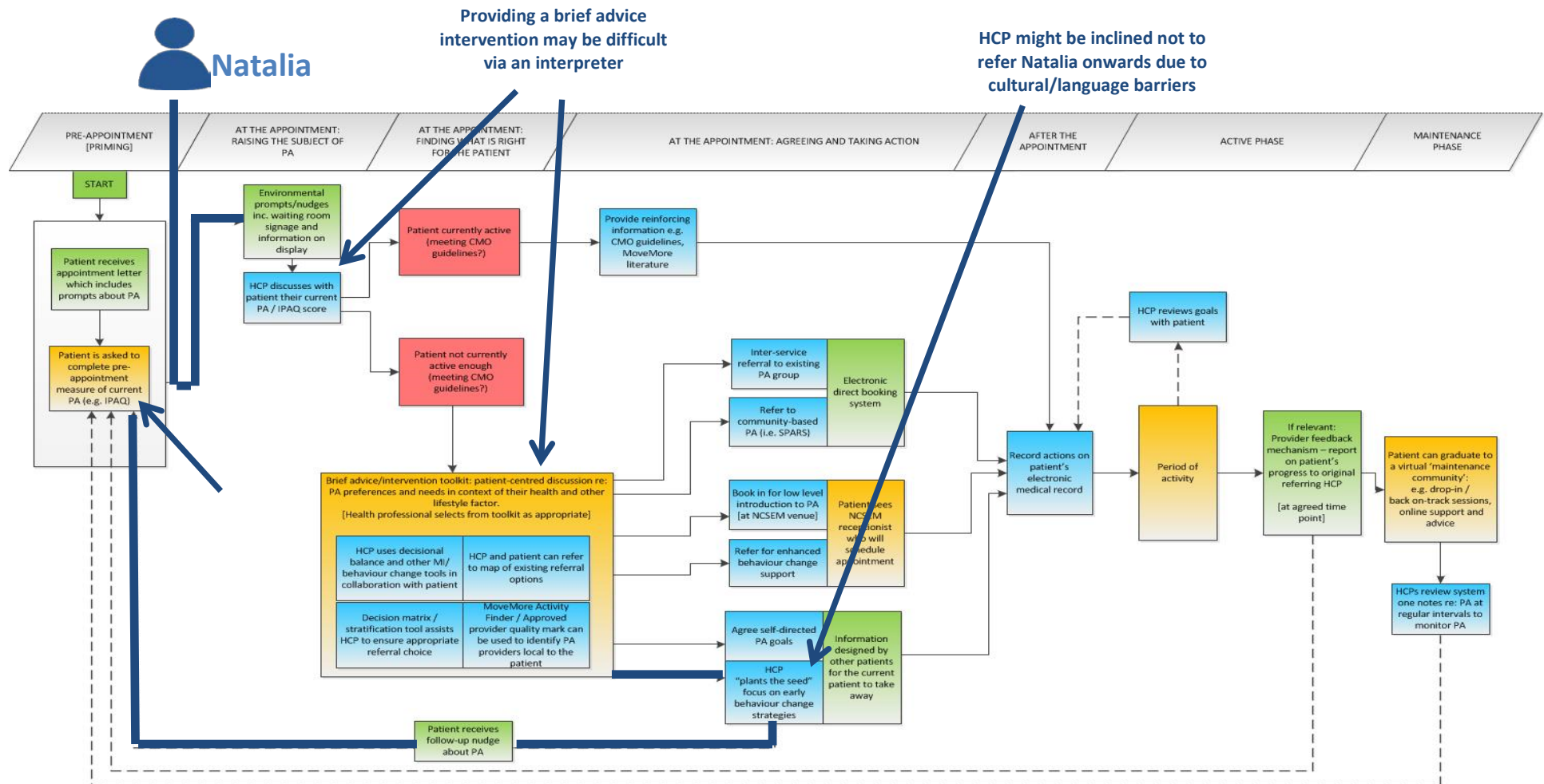


Figure 30: Pathway map modelled using "Natalia" persona

This exercise highlighted that despite considerable effort throughout the design process to consider patients' needs, developing one pathway that was flexible enough to deliver solutions that worked for all patients remained challenging. It also highlighted that prioritising and selecting ideas may have resulted in a tendency towards mainstream solutions that work less effectively for patients with specific needs (who might be considered in design terms, the 'extremes'). This is counter to the original intention of the user-centred design approach. The current pathway, or alternatives, may need to be reconsidered before those patients' needs are adequately addressed.

7.7 Comparison of the co-designed pathway with existing models of PA promotion

Despite positive feedback from staff and endorsement from the service lead for implementation, further work may be needed to refine and test this pathway, in addition to the development of prototypes into usable tools. Contemplating and planning for implementation is not a substitute for testing the effectiveness of the pathway, but it should be considered a fundamental part of the development process (Bertram, Blase, & Fixsen, 2015). Whilst further development and testing work is beyond the scope of this thesis, this is nevertheless an opportune stage at which to pause and reflect how the co-designed model compares to existing PA pathways. The existing pathways considered here were not developed through a user-centred design approach, building instead on systematic evidence reviews and consultation with expert groups (of health professionals). Comparing these with the pathway created within this research thus provides an opportunity to reflect on how the user-centred design approach may yield different ideas to determine a PA pathway.

7.7.1 Let's Get Moving pathway

Possibly most similar to the co-designed pathway is the Let's Get Moving - NHS adult PA care pathway (LGM; Department of Health, 2009), which was primarily designed for the promotion of PA in primary care, but which has also been adapted in Scotland for

use in secondary and community care (Jackson et al., 2014). Figure 31 shows the LGM (England version):

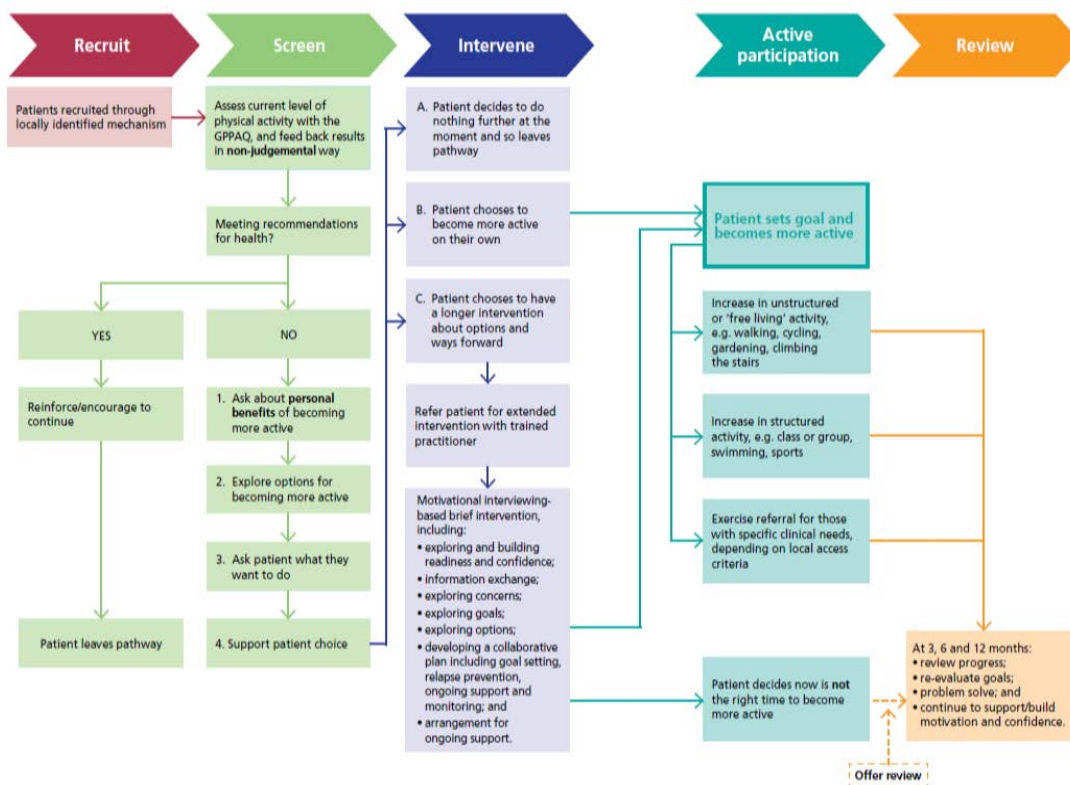


Figure 31: *Let's Get Moving pathway (England)*

LGM was developed based on a systematic review. This provided the basis for the programme components and specific protocols which were refined in consultation with a 'representative group' of health professionals (Bull & Milton, 2011). There are a number of similarities between the pathway created in this thesis and the LGM pathway and both are presented as a series of similar stages. Initial assessment of current PA levels using a validated measure (IPAQ in the co-designed pathway; GPPAQ in LGM) is used to determine whether or not PA advice or intervention is provided. Some patients will then go on to receive a brief intervention from their health professional which is intended to be patient-centred and draws on motivational interviewing principles. Multiple options are provided for patients to receive basic or enhanced behaviour change intervention and to be referred into different types of activity based on their needs and preferences.

The most notable difference between the pathways is their starting point. Whereas the LGM pathway begins with the health professional enquiring about the patient's current activity levels, the co-designed pathway considers the patient to join the pathway before they arrive at their appointment. Both pathways accept that patients can choose not to take any action regarding PA and highlight opportunities to review this later, but the co-designed pathway explicitly suggests that health professionals still attempt to initiate some progress towards behaviour change by "planting the seed". A dedicated stage is provided for electronic recording of actions on the patients' medical record in the co-designed pathway, as well as directly involving PA providers by specifying that they provide feedback to the original referring health professional. Both pathways highlight the importance of following up patients at later intervals, but the co-designed pathway goes further by allocating a stage in the pathway for patients to 'graduate' to an actual or virtual maintenance programme.

7.7.2 Exercise is Medicine® Initiative

The pathway can also be considered in relation to the comprehensive Exercise is Medicine® (EIM) solution. The EIM initiative was introduced to embed evidence-based strategies to promote PA as a part of standard care to prevent and treat NCDs and is promoted as a global initiative with regional and national task forces (Lobelo et al., 2014). The solution is presented as five steps delivered by clinical and community providers (see figure 32).

The steps outlined in the EIM solution are largely reflected in the co-designed pathway. The EIM model recognises the limits of time on health professionals and advocates assessing "physical activity as a vital sign" (PAVS) using two simple questions rather than a longer validated questionnaire such as the IPAQ. The second step outlines a behavioural counselling approach to be delivered by health professionals which is similar to the "finding what is right" stage in the co-designed pathway. Step three relates to a prescription of PA which is somewhat analogous with the "agreeing and taking action" stage; both promote patient choice over PA although the EIM solution impresses the importance of a written prescription which is not explicit in the

co-designed pathway. Although the decision matrix tool included in the co-designed pathway aims to help the health professional consider what PA is appropriate for the patient's physical condition, the EIM solution goes further by suggesting the use of pre-populated disease-specific prescriptions to match the patients' NCD status. The co-designed pathway and the EIM solution are complementary in the value they place on embedding PA into the patient medical record. Both also suggest that a network of reliable local referral partners can be identified using a process of quality accreditation or certification. The EIM solution goes further in monitoring the activity phase, identifying the potential for PA to be monitored objectively using active technology. This was proposed in the co-design workshops but not taken forward to the final pathway map based on perceived cost and feasibility.

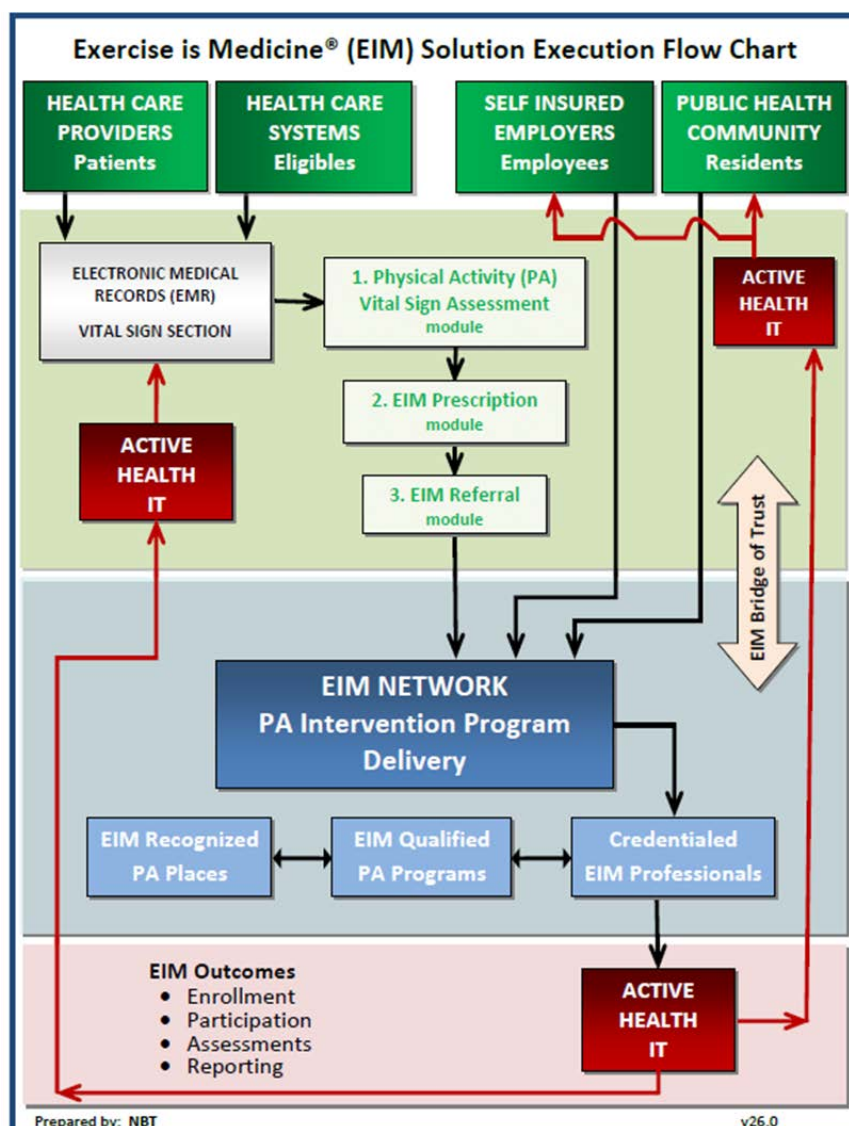


Figure 32: Exercise is Medicine® solution flow chart

As with the Let's Get Moving pathway, pre-appointment priming to encourage patients to be receptive to PA conversations is not overtly recognised as forming a part of the EIM process. Whilst this does not necessarily mean that existing initiatives do not promote or value the principles of priming patients, they do not present it as a formal step in the pathway. Taken together with the case study analysis, this indicates that priming may constitute one of the novel features of the co-designed pathway. Table 18 highlights the key stages of the co-designed pathway and how they differ or resemble the LGM and EIM models:

Table 18
Comparison of key stages between co-designed and existing pathways

Stage	Co-designed pathway	Let's Get Moving	Exercise is Medicine
Pre-appointment	Priming via patients' appointment letter and environmental nudges	n/a	n/a
At the appointment: assessment of current PA levels	IPAQ	GPPAQ	Physical activity as a vital sign (PAVS)
At the appointment: discussion about PA	Brief advice/intervention based on MI	Brief advice/intervention based on MI	Behaviour change counselling based on MI
At the appointment: prescription or referral	Use of tools (decision support tool, MoveMore online activity finder). Signpost or refer to one of multiple options Possible quality assurance of referral providers	Person-centred approach to find the right option for the patient Exercise referral based on local availability and criteria	Pre-populated disease-specific prescriptions Referral to EIM-certified provider
After the appointment	Recording actions on electronic medical record	n/a	Recording actions on electronic medical record
Activity and maintenance phases	Feedback from providers on patient progress (if applicable) Patient graduates into maintenance community	3,6,12 month review (mechanism/outcome measures not specified)	Objective measuring of agreed EIM outcomes

7.8 Discussion

Priming as a novel element of the pathway

The priming solutions proposed are reflective of one recognised influence on behaviour highlighted by the UK government's behavioural insights team (Dolan et al., 2010). The MINDSPACE framework combines academic and empirical research from behavioural economics and social psychology to identify 9 key elements that can guide policy makers aiming to influence individual and population behaviour:

M	essenger	We are heavily influenced by who communicates information
I	ncentives	Our responses to incentives are shaped by predictable mental shortcuts such as strongly avoiding losses
N	orms	We are strongly influenced by what others do
D	efaults	We 'go with the flow' of pre-set options
S	alience	Our attention is drawn to what is novel
P	riming	Our acts are often influenced by sub-conscious cues
A	ffect	Our emotional associations can powerfully shape our actions
C	ommitment	We seek to be consistent with our public promises, and reciprocate acts
E	go	We act in ways that make us feel better about ourselves

Figure 33: *MINDSPACE framework*

The popularity of the priming stages of the pathway, along with apparent demand for alternative approaches to engage some patients suggest that this framework could be used to develop further strategies either as part of, or complementary to the proposed PA pathway. There is evidence to suggest increasing interest in the use of priming or nudges in the NHS, for example to reduce waste and inefficiency (Perry, Chhatralia, Damesick, Hobden, & Volpe, 2015). Currently, PA interventions tend to focus on individual behaviour change techniques rather than environmental or social cues (Tully & Hunter, 2015). The findings in this study suggest scope for future research to explore how this can be extended in lifestyle interventions.

Health professionals' influence on implementation

Considering the barriers and facilitators to implementation of a PA pathway upfront places a spotlight on the importance of engaging health professionals, and their power to choose whether or not to adopt new ways of working. The behavioural insights team framework EAST (Easy, Accessible, Social, Timely; Cabinet Office, 2012) is

applicable here. One of the main issues raised in the case study was the need to make the pathway seem easy for health professionals to deliver, and to minimise any perceived additional burden on their workload, which could be aided by automating processes. The EAST framework suggests "reducing the hassle factor" and making the desired option the default. The framework also highlights the social factor, harnessing the power of networks and behavioural norms. Applying this to the PA pathway, health professionals described how individuals could act as champions, and how informal sharing of what works could influence their practice. Building mechanisms based on the EAST framework into implementation could be fundamental to adoption and continued use of the pathway.

The current case study suggests that individual health professionals would differ in the extent to which they would apply the PA pathway in their practice. This has been a recurring theme through the research. Huijg and colleagues (2015) have previously identified health professionals' characteristics (knowledge, positive attitudes and beliefs about capabilities) as preconditions for implementing PA interventions in primary care. Implementation needs to be sensitive to these varying attitudes, recognising that health professionals will respond to different incentives, methods of introduction and support. A qualitative study of the integration of new innovations in healthcare settings in the US suggests that the extent to which staff can see benefits for themselves (as opposed to patients only) affects mechanisms for integration (Brewster et al., 2015). Personally beneficial interventions (i.e. things that make the job easier) are integrated through a shift in attitudes and norms over time. Non-personally beneficial elements can be integrated through automation (simple interventions) and revised performance standards (complex interventions) (Brewster et al., 2015). Automation was a popular strategy suggested by health professionals in the current study, but the pathway is not a simple intervention. Health professionals and the service lead tended to emphasise individual preference as opposed to creating formal standards or procedures against which to measure health professionals' use of the pathway.

Suitability of the pathway for different patients

Participants have raised questions about how to support and manage patients who are "not ready" for PA throughout this user-centred design process. Some patient participants felt strongly that an overcautious approach would "let patients off" and that eventually, patient choice would need to be limited if particularly resistant patients were to benefit from PA. This contrasts with a belief amongst the majority of health professionals that forcing patients into PA is ineffectual and could even be harmful. The idea that some patients are unsuitable for PA advice has been proposed by health professionals in previous research (Bohman et al., 2015b; Learmonth et al., 2017). During a review of the Welsh National Exercise Referral Scheme, exercise professionals reported that it was (unsurprisingly) easier to work with patients who were already motivated and found these patients more likely to adhere to the programme (Moore et al., 2011). The solutions put forward in designing the pathway have attempted to address the fact that not all patients are immediately open to increasing PA, but the fact that health professionals continued to raise it in this final phase suggests that it remains a concern. Ideas around priming and nudges have been particularly well received by health professionals in the survey and interviews. This may be because they offer an alternative strategy to support patients with low motivation or resistance to the idea of PA, which also releases some of the pressure from the health professional to convince the patient. There is an enduring belief that a PA pathway may be less appropriate for these patients and a wholly different approach is therefore welcomed.

Considering implementation of the pathway from health professionals' and patients' points of view raises a key question: is the pathway going to help more patients engage with PA or is it simply an elaborate variation of what already exists (i.e. the current PA referral service in Sheffield)? If the latter is true, a better use of resources might be to focus on tailoring or enhancing that system to facilitate participation and referrals. Based on the responses gathered in this *deliver* phase, the pathway appears to add value by placing value on priming at the start and PA maintenance at the end of the pathway, plus specific improvements mid-pathway to address gaps in provision such as low level introductions to PA and formal recording and feedback from PA providers. It is worth considering whether these features could be embedded

individually rather than as a whole pathway, although this was not an approach endorsed by the service lead. Breaking the pathway down could reduce the risk of overwhelming health professionals with a complex pathway map, by positioning the features as improvements to existing services as opposed to a completely new way of working. Then again, it may fail to galvanise a change in some health professionals' attitudes and fundamental ways of working, which the introduction of a new pathway could attempt to address with appropriate implementation planning.

Core requirements of a PA pathway identified in the earlier phases of the research had included support for generating a positive, long-term impact on patients' PA behaviour. Participants in the *discover* phase also described a wide range of social, behavioural, emotional and physical aspirational outcomes of PA. Emphasis on the earlier initiation and engagement activities of the pathway may have caused the long-term impact and outcomes of PA to be overlooked. The risk of this approach is to replicate the same shortcomings as existing PA interventions highlighted in chapter one, failing to engender increases in PA that are maintained beyond the short-term intervention. At the same time, it reinforces the challenge facing NHS professionals to achieve a long-term impact within a limited amount of contact, a reminder that healthcare systems are only one domain in which PA can be influenced.

7.8.1 Methodological reflections

Storyboarding task

Developing the storyboard was challenging for health professionals in the co-design group. Stages in the pathway could be identified but the discussion quickly centred on feasibility for the NHS to properly resource each stage or about *who* would ensure these stages were delivered. There was a tendency to revert back to what was familiar, such as proposing GPs take responsibility for the pathway. Difficulties with the storyboard appeared to be underpinned by pessimism from health professionals who had seen several years of cuts to services. Massey & Munt (2009) have suggested that despite theoretical and policy support in principle for innovation in the NHS, operational realities and a focus on value for money imposed by finite resources may undermine efforts to develop new practices. During this activity health professionals

were reluctant to commit themselves or their service, either practically or hypothetically, to taking any action, citing lack of time or resources.

The struggle with the storyboard task was poignant given the particularly passionate and motivated set of health professionals at the outset of the design process. Members of the co-design group indicated a lack of confidence in themselves as having the power to initiate change within the NHS. Massey & Munt (2009) suggest that staff view the NHS as a huge machine. Change or improvement is thought to happen by 'searching for the right button to press' rather than being initiated by people within the system.

Use of a case study

Taking a case study approach to consider pathway implementation allowed the culture of the service to be considered in terms of barriers and facilitators. Looking at one service in isolation enabled any factors specific to health professionals from that service to be highlighted which was appropriate given the emphasis of the thesis on the user perspective. Whilst the service remained very supportive of the research, there was an impression at this phase that it was becoming harder to allocate staff members' time. Health professionals seemed to consider themselves as passive participants of an external project rather than actively driving the research. Despite support from the service lead who would endorse a 'launch' of the pathway, this would need to be led by the researcher.

Health professionals who participated in this phase (and throughout the earlier phases) were predominantly those who self-report relatively high levels of patient referrals to PA already. This potentially made it harder for them to see added value in the pathway, but also likely to judge solutions positively. The case study of Physioworks would have been strengthened by interviewing a larger number of staff members, particularly those who currently do not refer many patients to SPARS and thus may have provided a different perspective on implementation. Whilst discussions highlighted that other health professionals may be less willing to engage with PA promotion, these professionals were represented to a lesser extent amongst

participants, and measures to address those attitudes are based on their colleagues' interpretations rather than their own suggestions.

A limitation of the case study approach in this phase is that it focuses on implementation of the pathway in one service. Conclusions cannot therefore be drawn about how well the pathway might function within one of the other services involved during the earlier phases of the double diamond. To this point, the multidisciplinary approach had been a strength of the research, helping participants to broaden their discussions and critical thinking. As the process has continued however, other services have become less involved (continence service dropping out at the *define* phase, and diabetes professionals failing to engage at the *develop* phase). As this happened, the Physioworks and podiatry services naturally became the services most well represented in terms of users' views. Future work needs to re-engage those other services to explore whether the pathway map remains useful in those settings.

Presentation of the pathway map

The two-dimensional format of the pathway map was not ideal for this phase as it may have oversimplified what is undoubtedly a complex pathway. The majority of suggestions for improvement were reflective of issues that had been considered at some point in the design process but simply hadn't been communicated well in the map. The current format of presenting the pathway was retained throughout this chapter as it encapsulated the detail needed to understand the components of the pathway, but it needs to be presented in a different format if shared widely in future.

Modelling the pathway using the personas does not replace the need to test the pathway with real patients but it did provide an indication of whether it meets the needs of a variety of patients. Weaknesses in the pathway have been highlighted that should be addressed before time and resources are spent on a pilot, such as the adaption of the pathway for non-English speaking patients. This demonstrates the importance of maintaining a focus on the user throughout the design and development of the pathway, right through to implementation. The user-centred design approach adopted in this research ensures that this prevails as a guiding principle in determining next steps.

7.8.2 Participants' reflections

Appendix P provides a summary of participants' feedback after the co-design workshops. Five health professionals and two patients completed and returned evaluation forms. Questions on the evaluation forms were based on five measures of validity applicable to this research (Reason and Bradbury, 2001) as identified in chapter 3:

- Outcome validity – the resulting solution of problems and improvements generated
- Democratic validity – the level of involvement of stakeholders
- Process validity – facilitating the process of learning for participants
- Catalytic validity – empowerment of participants to understand and change reality
- Dialogical validity – discussion of aspects of the research between researcher and participants

The experience was rated as positive by patients and health professionals; respondents all felt "very much" involved, said that they would participate again in similar research and would encourage others to do so. Health professionals indicated personal learning about how to promote PA in their own practices and pledged to discuss PA in more consultations. Participants indicated a new appreciation for the complexity of the NHS and its implications for developing a PA pathway; one patient suggested that he would be more considerate of the health professionals he came into contact with. Respondents felt positive about the ideas generated and hoped to see them refined and implemented. Suggested improvements included involving GPs, primary care nurses or secondary care medics. One respondent suggested connecting with other health professionals and researchers so that the design solutions could have built on and integrated with PA and patient-centred care initiatives already taking place.

7.9 Chapter summary

The *deliver* phase presented the ideas discussed throughout the earlier *discover*, *define* and *develop* phases as a map outlining a physical activity pathway. A case study approach was taken to consider how prospectively any barriers and facilitators to implementing the pathway in the Physioworks NHS service and patient personas were used to model how the pathway might work for different types of patients. This suggested where the pathway might add value particularly in improving the initiation of PA conversations, but also highlighted weaknesses in addressing the needs of some patients for whom engaging with a pathway may yet remain challenging.

Chapter 8: Discussion, reflections and conclusions

8.0 Overview

The final chapter revisits the original aims of this thesis and considers the extent to which a user-centred, Research through Design methodology has met these aims. Presented here is a summary of the main findings from this research situated in relation to existing literature. Implications for practice and recommendations for future research concerning the promotion of PA in the NHS and the application of user-centred design are suggested. Personal reflections from the researcher are also considered before the thesis is concluded.

8.1 Aims and objectives of the thesis

The aim of this research was to explore the user-centred design of a PA pathway in usual NHS care. Chapter 2 set out five research objectives:

1	Explore patients' health aspirations and support needs in relation to PA pathways
2	Explore the training, resources and support needs of health professionals to effectively promote PA amongst patients
3	Involve patients and health professionals in the design a PA pathway which meets their needs
4	Identify the likely barriers to implementation of a PA pathway and identify steps to reduce or resolve these barriers
5	Document and evaluate a user-centred approach to designing a PA pathway in NHS care

A user-centred, Research through Design methodology using the UK Design Council's double diamond framework (Design Council, 2007) was adopted. This is the first study, to the researcher's knowledge, to explore the application of user-centred design (and the double diamond framework) to the design of a PA pathway in the NHS. MSK physiotherapy, podiatry, chronic pain, diabetes and continence services operating at NCSEM Sheffield locations were chosen as a setting to explore this approach. The

following sections present a critique and review of the main findings of the research, structured using the five original research objectives.

8.2 Objective 1: Explore patients' health aspirations and support needs in relation to PA pathways

8.2.1 Health concerns and aspirations transcend physical factors

Collectively, patients taking part in this research described a range of factors that positively or negatively influenced their health. Semi-structured interviews undertaken during the *discover* phase (chapter 4) found that PA had implications for patients' quality of life that was not limited to the relief of physical symptoms. For example, social identity and confidence were strong themes that were associated with individual perceptions of independence and ageing well. Since 2017 a number of opinion papers have been published explicitly highlighting the importance of social identity, social context (Williams & Gibson, 2017) and social connectedness (Wiltshire & Stevinson, 2017) in promoting PA. Previous qualitative research has identified social phobias as barriers to PA (e.g. Emslie et al., 2007) and existing PA interventions commonly use group exercise formats to facilitate social benefits as an outcome of PA (e.g. Desveaux et al., 2014). The current findings support calls for further research to explore interventions addressing the social determinants of PA (Williams & Gibson, 2017) but also a need for greater understanding of whether these can be feasibly addressed within NHS care. Findings of the case study in chapter 7 indicate potential limitations of a PA pathway model in responding to some of these issues.

Common health aspirations for patients in this research included losing weight, improving mood and reducing pain. These concur with the reasons given for taking part in PA interventions in previous qualitative research (Clarke et al., 2015; Craike et al., 2013; Donnelly et al., 2013) as well as reported outcomes such as pain relief (Kaptein et al., 2013) and improved mood (Mikkelsen et al., 2016). Overall, the complexity of patients' health needs in the current study indicated that a PA pathway should address patients' needs holistically and this was included as a core design requirement for a PA pathway in the *define* phase (chapter 5).

8.2.2 Links between active health engagement and PA

Previous research suggests that patient activation can vary between patients (Bernhardsson, Larsson, Johansson, & Öberg, 2017). The current research suggests that rapport with health professionals is an essential factor in enhancing patient activation. Patients who participated in the interviews (chapter 4) and co-design workshops (chapters 5 and 6) stressed the importance of previous care experiences and interactions with health professionals as influencing their attitudes towards the healthcare they receive and how they engage with it. For this reason, ensuring good communication between health professionals and patients was proposed as a core design requirement for a PA pathway. Previous studies have highlighted a link between health professionals' communication styles and patients' wellbeing and satisfaction (Jiang, 2017) or engagement with treatment (Bright, Kayes, Cummins, Worrall, & McPherson, 2017). Existing literature has not identified a direct link between objectively measured patient activation and receipt of PA advice but the current findings suggest that this should be explored further. In any case, this study highlights the importance of skills building amongst health professionals to develop the therapeutic alliance, with a view to maximising patient activation.

Some patients reached a pivotal moment of acceptance about their health issues. This could enable them to take control of managing their weight, mental health or other health issues and made them receptive to lifestyle advice, suggesting a version of a "teachable moment" for PA in patients with long term conditions. Research in cancer care and pregnancy support the finding that teachable moments can occur at different times for each patient (Atkinson, Shaw, & French, 2016; Karvinen, Bruner, & Truant, 2015) but there is currently no research exploring this within MSK conditions and diabetes. A teachable moment possibly differs from a "stage of change" (Centis et al., 2014) in that it involves not just eliciting motives for a behaviour from the patient but an understanding of what healthcare circumstances might also facilitate reaching such a moment during the trajectory of a long-term condition. The findings of this thesis indicate that this could be explored further.

Patients' expectations have been linked to perceived quality of care, which is associated with improved health behaviours including PA self-efficacy and maintenance (Whittal & Lippke, 2015). Managing patients' expectations about the treatment they would receive (and how active their own role should be in that) was identified as another core design requirement of a PA pathway. Prototypes developed during the *develop* phase (chapter 6) attempted to manage these expectations using priming, environmental cues and developing tools to support patients' active involvement in decisions about PA referral.

The majority of patients involved in this research were positive about the idea of increasing PA but a common barrier was fear of injury or exacerbation of their illness or injury, especially with MSK-related issues. Patients viewed the role for a health or exercise professional to provide advice or reassurance to counterbalance these concerns. The current finding that fear of injury is a barrier to PA is not new (e.g. Clarke et al., 2015) nor that health professionals are potential sources of reassurance (Withall et al., 2016). In the current study, this created a paradox; increasing PA was internally driven by a desire to take control of one's health, but the need for external support to overcome barriers could also undermine patients' autonomy. Nevertheless, addressing fears and concerns emerged from discussions as a core requirement for a PA pathway.

8.2.3 Meeting patients' specific and varying needs

Patients described a variety of practical circumstances and preferences regarding types of PA, location, cost, timing and social support consistent with previous research (Desveaux et al., 2014; Emslie et al., 2007; McPhail et al., 2014). This suggested that a 'menu' of PA referral or advice options were necessary in a PA pathway, which is consistent with many talking therapies where autonomy and choice are key ingredients of sustained behaviour change. Significantly, some preferences and needs negated individuals' likelihood or ability to access exercise groups in traditional gym-based environments, such as language barriers, a need for women-only environments, and mental health barriers. These factors remained throughout the double diamond process. As discussed in chapter 7, attempts to develop a standard PA pathway that

was flexible enough to meet these diverse needs were only partially successful. Existing PA interventions either place responsibility on the health professional for tailoring advice to individual patients' needs (e.g. LGM; Department of Health, 2009), or in some circumstances provide a distinct intervention tailored to the particular needs of certain patients (Withall, Jago, & Fox, 2011). Further research is needed to determine how accessible PA interventions are for specific sub-populations of patients, and how this accessibility can be improved. Any future testing of the co-designed pathway should include an evaluation of the extent to which it reduces health inequality.

8.3 Objective 2: Explore the training, resources and support needs of health professionals to effectively promote PA amongst patients

8.3.1 Balancing limited time and standardisation with patient-centred PA promotion

Amongst health professionals there was appreciation (to varying degrees) of the benefits of PA in a holistic, long-term approach, with patient empowerment as a central principle. Promoting PA fitted logically with this mind-set, yet NHS systems did not always appear to facilitate this way of working. Health professionals described organisational constraints against promoting PA. These included limited time in consultations that restricted their capacity to discuss wider psychosocial and practical issues such as family, work and previous experiences (all of which might influence PA behaviour). A lack of time to promote PA in routine consultations has been commonly reported in studies involving health professionals (e.g., Din, Moore, Murphy, Wilkinson, & Williams, 2015) and there is evidence that health professionals consider PA a low priority (Persson et al., 2013). Time pressures in routine consultations led to suggestions from participants for streamlined and automated processes within a PA pathway. A number of the shortlisted solutions proposed by users were intended primarily to make it easier for health professionals to carry out their role in the pathway, for example a tool to make quicker decisions about referral, and electronic versions of forms printable directly from the medical records system. This exemplifies

tensions between a desire for standardisation that did not easily coexist with ideals of increasing patient choice and flexibility, but was nonetheless seen as necessary to making PA promotion feasible. Health professionals also reported a sense of responsibility to address patients' immediate physical symptoms that impacted on the urgency (or lack of) to address PA.

8.3.2 Improving adaptive knowledge and skills regarding PA

Health professionals described a lack of appropriate knowledge about PA in their interviews (chapter 4). They felt unable to make judgements or give advice about comorbidities that were potential contraindications to PA. The biomedical nature of health professionals' training appeared to undermine their confidence and ability to deliver lifestyle (PA) behaviour change advice. Health professionals also suggested that they needed better awareness and knowledge of local PA facilities and options for patient referral. This would enable them to endorse a range of options available for patients and encourage greater confidence in signposting. Several of the solutions prototyped sought to better connect health professionals with local PA providers to improve awareness. This research has illustrated that health professionals' decisions whether or not to discuss PA with patients were often conscious, affected by a combination of their own attitudes and perceived organisational constraints. An important task for a PA pathway was therefore identified as inducing more regular and consistent promotion of PA, formalising it within consultations. Evaluation of existing PA pathways demonstrates that health professionals struggle to deliver behaviour change elements (Moore et al., 2013) and qualitative research has found that health professionals also want better knowledge about local PA options (Crisford et al., 2013). Training currently exists to support health professionals with integrating PA in their consultations (e.g. PHE), but these imply a change in health professionals' behaviour whilst the organisational systems around them remain constant. Multiple previous studies provide support for the finding that health professionals want more formal organisational protocols for promoting PA (Bohman et al., 2015b; Learmonth et al., 2017; Persson et al., 2013). Greater investigation of organisational factors that enable or limit PA promotion appears to be warranted.

8.4 Objective 3: Involve patients and health professionals in the design a PA pathway

8.4.1 Perceived novelty of the co-designed pathway

This research involved designing a PA pathway using the double diamond as a methodological framework. Research methods were applied to each of the four phases of the double diamond (*discover, define, develop, deliver*) that enabled involvement of patients and health professionals throughout the design process. The result was a co-designed NHS PA pathway model incorporating stages and features that patients and health professionals considered important. Typical qualitative research (in the form of interviews and focus groups) might stop at the end of the *define* phase, where problems and opportunities are identified in the form of "recommendations" for future PA interventions. The current study extends existing literature by describing how patients' and health professionals' needs, barriers and facilitators regarding PA were translated by them into practical solutions including tools and pathway stages.

Chapter 7 (*Deliver*) included a comparison of the co-designed pathway against existing models of PA promotion. A novel feature was the introduction of priming and environmental nudges at the outset of the pathway. Individually, these are not new concepts (Behavioural Insights Team, 2016), but there is little, if any empirical evidence of them having been applied as PA interventions in an NHS setting. This research has highlighted potential for further research to explore the impact of behavioural insights approaches for promoting PA.

Another element of the co-designed pathway that was not identified in other pathways, was a formal mechanism to provide feedback on patients' progress from PA providers back to the health professional responsible for referral. A dearth of research involving PA providers and lack of detail about the content of locally managed exercise referral schemes makes it difficult to ascertain whether this is only new in a local (Sheffield) context. Future evaluation would be necessary to explore the effect of feedback on health professionals' future referral behaviours.

Excepting the novel features identified, the basic stages of the co-designed pathway were largely consistent with existing PA pathways for NHS England and Scotland based on 'Let's Get Moving' (Department of Health, 2009; Jackson et al., 2014). In addition to the priming and feedback elements, the current research suggests how 'tools' (e.g. decision tool, use of an online portal) might be employed at various stages of the pathway to improve or aid the user experience. One of the original contributions of this PhD is the extension of knowledge beyond patients' and health professionals' needs regarding PA, to the identification and prototyping of solutions designed by these groups to meet these needs.

8.4.2 Suitability of the pathway for meeting patients' needs

The *deliver* phase (chapter 7) used patient personas created during the *define* phase (chapter 5) to model how well the co-designed pathway was likely to meet patients' needs. The modelling exercise showed that the pathway worked for the majority of personas, but was less suitable for one persona (Natalia) due to language and cultural barriers. Although increasing the accessibility of PA had been identified as a key objective of a PA pathway, this phase of the research highlighted the difficulties of building a pathway model with sufficient flexibility and sensitivity to individual needs. Chapter one raised questions about whether existing PA programmes cater for a diverse demographic of patients and the importance of adapting interventions to suit different groups (Murray et al., 2017). Further research is needed to explore whether targeted, bespoke interventions are more appropriate than standardised intervention attempting to meet the wide range of patients' needs.

The current research raised general questions about the appropriateness of a "pathway" for promoting PA. Particularly for those resistant or not psychologically 'ready' for PA, the *deliver* phase of the research indicated that an entirely different approach (i.e. not a pathway) might be necessary or at least welcomed by users. This research suggests that the term 'pathway' potentially creates an expectation that all patients move incrementally through to the end. This could potentially exclude a significant proportion of patients whom for a variety of reasons are unwilling or unable to engage with a pathway (or are perceived as such by the health professional). In the

current study, efforts were made to counteract this pressure by creating multiple possible routes through the pathway and multiple exit points. The current study identified a role for health professionals to 'plant the seed' to lay the foundations for a change in behaviour at a later, more opportune or appropriate time. Acknowledging this as a valued outcome in its own right could incentivise health professionals, release pressure and provide an opportunity for more patients to benefit from PA rather than being considered 'unsuitable' to join the pathway.

8.4.3 Recognition and involvement of PA providers as key stakeholders

The design of a PA pathway in this research incorporated the views of PA providers and local voluntary groups. Interviews explored how the prototyped solutions which directly implicated providers would be received and/or might need to be amended. General themes included in Appendix O also highlighted the commercial interests of providers in retaining and managing patient referrals. Previous literature has not explored the motives and needs underpinning PA providers' decisions to provide PA referral services or how these services are constructed. A gatekeeping role for health professionals has been identified (Din et al., 2015; Hefferon et al., 2013) in terms of which patients are referred to PA providers, but the current research also illustrates a potential role for health professionals as mediators, to communicate what patients want or need so that PA providers can tailor their service offer accordingly.

8.5 Objective 4: Identify the likely barriers to implementation of a PA pathway and identify steps to reduce or resolve these barriers

8.5.1 Barriers and facilitators to implementation of the pathway

The fourth phase of the double diamond, *deliver*, used a case study approach to prospectively explore the implementation of the co-designed pathway within a particular service (Physioworks). Interviews with physiotherapists and the service lead along with re-analysis of survey responses from Physioworks staff identified barriers and facilitators to implementation. The study showed that 'buy-in' to adopt and use

the pathway largely depended on whether health professionals perceived it as an additional burden or something that made promoting PA easier.

Overall, the pathway was appraised as being a formal version of best practice already ongoing within Physioworks, with some novel features including pre-appointment priming and feedback loops from providers. Failure to identify the nuances of the pathway would prevent health professionals from understanding its value. At the same time, health professionals voiced mixed opinions about whether the pathway map was too complicated. Presenting the pathway in a simple format that minimised its perceived complexity was recommended. This corresponds with existing qualitative research where health professionals have expressed a need for clearer guidelines and protocols in PA promotion (Bohman et al., 2015b; Crisford et al., 2013). The current study again highlights a challenge to establish a simple system for PA promotion that can accommodate the various different routes and preferences of patients.

The results of the case study indicated that health professionals might be resistant to changing their individual working practices; clinicians were protective about maintaining autonomy over clinical decision-making and would not respond well to a PA pathway being enforced. To avoid this, health professionals and the service lead recommended the facilitation of training, whereby health professionals could work with their colleagues to explore how the pathway could integrate with their current caseload. Even so, adoption of the pathway was likely to vary, with health professionals using the pathway as a toolkit from which to select the parts that were appropriate for each patient on a case-by-case basis.

The case study showed how a lack of opportunities for informal discussion and socialising with other colleagues prevented them from sharing and encouraging best practice. This would prevent collective appraisal and monitoring of the PA pathway that could encourage health professionals to incorporate it into their practice. Clinical champions, called here "super-users" were identified as one way to provide a source of support regarding practical issues arising with using the pathway as well as using social norms to influence use of the pathway amongst peers. Existing literature identifies individual health professionals' attitudes towards PA as either a barrier or

facilitator to its promotion (Bohman et al., 2015b; Din et al., 2015). The current study suggests a role for collective attitudes to also influence health professionals' behaviour. Normative influences have been identified as shaping PA promotion behaviour via professional conferences (Crisford et al., 2013) but this study suggests they could also be harnessed within informal, everyday professional networks. Further research should draw on organisational change and social science literature to understand how this change is likely to be affected.

8.5.2 Reflecting on the non- condition-specific focus of the research

Chapter 2 identified that previous PA research in healthcare settings has focused on patients and health professionals within one specific health condition or service. The current research recruited patients and health professionals from multiple health services, conditions and professional specialisms. One finding was that patients with different health conditions had similar needs with regards to PA. There were some obvious physical condition-specific contraindications to certain types of PA. Nevertheless social, attitudinal and practical barriers and facilitators were shared by patients from multiple services, and the personas created during the *define* phase (chapter 5) could be applied to any of the health conditions. When patients specifically raised the issue of group PA, they described a preference for groups with others of similar fitness levels, ages or weights, not necessarily the same health condition. This finding provides empirical support for previous IOC and FSEM statements that have proposed the promotion of PA across rather than within health conditions (Jones et al., 2014; Matheson et al., 2013) stratifying patients by psychosocial and behavioural rather than disease factors. However, the findings contradict previous research with some clinical populations, for example cancer patients, where participants of group PA programmes report benefits associated with opportunities to discuss and share experiences with other patients (Bruun et al., 2014; Luoma et al., 2014). An explanation for this may be that patients participating in this research had conditions where common health experiences would be less apparent.

The current research found that classifying patients based on their physical health condition served to benefit health professionals and PA providers, by providing

boundaries for managing perceived risks. PA providers reported a desire to receive notice of patients' medical history, to manage incoming referrals and assign appropriately qualified instructors. Sending patients to a class specific to their health condition provided health professionals with reassurance that adverse effects from PA would be minimised. Health professionals felt confident to give advice about PA only in relation to the health conditions they felt that their professional knowledge covered. This concurs with previous research where health professionals valued relating and tailoring PA advice to patients' health conditions (Crisford et al., 2013; Din et al., 2015). Chapter 6 illustrated the importance of balancing a focus on risk management with supporting the development of patients' self-efficacy, to avoid propagating a culture of fear regarding PA.

Participant evaluations showed that health professionals valued the inter-disciplinary format of the co-design groups and the opportunities for learning from each other. Nevertheless, the small group size restricted involvement in the co-design workshops to one or two members of staff from each service. Health professionals struggled when storyboarding the pathway to translate the ideas into practice in their services, with division of labour and envisaging change proving particularly challenging. It is possible that this task may have been more successful with a group of health professionals from one particular service where collective agreement on next steps and division of tasks could have been more targeted. Regardless, the common experiences and challenges shared by health professionals from across services highlights opportunities for greater collaboration in future PA promotion.

8.6 Objective 5: Document and evaluate the user-centred approach to designing a PA pathway in NHS care

This is the first study, to the researcher's knowledge, to explore the application of user-centred design (and the double diamond framework) to the design of a PA pathway in the NHS. The double diamond framework provided a guide to the basic phases of design without enforcing a rigid process and allowing the flexible, pragmatic selection of research methods that suited the research and the context. Documenting the process as an objective of the thesis provides a basis for reflecting on the

consequences of applying this approach as well as the benefits and disadvantages of the constituent activities and tasks throughout the process. The following sections describe themes arising from evaluation and reflection of this methodology within this context.

8.6.1 Strategies used to involve patients

Previous qualitative research regarding PA has acknowledged a potential self-selection bias in the patients that participate (Peel et al., 2010) that could limit the generalisability of findings to those who successfully complete the intervention. Whilst the majority of patients who took part in the current research were not (by their own accounts) particularly physically active, they nonetheless represented a subset of patients who were willing or motivated to volunteer. Woodard and colleagues (2011) caution that participants in user involvement research are not 'elected patient representatives'. Although not a substitute for first-hand accounts, using personas aided the co-design groups and the researcher in considering the viewpoints of other patients who might have been unable or unwilling to participate. Personas are commonly used in marketing and design, and have been used previously in the development of electronic and mobile health interventions (Davoody, Koch, Krakau, & Hägglund, 2016; Holden, Kulanthaivel, Purkayastha, Goggins, & Kirpalani, 2017; Morey, Barg-walkow, & Rogers, 2017) but have not previously been applied to research describing the design of PA interventions.

Informal consultation with patients about solution prototypes that was undertaken at the *develop* phase (chapter 6) provided a way for patients to be involved in the research and give their views without the requirement of on-going commitment to attending a workshop or interview. Methodological reflections (section 6.12.1, chapter 6) acknowledged that this level of involvement was limited to asking patients' views about tangible elements of the pathway that required no extensive background knowledge or explanation. To meet growing desires and expectations for patient involvement, future research should explore creative methods for meaningful involvement that can reduce barriers to participation and potentially limit self-selection bias.

8.6.2 Power dynamics and participants' ownership of the project

During the *develop* and *deliver* phases, this study identified a lack of belief amongst participants that they could initiate change within the NHS. This caused difficulties particularly in the health professionals' co-design group with moving from a set of discrete ideas as prototypes to a comprehensive pathway. Stickley's (2006) critical realist review of user involvement concludes that existing power structures prevent user-led change from happening and suggests that people from outside the organisation may be necessary to initiate change. It is unclear in the current research whether the involvement of a more senior member of NHS staff would have given participants the confidence that ideas requiring significant organisational change were possible to implement. The workshop facilitators represented an outside view that was valuable at times to push discussions on, but a service design professional may have provided expertise in helping to connect and actualise ideas.

Despite enthusiasm and commitment, the role of patients and health professionals in the research signified engagement rather than ownership. This was highlighted at several times within the double diamond. Methodological reflections described challenges communicating the findings from semi-structured interviews in the *discover* phase (chapter 4) to the co-design groups at the *define* phase (chapter 5) whilst also maintaining the groups' autonomy in defining which user problems should be addressed. Recommendations for the future would be to involve users directly in gathering insights at the *discover* phase to foster a sense of collective responsibility towards the outputs and translation of the research findings into practice. During the co-design workshops (*define*, chapter 5), participants tended to fall into a focus group mentality, with the expectation that the facilitators were directing the process. At the *deliver* phase (chapter 7) health professionals indicated a passive role in implementation, anticipating the pathway as something the researcher would launch with their 'support'. Some services fell away from the research over time (e.g. the continence service at the *define* phase, and the diabetes service at the *develop* phase). Possible explanations are the absence of a senior member of staff driving participation,

miscomprehension at the outset about the nature of participation or the impact of the researcher not being a member of NHS staff.

Undertaking this project as a piece of academic research may have had implications for ownership. For example, the requirement for patients and health professionals to provide written consent accompanied by "participant information sheets" (and indeed, use of the term "participants" throughout this thesis) does not imply active direction of the research. Discussions with service leads at the outset of the research and with participants of the co-design workshops attempted to overcome this by stressing that the research was to be user-led, but in this case traditional research roles persisted. Robson (2011) and Stickley (2006) have argued previously that user involvement research is unlikely to remove hierarchical relations during the process. Pearce and colleagues (2011) recommend that this is acknowledged so that a constructive partnership relationship can be established, aiming to strike a balance between providing sufficient guidance and allowing users to take control.

8.6.3 Incremental versus radical innovation

During the ideation task, patients and health professionals generated a mixture of radical and modest ideas, but voted to prototype the ideas they perceived as most feasible. The perceived complexity of the NHS 'system' overwhelmed participants, making it difficult for them to envisage how ideas could be realised, and the pathway began to be moulded for the system rather than the user. As a consequence, the final pathway model reflects a modified or enhanced version of existing referral pathways. Previous research has identified that users find it difficult to envisage novel ideas that are not familiar to at least one of the group (Bowen et al., 2011). A lack of distance or perspective is sometimes thought to restrict creativity or openness to new ideas (Pearce et al., 2011). Other authors suggest that incremental improvement has the most everyday impact in healthcare settings (Massey & Munt, 2009) and that transformative innovation can only be achieved through changes in technology and deliberate attempts to change meaning (Norman & Verganti, 2012). It is also possible that the existing pathway model is already a good fit for the context and that findings of the current study to make stages of the pathway more user-centred are useful.

8.6.4 Users at the centre of the research

A strength of this research is the consistent focus on users throughout the thesis. Periodically recruiting 'new users' is recommended in user involvement work to avoid individual personal agendas dominating (Pearce et al., 2011). New participants were recruited at every phase of this research to ensure that ideas were sense-checked and critically appraised by others and to maximise the ecological validity of the findings. Feedback from the co-design group members indicates that their experience was positive. Chapter one highlighted a previous IOC consensus statement calling for users to be the focus of developing PA programmes (Matheson et al., 2013). This research has demonstrated that this is both feasible and desirable, for researchers and developers of interventions and for the users themselves.

8.6.5 Impact of the research

This research has resulted in practical changes within the NHS based on the adoption of individual features of the co-designed pathway. At NCSEM sites, signage prototyped in the *develop* phase has been introduced and plans for further changes to patient waiting areas are being informed by the *priming* stage of the pathway. At NCSEM Graves, joint sessions run by health professionals and PA providers are being established. NCSEM Concord is trialling low-level support and confidence building sessions and directly bookable PA appointments. Although the pathway as a whole requires further development, there is support from Physioworks to schedule a launch event to raise awareness of the pathway amongst staff and identification of potential "super-users". The research findings have been shared with lead staff from other services (diabetes, podiatry, pain) regularly throughout the process and discussions will take place regarding future implementation of the pathway or its components.

8.7 Limitations of the current study

The main limitation of this study is that it was not possible within the current scope to test the effectiveness of the pathway. This limits the objective comparison of the co-

designed pathway with existing models of PA and means that only tentative conclusions can be drawn about whether a user-centred approach to designing a pathway adds value beyond existing evidence-based approaches to designing interventions. Theorising about co-design research has focused so far on *who*, *what* and *how* rather than *why* it is expected to produce benefits (Durose, Needham, Mangan, & Rees, 2017). It is proposed that research based on co-design would benefit from comparative evidence, such as comparing co-design sites, and comparing co-design with traditional approaches (Durose et al., 2017). This is a potential avenue for future research. The findings of this thesis present current views from health professionals regarding the pathway and its constituent elements. At the point of submitting the thesis, the findings highlight actions taken to date as a result of the PhD. Further evaluation is required to assess longitudinal change resulting from implementation of features of the pathway.

Although long-term impact was identified by users as an important requirement of a PA pathway, the solutions suggested and prototyped focused towards the earlier, initial stages of the pathway. The findings of the *discover* and *deliver* phases identified a series of patient-centred outcomes for a PA pathway and further research is still needed to explore these further.

Models of behaviour change such as COM-B (Michie et al., 2011) address many of the concepts identified in this research as influencing patients' and health professionals' behaviour at individual, interpersonal, organisational and policy levels. These models provide a framework to identify relevant intervention components and it is widely encouraged that health behaviour change interventions are underpinned by appropriate theory (Michie et al., 2011). The user-centred design approach applied in this research did not specifically encourage consultation or application of theory (although the flexibility of the framework did not prohibit this). Westhorp and colleagues (2016) provide an example of how theory and existing evidence might be reconciled with co-design, using realist philosophy of science to develop and refine programme theories about how intervention components might work and for whom. This is a potential avenue for further research.

8.7.1 Generalisability of the findings

This research was conducted with patients and staff receiving or delivering care from NCSEM Sheffield locations. The thesis contributes methodological reflections on the process of applying user-centred design to the development of a PA pathway which are likely to be applicable in other healthcare contexts. Some of the findings are likely to be more locally specific, for example one of the personas represented a minority ethnic group that was representative of the catchment population for NCSEM Concord. Also, in the final case study the service lead acknowledged changes within the service that were linked to the timeframe of moving into the NCSEM centres. The solutions generated took into account opportunities for making use of the NCSEM co-location model, but participants' commitment to ensuring that solutions were accessible across Sheffield maintained a focus on developing ideas that could be implemented in any clinic. Flexibility built into the pathway was thus intended to aid the adaptability of the model to different organisational contexts, based on an understanding that this adaptation is necessary for implementation (Birken et al., 2017). Further research should evaluate whether the pathway needs to be applied as a whole solution or can be dissected into separate elements selected to fit different contexts.

8.8 Implications for future practice

This study reinforces the need to involve end users in the design of interventions to ensure that they are desirable and feasible (Matheson et al., 2013). However, it has also highlighted that in a complex system such as the NHS, end users may need support from others to envisage and enact change. The findings highlight multiple examples of contradiction between how stakeholders think PA should be promoted, and actual practice. Whilst the rhetoric about PA includes holistic care, empowerment and patient choice, ultimately the NHS environment (a biomedically trained workforce, pressure to respond to acute symptoms, lack of confidence to discuss PA) presents a significant constraint. There is no additional resource or time afforded to health professionals to promote PA which has complex social determinants, and health professionals understandably present a predominantly medical motive and context for PA. A risk-adverse setting which focuses on pre-participation screening for physical

contraindications, supervision by appropriately qualified instructors and stratification of patients into condition-specific classes, all done with patients' best interests nevertheless can build further trepidation about PA rather than independence and self-efficacy. For some patients, a condition-specific approach with a high level of support and supervision might facilitate initiation of PA, particularly if they are concerned about exacerbating a long-term physical condition. However, maintaining this highly structured approach for too long might undermine the development of patients' confidence and capacity to self-manage, by reinforcing their status as a patient. The current findings highlight the importance of building patients' ability to make decisions about PA, and to incorporate it into their life alongside any existing health conditions to ensure that they can maintain it independently.

The results of this study are of direct practical relevance to the promotion of PA in the NHS and are likely to interest health professionals, PA providers and those responsible for developing PA interventions. Key implications are summarised as follows:

- Professionals promoting PA should consider the social as well as the health factors that determine and affect individuals' PA behaviour and help patients to address these factors where possible
- Managing patients' expectations of their care and encouraging them to take control of their health can contribute to patients' engagement with self-management behaviours including PA
- Addressing patients' fears and concerns regarding PA through appropriate advice, stratification and supervision is appropriate, but care is needed to ensure that risk management strategies do not undermine patients' autonomy or perpetuate fears about PA
- Providers and developers of interventions should consider the accessibility of PA interventions for different patient populations, and that interventions do not unintentionally exclude patients with particular needs or increase health inequalities. Providing modifications or separate interventions to meet the specific needs of vulnerable groups may be appropriate
- Metrics of success for PA interventions need to be flexible to reflect the different likely outcomes for patients. This could incentivise health professionals to provide early or interim advice, laying foundations for

behaviour change when the patient is more ready. It might also include recognition of increases in low level activity that might not meet CMO guidelines but nevertheless marks a significant achievement for some patients

- Greater emphasis is needed towards collaboration between health professionals and PA providers and voluntary groups through local networks, to bolster health professionals' confidence in tailoring PA advice to patients. Health professionals from different services face common challenges in promoting PA; working together to share best practice should be encouraged wherever possible
- PA providers should provide feedback to professionals who refer patients, to offer positive reinforcement for referring and to encourage more appropriate future referrals
- Developers of PA interventions should consider the role of normative influences and clinical champions on changing health professionals' behaviour. New interventions should have clear, simple guidelines that reinforce the value of the intervention and minimise perceived burden, and health professionals should be given the opportunity to consider how new interventions can be integrated within their current caseloads.

8.9 Recommendations for further research

This thesis has addressed several objectives but also highlighted areas requiring further research. These include extending and clarifying the findings in relation to a PA pathway and further methodological developments.

Testing and enhancing the effectiveness of the PA pathway

- Further research is required to establish the effectiveness of the co-designed pathway. Testing the pathway will enable robust conclusions to be drawn about the value of involving patients and health professionals in its design. This will include evaluating the impact of the novel pathway elements such as the priming stages and feedback from providers to health professionals.
- A longitudinal evaluation is needed to explore the impact of the pathway on service(s) and professional practices over time. To aid an understanding of how

well the pathway addresses the needs of a variety of patients, a realist evaluation methodology (Pawson & Tilley, 1997) could be applied to determine who the pathway works for, why, and under what circumstances. This would enable further understanding about the relative accessibility of interventions and factors that might contribute to inhibiting or promoting health equalities.

- Participants of the co-design team chose to focus primarily on the initiation and early stages of the PA pathway. Further research is still needed to clarify how PA interventions can achieve patient-centred outcomes identified as important in this research and user-centred solutions to facilitating the long-term maintenance of PA.

Understanding patients' and health professionals' behaviour

- The current findings indicated a possible version of a 'teachable moment' for patients with long term conditions. More research is needed to establish whether this is a phenomenon which can be characterised and differentiated from a state of readiness to change. If a teachable moment can be defined, further research would be needed to establish whether and how health professionals can help patients to reach it.
- Future research could benefit from the application of behavioural insights theory to understanding and changing PA promotion. This might include, but is not limited to, exploration of normative influences on health professionals' PA promotion behaviours and the effects of environmental cues on patients' attitudes towards PA.

Applications of Research through Design

- The adoption of a user-centred design approach in this context uncovered several avenues for further research. Further exploration is needed regarding the use of personas for intervention development. The influence of individual health professionals' attitudes suggests that future intervention research could investigate whether health professional personas are also useful, not only for intervention design but also implementation planning.
- Future research should explore creative ways to make research involvement accessible to patients. For example, this could include establishing a stable

presence in healthcare settings to allow patients to participate directly and immediately. Patients in the current study were generally happy to be consulted. Future research should attempt to reconcile making participation as easy as possible (to attract a wider range of patients) with enabling meaningful involvement that can shape intervention design and implementation plans early, as opposed to consultation after key decisions have been made.

8.10 Personal reflections on the research process

I have been raised with a strong sense of social justice which has been reinforced by working for over 12 years in the charity sector. Working with people from very diverse backgrounds and championing a range of causes has taught me the importance of being non-judgemental, learning from others and taking positive steps to effect change. This may have influenced my inclination towards user-centred design as a methodology that offered a chance to work with people for collective action rather than seeing them as subjects of my research. On reflection, I think the PhD has taught me to be less idealistic about this and to accept that there are inevitable imbalances between researcher and participants. I understand now that as the researcher my role is to work collaboratively within the given context and to explore differences between myself and participants reflexively. This chapter has discussed the implications of traditional research processes such as participant information sheets for instituting roles within the research. Participants all knew that the research contributed to my PhD and therefore viewed me as being in charge. My lack of experience in leading this type of research may also have influenced this dynamic. Given that I had placed myself as a 'reflexive participant' it was challenging to reconcile what influence my own position (and opinions) should have on the research and something I was conscious of throughout as part of my epistemological position. I made genuine attempts to ensure that even if action was initiated by me, it was also informed by the views of participants so that it remained user-centred. For example, I continuously referred back to the data from participants including notes, transcripts and photos of sketches made during workshops. Using NVivo software to manage this data provided me with

an overview of how themes recurred and evolved throughout the different phases of the research.

Prior to commencing this PhD research I completed an MSc in Sport and Exercise Psychology. My motivation for choosing this branch of psychology was my own beliefs in the value of exercise. My previous exercise habits had been normal to me for many years but I now realise that I was extremely fit and active in comparison to many of the participants in my research. I find exercising particularly useful for managing stress and it has helped me cope with bereavements and other life events so I personally believe strongly in the links between PA and mental health. I was conscious of this belief in interpreting participants' views and discussed this directly with a colleague during the triangulation of interview data to ensure I wasn't placing undue emphasis on these aspects.

A minority of the health professionals who participated in this research found patients' physical inactivity frustrating. They were extremely active themselves and were almost incredulous about why other people did not or would not engage with PA. During the early stages of the research my personal impression was that the myriad of health and social issues people described could all have been positively influenced by PA - if only we could find the right way to support them. Whilst I still believe this is true to an extent, as the research has progressed I've developed greater appreciation that for some people, there are other priorities. For those people the route to becoming more active may therefore be longer and less direct.

Certain patients and their experiences have stuck with me throughout this research. I feel extremely privileged that so many people were willing to share their most personal experiences and feelings with me. I felt a sense of responsibility towards participants to deliver actionable outcomes from the research and not just talking points. One female patient who took part in the co-design workshops commented to me that she had experience of policy makers ignoring or manipulating community members' views to meet their own agendas, and not providing feedback on actions taken. This comment motivated me to be particularly careful about interpreting participants' views fairly and providing regular updates to participants who wanted

them. At the same time, it has been a challenge to give everyone a voice, manage the diversity of viewpoints whilst keeping an eye on the bigger picture, and being practical about what we could achieve. The research has highlighted starkly contrasting viewpoints within and between groups of people about how PA should be promoted and supported and I don't have a definitive answer about how these can be reconciled. Nonetheless, having undertaken this research for three years I maintain that engaging meaningfully with people who are directly affected is still essential to further our understanding and develop more useful solutions.

8.11 Conclusions

This thesis extends current literature on PA in the NHS. The findings explore patients' and health professionals' views and needs regarding a PA pathway but also outline solutions designed by them to address their needs. In doing so, this has highlighted the consequences of a biomedical NHS culture and organisational system for the promotion of PA. Key findings of this study include patients' support needs which include reassurance about the practical safety of PA, health professionals' uncertainty and lack of resources to promote PA (knowledge, skills and time) and PA providers' role in extending supervision and support. The thesis shows how these factors combined might limit the promotion of PA that fully meets aspirations for patient empowerment. The thesis also demonstrates the challenges of responding to diverse patient needs using a pathway model. Finally, this research has identified strengths, limitations and practical recommendations for the application of user-centred design in a PA context, and the challenges for innovation and change in the context of the considerable system of the NHS.

References

- Anderson, A. S., Steele, R., & Coyle, J. (2013). Lifestyle issues for colorectal cancer survivors--perceived needs, beliefs and opportunities. *Supportive Care in Cancer : Official Journal of the Multinational Association of Supportive Care in Cancer*, *21*(1), 35–42. <https://doi.org/http://dx.doi.org/10.1007/s00520-012-1487-7>
- Anokye, N. K., Trueman, P., Green, C., Pavey, T. G., Hillsdon, M., & Taylor, R. S. (2011). The cost-effectiveness of exercise referral schemes. *BMC Public Health*, *11*(1), 954. <https://doi.org/10.1186/1471-2458-11-954>
- Arnstein, S. R. (1969). A Ladder Of Citizen Participation. *Journal of the American Planning Association*, *35*(4), 216–224. <https://doi.org/10.1080/01944366908977225>
- Arsenijevic, J., & Groot, W. (2017). Physical activity on prescription schemes (PARS): do programme characteristics influence effectiveness? Results of a systematic review and meta-analyses. *BMJ Open*, *7*(2), e012156. <https://doi.org/10.1136/bmjopen-2016-012156>
- Artz, N., Dixon, S., Wylde, V., Beswick, A., Blom, A., & Gooberman-Hill, R. (2013). Physiotherapy Provision Following Discharge after Total Hip and Total Knee Replacement: A Survey of Current Practice at High-Volume NHS Hospitals in England and Wales. *Musculoskeletal Care*, *11*(1), 31–38. <https://doi.org/10.1002/msc.1027>
- AuYoung, M., Ponce, N. A., Duru, O. K., Bustamante, A. V., Mangione, C. M., & Rodriguez, H. P. (2016). Patient activation is inconsistently associated with positive health behaviors among obese safety net patients. *Journal of Immigrant and Minority Health*, *18*(6), 1489–1497. <https://doi.org/http://dx.doi.org/10.1007/s10903-015-0285-y>
- Bäck, M., Öberg, B., & Krevers, B. (2017). Important aspects in relation to patients' attendance at exercise-based cardiac rehabilitation - facilitators, barriers and physiotherapist's role: a qualitative study. *BMC Cardiovascular Disorders*, *17*(1), 77. <https://doi.org/10.1186/s12872-017-0512-7>
- BACPR. (2017). *The BACPR Standards and Core Components for Cardiovascular Disease Prevention and Rehabilitation 2017*.
- Baert, V., Gorus, E., Guldemont, N., De Coster, S., & Bautmans, I. (2015). Physiotherapists' Perceived Motivators and Barriers for Organizing Physical Activity for Older Long-Term Care Facility Residents. *Journal of the American Medical Directors Association*, *16*(5), 371–379. <https://doi.org/10.1016/j.jamda.2014.12.010>
- Bamford, C., Heaven, B., May, C., & Moynihan, P. (2012). Implementing nutrition guidelines for older people in residential care homes: a qualitative study using Normalization Process Theory. *Implementation Science : IS*, *7*(1), 106. <https://doi.org/10.1186/1748-5908-7-106>

- Bandura, A. (1998). Health promotion from the perspective of social cognitive theory. *Psychology & Health, 13*(4), 623–649.
<https://doi.org/10.1080/08870449808407422>
- Barnett-Page, E., & Thomas, J. (2009). *Methods for the synthesis of qualitative research: a critical review*. (NCRM Working Paper Series No. 01/09). London.
<https://doi.org/10.1186/1471-2288-9-59>
- Barnett, K., Mercer, S. W., Norbury, M., Watt, G., Wyke, S., & Guthrie, B. (2012). Epidemiology of multimorbidity and implications for health care, research, and medical education: A cross-sectional study. *The Lancet, 380*(9836), 37–43.
[https://doi.org/10.1016/S0140-6736\(12\)60240-2](https://doi.org/10.1016/S0140-6736(12)60240-2)
- Bartholomew, L., Parcel, G., Kok, G., NH, G., & Fernandez, M. (2011). *Planning health promotion programs: an Intervention Mapping approach*. San Francisco: Jossey-Bass.
- Behavioural Insights Team. (2016). *Making the change. Behavioural factors in person- and community- centred approaches for health and wellbeing*.
https://www.nesta.org.uk/sites/default/files/making_the_change.rtv_.pdf
- Beighton, C., Victor, C., Normansell, R., Cook, D., Kerry, S., Iliffe, S., ... Carole Beighton, Christina Victor, Rebecca Normansell, Derek Cook, Sally Kerry, Steve Iliffe, Michael Ussher, Peter Whincup, Julia Fox-Rushby, Alison Woodcock, and T. H. (2015). “It’s not just about walking.....it’s the practice nurse that makes it work”: a qualitative exploration of the views of practice nurses delivering complex physical activity interventions in primary care. *BMC Public Health, 15*(1), 1236.
<https://doi.org/10.1186/s12889-015-2568-6>
- Bellg, A. J., Borrelli, B., Resnick, B., Hecht, J., Minicucci, D. S., Ory, M., ... Czajkowski, S. (2004). Enhancing Treatment Fidelity in Health Behavior Change Studies: Best Practices and Recommendations From the NIH Behavior Change Consortium. *Health Psychology, 23*(5), 443–451. <https://doi.org/10.1037/0278-6133.23.5.443>
- Bernhardsson, S., Larsson, M. E. H., Johansson, K., & Öberg, B. (2017). “In the physio we trust”: A qualitative study on patients’ preferences for physiotherapy. *Physiotherapy Theory & Practice, 33*(7), 535–549.
<https://doi.org/10.1080/09593985.2017.1328720>
- Bertram, R. M., Blase, K. A., & Fixsen, D. L. (2015). Improving programs and outcomes: Implementation frameworks and organization change. *Research on Social Work Practice, 25*(4), 477–487. <https://doi.org/10.1177/1049731514537687>
- Berwick, D. M. (2009). What “patient-centered” should mean: confessions of an extremist. *Health Affairs (Project Hope), 28*(4), w555-65.
<https://doi.org/10.1377/hlthaff.28.4.w555>
- Birken, S. A., Bunger, A. C., Powell, B. J., Turner, K., Clary, A. S., Klamann, S. L., ... Weiner, B. J. (2017). Organizational theory for dissemination and implementation research. *Implementation Science, 12*(1), 62. <https://doi.org/10.1186/s13012-017-0592-x>

- Blaikie, N. (2007). *Approaches to social enquiry: advancing knowledge* (2nd ed.). Cambridge: Polity.
- Blessing, L. T. M., & Chakrabarti, A. (2009). DRM, a Design Research Methodology, 397. <https://doi.org/10.1007/978-1-84882-587-1>
- Bohman, D. M., Mattsson, L., & Borglin, G. (2015a). Primary healthcare nurses' experiences of physical activity referrals: an interview study. *Primary Health Care Research & Development*, 16(3), 270–280. <https://doi.org/10.1017/S1463423614000267>
- Bohman, D. M., Mattsson, L., & Borglin, G. (2015b). Primary healthcare nurses' experiences of physical activity referrals: an interview study. *Primary Health Care Research & Development*, 16(3), 270–280. <https://doi.org/10.1017/S1463423614000267>
- Booth, A. O., Lewis, C., Dean, M., Hunter, S. J., & McKinley, M. C. (2013). Diet and physical activity in the self-management of type 2 diabetes: barriers and facilitators identified by patients and health professionals. *Primary Health Care Research & Development*, 14(3), 293–306. <https://doi.org/10.1017/S1463423612000412>
- Bowen, S., Dearden, A., Wolstenholme, D., Cobb, M., & Wright, P. (2011). Different Views: Including Others in Participatory Health Service Innovation. In J. Burr (Ed.), *Proceedings of PINC 2011* (pp. 230–236). Sønderborg, Denmark: University of Southern Denmark. Retrieved from <http://shura.shu.ac.uk/3536/>
- Boyden, T., Rubenfire, M., & Franklin, B. (2010). Will Increasing Referral to Cardiac Rehabilitation Improve Participation? *Preventive Cardiology*, 13(4), 198–202. <https://doi.org/10.1111/j.1751-7141.2010.00086.x>
- Bradwell, P., & Marr, S. (2008). *Making the most of collaboration an international survey of public service co-design*. London.
- Brandling, J., & House, W. (2009). Social prescribing in general practice: Adding meaning to medicine. *British Journal of General Practice*, 59(563), 454–456. <https://doi.org/10.3399/bjgp09X421085>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101.
- Braun, V., & Clarke, V. (2013). *Successful qualitative research: a practical guide for beginners*. London: SAGE Publications Ltd.
- Bravo, P., Edwards, A., Barr, P. J., Scholl, I., Elwyn, G., McAllister, M., ... Protheroe, J. (2015). Conceptualising patient empowerment: a mixed methods study. *BMC Health Services Research*, 15(1), 252. <https://doi.org/10.1186/s12913-015-0907-z>
- British Heart Foundation. (2010). *A Toolkit for the Design, Implementation & Evaluation of Exercise Referral Schemes*. <http://www.ssehsactive.org.uk/exercisereferral/index.html>
- British Heart Foundation. (2016). *The National Audit of Cardiac Rehabilitation Annual*

- Statistical Report 2016*. Retrieved from http://www.cardiacrehabilitation.org.uk/docs/BHF_NACR_Report_2016.pdf
- British Heart Foundation. (2017). *Physical inactivity and sedentary behaviour report 2017*. British Heart Foundation. Retrieved from <https://www.bhf.org.uk/publications/statistics/physical-inactivity-report-2017>
- British Thoracic Society, Royal College of Physicians, & Healthcare Quality Improvement Partnership. (2015). *National COPD Audit Programme: Pulmonary rehabilitation. Time to breathe better*. Retrieved from <https://www.rcplondon.ac.uk/projects/national-copd-audit-programme-pulmonary-rehabilitation-workstream>
- Browne, J., Mihas, P., & Penn, D. L. (2016). Focus on Exercise: Client and Clinician Perspectives on Exercise in Individuals with Serious Mental Illness. *Community Mental Health Journal*, 52(4). <https://doi.org/10.1007/s10597-015-9896-y>
- Brunton, G., Oliver, S., Oliver, K., & Lorenc, T. (2006). *A synthesis of research addressing children's young people's and parents' views of walking and cycling for transport*. *Social Science Research*. Retrieved from <http://eppi.ioe.ac.uk/cms/LinkClick.aspx?fileticket=%2B%2F13Gybr%2B6U%3D&t abid=942&mid=2141&language=en-US>
- Bruun, D. M., Krustrup, P., Hornstrup, T., Uth, J., Brasso, K., Rørth, M., ... Midtgaard, J. (2014). "All boys and men can play football": A qualitative investigation of recreational football in prostate cancer patients. *Scandinavian Journal of Medicine and Science in Sports*, 24(SUPPL.1), 113–121. <https://doi.org/10.1111/sms.12193>
- Bull, F. C., & Milton, K. E. (2010). A process evaluation of a "physical activity pathway" in the primary care setting. *BMC Public Health*, 10, 463. <https://doi.org/10.1186/1471-2458-10-463>
- Bull, F., & Milton, K. (2011). Let's Get Moving: a systematic pathway for the promotion of physical activity in a primary care setting. *Global Health Promotion*, 18(1), 59–61. <https://doi.org/10.1177/1757975910393173>
- Burke, S. M., West, M. A., Grocott, M. P. W., Brunet, J., & Jack, S. (2015). Exploring the experience of adhering to a prescribed pre-surgical exercise program for patients with advanced rectal cancer: A phenomenological study. *Psychology of Sport and Exercise*, 16(Part 3), 88–95. <https://doi.org/http://dx.doi.org/10.1016/j.psychsport.2014.09.005>
- Burr, V. (2003). *Social constructionism* (2nd ed.). London: Routledge.
- Camp, P., Reid, W., Chung, F., Kirkham, A., Brooks, D., Goodridge, D., ... Hoens, A. (2015). Clinical decision-making tool for safe and effective prescription of exercise in acute exacerbations of chronic obstructive pulmonary disease: Results from an interdisciplinary Delphi survey and focus groups. *Physical Therapy*, 95(10), 1387–1396.
- Cargo, M., & Mercer, S. L. (2008). The Value and Challenges of Participatory Research: Strengthening Its Practice. *Annual Review of Public Health*, 29(1), 325–350.

<https://doi.org/10.1146/annurev.publhealth.29.091307.083824>

- Carr, V. L., Sangiorgi, D., Büscher, M., Junginger, S., & Cooper, R. (2011). Integrating evidence-based design and experienced-based approaches in healthcare service design. *Health Environments Research and Design Journal*, 4(4), 12–33. <https://doi.org/10.1177/193758671100400403>
- Carroll, C., Booth, A., & Cooper, K. (2011). A worked example of “ best fit ” framework synthesis: A systematic review of views concerning the taking of some potential chemopreventive agents. *BMC Medical Research Methodology*, 11, 29. <https://doi.org/10.1186/1471-2288-11-29>
- Chamberlain, P., Wolstenholme, D., Dexter, M., & Seals, E. (2015). *The State of the Art of Design in Health: An expert-led review of the extent of the art of design theory and practice in health and social care*. Sheffield.
- Cheville, A. L., Dose, A. M., Basford, J. R., & Rhudy, L. M. (2012). Insights Into the Reluctance of Patients With Late-Stage Cancer to Adopt Exercise as a Means to Reduce Their Symptoms and Improve Their Function. *Journal of Pain and Symptom Management*, 44, 84–94. <https://doi.org/10.1016/j.jpainsymman.2011.08.009>
- Clarke, A. L., Young, H. M. L., Hull, K. L., Hudson, N., Burton, J. O., & Smith, A. C. (2015). Motivations and barriers to exercise in chronic kidney disease: a qualitative study. *Nephrology, Dialysis, Transplantation: Official Publication Of The European Dialysis And Transplant Association - European Renal Association*, (June), 1885–1892. <https://doi.org/10.1093/ndt/gfv208>
- Clune, S. J., & Lockrey, S. (2014). Developing environmental sustainability strategies, the Double Diamond method of LCA and design thinking: A case study from aged care. *Journal of Cleaner Production*, 85, 67–82. <https://doi.org/10.1016/j.jclepro.2014.02.003>
- Coghlan, D., & Brannick, T. (2014). *Doing action research in your own organisation* (4th ed.). Los Angeles: Sage Publications.
- Collins, T. C., Kroll, T. L., Krueger, P. N., Willson, P., Ashton, C. M., & Sharf, B. F. (2006). A Qualitative Approach to Developing a Patient-Derived Intervention to Increase Exercise in Peripheral Arterial Disease. *Journal of Cardiopulmonary Rehabilitation*, 26(2), 92–100. <https://doi.org/10.1097/00008483-200603000-00009>
- Colquhoun, H. L., Squires, J. E., Kolehmainen, N., Fraser, C., & Grimshaw, J. M. (2017). Methods for designing interventions to change healthcare professionals’ behaviour: a systematic review. *Implementation Science*, 12(1), 30. <https://doi.org/10.1186/s13012-017-0560-5>
- Connelly, J. (2001). Critical realism and health promotion: effective practice needs an effective theory. *Health Education Research*, 16(2), 115–120. <https://doi.org/10.1093/her/16.2.115>
- Cooke, A., Smith, D., & Booth, A. (2012). Beyond PICO. *Qualitative Health Research*, 22(10), 1435–1443. <https://doi.org/10.1177/1049732312452938>

- Craig, C. L., Marshall, A. L., Sjöström, M., Bauman, A. E., Booth, M. L., Ainsworth, B. E., ... Oja, P. (2003). International physical activity questionnaire: 12-Country reliability and validity. *Medicine and Science in Sports and Exercise*, 35(8), 1381–1395. <https://doi.org/10.1249/01.MSS.0000078924.61453.FB>
- Craig, P., Dieppe, P., Macintyre, S., Michie, S., Nazareth, I., Petticrew, M., ... Petticrew, M. (2008). Developing and evaluating complex interventions : new guidance. *BMJ (Clinical Research Ed.)*, 337, a1655. <https://doi.org/10.1136/bmj.a1655>
- Craike, M. J., Hose, K., Courneya, K. S., Harrison, S. J., & Livingston, P. M. (2013). Perceived benefits and barriers to exercise for recently treated patients with multiple myeloma: a qualitative study. *BMC Cancer*, 13, 319. <https://doi.org/10.1186/1471-2407-13-319>
- Crank, H., Carter, A., Humphreys, L., Snowdon, N., Daley, A., Woodroffe, N., ... Saxton, J. M. (2017). A qualitative investigation of exercise perceptions and experiences in people with multiple sclerosis before, during and after participation in a personally-tailored exercise program. *Archives of Physical Medicine and Rehabilitation*. <https://doi.org/10.1016/j.apmr.2017.05.022>
- Creswell, J. W., Hanson, W. E., Plano Clark, V. L., & Morales, A. (2007). Qualitative Research Designs. *The Counseling Psychologist*, 35(2), 236–264. <https://doi.org/10.1177/0011000006287390>
- Crisford, P., Winzenberg, T., Venn, A., & Cleland, V. (2013). Understanding the physical activity promotion behaviours of podiatrists: A qualitative study. *Journal of Foot and Ankle Research*, 6(1). <https://doi.org/10.1186/1757-1146-6-37>
- Critical Appraisal Skills Programme. (2017). CASP Qualitative Research Checklist. Retrieved November 14, 2017, from <http://www.casp-uk.net/casp-tools-checklists>
- Crone, D., Johnston, L. H., Gidlow, C., Henley, C., & James, D. V. B. (2008). Uptake and participation in physical activity referral schemes in the UK: An investigation of patients referred with mental health problems. *Issues in Mental Health Nursing*, 29(10), 1088–1097. <https://doi.org/10.1080/01612840802319837>
- Cross, N. (2001). Designerly Ways of Knowing: Design Discipline Versus Design Science. *Design Issues*, 17(3), 49–55. <https://doi.org/10.1162/074793601750357196>
- Crotty, M. (1998). *The foundations of social research: meaning and perspective in the research process*. London: Sage Publications.
- Cupchik, G. C. (2001). Constructivist Realism: An Ontology That Encompasses Positivist and Constructivist Approaches to the Social Sciences. *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research*, 2(1), 1–8.
- Darlow, B., Perry, M., Dean, S., Mathieson, F., Baxter, G. D., & Dowell, A. (2016). Putting Physical Activity While Experiencing Low Back Pain in Context: Balancing the Risks and Benefits. *Archives of Physical Medicine and Rehabilitation*, 97(2), 245–251. <https://doi.org/10.1016/j.apmr.2015.09.020>
- Davoody, N., Koch, S., Krakau, I., & Hägglund, M. (2016). Post-discharge stroke

patients' information needs as input to proposing patient-centred eHealth services. *BMC Medical Informatics and Decision Making*, 16(1), 66.
<https://doi.org/10.1186/s12911-016-0307-2>

- Department of Health Physical Activity Health Improvement and Protection. (2011a). *Start Active , Stay Active. Report*, 62.
https://doi.org/https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/216370/dh_128210.pdf
- Department of Health Physical Activity Health Improvement and Protection. (2011b). *Start Active , Stay Active. Report*.
https://doi.org/https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/216370/dh_128210.pdf
- Design Commission. (2013). *Restarting Britain 2: Design and Public Services*. Retrieved from files/101/DC_Restarting_Britain_2_report - interactive.pdf
- Design Council. (2007). Eleven lessons: managing design in eleven global companies. Desk research report. *Engineering*, 44(272099), 18. Retrieved from http://www.designcouncil.org.uk/Documents/Publications/ElevenLessons/ElevenLessons_DeskResearchReport.pdf
- Design Council. (2015). *Design methods for developing services. Keeping Connected Business Challenge*. Retrieved from [http://www.designcouncil.org.uk/sites/default/files/asset/document/Design methods for developing services.pdf](http://www.designcouncil.org.uk/sites/default/files/asset/document/Design%20methods%20for%20developing%20services.pdf)
- Desrochers, P., Kairy, D., Pan, S., Corriveau, H., Tousignant, M., & Corriveau, N. (2016). Tai chi for upper limb rehabilitation in stroke patients: the patient's perspective. <https://doi.org/10.1080/09638288.2016.1194900>
- Desveaux, L., Rolfe, D., Beauchamp, M., Goldstein, R., & Brooks, D. (2014). Participant experiences of a community-based maintenance program post-pulmonary rehabilitation. *Chronic Respiratory Disease*.
<https://doi.org/10.1177/1479972313516880>
- Devi, R., Carpenter, C., Powell, J., & Singh, S. (2014). Exploring the experience of using a web-based cardiac rehabilitation programme in a primary care angina population: a qualitative study. *International Journal of Therapy and Rehabilitation*, 21(9), 434–440. <https://doi.org/10.12968/ijtr.2014.21.9.434>
- Dewey, J. (1931). The development of American pragmatism. In J. Dewey (Ed.), *Philosophy and Civilisation*. New York: Minton, Balch & Co.
- Din, N. U., Moore, G. F., Murphy, S., Wilkinson, C., & Williams, N. H. (2015). Health Professionals' Perspectives on Exercise Referral and Physical Activity Promotion in Primary Care: Findings from a Process Evaluation of the National Exercise Referral Scheme in Wales. *Health Education Journal*, 74(6), 743–757.
<https://doi.org/10.1177/0017896914559785>
- Ding, D., Lawson, K. D., Kolbe-Alexander, T. L., Finkelstein, E. A., Katzmarzyk, P. T., van Mechelen, W., & Pratt, M. (2016). The economic burden of physical inactivity: a

- global analysis of major non-communicable diseases. *The Lancet*, 388(10051), 1311–1324. [https://doi.org/10.1016/S0140-6736\(16\)30383-X](https://doi.org/10.1016/S0140-6736(16)30383-X)
- Dixon-Woods, M., Shaw, R. L., Agarwal, S., & Smith, J. A. (2004). The problem of appraising qualitative research. *Quality and Safety in Health Care*, 13(3), 223–225. <https://doi.org/10.1136/qshc.2003.008714>
- Dobbels, F., De Jong, C., Drost, E., Elberse, J., Feridou, C., Jacobs, L., ... Rüdell, K. (n.d.). The PROactive innovative conceptual framework on physical activity. <https://doi.org/10.1183/09031936.00004814>
- Dolan, P., Hallsworth, M., Halpern, D., King, D., & Vlaev, I. (2010). *MINDSPACE: Influencing behaviour through public policy* (Vol. 33). <https://doi.org/10.1111/j.1753-4887.2009.00206.x>
- Donnelly, C. M., Lowe-Strong, A., Rankin, J. P., Campbell, A., Blaney, J. M., & Gracey, J. H. (2013). A focus group study exploring gynecological cancer survivors' experiences and perceptions of participating in a RCT testing the efficacy of a home-based physical activity intervention. *Supportive Care in Cancer*, 21(6), 1697–1708. <https://doi.org/10.1007/s00520-012-1716-0>
- Doyle, L. H. (2003). Synthesis through meta-ethnography: paradoxes, enhancements, and possibilities. *Qualitative Research*, 3(3), 321–344.
- Dunkley, A. J., Bodicoat, D. H., Greaves, C. J., Russell, C., Davies, M. J., Khunti, K., ... Russell, C. (2014). Diabetes Prevention in the Real World: Effectiveness of Pragmatic Lifestyle Interventions for the Prevention of Type 2 Diabetes and of the Impact of Adherence to Guideline Recommendations. A Systematic Review and Meta-analysis. *Diabetes Care*, 37(6).
- Durose, C., Needham, C., Mangan, C., & Rees, J. (2017). Generating “good enough” evidence for co-production. *Evidence and Policy*, 13(1), 135–151. <https://doi.org/10.1332/174426415X14440619792955>
- Edwards, R. T., Linck, P., Hounsome, N., Raisanen, L., Williams, N., Moore, L., & Murphy, S. (2013). Cost-effectiveness of a national exercise referral programme for primary care patients in Wales: results of a randomised controlled trial. *BMC Public Health*, 13(1), 1021. <https://doi.org/10.1186/1471-2458-13-1021>
- Elissen, A. M. J., Hertroijs, D. F. L., Schaper, N., & Ruwaard, D. (2016). PROFiling patients' healthcare needs to support integrated, person-centered models for Long-term disease management (PROFILE): Study design and rationale. *International Journal of Integrated Care*, 15(5), 1–11. <https://doi.org/10.5334/ijic.2081>
- Elley, C. R., Dean, S., & Kerse, N. (2007). Physical activity promotion in general practice-patient attitudes. *Australian Family Physician*, 36(12), 1061–1064.
- Emslie, C., Whyte, F., Campbell, A., Mutrie, N., Lee, L., Ritchie, D., & Kearney, N. (2007). “I wouldn't have been interested in just sitting round a table talking about cancer”; exploring the experiences of women with breast cancer in a group exercise trial. *Health Education Research*, 22(6), 827–838.

<https://doi.org/10.1093/her/cyl159>

- Feast, L. (2010). Epistemological Positions Informing Theories of Design Research: Implications for the Design Discipline and Design Practice. *“Design and Complexity”, the 2010 Design Research*, (40), 7–9. <https://doi.org/9782981198525>
- Fisher, A., Beeken, R. J., Heinrich, M., Williams, K., & Wardle, J. (2016). Health behaviours and fear of cancer recurrence in 10 969 colorectal cancer (CRC) patients. *Psycho-Oncology*, 25(12), 1434–1440. <https://doi.org/http://dx.doi.org/10.1002/pon.4076>
- Fixsen, D. L., Blase, K. a., Naoom, S. F., & Wallace, F. (2009). Core Implementation Components. *Research on Social Work Practice*, 19(5), 531–540. <https://doi.org/10.1177/1049731509335549>
- Fjeldsoe, B. S., Miller, Y. D., O’Brien, J. L., & Marshall, A. L. (2012). Iterative development of MobileMums: a physical activity intervention for women with young children. *The International Journal of Behavioral Nutrition and Physical Activity*, 9(1), 151. <https://doi.org/10.1186/1479-5868-9-151>
- Flyvbjerg, B. (2011). Case study. In N. K. Denzin & Y. S. Lincoln (Eds.), *The Sage handbook of qualitative research* (4th ed., pp. 301–316). Thousand Oaks, CA: Sage Publications.
- Foster, F., Piggott, R., Riley, L., & Beech, R. (2015). Working with primary care clinicians and patients to introduce strategies for increasing referrals for pulmonary rehabilitation. *Primary Health Care Research & Development*, (April), 1–12. <https://doi.org/10.1017/S1463423615000286>
- Frayling, C. (1993). Research in Art and Design. *Royal College of Art Research Papers*. <https://doi.org/2016.01.18>
- Galdas, P. M., Oliffe, J. L., Kang, H. B. K., & Kelly, M. T. (2012). Punjabi Sikh Patients’ Perceived Barriers to Engaging in Physical Exercise Following Myocardial Infarction. *Public Health Nursing*, 29(6), 534–541. <https://doi.org/10.1111/j.1525-1446.2012.01009.x>
- Gammon, D., Strand, M., & Eng, L. S. (2014). Service users’ perspectives in the design of an online tool for assisted self-help in mental health: a case study of implications. *International Journal of Mental Health Systems*, 8(1), 2. <https://doi.org/10.1186/1752-4458-8-2>
- Gates, A. B. (n.d.). Training tomorrow ’ s doctors , in exercise medicine , for tomorrow ’ s patients, 207–209. <https://doi.org/10.1136/bjsports-2014-094442>
- Gates, A. B. (2015). Training tomorrow’s doctors, in exercise medicine, for tomorrow’s patients. *British Journal of Sports Medicine*, 49, 207–208. <https://doi.org/10.1136/bjsports-2014-094442>
- Gaver, W. (2012). What should we expect from research through design? *Proceedings of the 2012 ACM Annual Conference on Human Factors in Computing Systems - CHI ’12*, 937. <https://doi.org/10.1145/2207676.2208538>

- Gidlow, C., Johnston, L. H., Crone, D., Ellis, N., & James, D. (2006). A systematic review of the relationship between socio-economic position and physical activity. *Health Education Journal*, *65*(4), 338–367. <https://doi.org/10.1177/0017896906069378>
- Glanville, R. (2015). The sometimes uncomfortable marriages of design and research. In P. Rodgers & J. Yee (Eds.), *Routledge Companion to Design Research*. Abingdon, Oxon: Routledge.
- Goldkuhl, G. (2008). Practical inquiry as action research and beyond. In V. Golden, W; Acton, T; Conboy, K; Van Der Heijden, H; Tuunainen (Ed.), *Proceedings of the 16th European Conference on Information Systems* (pp. 267–278). Galway, Ireland.
- Greenhalgh, T., Robert, G., Macfarlane, F., Bate, P., & Kyriakidou, O. (2014). Diffusion of Innovations in Service Organizations : Systematic Review and Recommendations, *82*(4), 581–629.
- Groven, K. S., Råheim, M., & Engelsrud, G. (2013). Changing Bodies, Changing Habits: Women’s Experiences of Interval Training Following Gastric Bypass Surgery. *Health Care for Women International*, *9332*(May 2015), 1–27. <https://doi.org/10.1080/07399332.2013.794465>
- Hanney, W. J., Kolber, M. J., George, S. Z., Young, I., Patel, C. K., & Cleland, J. A. (2013). ORIGINAL RESEARCH. DEVELOPMENT OF A PRELIMINARY CLINICAL PREDICTION RULE TO IDENTIFY PATIENTS WITH NECK PAIN THAT MAY BENEFIT FROM A STANDARDIZED PROGRAM OF STRETCHING AND MUSCLE PERFORMANCE EXERCISE: A PROSPECTIVE COHORT STUDY. *International Journal of Sports Physical Therapy*, *8*(6), 756–776. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=ccm&AN=103896073&site=ehost-live>
- Harrison, H., Birks, M., Franklin, R., & Mills, J. (2017). Case Study Research: Foundations and Methodological Orientations. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research*, *18*(1). <https://doi.org/http://dx.doi.org/10.17169/fqs-18.1.2655>.
- Hasso Plattner Institute of Design at Stanford University. (2017). “How might we” questions.
- Health Research Authority. (2017). *Applying a proportionate approach to the process of seeking consent: HRA Guidance*. Retrieved from www.hra.nhs.uk/.../01/applying-proportionate-approach-process-seeking-consent.pdf
- Hébert, E. T., Caughy, M. O., & Shuval, K. (2012). Primary care providers’ perceptions of physical activity counselling in a clinical setting: a systematic review. *British Journal of Sports Medicine*, *46*(9), 625–631. <https://doi.org/10.1136/bjsports-2011-090734>
- Hefferon, K., Murphy, H., McLeod, J., Mutrie, N., & Campbell, A. (2013a). Understanding barriers to exercise implementation 5-year post-breast cancer diagnosis: a large-scale qualitative study. *Health Education Research*, *28*(5), 843–856. <https://doi.org/10.1093/her/cyt083>

- Hefferon, K., Murphy, H., McLeod, J., Mutrie, N., & Campbell, A. (2013b). Understanding barriers to exercise implementation 5-year post-breast cancer diagnosis: a large-scale qualitative study. *Health Education Research, 28*(5), 843–856. <https://doi.org/10.1093/her/cyt083>
- Heinen, M. M., Evers, A. W. M., Van Uden, C. J. T., Van der Vleuten, C. J. M., van de Kerkhof, P. C. M., & Van Achterberg, T. (2007). Sedentary patients with venous or mixed leg ulcers: determinants of physical activity. *Journal of Advanced Nursing, 60*(1), 50–57. Retrieved from <http://lcproxy.shu.ac.uk/login?url=https://search.proquest.com/docview/68254034?accountid=13827>
- Henriksson, A., Arving, C., Johansson, B., Igelström, H., & Nordin, K. (2016). Perceived barriers to and facilitators of being physically active during adjuvant cancer treatment. *Patient Education and Counseling, 99*(7), 1220–1226. <https://doi.org/10.1016/j.pec.2016.01.019>
- Heron, N., Tully, M. A., McKinley, M. C., & Cupples, M. E. (2014a). Physical activity assessment in practice: a mixed methods study of GPPAQ use in primary care. *BMC Family Practice, 15*, 11. <https://doi.org/http://dx.doi.org/10.1186/1471-2296-15-11>
- Heron, N., Tully, M. a, McKinley, M. C., & Cupples, M. E. (2014b). Physical activity assessment in practice: a mixed methods study of GPPAQ use in primary care. *BMC Family Practice, 15*, 11. <https://doi.org/10.1186/1471-2296-15-11>
- Hibbard, J. H., & Greene, J. (2013). What the evidence shows about patient activation: Better health outcomes and care experiences; fewer data on costs. *Health Affairs, 32*(2), 207–214. <https://doi.org/10.1377/hlthaff.2012.1061>
- Hibbard, J. H., Stockard, J., Mahoney, E. R., & Tusler, M. (2004). Development of the Patient Activation Measure (PAM): Conceptualizing and Measuring Activation in Patients and Consumers. *Health Services Research, 39*(4p1), 1005–1026. <https://doi.org/10.1111/j.1475-6773.2004.00269.x>
- Hillsdon, K. M., Kersten, P., & Kirk, H. J. S. (2013). A qualitative study exploring patients' experiences of standard care or cardiac rehabilitation post minor stroke and transient ischaemic attack. *Clinical Rehabilitation, 27*(9), 845–853. <https://doi.org/10.1177/0269215513478956>
- Holden, R. J., Kulanthaivel, A., Purkayastha, S., Goggins, K. M., & Kirpalani, S. (2017). Know thy eHealth user: Development of biopsychosocial personas from a study of older adults with heart failure. *International Journal of Medical Informatics, 108*(August 2016), 158–167. <https://doi.org/10.1016/j.ijmedinf.2017.10.006>
- Holmberg, C., Farahani, Z., & Witt, C. (2016). How Do Patients with Chronic Neck Pain Experience the Effects of Qigong and Exercise Therapy? A Qualitative Interview Study. *Evidence - Based Complementary and Alternative Medicine, 2016*. <https://doi.org/10.1155/2016/8010891>
- Holmberg, C., Rappenecker, J., Karner, J. J., & Witt, C. M. (2014). The perspectives of older women with chronic neck pain on perceived effects of qigong and exercise

therapy on aging: A qualitative interview study. *Clinical Interventions in Aging*, 9, 403–410. <https://doi.org/10.2147/CIA.S54249>

Horgan, J. M. P., Blenkinsopp, A., & McManus, R. J. (2010). Evaluation of a cardiovascular disease opportunistic risk assessment pilot ('Heart MOT' service) in community pharmacies. *Journal of Public Health*, 32(1), 110–116. <https://doi.org/10.1093/pubmed/fdp092>

Huijg, J. M., Gebhardt, W. a, Verheijden, M. W., van der Zouwe, N., de Vries, J. D., Middelkoop, B. J. C., & Crone, M. R. (2014). Factors Influencing Primary Health Care Professionals' Physical Activity Promotion Behaviors: A Systematic Review. *International Journal of Behavioral Medicine*, 32–50. <https://doi.org/10.1007/s12529-014-9398-2>

Huijg, J. M., van der Zouwe, N., Crone, M. R., Verheijden, M. W., Middelkoop, B. J. C., & Gebhardt, W. a. (2015). Factors Influencing the Introduction of Physical Activity Interventions in Primary Health Care: a Qualitative Study. *International Journal of Behavioral Medicine*, 22, 404–414. <https://doi.org/10.1007/s12529-014-9411-9>

Husebo, A. M. L., Karlsen, B., Allan, H., Soreide, J. A., & Bru, E. (2015). Factors perceived to influence exercise adherence in women with breast cancer participating in an exercise programme during adjuvant chemotherapy: A focus group study. *Journal of Clinical Nursing*, 24(3–4), 500–510. <https://doi.org/10.1111/jocn.12633>

Husebo, A. M. L., Karlsen, B., Allan, H., Soreide, J. A., & Bru, E. (2015). Factors perceived to influence exercise adherence in women with breast cancer participating in an exercise programme during adjuvant chemotherapy: a focus group study. *Journal of Clinical Nursing*, 24(3–4), 500–510. <https://doi.org/10.1111/jocn.12633>

Hutchison, A. J., Breckon, J. D., & Johnston, L. H. (2009). Physical Activity Behavior Change Interventions Based on the Transtheoretical Model: A Systematic Review. *Health Education & Behavior*, 36(5), 829–845. <https://doi.org/10.1177/1090198108318491>

Ingledeu, D. K., Markland, D., & Strömmer, S. T. (2014). Elucidating the roles of motives and gains in exercise participation. *Sport, Exercise, and Performance Psychology*, 3(2), 116–131. <https://doi.org/10.1037/spy0000004>

Jackson, F., Myers, F., Oates, A., & Martin, N. (2014). *NHS Primary Care Physical Activity Pathway Feasibility Study Final Main Report May 2014*.

James, D., Mills, H., Crone, D., Johnston, L. H., Morris, C., & Gidlow, C. J. (2009). Factors associated with physical activity referral completion and health outcomes. *Journal of Sports Sciences*, 27(10), 1007–1017. <https://doi.org/10.1080/02640410903214248>

James, D. V. B., Johnston, L. H., Crone, D., Sidford, A. H., Gidlow, C., Morris, C., & Foster, C. (2008). Factors associated with physical activity referral uptake and participation. *Journal of Sports Sciences*, 26(2), 217–224. <https://doi.org/10.1080/02640410701468863>

- Joelsson, M., Bernhardsson, S., & Larsson, M. E. H. (2017). Patients with chronic pain may need extra support when prescribed physical activity in primary care: A qualitative study. *Scandinavian Journal of Primary Health Care*, *35*(1), 64–74. <https://doi.org/http://dx.doi.org/10.1080/02813432.2017.1288815>
- Jokar, F., Yousefi, H., Yousefy, A., & Sadeghi, M. (2015). Behavioral Change Challenges in the Context of Center-Based Cardiac Rehabilitation: A Qualitative Study. *Iranian Red Crescent Medical Journal*, *17*(5). [https://doi.org/10.5812/ircmj.17\(5\)2015.27504](https://doi.org/10.5812/ircmj.17(5)2015.27504)
- Jonas, W. (2007). Design Research and its Meaning to the Methodological Development of the Discipline. In *Design Research Now* (pp. 187–206).
- Jones, N., Weiler, R., Hutchings, K., Stride, M., Adejuwon, A., Baker, P., ... Chew, S. (2014). *Sport and exercise medicine: a fresh approach* (Vol. 42). <https://doi.org/10.1016/j.mpmed.2014.01.011>
- Jun, G. T., Morrison, C., & Clarkson, P. J. (2014). Articulating current service development practices: a qualitative analysis of eleven mental health projects. *BMC Health Services Research*, *14*, 20. <https://doi.org/10.1186/1472-6963-14-20>
- Kaptein, S. A., Backman, C. L., Badley, E. M., Lacaille, D., Beaton, D. E., Hofstetter, C., & Gignac, M. A. M. (2013). Choosing where to put your energy: A qualitative analysis of the role of physical activity in the lives of working adults with arthritis. *Arthritis Care and Research*, *65*(7), 1070–1076. <https://doi.org/10.1002/acr.21957>
- Khunti, K., Gray, L. J., Skinner, T., Carey, M. E., Realf, K., Dallosso, H., ... Davies, M. J. (2012). Effectiveness of a diabetes education and self management programme (DESMOND) for people with newly diagnosed type 2 diabetes mellitus: Three year follow-up of a cluster randomised controlled trial in primary care. *BMJ: British Medical Journal*, *344*(7860). Retrieved from <http://lproxy.shu.ac.uk/login?url=https://search.proquest.com/docview/1027509312?accountid=13827>
- King, N., & Horrocks, C. (2010). *Interviews in Qualitative Research*. London: Sage Publications.
- Kitson, A., Marshall, A., Bassett, K., & Zeitz, K. (2013). What are the core elements of patient-centred care? A narrative review and synthesis of the literature from health policy, medicine and nursing. *Journal of Advanced Nursing*, *69*(1), 4–15. <https://doi.org/10.1111/j.1365-2648.2012.06064.x>
- Larun, L., & Malterud, K. (2011). Finding the right balance of physical activity. A focus group study about experiences among patients with chronic fatigue syndrome. *Patient Education and Counseling*, *83*(2), 222–226. <https://doi.org/10.1016/j.pec.2010.05.027>
- Learmonth, Y. C., Adamson, B. C., Balto, J. M., Chiu, C.-Y., Molina-Guzman, I. M., Finlayson, M., ... Motl, R. W. (2017). Investigating the needs and wants of healthcare providers for promoting exercise in persons with multiple sclerosis: a qualitative study. *Disability and Rehabilitation*, *8288*(August), 1–9. <https://doi.org/10.1080/09638288.2017.1327989>

- Lee, A. S., & Nickerson, J. V. (2010). Theory as a case of design: Lessons for design from the philosophy of science. *Proceedings of the Annual Hawaii International Conference on System Sciences*, 1–8. <https://doi.org/10.1109/HICSS.2010.484>
- Lee, I. M., Shiroma, E. J., Lobelo, F., Puska, P., Blair, S. N., Katzmarzyk, P. T., ... Wells, J. C. (2012). Effect of physical inactivity on major non-communicable diseases worldwide: An analysis of burden of disease and life expectancy. *The Lancet*, *380*(9838), 219–229. [https://doi.org/10.1016/S0140-6736\(12\)61031-9](https://doi.org/10.1016/S0140-6736(12)61031-9)
- Leijon, M. E., Stark-Ekman, D., Nilsen, P., Ekberg, K., Walter, L., Ståhle, A., & Bendtsen, P. (2010). Is there a demand for physical activity interventions provided by the health care sector? Findings from a population survey. *BMC Public Health*, *10*, 34. <https://doi.org/10.1186/1471-2458-10-34>
- Levati, S., Campbell, P., Frost, R., Dougall, N., Wells, M., Donaldson, C., & Hagen, S. (2016). Optimisation of complex health interventions prior to a randomised controlled trial: a scoping review of strategies used. *Pilot and Feasibility Studies*, *2*(1), 1–17. <https://doi.org/10.1186/s40814-016-0058-y>
- Lindstrom, B., & Eriksson, M. (2005). Salutogenesis. *Journal of Epidemiology & Community Health*, *59*(6), 440–442. <https://doi.org/10.1136/jech.2005.034777>
- Lobb, R., Colditz, G. A., & Louis, S. (2014). Implementation Science and its Application to Population Health. *American Journal of Public Health*, 235–251. <https://doi.org/10.1146/annurev-publhealth-031912-114444>.Implementation
- Lobelo, F., Stoutenberg, M., & Hutber, A. (2014). The Exercise is Medicine Global Health Initiative: a 2014 update. *British Journal of Sports Medicine*, *48*(22), 1627–33. <https://doi.org/10.1136/bjsports-2013-093080>
- Lowe, A., Gates, A., & Callaghan, P. (2016). Special interest report: making every contact count for physical activity: equipping tomorrow's physiotherapists to deliver high quality physical activity interventions. *Physiotherapy*, *102*, e45–e46. <https://doi.org/10.1016/j.physio.2016.10.364>
- LUMA Institute. (2012). *Innovating for people : handbook of human-centered design methods*. Piitsburgh, Pennsylvania: LUMA Institute LLC.
- Luoma, M.-L., Hakamies-Blomqvist, L., Blomqvist, C., Nikander, R., Gustavsson-Lilius, M., & Saarto, T. (2014). Experiences of breast cancer survivors participating in a tailored exercise intervention -a qualitative study. *Anticancer Research*, *34*(3), 1193–1199.
- MacAuley, D., Bauman, A., & Frémont, P. (2015). Exercise: not a miracle cure, just good medicine. *BMJ (Clinical Research Ed.)*, *350*(4), h1416. <https://doi.org/10.1136/bmj.h1416>
- Macdonald, A., & Robert, G. (2014). Reconciling Science and Art within healthcare Service Design. *Mapping and Developing Service Design Research in the UK*, 36–37. Retrieved from http://www.researchgate.net/profile/Daniela_Sangiorgi/publication/263255940_SERVICE_DESIGN_RESEARCH_UK_NETWORK_Mapping_and_developing_Service

- Malhotra, C., Chan, N., Zhou, J., Dalager, H. B., & Finkelstein, E. (2015). Variation in physician recommendations, knowledge and perceived roles regarding provision of end-of-life care. *BMC Palliative Care*, *14*, 52. <https://doi.org/10.1186/s12904-015-0050-y>
- Malpass, A., Andrews, R., & Turner, K. M. (2009). Patients with Type 2 Diabetes experiences of making multiple lifestyle changes: a qualitative study. *Patient Education and Counseling*, *74*(2), 258–263. <https://doi.org/10.1016/j.pec.2008.08.018>
- Malterud, K. (2001). Qualitative research: standards, challenges, and guidelines. *The Lancet*, *358*, 483–488. [https://doi.org/10.1016/S0140-6736\(01\)05627-6](https://doi.org/10.1016/S0140-6736(01)05627-6)
- Mantoura, P., & Potvin, L. (2013). A realist-constructionist perspective on participatory research in health promotion. *Health Promotion International*, *28*(1), 61–72. <https://doi.org/10.1093/heapro/das037>
- Martin, B. W., Kahlmeier, S., Racioppi, F., Berggren, F., Miettinen, M., Oppert, J. M., ... Sjöström, M. (2006). Evidence-based physical activity promotion - HEPA Europe, the European Network for the Promotion of Health-Enhancing Physical Activity. *Journal of Public Health*, *14*(2), 53–57. <https://doi.org/10.1007/s10389-006-0029-5>
- Massey, C., & Munt, D. (2009). Preparing to be creative in the NHS: making it personal. *Health Care Analysis : HCA : Journal of Health Philosophy and Policy*, *17*(4), 296–308. <https://doi.org/10.1007/s10728-009-0132-1>
- Matheson, G. O., Klugl, M., Engebretsen, L., Bendiksen, F., Blair, S. N., Borjesson, M., ... Ljungqvist, A. (2013). Prevention and management of non-communicable disease: the IOC consensus statement, Lausanne 2013. *British Journal of Sports Medicine*, *47*, 1003–1011. <https://doi.org/10.1136/bjsports-2013-093034>
- Maxwell, J. (1995). Diversity and methodology in a changing world. *Pedagogia*, *30*, 32–40.
- Maxwell, J. (2012). *A realist approach for qualitative research*. London: Sage Publications.
- May, C., & Finch, T. (2009). Implementing, Embedding, and Integrating Practices: An Outline of Normalization Process Theory. *Sociology*, *43*(3), 535–554. <https://doi.org/10.1177/0038038509103208>
- McBride, C. M., Emmons, K. M., & Lipkus, I. M. (2003). Understanding the potential of teachable moments for motivating smoking cessation. *Health Education Research*, *18*(2), 156–170.
- McPhail, S. M., Schippers, M., Marshall, A. L., Waite, M., & Kuipers, P. (2014). Perceived barriers and facilitators to increasing physical activity among people with musculoskeletal disorders: a qualitative investigation to inform intervention development. *Clinical Interventions in Aging*, *9*, 2113–2122. <https://doi.org/10.2147/CIA.S72731>

- Merriam, S. B. (1998). *Qualitative research and case study applications in education* (2nd ed.). San Francisco, CA: Jossey-Bass Publishers.
- Merriam, S. B. (2009). *Qualitative research: A guide to design and implementation* (2nd ed.). San Francisco, CA: Jossey-Bass.
- Mikkelsen, M. R., Hendriksen, C., Schiødt, F. V., & Rydahl-Hansen, S. (2016). Alcoholic liver disease patients' perspective of a coping and physical activity-oriented rehabilitation intervention after hepatic encephalopathy. *Journal of Clinical Nursing, 25*(17–18), 2457–2467. <https://doi.org/10.1111/jocn.13265>
- Miles, M. B., & Huberman, A. (1994). *Qualitative data analysis: an expanded sourcebook* (2nd ed.). London: Sage Publications.
- Miller, W. R., & Rose, G. S. (2013). Motivational Interviewing and Decisional Balance: Contrasting Responses to Client Ambivalence. *Behavioural and Cognitive Psychotherapy, 43*(2), 1–13. <https://doi.org/10.1017/S1352465813000878>
- Mills, H., Crone, D., James, D. V. B., & Johnston, L. H. (2012). Exploring the perceptions of success in an exercise referral scheme: a mixed method investigation. *Evaluation Review, 36*(6), 407–429. <https://doi.org/10.1177/0193841X12474452>
- Missel, M., Pedersen, J. H., Hendriksen, C., Tewes, M., & Adamsen, L. (2015). Exercise intervention for patients diagnosed with operable non-small cell lung cancer: a qualitative longitudinal feasibility study. *Supportive Care in Cancer, 23*(8), 2311–2318. <https://doi.org/10.1007/s00520-014-2579-3>
- Moja, L., Polo Friz, H., Capobussi, M., Kwag, K., Banzi, R., Ruggiero, F., ... Bonovas, S. (2016). Implementing an evidence-based computerized decision support system to improve patient care in a general hospital: the CODES study protocol for a randomized controlled trial. *Implementation Science : IS, 11*(1), 89. <https://doi.org/10.1186/s13012-016-0455-x>
- Moore, G. F., Moore, L., & Murphy, S. (2011). Facilitating adherence to physical activity: exercise professionals' experiences of the National Exercise Referral Scheme in Wales: a qualitative study. *BMC Public Health, 11*(1), 935. <https://doi.org/10.1186/1471-2458-11-935>
- Moore, G. F., Raisanen, L., Moore, L., Din, N. U., & Murphy, S. (2013). Mixed-method process evaluation of the Welsh National Exercise Referral Scheme. *Health Education, 113*(6), 476–501. <https://doi.org/http://dx.doi.org/10.1108/HE-08-2012-0046>
- Moore, L., Hogg, L., & White, P. (2012). Acceptability and feasibility of pulmonary rehabilitation for COPD: a community qualitative study. *Primary Care Respiratory Journal : Journal of the General Practice Airways Group, 21*(4), 419–424. <https://doi.org/10.4104/pcrj.2012.00086>
- Morey, S. A., Barg-walkow, L. H., & Rogers, W. A. (2017). Managing Heart Failure On the Go : Usability Issues with mHealth Apps for Older Adults, 1–5.
- Morris, J. H., Oliver, T., Kroll, T., Joice, S., & Williams, B. (2015). From physical and functional to continuity with pre-stroke self and participation in valued activities:

- A qualitative exploration of stroke survivors', carers' and physiotherapists' perceptions of physical activity after stroke. *Disability and Rehabilitation*, 37(1), 64–77. <https://doi.org/10.3109/09638288.2014.907828>
- Mulligan, H., Fjellman-Wiklund, A., Hale, L., Thomas, D., & Häger-Ross, C. (2011). Promoting physical activity for people with neurological disability: Perspectives and experiences of physiotherapists. *Physiotherapy Theory and Practice*, 27(6). <https://doi.org/10.3109/09593985.2010.519015>
- Murphy, S. M., Edwards, R. T., Williams, N., Raisanen, L., Moore, G., Linck, P., ... Moore, L. (2012). An evaluation of the effectiveness and cost effectiveness of the National Exercise Referral Scheme in Wales, UK: a randomised controlled trial of a public health policy initiative. *Journal of Epidemiology and Community Health*, 66(8), 745–753. <https://doi.org/10.1136/jech-2011-200689>
- Murray, R; Caulier-Grice, J; Mulgan, G. (2010). *The Open Book of Social Innovation*. London: National Endowment for Science, Technology and the Art.
- Murray, K. E., Ermias, A., Lung, A., Mohamed, A. S., Ellis, B. H., Linke, S., ... Marcus, B. H. (2017). Culturally adapting a physical activity intervention for Somali women: the need for theory and innovation to promote equity. *Translational Behavioral Medicine*, 7(1), 6–15. <https://doi.org/10.1007/s13142-016-0436-2>
- NHS Confederation. (2014). NHS Statistics. Retrieved from <http://www.nhsconfed.org/priorities/political-engagement/Pages/NHS-statistics.aspx>
- NHS England. (2014). *Five Year Forward View*. Retrieved from <https://www.england.nhs.uk/wp-content/uploads/2014/10/5yfv-web.pdf>
- NHS England. (2016). Achieving World-Class Cancer Outcomes: Taking the strategy forward, (May), 1–13. Retrieved from <https://www.england.nhs.uk/wp-content/uploads/2016/05/cancer-strategy.pdf>
- Nice. (2015). QS 84 Physical activity : encouraging activity in all people in contact with the NHS. *NICE Quality Standard*, (March).
- NICE. (2013). *Physical activity : brief advice for adults in primary care*. *NICE Guidelines*.
- NICE. (2014). PH54: Exercise referral schemes to promote physical activity, (September), 48. Retrieved from <https://www.nice.org.uk/guidance/ph54>
- Nicholson, S. L., Donaghy, M., Johnston, M., Sniehotta, F. F., van Wijck, F., Johnston, D., ... Mead, G. (2013). A qualitative theory guided analysis of stroke survivors' perceived barriers and facilitators to physical activity. *Disability and Rehabilitation*, 36(22), 1–12. <https://doi.org/10.3109/09638288.2013.874506>
- Norman, D. A., & Verganti, R. (2012). Incremental and Radical Innovation. *Design Issues*. https://doi.org/10.1162/DESI_a_00250
- Normansell, R., Holmes, R., Victor, C., Cook, D. G., Kerry, S., Iliffe, S., ... Harris, T. (2016). Exploring non-participation in primary care physical activity interventions: PACE-UP trial interview findings. *Trials*, 17, 178. <https://doi.org/10.1186/s13063-016->

- Orow, G., Kinmonth, A.-L., Sanderson, S., & Sutton, S. (2012). Effectiveness of physical activity promotion based in primary care: systematic review and meta-analysis of randomised controlled trials. *Bmj*, *344*(mar26 1), e1389–e1389. <https://doi.org/10.1136/bmj.e1389>
- Osborn, A. (1953). *Applied Imagination*. New York: Scribner.
- Patel, A., Schofield, G. M., Kolt, G. S., Keogh, J. W., Bauman, A., Warburton, D., ... Thomas, S. (2011). General practitioners' views and experiences of counselling for physical activity through the New Zealand Green Prescription program. *BMC Family Practice*, *12*(1), 119. <https://doi.org/10.1186/1471-2296-12-119>
- Patton, M. (2002). *Qualitative research and evaluation methods* (3rd ed.). London: Sage Publications.
- Pavey, T. G., Taylor, A. H., Fox, K. R., Hillsdon, M., Anokye, N., Campbell, J. L., ... Taylor, R. S. (2011). Effect of exercise referral schemes in primary care on physical activity and improving health outcomes: systematic review and meta-analysis. *British Medical Journal*, *343*(nov04 2), d6462–d6462. <https://doi.org/10.1136/bmj.d6462>
- Pavey, T., Taylor, A., Hillsdon, M., Fox, K., Campbell, J., Foster, C., ... Taylor, R. (2012). Levels and predictors of exercise referral scheme uptake and adherence: a systematic review. *Journal of Epidemiology and Community Health*, *66*(8), 737–744. <https://doi.org/10.1136/jech-2011-200354>
- Pawson, R., & Tilley, N. (1997). *Realistic Evaluation*. Los Angeles: Sage Publications.
- Pearce, V., Baraitser, P., Smith, G., & Greenhalgh, T. (2011). Experience-based co-design. In T. Greenhalgh, C. Humphrey, & F. Woodward (Eds.), *User Involvement in Health Care* (pp. 28–51). Chichester: Wiley-Blackwell.
- Pedersen, B. K., & Saltin, B. (2015). Exercise as medicine - Evidence for prescribing exercise as therapy in 26 different chronic diseases. *Scandinavian Journal of Medicine and Science in Sports*, *25*, 1–72. <https://doi.org/10.1111/sms.12581>
- Peel, E., Douglas, M., Parry, O., Lawton, J., Peel, E., Douglas, M., ... Lawton, J. (2010). Type 2 diabetes and dog walking: patients' longitudinal perspectives about implementing and sustaining physical activity. *British Journal of General Practice*, *60*(577), 570–577. <https://doi.org/10.3399/bjgp10X515061>
- Perry, C., Chhatralia, K., Damesick, D., Hobden, S., & Volpe, L. (2015). *Behavioural insights in health care Nudging to reduce inefficiency and waste*. The Health Foundation. <http://www.health.org.uk/publication/behavioural-insights-health-care>
- Persson, G., Brorsson, A., Ekvall Hansson, E., Troein, M., Strandberg, E., Leijon, M., ... DuPre, E. (2013). Physical activity on prescription (PAP) from the general practitioner's perspective – a qualitative study. *BMC Family Practice*, *14*(1), 128. <https://doi.org/10.1186/1471-2296-14-128>
- Popay, J., & Collins, M. (2014). *PiiAF The Public Involvement Impact Assessment*

Framework Guidance. Retrieved from <http://piiaf.org.uk/documents/piiaf-guidance-jan14.pdf>

- Pratt, M., Perez, L. G., Goenka, S., Brownson, R. C., Bauman, A., Sarmiento, O. L., & Hallal, P. C. (2015). Can Population Levels of Physical Activity Be Increased? Global Evidence and Experience. *Progress in Cardiovascular Diseases, 57*(4), 356–367. <https://doi.org/10.1016/j.pcad.2014.09.002>
- Prestwich, A., Sniehotta, F. F., Whittington, C., Dombrowski, S. U., Rogers, L., & Michie, S. (2014). Does theory influence the effectiveness of health behavior interventions? Meta-analysis. *Health Psychology, 33*(5), 465–474. <https://doi.org/10.1037/a0032853>
- Prochaska, J. O., & DiClemente, C. C. (1983). Stages and processes of self-change of smoking: Toward an integrative model of change. *Journal of Consulting and Clinical Psychology, 51*(3), 390–395. <https://doi.org/10.1037/0022-006X.51.3.390>
- Prochaska, J. O., & Velicer, W. F. (1997). The transtheoretical model of health behavior change. *American Journal of Health Promotion, 12*(1), 38–48. <https://doi.org/10.4278/0890-1171-12.1.38>
- Public Health England. (2014). *Everybody active, every day: An evidence-based approach to physical activity*. Public Health England. Retrieved from www.gov.uk/phe%5Cnwww.facebook.com/PublicHealthEngland
- Puttick, R., & Ludlow, J. (2013). *Standards of Evidence : an Approach That Balances the Need for Evidence With Innovation*. London. Retrieved from https://www.nesta.org.uk/sites/default/files/standards_of_evidence.pdf
- Rask, K. J., Ziemer, D. C., Kohler, S. A., Hawley, J. N., Arinde, F. J., & Barnes, C. S. (2009). Patient activation is associated with healthy behaviors and ease in managing diabetes in an indigent population. *The Diabetes Educator, 35*(4), 622–630. <https://doi.org/http://dx.doi.org/10.1177/0145721709335004>
- Rastad, C., Martin, C., & Åsenlöf, P. (2014). Barriers, Benefits, and Strategies for Physical Activity in Patients With Schizophrenia. *Physical Therapy, 94*(10), 1467–1479. <https://doi.org/10.2522/ptj.20120443>
- Reason, P., & Bradbury, H. (2001). *Handbook of action research: Participative inquiry and practice*. London: Sage Publications.
- Reis, R. S., Salvo, D., Ogilvie, D., Lambert, E. V, Goenka, S., Brownson, R. C., ... Town, C. (2016). Physical Activity 2016 : Progress and Challenges Scaling up physical activity interventions worldwide : stepping. *The Lancet, 388*(10051), 1337–1348. [https://doi.org/10.1016/S0140-6736\(16\)30728-0](https://doi.org/10.1016/S0140-6736(16)30728-0)
- Ritchie, J., & Spencer, L. (1994). Qualitative data analysis for applied policy research. In A. Bryman & R. Burgess (Eds.), *Analyzing Qualitative Data*. London: Routledge.
- Roaldsen, K. S., Biguet, G., & Elfving, B. (2011). Physical activity in patients with venous leg ulcer--between engagement and avoidance. A patient perspective. *Clinical Rehabilitation, 25*(3), 275–286. <https://doi.org/10.1177/0269215510371424>

- Roberts, J. P., Fisher, T. R., Trowbridge, M. J., & Bent, C. (2016). A design thinking framework for healthcare management and innovation. *Healthcare*, 4(1), 11–14. <https://doi.org/10.1016/j.hjdsi.2015.12.002>
- Robson, C. (2011). *Real world research : a resource for users of social research methods in applied settings* (3rd ed.). Chichester: John Wiley & Sons.
- Rodgers, M. M., Cohen, Z. A., Joseph, L., & Rossi, W. (2012). Workshop on personal motion technologies for healthy independent living: executive summary. *Archives Of Physical Medicine And Rehabilitation*, 93(6), 935–939. <https://doi.org/10.1016/j.apmr.2011.12.026>
- Rollnick, S., Miller, W. R., Butler, C. C., & Aloia, M. S. (2008). Motivational Interviewing in Health Care: Helping Patients Change Behavior. *COPD: Journal of Chronic Obstructive Pulmonary Disease*, 5(3), 203–203. <https://doi.org/10.1080/15412550802093108>
- Rorty, R. (1980). *Philosophy and the Mirror of Nature*. Oxford: Blackwell Publishing Ltd.
- Sallis, J. F., Bull, F., Guthold, R., Heath, G. W., Inoue, S., Kelly, P., ... Hallal, P. C. (2016). Progress in physical activity over the Olympic quadrennium. *The Lancet*, 388(10051), 1325–1336. [https://doi.org/10.1016/S0140-6736\(16\)30581-5](https://doi.org/10.1016/S0140-6736(16)30581-5)
- Sanders, E. B.-N., & Stappers, P. J. (2008). Co-creation and the new landscapes of design. *CoDesign*, 4(1), 5–18. <https://doi.org/10.1080/15710880701875068>
- Sangiorgi, D. (2015). Designing for public sector innovation in the UK: design strategies for paradigm shifts. *Foresight*, 17(4), 332–348.
- Searle, A., Calnan, M., Turner, K. M., Lawlor, D. A., Campbell, J., Chalder, M., & Lewis, G. (2012). General practitioners' beliefs about physical activity for managing depression in primary care. *Mental Health and Physical Activity*, 5(1), 13–19. <https://doi.org/http://dx.doi.org/10.1016/j.mhpa.2011.11.001>
- Service, O., Hallsworth, M., Halpern, D., Algate, F., Gallagher, R., Nguyen, S., ... Kirkman, E. (2012). *EAST Four simple ways to apply behavioural insights*. Nesta. <https://doi.org/http://behaviouralinsights.co.uk/publications/east-four-simple-ways-apply-behavioural-insights>
- Silverman, D. (1993). *Interpreting Qualitative Data: Methods for Analyzing Talk. Text and Interaction*. London: Sage Publications.
- Simonö, C. P., Pedersen, B. D., Dreyer, P., & Birkelund, R. (2015). Dealing with existential anxiety in exercise-based cardiac rehabilitation: A phenomenological-hermeneutic study of patients' lived experiences. *Journal of Clinical Nursing*, 24(17–18), 2581–2590. <https://doi.org/http://dx.doi.org/10.1111/jocn.12867>
- Ski, C. F., & Thompson, D. R. (2011). Beyond the blues: the need for integrated care pathways. *European Journal of Cardiovascular Prevention and Rehabilitation : Official Journal of the European Society of Cardiology, Working Groups on Epidemiology & Prevention and Cardiac Rehabilitation and Exercise Physiology*, 18(2), 218–21. <https://doi.org/10.1177/1741826710389409>

- Slade, S. C., Molloy, E., & Keating, J. L. (2009). "Listen to me, tell me": a qualitative study of partnership in care for people with non-specific chronic low back pain. *Clinical Rehabilitation*, 23(3), 270–280. <https://doi.org/10.1177/0269215508100468>
- Slade, S., PhD, P. T., Patel, S., PhD, C., Underwood, M., MD, F., ... PhD, P. T. (2014). What Are Patient Beliefs and Perceptions About Exercise for Nonspecific Chronic Low Back Pain?: A Systematic Review of Qualitative Studies. *Clin J Pain*, 30(11), 995–1005. <https://doi.org/10.1097/AJP.0000000000000044>
- Smith, C. M., Hale, L. A., Mulligan, H. F., & Treharne, G. J. (2013). Participant perceptions of a novel physiotherapy approach ("Blue Prescription") for increasing levels of physical activity in people with multiple sclerosis: a qualitative study following intervention. *Disability and Rehabilitation*, 35(14), 1174–1181. <https://doi.org/10.3109/09638288.2012.723792>
- So, C., & Joo, J. (2017). Does a Persona Improve Creativity? *Design Journal*, 20(4), 459–475. <https://doi.org/10.1080/14606925.2017.1319672>
- 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), 939–946. <https://doi.org/10.1007/s40279-016-0488-y>
- Stenmark Tullberg, H., Fagevik Olsén, M., Shams, K., & Wiklund, M. (2017). "Stepping with ease towards a new way of living" – experiences of physical activity 5 years after bariatric surgery. *European Journal of Physiotherapy*, 19(3), 154–159. <https://doi.org/10.1080/21679169.2017.1326527>
- Stevens, M., Tim Rees, B., Pete Coffee, B., Niklas Steffens, B. K., Alexander Haslam, B. S., & Remco Polman, B. (2017). A Social Identity Approach to Understanding and Promoting Physical Activity. *Sports Medicine*. <https://doi.org/10.1007/s40279-017-0720-4>
- Stickley, T. (2006). Should service user involvement be consigned to history? A critical realist perspective. *Journal of Psychiatric and Mental Health Nursing*, 13, 570–577. <https://doi.org/10.1111/j.1365-2850.2006.00982.x>
- Stige, B. (2002). Do We Need General Criteria for the Evaluation of Qualitative Research Articles, and If We Do, How Could Such Criteria Be Formulated? *Nordic Journal of Music Therapy*, 11(1), 65–71. <https://doi.org/10.1080/08098130209478048>
- Stige, B., Malterud, K., & Midtgarden, T. (2009). Toward an agenda for evaluation of qualitative research. *Qualitative Health Research*, 19(10), 1504–1516.
- Stretton, C. et al. (2013). Activity coaching to improve walking is liked by rehabilitation patients but physiotherapists have concerns: a qualitative study. *Journal of Physiotherapy (Elsevier)*, 59(3), 199–206. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=ccm&AN=107859166&site=ehost-live>

- Sutton, E., Hackshaw-McGeagh, L. E., Aning, J., Bahl, A., Koupparis, A., Persad, R., ... Lane, J. A. (2017). The provision of dietary and physical activity advice for men diagnosed with prostate cancer: a qualitative study of the experiences and views of health care professionals, patients and partners. *Cancer Causes & Control*, 28(4), 319–329. <https://doi.org/10.1007/s10552-017-0861-7>
- Sykes, W. (1991). Taking stock: Issues from the literature on validity and reliability in qualitative research. *Journal of the Market Research Society*, 33(1), 3–12.
- The Academy of Medical Royal Colleges. (2015). Exercise: The miracle cure and the role of the doctor in promoting it. *Report from the Academy of Medical Royal Colleges*, (February). Retrieved from <http://www.aomrc.org.uk/>
- The Health and Social Care Information Centre. (2012). *Health survey for England. The Health and Social Care Information Centre, HSE* (Vol. 1). Retrieved from <http://content.digital.nhs.uk/catalogue/PUB13218/HSE2012-Ch2-Phys-act-adults.pdf>
- Thorpe, O., Kumar, S., & Johnston, K. (2014). Barriers to and enablers of physical activity in patients with COPD following a hospital admission: A qualitative study. *International Journal of COPD*, 9, 115–128. <https://doi.org/10.2147/COPD.S54457>
- Tong, A., Flemming, K., McInnes, E., Oliver, S., & Craig, J. (2012). Enhancing transparency in reporting the synthesis of qualitative research: ENTREQ. *BMC Medical Research Methodology*, 12(1), 181. <https://doi.org/10.1186/1471-2288-12-181>
- Trochim, W. M. (2001). *Research Methods Knowledge Base* (2nd ed.). Cincinnati: Atomic Dog Publishing.
- Trost, S. G., Blair, S. N., & Khan, K. M. (2014). Physical inactivity remains the greatest public health problem of the 21st century: evidence, improved methods and solutions using the “7 investments that work” as a framework. *British Journal of Sports Medicine*, 48(3), 169–70. <https://doi.org/10.1136/bjsports-2013-093372>
- Tully, M., & Hunter, R. (2015). Promoting physical activity: time for a major re-think. *Aspetar Sports Medicine Journal*, 4, 258–263. Retrieved from <http://www.aspetar.com/journal/viewarticle.aspx?id=229#.WErV5MpaGUk>
- University of Southampton NHS Foundation Trust. (2016). Preparing for your operation - your pre-hospital surgery visits. University of Southampton NHS Foundation Trust. Retrieved from <http://www.uhs.nhs.uk/Media/Controlleddocuments/Patientinformation/Surgery/Preparation-for-surgery-patient-information.pdf>
- Van Dam, H. A., Van Der Horst, F., Van Den Borne, B., Ryckman, R., & Crebolder, H. (2003). Provider-patient interaction in diabetes care: Effects on patient self-care and outcomes - A systematic review. *Patient Education and Counseling*, 51(1), 17–28. [https://doi.org/10.1016/S0738-3991\(02\)00122-2](https://doi.org/10.1016/S0738-3991(02)00122-2)
- Van Hecke, A., Verhaeghe, S., Grypdonck, M., Beele, H., Flour, M., & Defloor, T. (2011). Systematic development and validation of a nursing intervention: the case of

- lifestyle adherence promotion in patients with leg ulcers. *Journal of Advanced Nursing*, 67(3), 662–76. <https://doi.org/10.1111/j.1365-2648.2010.05539.x>
- Van Uden-Kraan, C. F., Chinapaw, M. J. M., Drossaert, C. H. C., Verdonck-De Leeuw, I. M., & Buffart, L. M. (2013). Cancer patients' experiences with and perceived outcomes of yoga: Results from focus groups. *Supportive Care in Cancer*, 21(7), 1861–1870. <https://doi.org/10.1007/s00520-013-1728-4>
- Warburton, D., Bredin, S., Jamnik, V., Shephard, R., & Gledhill, N. (2016). *Consensus on evidence-based preparticipation screening and risk stratification. Annual Review of Gerontology and Geriatrics* (Vol. 36). <https://doi.org/http://dx.doi.org/10.1891/0198-8794.36.53>
- Warburton, D. E. R., Jamnik, V. K., Bredin, S. S. D., Gledhill, N., & Collaboration, P.-Q. (2011). The Physical Activity Readiness Questionnaire for Everyone (PAR-Q+) and electronic physical activity readiness medical examination (ePARmed-X+). *Health & Fitness Journal of Canada*, 4(2), 3–23.
- Ward, M. (2014). Experiences in physical activity promotion in health care settings for primary prevention in the UK. *Schweizerische Zeitschrift Für Sportmedizin Und Sporttraumatologie*, 62(2). <https://doi.org/10.5167/uzh-98310>
- Wasser, J. G., Vasilopoulos, T., Zdziarski, L. A., & Vincent, H. K. (2017). Exercise Benefits for Chronic Low Back Pain in Overweight and Obese Individuals. *Pm&R*, 9(2), 181–192. <https://doi.org/10.1016/j.pmrj.2016.06.019>
- Weed, M. (2016). Evidence for physical activity guidelines as a public health intervention: efficacy, effectiveness, and harm – a critical policy sciences approach. *Health Psychology and Behavioral Medicine*, 4(1), 56–69. <https://doi.org/10.1080/21642850.2016.1159517>
- Weiler, R., Feldschreiber, P., & Stamatakis, E. (2012). Medicolegal neglect? The case for physical activity promotion and exercise medicine. *British Journal of Sports Medicine*, 46(4), 228–32. <https://doi.org/10.1136/bjism.2011.084186>
- Westhorp, G., Stevens, K., & Rogers, P. J. (2016). Using realist action research for service redesign. *Evaluation*, 22(3), 361–379. <https://doi.org/10.1177/1356389016656514>
- Wherton, J., Sugarhood, P., Procter, R., Hinder, S., & Greenhalgh, T. (2015). Co-production in practice: how people with assisted living needs can help design and evolve technologies and services. *Implementation Science*, 10(1), 75. <https://doi.org/10.1186/s13012-015-0271-8>
- Whiting, L., Kendall, S., & Wills, W. (2012). An Asset-Based Approach: An Alternative Health Promotion Strategy? *Community Practitioner*, 85(1), 25–28. <https://doi.org/10.1034/j.1600-0528.2000.028006399.x>
- Whittaker, R., Merry, S., Dorey, E., & Maddison, R. (2012). A development and evaluation process for mHealth interventions: examples from New Zealand. *Journal of Health Communication*, 17 Suppl 1(October 2014), 11–21. <https://doi.org/10.1080/10810730.2011.649103>

- WHO. (2014). *Global status report on noncommunicable diseases 2014*. World Health. [https://doi.org/ISBN 9789241564854](https://doi.org/ISBN%209789241564854)
- Wiklund, M., Olsén, M. F., & Willén, C. (2011). Physical activity as viewed by adults with severe obesity, awaiting gastric bypass surgery. *Physiotherapy Research International*, *16*(3), 179–186. <https://doi.org/10.1002/pri.497>
- Williams, O., & Gibson, K. (2017). Exercise as a poisoned elixir: inactivity, inequality and intervention. *Qualitative Research in Sport, Exercise and Health*, *6778*(September), 1–17. <https://doi.org/10.1080/2159676X.2017.1346698>
- Willig, C. (2016). *Introducing qualitative research in psychology* (3rd ed.). Maidenhead: Open University Press.
- Wiltshire, G., & Stevinson, C. (2017). Exploring the role of social capital in community-based physical activity: qualitative insights from parkrun. *Qualitative Research in Sport, Exercise and Health*, *6778*(October), 1–16. <https://doi.org/10.1080/2159676X.2017.1376347>
- Withall, J., Haase, A. M., Walsh, N. E., Young, A., & Cramp, F. (2016). Physical activity engagement in early rheumatoid arthritis: a qualitative study to inform intervention development. *Physiotherapy (United Kingdom)*, *102*(3), 264–271. <https://doi.org/10.1016/j.physio.2015.07.002>
- Withall, J., Jago, R., & Fox, K. R. (2011). Why some do but most don't. Barriers and enablers to engaging low-income groups in physical activity programmes: a mixed methods study. *BMC Public Health*, *11*(1), 507. <https://doi.org/10.1186/1471-2458-11-507>
- Wong, E. M. L., Zhong, X. B., Sit, J. W. H., Chair, S. Y., Leung, D. Y. P., Leung, C., & Leung, K. C. (2016). Attitude toward the out-patient cardiac rehabilitation program and facilitators for maintenance of exercise behavior. *Psychology, Health & Medicine*, *21*(6), 724–734. <https://doi.org/10.1080/13548506.2015.1115107>
- Woodard, F., Bovill, L., & Freedman, D. (2011). Involving users in leadership and governance. In T. Greenhalgh, C. Humphrey, & F. Woodard (Eds.), *User Involvement in Health Care* (pp. 81–103). Chichester: Wiley-Blackwell.
- Yin, R. K. (2014). *Case study research: design and methods* (5th ed.). Los Angeles, California: Sage Publications.

**PhD thesis: Exploring the user-centred design of a physical
activity pathway in NHS care**

Helen Speake

December 2017

Volume 2: Appendices

Appendix A: CASP appraisal questions applied to literature review

<p>Was the research design appropriate to address the aims of the research?</p> <p><input type="checkbox"/> If the researcher has justified the research design (E.g. have they discussed how they decided which method to use)?</p>
<p>Was the recruitment strategy appropriate to the aims of the research?</p> <p><input type="checkbox"/> If the researcher has explained how the participants were selected</p> <p><input type="checkbox"/> If they explained why the participants they selected were the most appropriate to provide access to the type of knowledge sought by the study</p> <p><input type="checkbox"/> If there are any discussions around recruitment (e.g. why some people chose not to take part)</p>
<p>Was the data collected in a way that addressed the research issue?</p> <p><input type="checkbox"/> If the setting for data collection was justified. <input type="checkbox"/> If it is clear how data were collected (e.g. focus group, semi-structured interview etc.)</p> <p><input type="checkbox"/> If the researcher has justified the methods chosen</p> <p><input type="checkbox"/> If the researcher has made the methods explicit (e.g. for interview method, is there an indication of how interviews were conducted, or did they use a topic guide)?</p> <p><input type="checkbox"/> If methods were modified during the study. If so, has the researcher explained how and why?</p> <p><input type="checkbox"/> If the form of data is clear (e.g. tape recordings, video material, notes etc.)</p> <p><input type="checkbox"/> If the researcher has discussed saturation of data</p>
<p>Has the relationship between researcher and participants been adequately considered?</p> <p><input type="checkbox"/> If the researcher critically examined their own role, potential bias and influence during</p> <p>(a) Formulation of the research questions</p> <p>(b) Data collection, including sample recruitment and choice of location</p> <p><input type="checkbox"/> How the researcher responded to events during the study and whether they considered the implications of any changes in the research design</p>
<p>Have ethical issues been taken into consideration?</p> <p><input type="checkbox"/> If there are sufficient details of how the research was explained to participants for the reader to assess whether ethical standards were maintained</p> <p><input type="checkbox"/> If the researcher has discussed issues raised by the study (e.g. issues around informed consent or confidentiality or how they have handled the effects of the study on the participants during and after the study)</p> <p><input type="checkbox"/> If approval has been sought from the ethics committee</p>
<p>Was the data analysis sufficiently rigorous?</p> <p><input type="checkbox"/> If there is an in-depth description of the analysis process</p> <p><input type="checkbox"/> If thematic analysis is used. If so, is it clear how the categories/themes were derived from the data?</p> <p><input type="checkbox"/> Whether the researcher explains how the data presented were selected from the original sample to demonstrate the analysis process</p> <p><input type="checkbox"/> If sufficient data are presented to support the findings. <input type="checkbox"/> To what extent contradictory data are taken into account</p> <p><input type="checkbox"/> Whether the researcher critically examined their own role, potential bias and influence during analysis and selection of data for presentation</p>
<p>Is there a clear statement of findings?</p> <p><input type="checkbox"/> If the findings are explicit</p> <p><input type="checkbox"/> If there is adequate discussion of the evidence both for and against the researchers arguments</p> <p><input type="checkbox"/> If the researcher has discussed the credibility of their findings (e.g. triangulation, respondent validation, more than one analyst)</p> <p><input type="checkbox"/> If the findings are discussed in relation to the original research question</p>

Appendix B: Qualitative synthesis themes and subthemes: literature involving patients

Themes	Sub-themes			References
Definition of PA	Implicit in the programme or trial being evaluated			*all papers with PA interventions*
	Not defined			Anderson et al., 2013 Arthur et al., 2016 Clarke et al., 2015 McPhail et al., 2014 Stone & Baker., 2017 Withall et al., 2016
	Researcher-defined	Textbook definition provided by authors for the article but not reported whether shared with study participants		Darlow et al., 2016
	Patient-defined	Asked patients to report how much of [defined type of PA] they currently engage in		Fisher et al., 2016 Heinen et al., 2007 Stenmark-Tullberg et al., 2017 Wiklund et al., 2011
		Asked patients to define PA by asking "what counts/what does PA mean to you?"		Normansell et al., 2016 Roaldsen et al., 2011
		Indirectly defined when patients described what they can/cannot do in daily life		Kaptein et al., 2013 Rastad et al., 2014
	Patients' understanding and beliefs about PA as a medical intervention	Associations between condition and PA	Relief of symptoms	Fatigue Pain
'Response' to condition			Offset weight gain	Craike et al., 2013

Themes	Sub-themes		References	
			Emslie et al., 2007	
			Prevent further decline	Bruun et al., 2015 Clarke et al., 2015 Desveaux et al., 2014 Elley et al., 2007 Eriksson et al., 2013
		Psychological coping	Enhanced social interaction	Craike et al., 2013
			Greater confidence	van Uden-Kraan et al., 2013
			Take control and restore normality	Husbeo et al., 2015 Roaldsen et al., 2011 Malpass et al., 2009 Smith et al., 2013
			Feel better	Donnelly et al., 2013
		Alternative to medication		Searle et al., 2011
		Matching the type of PA to health condition	Uncertainty about appropriate type and intensity of PA suited to health condition	Nicholson et al., 2013 Nordvall-Stromberg et al., 2014
			Misconception that all PA must be vigorous	Rastad et al., 2014
			Certain types of PA more suitable for certain health conditions (e.g. water-based)	Chard, 2016
		Associations between general physical and mental wellbeing and PA		Anderson et al., 2013 Back et al., 2017 Henriksson et al., 2016 McPhail et al., 2014 Missel et al., 2015 Smith et al., 2017

Themes	Sub-themes			References
		Health benefits not contingent on relief of symptoms		Cheville et al., 2012 Darlow et al., 2016 Fisher et al., 2016 Holmberg et al., 2014 Peel et al., 2010
Role and impact of the health professional	Perceptions of health professionals' input regarding PA	Lack of input from health professionals regarding PA		Crank et al., 2017 Henriksson et al., 2016 Nordvall-Stromberg et al., 2014 Smith et al., 2017 Stone & Baker, 2017
		Only generic "stay active" messages received from health professionals		Chard, 2016 Peel et al., 2010
	Health professionals as information sources	Health professionals in a position of authority to provide PA information		Bruun et al., 2015 Elley et al., 2007 Henriksson et al., 2016 Husebo et al., 2015 Joelsson et al., 2017 Jokar et al., 2015
		Health professionals as gateway to PA		Hefferon et al., 2013
		Consistency of information from different health professionals is important		Back et al., 2017 Crank et al., 2017 Stone & Baker, 2017
		Good quality interactions with health professionals as determinants of patients' willingness to engage with PA		Back et al., 2017 Moore et al., 2012
		Health professionals are not the		Clarke et al., 2015

Themes	Sub-themes		References
		primary source of information influencing patients' attitudes	Chong et al., 2016
	Health professionals as prescribers of PA	Patients want more prescriptive advice from health professionals	Cheville et al., 2012 Roaldsen et al., 2011
		PA prescription not considered a priority for health professionals	Clarke et al., 2015
		Health professionals should tailor PA recommendations to the individual patient	Back et al., 2017 Joelsson et al., 2017
		Health professionals are the gateway to PA	Hefferon et al., 2013
	Health professionals as sources of motivation for PA		Henriksson et al., 2016
	Patients derive comfort about PA from health professionals	Health professionals can provide reassurance about PA being acceptable	Anderson et al., 2013 Heinen et al., 2007 Henriksson et al., 2016 Smith et al., 2013 Withall et al., 2016
		The presence of health professionals during PA provides a sense of safety	Back et al., 2017 Bruun et al., 2015 Missel et al., 2015
		Health professionals can help patients manage side-effects arising during PA	Bruun et al., 2015 Ingram et al., 2010 Larun et al., 2011
	Negative influence of health professionals	Patients feel judged by health professionals for the impact of their lifestyle choices	Hillsdon et al., 2013
	Non-PA related benefits of health professional	Increased contact time /greater access to health professionals	Mikkelsen et al., 2016 Thorpe et al., 2014

Themes	Sub-themes			References
	involvement in PA interventions	provides extended opportunities to discuss condition leading to more patient confidence about health conditions		Devi et al., 2014
		Health professionals can provide psychological support		Donnelly et al., 2013
Barriers to PA	Physical barriers	Barriers specific to particular health conditions	Shortness of breath (COPD)	Thorpe et al., 2014
			Pain (chronic pain, leg ulcers)	Heinen et al., 2007 Joelsson et al., 2017 Stone & Baker, 2017 Withall et al., 2016
			Side effects of cancer treatment e.g. nausea, fatigue	Cheville et al., 2012 Craike et al., 2013 Fisher et al., 2016 Henriksson et al., 2016 Husebo et al., 2015 Ingram et al., 2010 Missel et al., 2015 Smith et al., 2017
		Age or mobility-related comorbidities	Fisher et al., 2016 Normansell et al., 2016	
		General physical health or fitness	Clarke et al., 2015 Elley et al., 2007 McPhail et al., 2014	
	Psychological and attitudinal barriers	Barriers related to self	Lack of motivation	Chong et al., 2016 Craike et al., 2013 Crank et al., 2017 Desveaux et al., 2014 Hefferon et al., 2013 Ingram et al., 2010 McPhail et al., 2014 Searle et al., 2011

Themes	Sub-themes		References	
		Low confidence or self esteem	Elley et al., 2007 Searle et al., 2011 Sharma et al., 2012 Stone & Baker, 2017	
		Phobias about exercising in public	Emslie et al., 2007 Henriksson et al., 2016 Joelsson et al., 2017 Rastad et al., 2014	
		Depression, anxiety, loneliness	Desveaux et al., 2014 McPhail et al., 2014	
		Low self-efficacy for increasing PA	Crank et al., 2017 Heinen et al., 2007 Henriksson et al., 2016 Moore et al., 2012 Nicolson et al., 2013 Roaldsen et al., 2011	
	Barriers related to PA	Indifference or uncertainty about the benefits of PA	Chong et al., 2016 Husebo et al., 2015 Joelsson et al., 2017 Moore et al., 2012 Normansell et al., 2016 Simony et al., 2015	
		Previous negative experience of PA	Desrochers et al., 2016	
		Fears about injury or aggravation of current health conditions	Andersen et al., 2013 Clarke et al., 2015 Chong et al., 2016 Darlow et al., 2016 McPail et al., 2014	
	Practical and environmental barriers	Practical barriers	Cost	Back et al., 2017 Desveaux et al., 2014 Joelsson et al., 2017

Themes	Sub-themes			References
			Location	Arthur et al., 2016 Clarke et al., 2015 Desveaux et al., 2014 Hefferon et al., 2013 Sharma et al., 2012
			Lack of time	Chong et al., 2016 Devi et al., 2014 Emslie et al., 2007 Wong et al., 2015
			Inconvenient timing of programme	Devi et al., 2014 McPhail et al., 2014
			Not having the right clothing	Henriksson et al., 2016 Rastad et al., 2014
		Environmental barriers	Weather and change of seasons	Desveaux et al., 2014 Devi et al., 2014 Elley et al., 2007 Hefferon et al., 2013 Joelsson et al., 2017
	Social and cultural barriers	Social concerns	Feeling stigmatised by health condition	Jokar et al., 2015
			Wanting to hide condition from employer	Kaptein et al., 2013
		Family as a barrier	Resistance and overprotection from family members towards PA	Jokar et al., 2015 Henriksson et al., 2016
			Non-medical life events distracting from PA	Husebo et al., 2015
	Facilitators and enablers of PA	Factors arising during initiation of PA	Suitability and format of PA	Cost
Time				McPhail et al., 2014 Withall et al., 2016
Location				Arthur et al., 2016 Back et al., 2017 Chong et al., 2016

Themes	Sub-themes			References	
				Clarke et al., 2015 Desveaux et al., 2014 Donnelly et al., 2013 McPhail et al., 2014 Withall et al., 2016	
			Flexible programme adaptable to ongoing individual treatment, lifestyle and physical abilities	Anderson et al., 2013 Chard et al., 2016 Desrochers et al., 2016 Moore et al., 2012 O'Donovan & Kennedy, 2015	
		Method of introducing PA to the patient	Access to information	Devi et al., 2014	
			Tailored information	Elley et al., 2007	
			Linking PA to alleviating symptoms	Anderson et al., 2013 Chong et al., 2016 Searle et al., 2011	
			Introduction by a patient who had already completed intervention	Moore et al., 2012 Withall et al., 2016	
		Timing of PA advice in the care pathway		Donnelly et al., 2013 Withall et al., 2016	
			Advice most useful at point of transition from acute treatment to long-term management	Anderson et al., 2013 Arthur et al., 2016	
			Teachable moments	Henriksson et al., 2016	
		Enabling factors during PA	Positive experiences	Benefits of a routine and taking control	Burke et al., 2015 Crank et al., 2017 Desveaux et al., 2014 Emslie et al., 2007 Eriksson et al., 2013 O'Donovan & Kennedy, 2015
				Feeling safe and supported by exercise providers	Burke et al., 2015 Chard, 2016

Themes	Sub-themes			References
				Crank et al., 2017 Desveaux et al., 2014 Elley et al., 2007 Groven et al., 2013 Luoma et al., 2014
			Enjoyment	Back et al., 2017 Bruun et al., 2015 Donnelly et al., 2013 Henriksson et al., 2016
			Mastery of energy balance and pacing	Henriksson et al., 2016 Larun et al., 2011
	Behaviour change strategies		Accountability and regular reviews	Anderson et al., 2013 Crank et al., 2017 Donnelly et al., 2013 Elley et al., 2007
			Goal setting	Back et al., 2017 Devi et al., 2014 Henriksson et al., 2016
			Positive affect	Sharma et al., 2012 McPhail et al., 2014 Thorpe et al., 2014
	Group and peer support benefits		Camaraderie and learning from others	Back et al., 2017 Bruun et al., 2015 Burke et al., 2015 Crank et al., 2017 Desveaux et al., 2014 Donnelly et al., 2013 Elley et al., 2007 Groven et al., 2013 Hillsdon et al., 2013 Luoma et al., 2014 Mikkelsen et al., 2016

Themes	Sub-themes			References
				Missel et al., 2015 O'Donovan & Kennedy, 2015 Simony et al., 2015 Wong et al., 2015
		Social support	Similarity of group members reduces embarrassment about symptoms [breast cancer] Encouragement and support from family and friends	Emslie et al., 2007 Luoma et al., 2014 Back et al., 2017 Bruun et al., 2015 Clarke et al., 2015 Heinen et al., 2007 Husebo et al., 2015 Ingram et al., 2010 Mikkelsen et al., 2016 Nordvall-Stromberg et al., 2014 Stone & Baker, 2017
		Appropriate equipment and aids		Heinen et al., 2007 Missel et al., 2015 Nordvall-Stromberg et al., 2014 Roaldsen et al., 2011
		Individual patient characteristics as facilitators	Positive previous experiences of PA and positive self-efficacy	
	Self-identifying as a physically active person		Nicholson et al., 2013	
	Length of experience managing health condition (=more confidence in PA)		Darlow et al., 2016	
	Self-motivation, determination, self-challenge		Devi et al., 2014 Donnelly et al., 2013 Groven et al., 2013	

Themes	Sub-themes			References
				Ingram et al., 2010
Reported consequences of PA on health	Positive physical effects	Improved function and mobility		Bruun et al., 2015 Desrochers et al., 2016 Donnelly et al., 2013 Joelsson et al., 2017 Mikkelsen et al., 2016
		Increased energy		Missel et al., 2015 Crank et al., 2017
		Pain relief		Kaptein et al., 2013 Larun et al., 2011
	Negative physical effects	Symptom relief not experienced by all participants		Craike et al., 2013 Darlow et al., 2016
		Exacerbation of pain		Kaptein et al., 2013 Larun et al., 2011
	Positive psychological effects	Improved wellbeing		Donnelly et al., 2013 Luoma et al., 2014 Missel et al., 2015 Rastad et al., 2014 Rae et al., 2009
		Improved mood		Mikkelsen et al., 2016
		Increased sense of control		Sharma et al., 2012 Searle et al., 2011
		Optimism about future health		Missel et al., 2015
		Increased self-efficacy		Sharma et al., 2012 Simony et al., 2015 Smith et al., 2013
		Better coping with health condition		Devi et al., 2014 Eriksson et al., 2013
		Distraction from negative thoughts		Searle et al., 2011
		PA-specific effects: tai chi,	Relaxation	

Themes	Sub-themes		References
		Qigong, yoga	Holmberg et al., 2016 Holmberg et al., 2014 van Uden-Kraan et al., 2013
		Motivation to engage in further PA	Burke et al., 2015 Smith et al., 2013

Appendix C: Qualitative synthesis themes and subthemes: literature involving health professionals

Themes	Sub-themes			References
Health professionals' perceptions of PA	Definition of PA	Health professional-defined	Following PA guidelines for health condition	Crisford et al., 2013
			Preference walking as most accessible and low cost for majority of patients	Beighton et al., 2015
		Health professionals base PA advice on anecdotal knowledge rather than evidence		Searle et al., 2011
		Lack of confidence about effectiveness of PA in comparison to smoking cessation		Din et al., 2015
	Health professionals' perceptions of PA benefits	PA as secondary management		Patel et al., 2011
		PA as secondary prevention		Persson et al., 2015
	Health professionals' use of PA	Health professionals do not use PA for primary prevention		Bohman et al., 2015
		Promoting PA is part of a holistic way of working		Crisford et al., 2013 Mulligan et al., 2011
		PA has low priority and status		Persson et al., 2013
		Do not view prescribing as part of role		Crisford et al., 2013
		Cynicism about effectiveness of formal PA prescriptions		Persson et al., 2013
	Negative attitudes about PA	Health professionals gatekeeping role is an unnecessary barrier		Din et al., 2015
		Sharing personal views		Persson et al., 2013 Searle et al., 2011

Themes	Sub-themes		References
		Issuing written prescriptions which emulate medical prescriptions	Bohman et al., 2015
Intervention/programme factors	Strategies to impress the value of PA onto patients	Combining written and verbal information	Bohman et al., 2015
		Relating PA to the patient's health condition	Crisford et al., 2013
		"Teachable moments" for raising subject of PA	Din et al., 2015
	Tailoring PA to the individual	Tailoring structured PA to the patient's ability and condition	Din et al., 2015
		Helping patients with physical limitations to adapt and regain previously enjoyed modes of PA	Mulligan et al., 2015
		Lack of time for PA discussion	Crisford et al., 2013 Din et al., 2015 Heron et al., 2014 Patel et al., 2011 Persson et al., 2013
		Complicated computer systems	Beighton et al., 2015 Bohman et al., 2015
	Intervention barriers	Identify and remove 'non-essential' trial protocols to save time	Beighton et al., 2015
		Need for clearer guidelines and more formal exercise promotion protocols	Bohman et al., 2015 Crisford et al., 2013 Learmonth et al., 2017 Persson et al., 2013
	Feasibility of delivering interventions	Need for consistency between health professionals	Learmonth et al., 2017
Socio-political and organisational factors	Organisational guidelines and protocols	Competing incentivisation from smoking cessation	Din et al., 2015

Themes	Sub-themes			References	
Health professional	Financial factors	Raising prioritisation of PA requires funding		Learmonth et al., 2017	
		PA is improper use of healthcare budget		Din et al., 2015	
		Change of practices from reliance on prescribing fast-acting pharmaceuticals to slower-acting PA		Persson et al., 2015	
		Collegial and managerial support needed to change practices		Bohman et al., 2015	
	Changing professional practices	Normative influences on PA promotion behaviours e.g. conferences		Crisford et al., 2013	
		Priority should be reducing population-level environmental barriers to PA		Din et al., 2015	
		PA and inequalities	PA may increase inequalities PA can address inequalities if targeted correctly	Din et al., 2015	
	Social-ecological position of PA	Health professionals have a role to help patients overcome social and environmental barriers to PA		Mulligan et al., 2015	
		Social values, school education also influence PA		Persson et al., 2013	
		Active professionals position themselves as role models		Bohman et al., 2015 Din et al., 2015	
		Inactive professionals avoid PA promotion for fear of hypocrisy		Bohman et al., 2015 Din et al., 2015	
		Lack of knowledge to promote PA	Insecure about knowledge of types and intensity of PA to issue prescriptions	Bohamn et al., 2015 Crisford et al., 2013	
	Health professional	Own PA levels influence	Utilise knowledge of government		Mulligan et al., 2011

Themes	Sub-themes		References	
factors	promotion behaviours	recommendations		
		Need more knowledge of local PA options	Crisford et al., 2013	
	Knowledge and skills	Lack of confidence in behaviour change skills		Learmonth et al., 2017 Persson et al., 2013
		Transferable skills learnt in PA interventions for other lifestyle intervention		Beighton et al., 2015
		Absence of non-pharmacological interventions in medical training		Persson et al., 2013
		PA should be part of graduate training not early curriculum		Learmonth et al., 2017
		Presenting condition		Crisford et al., 2013 Din et al., 2015 Persson et al., 2013
		Age and medical history		Crisford et al., 2013
		Perceived receptiveness and motivation for PA		Bohman et al., 2015 Learmonth et al., 2017
	Fear of litigation	Perceived affordability for the patient		Bohman et al., 2015 Din et al., 2015
	Concerns about the training of exercise professionals	Fear of negative impact on patient i.e. triggering depression		Searle et al., 2011
Advocate multi-disciplinary approach	Perceived affordability for the patient		Bohman et al., 2017	
Patient factors	Factors influencing subjective judgements about patient and PA	Adapting prescription to religious festivals and seasonal barriers	Beighton et al., 2015	

Appendix D: NHS REC approval letter



Health Research Authority
East Midlands - Nottingham 1 Research Ethics Committee
Royal Standard Place
Nottingham
NG1 6FS

Telephone: 0115 8839269

12 November 2015

Miss Helen Speake
PhD student
Sheffield Hallam University
c/o A017 Collegiate Hall
Collegiate Crescent
Sheffield Hallam University
S10 2BP

Dear Miss Speake

Study title:	Exploring the desirability and feasibility of physical activity as medicine in usual NHS care
REC reference:	15/EM/0515
IRAS project ID:	182331

Thank you for your letter of 11th November 2015 responding to the Proportionate Review Sub-Committee's request for changes to the documentation for the above study.

The revised documentation has been reviewed and approved by the sub-committee.

We plan to publish your research summary wording for the above study on the HRA website, together with your contact details. Publication will be no earlier than three months from the date of this favourable opinion letter. The expectation is that this information will be published for all studies that receive an ethical opinion but should you wish to provide a substitute contact point, wish to make a request to defer, or require further information, please contact the REC Assistant -Teagan Allen, NRESCommittee.EastMidlands-Nottingham1@nhs.net. Under very limited circumstances (e.g. for student research which has received an unfavourable opinion), it may be possible to grant an exemption to the publication of the study.

Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised.

Conditions of the favourable opinion

The favourable opinion is subject to the following conditions being met prior to the start of the

study.

You should notify the REC in writing once all conditions have been met (except for site approvals from host organisations) and provide copies of any revised documentation with updated version numbers. The REC will acknowledge receipt and provide a final list of the approved documentation for the study, which can be made available to host organisations to facilitate their permission for the study. Failure to provide the final versions to the REC may cause delay in obtaining permissions.

Management permission or approval must be obtained from each host organisation prior to the start of the study at the site concerned.

Management permission ("R&D approval") should be sought from all NHS organisations involved in the study in accordance with NHS research governance arrangements.

Guidance on applying for NHS permission for research is available in the Integrated Research Application System or at <http://www.rdforum.nhs.uk>.

Where a NHS organisation's role in the study is limited to identifying and referring potential participants to research sites ("participant identification centre"), guidance should be sought from the R&D office on the information it requires to give permission for this activity.

For non-NHS sites, site management permission should be obtained in accordance with the procedures of the relevant host organisation.

Sponsors are not required to notify the Committee of approvals from host organisations.

Registration of Clinical Trials

All clinical trials (defined as the first four categories on the IRAS filter page) must be registered on a publically accessible database. This should be before the first participant is recruited but no later than 6 weeks after recruitment of the first participant.

There is no requirement to separately notify the REC but you should do so at the earliest opportunity e.g. when submitting an amendment. We will audit the registration details as part of the annual progress reporting process.

To ensure transparency in research, we strongly recommend that all research is registered but for non-clinical trials this is not currently mandatory.

If a sponsor wishes to request a deferral for study registration within the required timeframe, they should contact hra.studyregistration@nhs.net. The expectation is that all clinical trials will be registered, however, in exceptional circumstances non registration may be permissible with prior agreement from the HRA. Guidance on where to register is provided on the HRA website.

It is the responsibility of the sponsor to ensure that all the conditions are complied with before the start of the study or its initiation at a particular site (as applicable).

Ethical review of research sites

The favourable opinion applies to all NHS sites taking part in the study, subject to management

permission being obtained from the NHS/HSC R&D office prior to the start of the study (see "Conditions of the favourable opinion" above).

Approved documents

The documents reviewed and approved by the Committee are:

<i>Document</i>	<i>Version</i>	<i>Date</i>
Copies of advertisement materials for research participants [Patient recruitment poster]	1	01 September 2015
Covering letter on headed paper [Cover letter re: revised PIS]	1	11 November 2015
Evidence of Sponsor insurance or indemnity (non NHS Sponsors only) [Sponsor insurance letter]	1	03 November 2015
Interview schedules or topic guides for participants [Interview guides]	Version2	05 October 2015
IRAS Checklist XML [Checklist_11112015]		11 November 2015
Letter from sponsor [Sponsor letter]	1	15 October 2015
Participant consent form [Participant consent forms]	2	01 October 2015
Participant information sheet (PIS) [Revised PIS]	3	11 November 2015
REC Application Form [REC_Form_04112015]		04 November 2015
Research protocol or project proposal [Protocol v2 20151005]	2	05 October 2015
Summary CV for Chief Investigator (CI) [2 page CV HS]	1	29 October 2015
Summary CV for supervisor (student research) [CSES 2 page CV RC]		16 October 2015
Summary, synopsis or diagram (flowchart) of protocol in non technical language [Lay summary]	1	03 November 2015

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

After ethical review

Reporting requirements

The attached document "After ethical review – guidance for researchers" gives detailed guidance on reporting requirements for studies with a favourable opinion, including:

- Notifying substantial amendments
- Adding new sites and investigators

- Notification of serious breaches of the protocol
- Progress and safety reports
- Notifying the end of the study

The HRA website also provides guidance on these topics, which is updated in the light of changes in reporting requirements or procedures.

Feedback

You are invited to give your view of the service that you have received from the National Research Ethics Service and the application procedure. If you wish to make your views known please use the feedback form available on the HRA website:

<http://www.hra.nhs.uk/about-the-hra/governance/quality-assurance>

We are pleased to welcome researchers and R & D staff at our NRES committee members' training days – see details at <http://www.hra.nhs.uk/hra-training/>

15/EM/0515

Please quote this number on all correspondence

With the Committee's best wishes for the success of this project.

Yours sincerely



Dr Carl Edwards
Chair

Email: NRESCommittee.EastMidlands-Nottingham1@nhs.net

Enclosures: *"After ethical review – guidance for researchers"*

Copy to: *Mr Brian Littlejohn*

Appendix E: Semi-structured interview guides (Discover phase)

Patient Interviews

Opening/rapport building

Tell me about yourself / Why did you decide to do this interview?

Health concerns

- What is the most important health concern you have?
- How does this affect your life?
- Do you receive regular treatment or have you seen a health care professional about this?
- Is there anything else you're currently (or recently) being treated for?

Patient journey

Focusing on X for a moment and the services you have accessed as a result

[choose main health issue for which treatment has been received]:

The experiences that people have over time with their health are sometimes called patient journeys. Can you try to describe what your own journey has been from the time that you first noticed [symptoms] until now? For example could you break this down into phases?

- key people/key events
- emotional touchpoints
- Where do you hope to be in the future?

Lifestyle factors

- What things [apart from medication] help you to feel better?
[Clarify meaning: physical change in symptoms vs. 'feeling' better?]
- How/why does X make you feel better?
- What else would help you to improve your health?
- Can you rank all these things in order of how much they help?

**discussion here will vary depending on whether the participant includes physical activity e.g. "I noticed you haven't mentioned physical activity as one of the things that make you feel better... why do you think that is?"

Defining PA

- How would you describe someone who was physically active?
- What sorts of things might they be doing?

- How is this similar / different to you?
- Has this always been the case? Have you done anything differently in the past?

Barriers

- What are the worst things about being physically active?
- What makes it harder?

Facilitators

- What are best things about being physically active? What do you most enjoy doing?
- What makes it easier?

Aspirations

- What would you change about your physical activity habits if you could?
- How might the NHS support you with this?
- Who would you want help from?
- What might put you off?
- How likely would you be to take up an offer of help? (1-10 scale and why)
- How would you know if it had made a difference - what would be a good outcome for you?
- Is physical activity something you might be willing to pay to do - perhaps in the way you might be asked to pay for a drug prescription?
- Has a health professional ever talked to you about physical activity before? What happened?

(The following questions are time permitting)

Defining PA as medicine

- What do you think the phrase 'physical activity as medicine' means?
- How is this different from 'physical activity for health'?

Guidelines and population-level solutions

- Are you aware of any guidelines for the amount of physical activity adults in the UK should aim for?
- What effect do you think guidelines like this have?
- If you were in charge and had no constraints, what would you change to encourage a more active population in the UK?

Health Professional Interviews

Opening exploratory

Tell me about yourself

- Why have you decided to take part?
- Your job
- What's important to you in your role?

Can you describe the patient journey that [condition/service] patients go through

- Who are the key people?
- What are the key events?
- When do things happen?
- What feelings / emotions do you think patients experience at different stages?
- What's your role in this journey?

Physical Activity

What does the phrase "physical activity" mean to you?

How do you feel about physical activity (or interviewee's preferred terminology) being promoted within existing NHS services?

Have you been involved with or read about a service that does this well?

- What do you think they do to make this happen?
- How is this different from what you currently do?
- What would need to change for you to make this happen?
- Who would need to be involved in making that happen?

What opportunities do you think there are to promote physical activity within *condition/service*?

- When should this happen?
- Who can benefit most?
- Prevention, rehab, or treatment for specific conditions?
- How should physical activity promotion be evaluated? What are the most important outcomes?

What problems do you foresee? What might stop it working?

- Organisational barriers

- Health professional barriers
- Patient barriers

Whose responsibility do you think it is to ensure that individual patients meet recommended levels of PA?

What part would you like to play?

- If not you, then who?
- How confident do you feel? What support do you think you need?

What do you think the phrase 'physical activity as medicine' means?

- How is this different from 'physical activity for health'?

Are you aware of any guidelines for the amount of physical activity adults in the UK should aim for?

- What effect do you think guidelines like this have?
- If you were in charge and had no constraints, what would you change to encourage a more active population in the UK?

Appendix F: Example patient interview transcript (Discover phase)

So, to just kick off, could I just ask you to just tell me a little bit about yourself, just maybe say three or four things that come to mind?

63, feeling it at this particular moment. I've lived in Sheffield all my life. Just got, well got married 18 months ago.

Congratulations.

And to be honest I'm a big football fan.

Are you, United or Wednesday?

Wednesday, there's only Wednesday, United don't exist.

All right, I can ask because I'm not from Sheffield.

No that's all right.

So you said feeling it a bit, so what do you think is your biggest health concern at the minute in your life?

To be honest it's everything. Since I touched 60 particularly I just seem to have gone downhill. I've got no energy. I'm a really bad sleeper, although on the tablets I'm on just now for the problem with my neck and seeing Richard for, they seem to be helping me sleep a little bit better.

Is that like a painkiller or?

Yeah, it's like a, she didn't class it as a painkiller when she gave it me at the hospital, she classed it as a preventative, to stop your headaches coming on. And she told me not to take any painkillers. So the doctors have been giving me painkillers, take two three or four times a day, so eight tablets a day. She advised at the hospital never take more than two tablets per week, otherwise the tablets that you're taking start re-evaluating your headaches. So your headaches are never going to go away. So these are helping me sleep slightly better, I am sleeping better. But I've been like this for donkeys' years.

Have you?

I'm up at four o'clock every morning for work anyway. And I've been like that since I was nearly 20 years old. So that's just a lifestyle thing that's through job and everything, so that's a thing that just over the last probably 10 or 15 years I've really been a bad sleeper all that time. And it's gradually got worse, now I'm hoping I'm getting to a little bit of a pattern. I'm going other way slightly. Because I can go to, with these tablets I can go to bed and literally fall asleep straightaway, and I am getting like. Let's say 11 o'clock at night, I'm getting through to four o'clock in a morning without a break some nights. So that is brilliant to me. I mean they do advise you to get eight hours, that would be nice, it would be nice.

That's a distant dream.

Yeah, distant dream. But if I can get four or five, I've lived for it must be 10 years on between one and three or four hours a night.

Wow.

And then when you're at work doing a 12 hour shift it's a lot. And gradually, and I think my body's got now, I mean I think I need two new knees which I'm seeing about in the next couple of weeks. But because I can't do anything because of my knees, I can't exercise. So the rest of your body then starts, you're not fit enough to do anything. I can't go for a long walk. So your body's reacting to that. I'm not getting any exercise whatsoever, so my body's just gradually fading out as far as I'm concerned. That's the way I look at it anyway. But there's

nothing I can do about it until I've had my knees done. And if they're all right, if I can get some exercise then hopefully I should be a bit better hopefully. Because when I got to 60 I thought if I get through to retirement I should be all right for retirement. But since then it's gone a bit backwards yeah, so it's gone a bit backwards. Other than that sparkling.

So how would you say, how long, you've said about 10 years, do you think before that you were in pretty good health or?

I've always, I've never had anything drastically wrong with me. The only time I've lost time at work is for major things. I had a six week period when I had varicose veins done in my leg. I've had a hernia which took me off for six weeks. And it's just things like that every 10 or 15 years. I've had about three, and they're the only things that's ever affected me really. Other than that just colds and flus and whatever, just normal stuff. So really I've got through life, and I was thinking when I was 60 I've got through life pretty good without having any major upsets other than things that you can't avoid, which is a hernia, you need to go in, you can't avoid them. It's just wear and tear so there's nothing you can do about it.

Yeah.

And hopefully I'm hoping that they can sort them.

What do you reckon was the, could you put your finger on one thing that changed when you hit the 60 mark that triggered everything going a bit?

No, I don't think I can. I think 60 just seemed to gradually, I think hang on I'm aching here, and then I'm aching somewhere else. At that time I could do a bit of exercise, so I got an exercise bike, I was trying that. But I weren't getting anywhere with it, I weren't getting any fitter. And gradually like I say the things that, my joints particularly, I just stopped exercise. I mean I've done weights in the past, I've done weights, I've done running. I've done quite a few things, but I can't do any of them now. So this is the thing that I don't like just now, is that I can't fight my way back to any sort of fitness that I'd like to, because my body won't let me. And yet it's my body that's suffering because I can't do it. So there's no end to it as far as I'm concerned until I have my knees done.

And hopefully if they can make me a bit more mobile, because my legs, they just feel, they're that heavy, they're that painful at times. I've stood on 12, 15 hours a day, so this is big problem. It wears me out moving, you know what I mean? So it's just wear and tear, that's all you put it down to. I must admit up to 60 I thought I was getting away with it, but somebody's decided I'm not going to get away too easy. So see how it goes.

What do you reckon, so you said you stand up all day at work, so what kind of impact is this all having on you do you think in your day to day life?

Basically it's ruining everything, because I don't want to do anything. All I want to do from walking out of door at quarter to five in a morning. The first thing that goes through my head when I walk out of the door is I can't wait to walk back through it. The rest of the day as far as I'm concerned is just dire.

Just getting through it.

Just I'm fighting to get through it, and that's what it is just now. I'm just fighting. I mean I've got a chair at work now, which since all this has started with my knees and my neck they've allowed me to have a chair, which they've never allowed before. The other firm where I spent 40 years there, we had a chair for machine. But this place that I'm at now they only do it for medical grounds, so I've got one. But my work's changed slightly, I can't sit and do it. So I can only do certain jobs. So I get to sit down, I get a rest, then I've got to stand again. But yeah, I'm fighting every day now. The way I look at it is that, and then when I get home at night I just cannot move off settee. That's what I don't like. I'm not, to be honest I'm not bothered about anything outside house. I'm all right going home. But I haven't got the energy if I wanted to to say let's do this.

What would you have done before, like if you did have the energy?

Well I've gone out jogging, all sorts. I've got mountain bike in garage, I'd love to get that out but it's just not there. I do like to get out for a walk but it's not worth the pain to be honest. The pain is really controlling my life. There's

nothing I can do about it because every painkiller they give me affects me wrong. It knocks me out. And of course with our job, I mean it's a dangerous job anyway because it's grinding and sharp cutters. So you can't afford to not be 100% on it, which I'm not 100% now.

You've got to be feeling 100% yeah.

But if I take tablets honestly I could be down to about 15% 20%, and that's not, I just cannot take that. I'd sooner not take them and have pain than feel like I do, because I shouldn't be driving. And I've never understood it all my life where tablets say if you take these tablets you'll feel drowsy, don't drive. I've never had them affect me like this. But they're affecting me now, and it's not safe to take them so I don't take them. So I'm taking these what she's given me now, but I'm not taking any other painkillers apart from these. These are supposed to be a preventative rather than an actual painkiller. So that's the way it's affected me anyway.

If someone could wave a magic wand and you could have one wish for your health, what would you choose to have?

Just to be fit again. I don't mean super fit, just to be fit and feel well. And not feel tired. This is the basic, my body's that worn out all I do is feel, I feel ready for bed 24 hours a day. And then when I go there I can't sleep. So you know what I mean, it's just one of them things. But just a bit of health, it would be nice. I'm hoping, like I say when I have my knees done, if they can get me mobile. And from everybody I've seen and spoke to they seem to think it will do, might get a bit of fitness back and I might feel better after that. But as things stand now I can't.

What would you say is your state of mind while all this is going on?

I don't think you want to know. My state of mind is I'm short tempered with everybody. I don't let it be known, which is another thing. Although I'm short tempered with people, I don't let them know about it. I keep it in. That affects me. I mean work's driving me crazy, I hate the people I work for but I can't let them know it because I need this job for the next two years. So it's frustration. It's just a frustration on top of everything else. And now the body's, tickly throat.

I know sorry.

No, it's all right; I've had it for a couple of weeks now.

I'm making you talk loads.

It might go, it might not.

So can you talk me through the care that you've had from the NHS?

To be honest I can't, I wouldn't knock them. There's no way, because you hear people on television saying oh they did this and did that. My care that I've had, they've looked into everything I've ever asked them for. They've sent me to hospital. If I've said I've wanted to go to the hospital they've sent me to the hospital. I'm not one for doctors anyway, but I've always had, I've got quite a respect for health service to be honest with you. Because they do a good job under bad circumstances as far as I'm concerned. And I don't know how they do that because I hate my job, and that's because. I only hate it because of the restrictions people are putting me under. So I can't imagine health service, what restrictions they're under and people are having to work for it. It must be unbelievable. But that's the same with everything isn't it, police force, everything. Everybody is under restrictions.

But yeah, I've always had good, everything I've ever had and done has been sorted. So I've got no, I've never had a complaint about the health service. I have about certain, like you go to a doctor, you don't get. I mean up to this last time, my last 10 or 15 visits over the last 20 years or so, not one doctor's touched me to examine me. Now I don't, if you go in with a complaint and they're just sitting there talking to you and writing you a prescription, and you go out. I can't understand how they can come up with, to me there's certain things got to have an examination. And if you're not getting one that prescription as you're walking out, I don't rate that bit.

So does that make you feel like you can't trust the prescription necessarily?

Sometimes yeah, but I've always took prescriptions, apart from now that they're starting to affect me. The tablets have never affected me in the past. But that's the only thing I've got about the health service, because I told doctor at hospital when I went to Hallamshire, because she gave me a good examination. And I said that's all I've been looking for is an examination. And it's not for, obviously if you go with a sore throat you're not going to get much of an examination. But there are things that need probing and to have a look at, and if you don't get that when you think you have it, then what are they giving you a prescription for? But that's the only problem I've got with it, with doctors and the National Health Service. As I said they've always done everything for me, and still are doing to be honest with you. Because like I say I want, I'm going for the next few weeks to see about my knees. So it's just no problem.

So you seeing, are you getting treatment for separate different things that are going on?

Not just now no. Excuse me, I don't know if this is a bad cold or what. No, I went to the doctor about a month back now for problems with my knees and problems with my neck and my head. I put my knees on hold until I got my neck sorted, because the neck has started giving me migraines and that was, I don't miss work easy but I had to lose a day's work. While I've been at this work nearly nine years it's the first day I've lost through not being able to get to work. And that was a migraine, and I thought I don't want any more of this. So I put my knees on hold until something was done about my neck. And now I'm going back in next, I think it's about a fortnight I'm going to back to see about my knees being looked at. But I didn't want to get them mixed up. I just wanted to stay on one thing rather than have two going on at the same time. But yeah.

So could you break it down into what stages you've been through? So you first of all went to the GP, what happened then?

He referred me for my neck. He referred me to hospital for x-rays. One for my left knee and one for my neck, which I had done that time. Went back to see him again. He asked me what I wanted to do. I said well let's leave my knee and let's sort my neck out first. So this is the problem I said, he weren't there again so I ended up seeing another doctor. I think that one referred me to neurology department for my head. That's when I went to see, that's when she's given me this last lot of tablets. And then I've been back now, I've been back to make an appointment to see another doctor who I saw last time that referred me to neurology department, and she's no longer there so I'm seeing another doctor this time to see him about my knees. So it's just about four or five different appointments. I've been to see the doctor, they've referred me. I've had x-rays done. Been to see about my neck, but my next thing is seeing about having my knees done. Just about five different appointments and referrals.

So you have to keep going back and making the appointments at the GP.

Yeah.

And what were you here today for?

Acupuncture for my neck. They're trying to stop, I think it's this muscle down right side of my neck. When it comes on it's sending, it's so much pain all the way up my neck and right side of my head to back of my eye. As I say I've had it bad but I've never had it as bad as that morning when I just couldn't get dressed. So that's what I'm here for. And since I've been on these tablets and had the acupuncture fortnightly, and then today, I've only had one real bad headache but not as bad as the one that knocked me out where I couldn't get to work. And I've just got another appointment next Thursday I think it is. I think that will be my last one to be honest with you the way he's talking.

And then do you feel like you're happy that it's been, enough has been done?

To be honest right from the beginning of coming here they made three appointments, since they made them three appointments, that three appointments said to be, well there's three appointments but nothing after. Now I don't know if there is, he says we might give it a rest and see how you go. So to me you're getting three appointments and then I don't know. If it doesn't work it doesn't work, and if it does it does. But up to now it's just three appointments. I'm happy with that up to a degree as to when I come next time. If it isn't any better I don't know where I'm going from there. I don't know if I'll still keep coming here, nothing's been said yet. We'll find that out probably next week.

Right, thinking about things that make you feel better in your day to day life, what things do you do or can happen in your day to day life that makes you just feel better, makes the day better?

Just getting home, that'll be a weekend away from work. That's about the main thing. And getting home at night. Other than that there's nothing else really. I just want to get home. I'm lucky that the wife, she's on a similar vein to me, she just likes her house and being at home. So as it stands just now though she's working, she works, I finish on a Friday and she starts Saturday and Sunday.

Oh no.

Yeah, so basically we're hardly ever in the house. So I look forward to weekends because they're my time. And I used to think that I could do what I want, I'll nip by to Meadow Hall or have a walk and watch a match in park. But it doesn't happen anymore, I just, so long as I'm in the house. And I feel guilty about it, that's the big problem. I'm not doing anything - I'm feeling guilty about not doing anything, but even though I haven't got the energy to do it.

What do you fill your time with then at the weekend?

Just watching telly. Saturdays it's all football, from dinner time onwards there's football on until about seven o'clock at night. With me being on my own I can do it, I've no problems bothering anybody else so I just watch football every Saturday. Sunday just do a bit of housework, basically that's about it.

What would you rather be doing?

I'd rather be, if I'd got the energy and the get up and go I'd sooner be doing, I'd sooner be going out on my pushbike, or going to a match. I mean I haven't been to Wednesday ground for about 10 years now. But I'd love to get, and I've love to have the energy and the get up and go to just say let's go to the match. But I haven't got it. It's just, it's frustrating. But to be honest with you I don't know how much I'd do if I felt better. And that's, if I do feel better that'll sort it out then. But as it stands now the only thing I've got in my brain is getting home and staying there. I don't even go to see relatives other than my sister and my brother. We don't see anybody other than if I go to see them. They don't come to see me. And I have got that where I'll go out and make sure that I'm involved in family, but other than that, I think that's guilt. It's always guilt. I've got to do something and it might not be much but at least I've done it. I just put it down to guilt because I'm not doing anything. I've got to do something. And little bits I do do are major things sometimes. But I don't know. But if I felt better I honestly don't know what I'd do. I'd be doing something but I don't know what it is.

Is there anything at all that you can do that makes your health feel better?

No, nothing. Even if I get some sleep I don't feel any better next day.

Really?

No, it's the same feeling of being totally worn out every day. If I went to bed, like I say a good night's sleep to me is probably six hours. If I get six hours I don't feel any different to what I've done if I've sat up all night. So I can't put a finger on what it is. But to me like I say because I'm not mobile enough to do anything without pain, if I'm going to have pain I might as well have pain on settee watching telly. That's the way I look at it. Because it's easier. I'm taking the easy option all the time, I know I am. But there's nothing I can do about it. It's 100% I'm going to take the easy option each time.

What do you reckon would be the hard option?

Get up and do something when I don't really want to do it. That would be hard. I'd be pushing myself. If I did something like that then I would be really pushing myself. And to be honest my brain's just saying don't do it. It's just this fatigue all the time. I put it down to sometimes, like if you've been exercising, and I can't remember what exercise feels like after exercising. But I just put it, I think back and I think when you've exercised and you've been doing something for three or four hours or working hard, to feel like that, that's what I feel like all the time. And then it's not nice to be honest with you. And I don't know how to get out of it. And I would say I'm putting

99% of my hopes in my knees, which sounds ridiculous but if they don't work and give me a bit more mobility to be able to not feel so bad.

Yeah.

If I can get my body a little bit fitter, feel a bit better, then things will happen. But if they don't nothing's going to happen, I'm just going to carry on as things are now. And I can't, to be honest I don't think about it. I try not to think about it because I know it's not going to change until something actually makes me change. And the only thing that's going to make me change is having my knees done. Because then there's a chance that I'll feel better or walk better so that I can exercise.

When do you think that will happen with the knees?

I've got a doctor's appointment on 9th March. If she refers me then that will be, I think it's within about, is it 48, 18 weeks is it, a referral. From a referral it's got to be 18 weeks so I've heard from referral to actual completion of whatever they want you to do. So that's what three going on four months. So it could be anything up to six months' time. And they'll only do one at a time. So I'm assuming if they do both, which I think they do, I'll get one does this year and one done next year. And then hopefully, so it's going to be next year minimum. See my left one's the worst, but because I'm having to walk funny on that one.

Yeah, it's taking that.

It's taking that one out at the same time. But standing on it all day, it's just one of these; it seems to settle as though your knees are gradually sinking into your calf muscle. And then when I try to come off it that's when pain goes. It's like a spike of lightening going straight up your knee, straight through my knee. But this being on this chair at work, that's helping that I must admit, it is helping it. Because I've got to stand up for certain things but it's the way that you have to stand for certain jobs that is worse for my knee. And up to now I've alleviated the worst job for it with sitting down. So I'm keeping my fingers crossed.

What would you, how would you describe someone who's physically active?

Lucky for one thing.

Yeah.

Somebody physically active, they've got to feel better in themselves for one thing. But other than that I'd just say lucky. I work with a lot of younger men at work, and they don't know how lucky they are. I didn't when I was that age. If you look after, I think if you look after yourself enough when you're younger, it's going to help your future when you're getting older.

What do you mean by look after yourself?

Just keep fit, underweight, don't get overweight. I'm slightly overweight now, but I haven't been all my life. I started putting weight on probably when I was 45, but I haven't put any on for two or three years, I can't get nothing off either. Physically because I'm not doing anything I'm not, my body's holding on to whatever. I try to cut down on the food but if you cut down on food your body just stores it up and says there must be a famine on, I'll keep all fat with me. So what do you do? It's a vicious circle. I'd like to be able to just do a bit of something so that I can eat what I want and know that I'm burning something off, but I'm not burning. I can't be burning anything off other than work. The trouble is with work I stand still most of the day, so I don't burn a lot of stuff off. But I'm keeping my weight down but I'm touching 18 stone so, but my build it doesn't look too bad. But it's still not good, I'd sooner lose, I'd love to lose another stone but I'm going to need to just exercise to get rid of that.

Right.

Because dieting, I've always been told you can't just diet, you've got to exercise at the same time. Well I can't do that. I can't even do weights to be honest with you now. I've done a lot of weights, not heavy weights and not bar bell, just with handheld. But that's affecting my neck so that's another thing, it's just affecting what I'd like to do. Because at least they kept you supple, but as I say my neck's, I've got arthritis in the top of my neck or in top of

my spine probably, so that's just, I don't want to aggravate that. So I've stopped with the weights, a few bits of weights that I used to do.

Was that at home you used to do that?

Yeah, I never went to, I've been a member of a gym about two or three times. But I never did weights at the gyms, that weren't something that really interested me, weights. Jogging and just, I don't know what you call it, just compression where you're pushing against other weights and stuff. But I've never been into weights other than just a couple of hand things in house. I've done a few, I've got some of them bell things, I don't know if you've seen them.

Like a kettle bell.

Yeah, I've got a couple of them; I used to do that at one time. But I can look at that on garage floor now and think no it scares me that.

Does it?

It scares me just the thought of picking it up and trying to do something with it.

What scares you about it?

Because I know how I'm going to feel once I pick it up. Once I start, if I start exercising I think I'm just going to feel so crap. So I look at it and think no, I'll leave it this time.

So it's not worth it.

I don't think it's worth it, not with the way I feel. I wish it were, but the way I'm feeling at this particular moment. I mean I used to do a few going up the steps, up and down steps. I can't do that because of my knees. So there's all sorts of little things that you think you can do but you can't do anymore.

Yeah.

My brain tells me I can run a six second 100 yards but my body says it's going to take me quarter of an hour.

So we've touched on some of these questions I think already, I was going to ask you what's the best things and worst things about being physically active. So I suppose I could ask you that as you feel now, what's the worst thing and the best thing?

The worst thing is like I say, feeling like this and not being able to do anything about it. The best thing, there isn't any best thing, there's nothing good about it. Not that I can see anyway. It's so bad. And this sounds depressing, I'm not a depressive, please don't think that but I'm not. But it's just the exercise and talking about it. When you talk about it, and I don't talk about it normally, but when you talk about it you start thinking it would be nice to do it. But there's things I've got to do before I can even attempt to start. I've had rowing machines in the past and all sorts, but the worst thing is that you can't do anything, the best, there's no best about it at all. I don't know how to get round.

Is there anything that makes it easier?

No, because whatever I try I know is going to affect me after it. So if I did push my legs too much my knees would swell, and I don't particular want that. Same with my neck, I've got to watch what I'm doing with my neck now because the last thing I want to do is my neck go wrong, because that will screw me up completely.

Yeah.

So basically what I'm doing I'm shutting down. And that's as things stand now. Actually shutting my body down and doing nothing, which is wrong, I know it is. But it's the easiest option, because I don't know what would happen if I tried to push it. As I say once I've, if I can get my knees done and they make me feel better, I don't

know what I'll do all day. I'll start opening up and things might get a bit better. That's what I'm hoping for anyway. That's why I'm having them done. If it weren't for hopefully feeling better there'd be no point in having them done.

What would you want help from the NHS with? In what way could the NHS help you in this situation?

Well the major thing is it's two operations for my knees. That's the thing I'm looking for from the National Health Service to do. They can't do anything with my neck, but I'm not bothered about headaches, I can cope with headaches. But my knees, they're affecting my life because they're stopping me doing stuff. So as far as, only thing I'm looking for from National Health Service is to get my knees done as soon as possible to give me some hope of trying to get at least some kind of fitness back. I'm obviously not going to be super fit but some kind of fitness back to where I feel better about myself. So that's all I'm looking for.

Who would be do you think the best person to help you with that?

I don't know to be honest. To me looking at it that way it's got to be surgeons who are going to do it. I've got my doctor, they'll push me through hopefully to do it. So that's one thing, the first option. If they say no I don't know where that leaves me. I don't think they will because the physio that put me, that was doing my neck before I come here for acupuncture, she saw x-rays from my knee and she said it is getting bad. So I don't think there'll be any problem. So that's the one thing, is doctor to surgeon to have a go and see what happens. Then if it's all right and where I can get some kind of feelings back, I know I'll feel better for myself. I've got to do.

So do you feel like in terms of if your knees got sorted, getting that fitness back, do you feel able to sort that yourself, or do you think the NHS could help you with that?

I don't know, because I don't know what the NHS can do to be honest with you. I've no idea what they could do that way. So I'd be looking at having a go myself. But then again I might be missing out on something.

If they offered you support with that would you take it do you think?

Yeah, I think so, especially as I'm coming up to, I'm in my last 20 months now I think, 22 months of work. I will be retiring at 65. And to be honest I don't care what happens in last year. But if I'm in a position where they can help me in some aspects of whatever's happening, I'd take it more than I would work. I've always thought about work first, even before my health. If I get to my last year my health comes before work. So if they could help me in any way, I'd even take time off work to do it, to have a go at it. But as I say it's not something I know about, it's not one of them things I can say, I can comment on to a great degree. I don't know.

If you were to say on a scale of one to 10 how likely you'd be to take up something, if someone said OK we've got this service or programme or whatever it might be to help you recover after your knee surgery, how likely do you think you'd be?

Probably seven or eight. I wouldn't go to 10 because that sounds as though that would be a definite. But I'd be way above, I would be above halfway.

What makes you hesitate from the 10?

From 10? Because that would be my state of mind. I've got to get my knees, once my knees are done my state of mind will go along with whatever my knees are doing. If they go wrong my state of mind is going to go over road. So I've got to get my state of mind. So I'd go to either seven or eight just now. Because if I need something I will take it, help. If I can get it I'll take it.

What would be the best outcome for you in terms of, say I was to call you in a year's time or two years' time, and your knees have been sorted and you feel like you've been able to get some kind of fitness back. And I asked you OK, what's different, how do you feel different, what would you say?

If my knees had been sorted and fitter, I'd be, you wouldn't be able to stop me laughing to be honest with you. That's all I want. But at this particular moment it's impossible, that in a couple of years' time, or even 18 months, if my knees are all right and I'm feeling well I'll be quite happy. In fact I'd be very happy.

Can you, I know this is quite difficult, it's a hard thing to describe, but what does feeling well mean to you, can you describe what you mean by that?

Yeah, it is hard that one. It would give me some of my life back. I think that's the only way I can describe it, because there's nothing happening just now. And hopefully if I am fitter in 18 months' time I shall be doing at least a bit of something I want to do. So I shall be getting some of my life back. Even if I've got to drag it back I'll go for it. Because I don't want to feel, I mean if nobody was helping me I'd just sit. And take this to whatever, but if somebody's putting something in front of me to help me, I'd like to say that I'm 100% where I'd go for it. But yeah, that's the way I'd look at it. That I'd get some of my life back so I'd be quite happy with that.

And would you be willing do you think to pay, you know how we pay for prescriptions, would you be willing to pay for physical activity support?

If I can afford it.

Yeah.

Yeah, I would be if I can afford it. I've no problem with that. It all depends on what the cost is and where I am money wise. I don't even know where I'm going to be for retirement yet. It's not looking brilliant but, not compared to what I'm earning. But if I can afford it yeah, I don't mind paying for anything that's, not everything can be free put it that way. And if, to me if National Health Service is giving you a service to help you like that, then why should that be, not everything can be free on it. There's got to be a point where every, the major things are free, but something like getting you back to fitness, if you can put a bit back into it, to me that's the way I look at it. If you can put a bit back into it that's fair enough.

But at the same time I have paid into it all my life. And there's people that's not paid a penny into it and getting stuff out of National Health Service. And it peeves me, because I know I've been in employment since I was 15, I've paid my whack. And whatever's in there I want it out. But if I've got to pay something towards certain things it doesn't scare me, and it doesn't make me mad. It makes me mad that there's people getting it that's never contributed. That does rattle me. But I don't mind paying a little bit of something, and if I've got money I'll pay it, I don't mind.

OK, one last question. Has a health professional ever talked to you about physical activity before? So all the people that you've seen over the last few months or years, has anyone ever spoke to you about your physical activity levels?

No, not a word, that's definite that.

OK, does that surprise you?

Yeah, now you've asked the question it does yeah. Not thought of it up to then. I've got no recollection of anybody ever saying a word to me about any sort of physical. Only over the, you must get more physical for your health. But that's not part of that question really.

Who said that to you?

It would be one of the doctors, but going back a long time. But nobody's ever given me any advice other than saying you must be a bit more physical for your health. But that's just a proposal to you isn't it really? It's not helping you, it's not telling you what to do or giving you advice on how to do it. So yeah, no never.

OK, is there anything I haven't asked you that you expected me to, or anything that you wanted to come and talk about that we haven't covered?

No, I don't think there is no. I read that thing you gave me, and I think we've touched on about everything that was on there. I can't think of anything to add to it, or to ask you. I might do in 24 hours but that's the way things go isn't it?

Yeah.

Especially with me.

Well you can always email me if there's something that you think of.

No, I'm quite happy with that.

OK, are you happy for me to stop recording?

Yeah.

OK.

So long as I haven't bored you.

Not at all, no.

[End of interview]

Appendix G: Example health professional interview transcript

(Discover phase)

So to start off with do you want to just give me a little bit of a brief overview of what your role is?

OK, so I work for Continence Advisory Service. I'm one of the physios amongst that team. So my role is to assess women who come with anything from urinary incontinence, prolapse and like vulva pain disorders, and basically help them rehabilitate that. So that's anything from lifestyle modifications like diet and, you know, like fluids and bowel management, all the way through to pelvic floor examination and pelvic floor exercises.

OK. You said you were one of the physios, how many physios are there in the team?

There's two in the team. We have a physio and he does, so I do three days and the other lady she does part management and then a day and a half of clinic. So we've probably got just under the equivalent of one full time physio in the team.

OK. And why might a person come to see you as opposed to one of the continence nurses for example? Is there any filtering of patients that way?

Yeah, so if you speak to the nurses they will say that the physios treat stress incontinence and they treat overactive bladder and urgency. I kind of see my role as slightly broader than just stress incontinence. So they will come and see us if it's anything more sort of in terms of a muscle and retraining. So, people who are struggling to contract their pelvic floor may be overactive as well as underactive. People who've, specifically me within the team if there's like a postural element to that, so is their posture and their movement contributing to how their pelvic floor is working? But we do have a lot of overlap. We do have a lot in terms of the lifestyle the fluids and the management that's very overlapped, but the nurses would manage much more the medication side, products like pads. That's what they would manage.

OK. Do you think you'd be able to describe a sort of patient pathway for one of the typical people that you might see?

Yeah, I mean we get two different, two main sources of referral. It's either from GPs or it's from consultant from the acute trust. Both of them would come in. They'd be sort of screened depending on what their presentation would be. They'd then be sent out an initial appointment with either a nurse or myself and then they usually get an hour's appointment, the first appointment through which we do all the screening of health, you know, background health but also presentation, you know, different symptoms, getting them to kind of do a bit more of a subjective, a lot more subjective in that in terms of how they perceive their symptoms. We use quite a lot of perception scoring to monitor their, sort of as outcome measures, as well as sort of actual outcome, like physical objective outcome measures as well.

So they definitely have this initial assessment, and then after that it varies really in terms of how many follow-up appointments. Generally I'd say on average between four and six appointments in total, and that could be anything from an initial assessment all the way through to telephone appointments and face-to-face follow-up appointments. But I'd say that's the average. Usually from their appointment discharge either they've improved and we can discharge them fully, either they have seen no improvement and they want to have ongoing investigation, as I say somebody who came to see us with prolapse. They may not have seen significant improvement because of the severity of their prolapse and therefore then we'd refer them on to either GP clinic, back to the GP clinic for a pessary or into sort of acute pathway for uro-gynae or gynae review with a consultant. That's the usual path.

OK. What kind of sort of feelings and emotions do you see people coming in to you with?

Oh crikey. I think our service is one of the most emotive. We use tissues a lot in all of our assessments. People come with anything from fear, shame, anxiety. Obviously we're dealing with a very sort of intimate area. So often other things that may not necessarily be related come out, if anything we are quite prone to bring up things about abuse, because we have to ask if somebody say has conditions where they have overactive or/and spasm in their vagina, then sometimes it can be related to an abusive situation or abusive partner. Obviously we see children coming along, we don't actually treat the children, but we see the children, see the family. So we get quite an insight into family life in that sense. And then I think a lot of people come in with very low confidence. It's usually affecting whether it's just their work, if not their relationships.

We see a lot of marital issues as well, so all the sort of upset and distress that goes with that as well. And then I'd like to think as they go through they do get better. For some people it is very much, you know, I feel like more of a life coach for them than I am a physio because we spend so much time looking at, well, what are you doing to contribute to your symptoms and how can you control that? Because so many of them feel completely out of control, they've got no, they feel like their body has sort of taken over them and they can't stop this leakage or they can't do anything about this prolapse and people have never mentioned the word prolapse to them before. So actually for them it's a huge thing. We could be the only people they've ever told about it.

OK, interesting. Are there any kind of pivotal moments within the pathway where you see people go through any particular transition or change?

I would say there's probably two key moments. Either on the initial assessment where it's the absolute sort of release of this is what I've been living with, this is how it's affected me, you know, I've lot this relationship or this job or, you know, I can't do this with my children. You know, you get that initial sort of release. And then I would say probably, you know, as we're getting sort of about three quarters of the way through the treatment, and I'm talking about the people who stay with us for the full treatment, who don't stop coming for whatever reason, it's the ones, you see them come in and they're sort of transformed in terms of their attitude about it. They come in freer; they don't seem so burdened by it. At that point you know that they're capable of coping with this on their own as well that they can see they have, it's almost like you've given them the capacity to manage their condition. Because a lot of the symptoms we treat aren't going to go away completely, you can reduce them significantly or if not completely, but actually you still have to keep up the exercise, you still have to keep up the lifestyle, otherwise they'll come back.

And are there any particularly influential people do you think in terms of a person's experience during the pathway?

Do you mean within our immediate team?

Anyone really that springs to mind for you that could influence the patient.

It depends on what they've presented with. If they are, if we need to refer out, so they need urodynamics or they need a pessary or actually they wanted a consultant review, it depends on their expectations really of what they want. Some people just don't want any input at all. I had one lady who was so completely mortified by her symptoms, even sitting and talking to me she just felt so uncomfortable that she couldn't, it took us session after session just to break that down. So we saw her for a lot longer because it just took like several sessions for her to get to the point where she could actually talk about it. So yeah it kind of depends on their expectations of what they want. Some ladies just want surgery. So until you send them to a consultant they don't feel that their input has been significant. Other ladies will come to you and feel it's significant purely just by seeing you.

What do you think motivates that kind of, if someone wants surgery, how have they got to that point where they've decided that's what right for them do you think?

Yeah, and it's an interesting question because I think it's different for a lot of people. For some people it is potentially a passivity thing that they feel so either fed up or repulsed by their symptoms they want someone else to make it better because they feel very detached from it. For some people it is they're just, they feel that they've tried every single option and they are just desperate to do something to make it better. And other ladies it's a very gradual process. They really want to do, they will consider surgery, but they really want to make sure they've done all the groundwork first. So have they addressed all the things that contributes, all the risk factors

like being constipated or being overweight or smoking, you know, they want to have sorted all that out first. And they want to have a go at pelvic floor exercises and then they want to have a go with a pessary and then they'll consider surgery. So it's quite variable, but there's definitely a group that come in who are like I just want surgery. And you could do everything with them and until they've seen that consultant they won't feel that they've had a complete assessment. Even though they might not tell them anything different to what we've told them.

OK. Thinking a bit more specifically about physical activity, if I say that to you what does physical activity mean, do you think?

If I'm thinking about my professional role, I would say physical activity is literally anything in which you move. So whether it's walking to the bus or doing the cleaning or, all the way up to kind of actual sort of hobbies, you know, whether it's swimming or running or, I don't know, whatever sport it might be. So I kind of see it quite broadly. I think when I think for myself, I'm much more about sport. It's about going to a class, it's about going out on my bike, it's about running whatever that is. But I appreciate that my physical activity level is maybe a bit warped in comparison to my kind of patient base, so yeah.

What about if I say physical activity as medicine? What does that mean to you?

As medicine, well that's the thing, that's why I think that my perception of it as, for my patients is the fact that it's essential, it's not, we all have to move, and actually that's just an essential part of life. And I think in terms of medicine it's massively, I don't know whether underrated, I think people know that it's good for them, they know that they should do it, but in terms of medicine I don't think people have got their heads, I don't think us as a nation and as a society have got our heads round the fact that we can treat our illnesses, our ailments with that. And I think there's quite a split in that. If you spoke to certain populations of Sheffield they would just think that's really obvious and other populations of Sheffield just think you're a nag and that you're going on about the same stuff and it's the same old list of stop smoking, eat healthily, lose weight. I think they kind of see it all bunched into just one sort of checklist that the NHS just kind of churns out. They don't see the true, it's almost like they know it but they don't understand it. Does that make sense?

Yeah.

They know that they should do that but they don't understand what it does to their body and why it helps them. Maybe they haven't experienced it as well, I don't know.

OK. So they can't really relate to it do you think?

Yeah, so it's almost like it's, not unattainable, but it isn't relevant to their social norm. So what happens in their workplace, what do people do and what do, you know, what happens in their family and, you know, yeah that's how I kind of see it, that there's a very set social sort of perception of different things in life and it's very hard, even for me outside of my experience of growing up and my background of kind of like well this is how I live and this is how my understanding of it, for me to kind of transfer my understanding to something else would be quite difficult. If I kind of think of it the other way around, to kind of not do those things and not see them as important would be really alien for me.

OK. What do you think about physical activity being promoted within the NHS?

I think it has really improved and I think there's, I think, I don't know if marketing's the right word, but certainly the advertising around it, the campaigns around it are a lot more accessible and I think what's kind of, where you can connect with them a lot easier. I think they are a lot more patient friendly, I guess. Again I think it is, it's on that list still like I was saying before, the list of we know what we should do, but the NHS is, can provide information, can encourage people to do the right thing, but if they're, for example if they've got a respiratory condition and they carry on smoking, they know they need to stop smoking, but the NHS can't make them do that. So it's sort of their capacity, the NHS's capacity will always be limited in that.

Right, so their kind of ability to influence that is sort of restricted do you think to kind of an advisory...?

I think in some senses the NHS is just one aspect of our whole like society, it's only one aspect of our culture, so the NHS only has a limited, you know, if you think about somebody's day to day life, they don't think about the NHS all day like the rest of us.

Well I do!

Well yeah I know, exactly I just can't understand it, why wouldn't anybody else think about the NHS all day? But they're going to think about like whether it's social media or what they're going to go and do tonight or whether it's their job, you know. I always kind of think when we've got building work happening in our house and people come and explain to us what they're doing, I'm like yeah, no I don't understand what you're talking about, just fine, if that's what you're meant to do just do it and I feel very passive to it. And I always think this must be what it's like to come into the NHS and feel very passive to stuff. And I don't understand what the plumber's going on about at all, and I just agree and say OK. So I think that's maybe potentially how it is for a patient as well with the NHS.

That's an interesting way of looking at it, yeah.

Yeah I don't have a clue about those things, so yeah maybe that's the flipside of it.

OK. Do you think there's any, can you think of an example where within the NHS you think physical activity is being really well promoted?

OK. So I think the areas that we've definitely seen really good improvements is things like pulmonary and cardiac rehab; I think they are like, that is just now an integral part of the treatment. It's not even questioned, you know, and I think you go back when that was first introduced and it was probably quite revolutionary and certainly for a lot of patients it would have been quite socially really difficult for them, but now there's such a good community around it and such a sense of belonging and, you know, that has almost filtered into other sort of other sort of areas of medicine and they're adopting that and hopefully rolling that out. I mean I don't know the full extent of that, but I think that's probably the best example of physical activity through the NHS.

What do you think it is that they particularly do well?

OK. I think the fact that it is a format that's really accessible, in the sense that the, even to go along you know that you're not going to, so say for one of those people to be told they need to exercise more and them to go to a normal gym class, they'd probably feel that they couldn't keep up, that nobody would understand, that maybe they feel much bigger than everybody, I don't know, so maybe a percent of that. But you've got people who are all of a similar situation and there's that social aspect as well as I'm struggling with this symptom and how are you coping with that and, you know, supporting and learning from each other as well. And also creating a positive environment around their health that yes you have this health condition but you can come to this and you can take control and you can actually influence your symptoms for the good, rather than feeling like it's just happened to you.

Do you think that would be important, if you were to sort of transfer that kind of situation into the continence service, do you think those issues would be equally as important?

Yeah, I think the experience I've had of running group sessions before in my previous roles, we did an antenatal group session and we also did a uro-gynae group session. So people who were coming, potentially candidates for surgery or had been referred to the consultants, the pathway there is that they, and I don't know what it is up at the acute trust here at Sheffield, was that they'd get referred into the gynae group and then they would see the physios. Because there's so much information to tell them and so much going on, and actually it was really good for them to come in, because you'd have somebody in their 20s, you know, somebody who's 80, someone who's, and in some ways that, it depended on the week, some weeks that was really good because people went wow there's every shape and size and different person here, I'm really not on my own. And sometimes you'd get it and there'd be like ten sort of 60, 70-year-olds and then one 20-year-old girl and you'd be like oh no she's just going to feel that she's really isolated in that. So I think actually having a group where people are very similar is important.

OK, that's interesting. Is there anything that you think within the continence service in terms of physical activity you'd like to be doing differently?

I think if I'm honest being a physio within the continence service, not that it's difficult challenging, I think I'm pushing enough boundaries as it is. I think our service is massively overspent and struggling to kind of keep ourselves as we are let alone introduce anything else on top of that. I think a lot of the ladies are very, you know, because I think maybe because I see the ladies who maybe do want to exercise or are experiencing their symptoms during exercise, I maybe see those ladies and I think actually one of the questions is what exercise can I do? How can I do it safely? And yeah I think the only routes I would say that would be potential for us as a continence service is to roll out appropriate exercise classes like a Pilates-based class or for them, yeah. That's why I never, if I wrote an endless possibility list for our service. I know that what I do on a day-to-day basis is quite different to what everybody else does on the team anyway, so yeah I already feel like I'm sort of kind of pushing the boundaries of what we do anyway.

But that would be your kind of wish list would it to be able to offer those kind of things?

Yeah, I think the wish list, yeah or you would have a bit more of a holistic clinic where it isn't just about squeeze your pelvic floor and stop drinking coffee, and that's kind of where I get a bit fed up. Because I think actually there is a huge role in terms of a person as a complete body, the pelvic floor isn't on its own floating next to your body it's part of the whole thing and actually people need to approach it as a whole, but I really appreciate that my training as a physio is very different to the training of nurses. And it's not that ours is better or theirs is better, it's just we're very different. And actually trying to get them to understand what I'm doing, even talking about basic muscles like glutes has been a challenge. So yes it would be lovely but I don't see it as a realistic potential for our team, unfortunately, just because of the gap in practice and knowledge. But obviously if the study can pull it off.

Is there anyone that you think particularly if you were able to do more around physical activity, would you think that there's any particular people that would benefit most from that?

I think, going back slightly to your last question and this one together, yes if I could do anything I'd love to have like a hydrotherapy session for people. I'd love to be able to do a Pilates class which is specifically designed so we can focus more on the pelvic floor. Those would be the two that I'd love to run. In terms of, sorry say the second question again.

So who would, is there anyone that you think would benefit most?

I don't think I could say there's just one set person or one type of person that would benefit, because I think the ones maybe who will have a higher BMI, I find that when I talk to them about reducing BMI and physical activity, and they're dealing with leakage or prolapse, you kind of feel somebody has to deal with so many hurdles and barriers to a problem, and if they have more than a tipping point then will they even get beyond that? So maybe actually having something on, you know, for somebody who maybe has a high BMI because we do have evidence that people who bring their BMIs below 30 has a significant reduction of impact on the pelvic floor so their symptoms can improve, they can train their pelvic floor easier if they get their BMI below 30. So maybe that could be an inclusion criteria for people with BMI over 30 that we actually give them capacity or give them opportunity to go into a class to help them with that. That is safe, that's monitored by somebody who can manage that, potentially, yeah.

OK. Is there any time at which you think this is the right time to talk to someone about physical activity?

I get in there really early.

Do you?

Because I like to set the expectation, I like to set the expectation that I'm not going to tell you just to squeeze your pelvic floor, because you can squeeze it all you like, if your BMI's high or if you're constipated or if you're not drinking the right stuff it's not going to work. So I tend to take a very sort of holistic approach in terms of these are all the components of your treatment. If you pick one of them you might have some impact, if you put

them all together you're going to get the best possible outcome. And I don't really budge from that because unless somebody has, you know, maybe, let's say somebody has a health condition that means that actually, say somebody who has like a respiratory condition, as long as they're not smoking and doing something to aggravate their symptoms we would just compensate around that and go OK well we can't stop you smoking other than, oh sorry we can't stop your respiratory condition, I mean obviously we can manage it and make sure if they say they're asthmatic, that they have the right inhalers, that they don't smoke, that they have preventative, you know, they're quite proactive in terms of any chest infections, I mean they kind of almost do like a pre-emptive course of antibiotics or whatever. That's where our role becomes a bit broader in the sense of it's not just about the pelvic floor exercises, it is about it all working together.

So yeah I do introduce things about diet and physical activity fairly early on. But I probably wouldn't say, I wouldn't push physical activity, because in terms of pelvic floor training we need to get them just coping, getting it working day-to-day before we can then load it higher.

So would you say that's more of the priority?

Probably yes. When we're talking physical activity, I guess we go back to your first question, how would you define it? If we're talking literal physical activity, walking for the bus, doing the cleaning then yes I would talk about it straightaway in terms of what we call the knack, so we get people to train it functionally. So sometimes the pelvic floor muscle not only is weak, it can also have lost its sort of patterning. So it's kind of like its behaviour. So where your pelvic floor should respond to an increase of pressure in your tummy, so as you go to cough or as you go to lift something up, sometimes it's kind of forgotten that or it's sluggish. So actually we do functional training with that. So say when you're going to do, you know, the hoovering, I want you to think about good posturing. We'll talk about their posture, we'll help them to correct that and talk about pelvic floor activation and tummy activation, so they're supporting the area as they're loading.

So if we're talking about that sort of physical activity, then yes I talk about it straightaway. If we're talking sports physical activity we always discuss sort of getting ...[unclear] management. So if I had somebody who came to me who, we get fell runners who come and they just run all the time, and it's like you've got to take the load down to allow that pelvic floor to recovery and actually train, because at the moment you're just constantly over fatiguing it, it never gets a chance to strengthen. So it's not, I wouldn't say it's as simple as, it depends on your pitch for what level they're at.

OK. What do you think in terms of evaluating how effective physical activity's been for someone? If you were head of the service or head of the NHS and you wanted to say OK, we've been promoting physical activity in our service and we want to know whether that's had any positive impact on patients, what outcome measures would you be looking for?

I suppose there's the basic, you know, blood pressure, weight, you know, the actual physical objective measures in terms of are you physically more active? But then if somebody's weight doesn't necessarily reflect their fitness or their physical activity, their blood pressure I would like to think would have changed in some way, if somebody wasn't physically active and had become physically active. In terms of physical activity, I think we also have to get away from the fact that it is just about it being physical benefits, you know, there's so many more benefits to it. So I'd be getting someone to do a whole sort of, I'd look at maybe a lifestyle outcome. So, you know, what's their overall mood, so before and after, so what would they rate their life, you know, I don't know. How satisfied are you with your life, or how well do you sleep, or, you know, how would you rate your mood out of one to ten. Or something like, so we can get an idea of, you know, is physical activity, yes it's probably hopefully affecting the physical sort of overall health, is it affecting the mood? And then lastly symptom specific, have your symptoms changed in any way because of activity? So say somebody's got, I don't know, hip arthritis, can they mobile further? Are they more comfortable because they're now doing stretches and strength work? You know, what would it, you know, those are kind of the three sort of actual just baseline and health measures, kind of that whole sort of like mental health and social health aspect of it and then lastly symptom specific.

OK. What do you think gets in the way of physical activity being promoted? Maybe thinking firstly kind of organisationally or professionally...

[Recording ends]

Appendix H: Interview summary report for participants (Discover phase)

**Sheffield
Hallam
University**



**Insights from patients and health professionals on the role
of physical activity in NHS care**

July 2016

Introduction

41 face-to-face interviews were carried out with patients and staff delivering or receiving care in Sheffield. The patient interviews have provided insight into the views of people accessing NHS services in Sheffield - their health concerns, care experiences and views about the role of physical activity in their lives and their health. Interviews with health professionals have provided an understanding of their professional priorities as well as the challenges and opportunities of promoting physical activity. These findings can be used to determine the important design challenges for developing physical activity pathways and programmes.

This report provides some examples of what people said and identifies the key insights that might be taken forward for future research.

Section One - Interviews with patients

Interviews were carried out with 19 patients (10 men, 9 women, age range 31-64) across hospital and community care settings in Sheffield. Each person interviewed was receiving care from one or more of the following services:

- Community physiotherapy · Diabetes · Chronic pain · Continence · Podiatry

9 themes were identified:

- Lifestyle and personal priorities
- The impact of current health conditions
- Experience of care pathways and relationships with health professionals
- Social identity and confidence
- Thoughts and experiences about physical activity
- Self-determination and self-efficacy
- Social support for physical activity
- Individual practicality and suitability of physical activity
- Health aspirations and future outlook

Lifestyle factors and personal priorities

Key insights:

- There are many lifestyle factors besides physical activity that are of significance to people and can affect their health and wellbeing. These include age, sleep, diet, weight management, financial worries and work-life
- For many people, physical activity is considered something to enjoy during personal time, but this time is limited and physical activity is considered by some as lower priority compared to family, work and financial responsibilities

"I mean by the time the evening comes about four or five o'clock I'm feeling raring to go, then it's too late to do any activities. Because between four and six, well four and seven is family time, so time when the family get together and granddaughter goes to bed about half past seven. So for me to go out to do some activity I'm missing out on family time, and after that I'm too tired."

"This is the basic, my body's that worn out all I do is feel, I feel ready for bed 24 hours a day. And then when I go there I can't sleep."

"...because I would be stuck financially, because now you've got a job and I can't do it. I don't claim anything else but that. I don't claim any added benefits, I run my own car, do you know what I mean, I do everything, but without that backbone I'd be homeless. So I'm just limping along until I've paid my mortgage off in three years, literally limping along."

The impact of current health conditions

Key Insights

- People often suggest general health changes such as losing weight or improving their mood rather than particular health conditions as being most important to them
- Some people living with long term conditions feel frustrated or exhausted about their health
- Health conditions can impact a person's life in many different ways. Some of these are directly linked to the specific symptoms of a condition but others are more indirect, such as the impact on their mood, energy and their ability to get out and about
- The side-effects of medication can have side effects such as lack of energy or enthusiasm, sleep problems, slower memory and decision-making and changes to digestion and eating patterns
- Mental health difficulties, ranging from mild to more serious are widespread. People see mental health as interlinked with physical health and think it must be addressed

"Oh god yeah it affects everything. My partner, relationship, family, it just affects everything I do this illness, because I don't do much at all."

"Since it happened the other week - I'm trying to get myself back into more work and I've tried a job and then my back went completely. So I knew standing on my feet or doing anything in one place is absolutely no good to me. I can't stand for long, I can't sit for long, I can't write for long because of my neck, and I just feel now that, well, I don't know what, I'm just going round and round and round in a circle, and that's what I don't like."

"Sorry it's just gone. This is what I'm like. You see my husband gets aggravated with me because he says I'm slow at doing everything. But he don't realise my body has slowed down. A person who has fits their brain is too active so they give them [medication] to slow it down so they don't have fits. Well, I'm having them effects."

"Well, I've been off work since the end of September and I've not been - I'm just trying to think really, I've been quite depressed and withdrawn and confused about the future and those kinds of things, so it's restricted my socialising and obviously my work pattern as well."

"Yeah it's just pain that makes me, it's pain, it's doing when I do certain things I just get really bad pain which stops me from doing everything yeah. Then which makes me more depressed, I cry a lot and then that stops me from doing things"

Experience of care pathways and relationships with health professionals

Key insights

- Uncertainty and a lack of information about care pathways is confusing; health confidence is associated with feeling certain about future treatment plans and expectations
- Relationships with health professionals are important to people. People with long-term health conditions value continuity in care and the opportunity to build trust and good communication with individual health professionals
- People want to feel listened to, taken seriously and that their symptoms are being thoroughly investigated so that they feel confident that the care they are getting is right for them
- People vary in confidence to seek another opinion or question the advice of health professionals. Age, language and cultural barriers may exist to prevent people requesting more information

"If you go in with a complaint and they're just sitting there talking to you and writing you a prescription, and you go out. I can't understand how they can come up with, to me there's certain things got to have an examination. And if you're not getting one, that prescription as you're walking out, I don't rate that bit."

"I've been back to make an appointment to see another doctor who I saw last time... she's no longer there so I'm seeing another doctor this time to see him about my knees... I've been to see the doctor, they've referred me. I've had x-rays done. Been to see about my neck, but my next thing is seeing about having my knees done... about five different appointments and referrals."

"I've seen every doctor in my practice and I feel like they're, every time I've seen them now I think they're fed up of seeing me and fobbing me off."

"If I'm starting to get regular in agony I'm just going back to the doctors. But they just send me here. And I listen to everything they say because what else can I do? I can't get aggressive and say listen I want to go there, I want to go there, because you can't do that."

"Language is a barrier sometimes. Sometimes just being a woman is a barrier, so I think it's difficult. I think the younger ones are better at it because they've got the language and they can go to the GP and say look I'm not happy with this diagnosis and the specialist clinic for younger people, you know, so they can go and get those kind of problems sorted out."

Social identity and confidence

Key insights

- Physical activity is perceived as being associated with a person's place and value in society, and with being able to do 'normal' everyday things
- Social links and relationships are important to people. Interacting with people through work and NHS care are both ways people can feel more connected
- People tend to compare their activity levels to what they think they 'should' be doing, often based on their expectations of what is appropriate for a person of their age
- Some people struggle with social interaction due to mental health difficulties or low confidence. They tend to shy away from group and public interaction and are less likely to take up opportunities to be active that they perceive as intimidating

"I think it's getting up out of bed and giving myself that push to go out to do things, you know, go to lunch with a friend or go for a walk around the block. To put some makeup on, just go to Boots and just have a wander round the perfume counter and things like that, just to be part of the world do you know what I mean, be part of a community, be out and about."

"It gives you hope because it feels as though somebody is trying to help you and do something for you. You feel like you're just off the radar when you're not getting any help, as though you're just an unimportant person what's ill and can't work due to the problems of the - when you give up work it feels as though you're classed as a lower type person."

"I mean 53 isn't old. I shouldn't be feeling old the way I do. My heart is young, but my body's just give in."

"There's something that when my friend, family comes and says are you coming out, it's just a dread of going out and just straight away I put a barrier up, no I'm not going and the more time I spend in the house I think the more depressed I get but I'm in a big circle so I just don't know what it is."

"I think it's memories of when I was young, because I was so poor at sport and things when I was at school, I think I have quite negative feelings about that and... I honestly feel anxious around places like gymnasiums and swimming pools and places like that."

Thoughts and experiences about physical activity

Key insights:

- People's attitudes towards physical activity are shaped by their previous experiences of it
- People identify many wide-ranging benefits of physical activity but most emphasize the 'feel good factor'
- Motivation for physical activity is influenced by factors including age and weight. People describe specific events and/or moments of "realisation" that they needed to change their physical activity levels
- Being willing and committed to physical activity includes an appreciation that it requires a level of preparation or planning
- People do not find physical activity easy to stick to and a range of factors can impact their ongoing habits. Deliberate effort is required to maintain regular physical activity

"It makes your mind much better, clears your mind, and we enjoy it."

"It just makes you feel better in yourself and everything. That's what, I've just this weekend, we've done walking with my husband; it was bright and sunny and we've walked everywhere, you know, and it's been lovely to do that. You know, we just chatted and everything."

"And if you're fitter you can live your life better."

"I need to get fit. I'm getting to an age now where there's no turning back if I don't sort it now."

"So I planned to see you today so that I couldn't get out of going. Whereas if I'd have stayed at home today and thought oh I'll go swimming at some stage, I probably wouldn't have done it. So I have to sort of plan it into my day."

"It's hard for me, it's not easy, but it's sheer determination that I've got to do it."

"In my opinion the easier you make it for somebody to turn up, the more chance you've got of them turning up; if you make it awkward for them to turn up, they're going to go it's raining, can't be bothered."

Self-determination and self-efficacy

Key insights:

- Independence from the NHS and control over one's own health is important. Reducing reliance on medication and having greater choice over care pathways can help people feel independent
- People vary in their confidence to pro-actively manage their health conditions
- Knowledge is power - people who have more information about their health conditions are in a better position to self-manage
- It takes people time to accept long-term health conditions but when they do, they are more likely to engage with behaviours and treatments focusing on protecting and improving their future health

"So I wish I could pay to have a body overhaul and somebody tell me right Mrs [_], yeah you've got a disc out there and that is going to give you that pain and in your knee it's because of that, that, that and that, that's what's causing your pain, but this is how we're going to help it, but they don't. Am I being un-realistic?"

"So this is the thing that I don't like just now, is that I can't fight my way back to any sort of fitness that I'd like to, because my body won't let me. And yet it's my body that's suffering because I can't do it. So there's no end to it as far as I'm concerned until I have my knees done."

"And eventually when I did get diagnosed, I rang the support group and I got a lot of support from the support group. They gave me information that my GP couldn't give me, and that sort of helped me through a lot. I found their advice really useful and I started to search out things for myself."

"That there are places you can go and it's not the end of the road. It's the beginning of a new journey for you, a different part of your life. You've lost something but you've got to pick yourself up and carry on."

"And then all these problems got me down so I decided to, one day I'd just had enough, because I'd put so much weight on, I thought right, I can't do anything about neuropathy, I can't do anything about arthritis in my back, but I can do something about my weight."

Social support for physical activity

Key insights:

- Social support helps people to cope with their health conditions both practically and emotionally
- Other people (including loved ones and professionals) can provide motivation and help people to keep going with physical activity
- People like to treat physical activity as a fun, social event with wider benefits beyond the exercise itself
- Some people think that there are benefits to being in a group with people who are of a similar age or fitness level, although not everyone feels confident about joining groups
- Exercise and health professionals are an important source of advice on the safety and appropriateness of physical activity

"Oh yes, in fact my wife got a bit fed up with it because I wasn't working, she was coming in from work and I'm saying where are we doing today, are we getting out somewhere? And she'd be tired and I'd be raring to go and get out together, because we've done everything together for 40-odd years ever since we've been married. And I think for my sake she'd say oh come on then, we'll go and have a little walk somewhere."

"We always put it down to me and [friend's name] having a good chat and airing all the problems out and you come out just feeling good. You know what I mean?"

"But I think it would encourage people of all ages and weight-wise, body-wise, to be able to be together to see you're not the only one that would like to improve your health and improve your life, but not having to stand there in front of other people or do these things in front of others that do it on a regular basis and much younger."

"I often think it would be great if there were gym sessions where I'd feel comfortable, with people who'd always been rubbish at and never wanted to go to the gym, but I've always thought if I did go to a beginners' session, are they really going to be beginners and that's always put me off, so that would be nice."

"Yes I think somebody who knows what they're talking about and advises you. I think I'd find that really helpful."

Individual practicality and suitability of physical activity

Key insights:

- People often perceive physical activity to be something expensive and time-consuming. Ideally they would like it to be close to home, easy to access and inexpensive
- Different people have different preferences when it comes to physical activity. Not everyone enjoys the same activities
- People are influenced by their previous experiences. If they have had a positive or negative experience of physical activity in their life, either through the NHS or otherwise, this will influence their attitudes and motivation towards physical activity
- People want to be comfortable and safe when being physically active. They don't want to engage in activities that make them feel embarrassed, make their symptoms worse or leave them feeling bad afterwards. With this in mind, they welcome advice from professionals on what is suitable and appropriate for them to be doing

- Cold, wet or dark weather and evenings make it significantly more difficult and less likely for people to be physically active

- *"For me it's an issue because if I can't get a lift its taxis so say I'm paying £12-£15 in a taxi, then I'm paying £5-£6 for the gym and I'm paying £5-£6 for lunch, that's a lot of money a week. £40 on a one hour activity is a lot of money."*

"I mean they send me for Pilates and things. Well, I went to class and she saw me performing, she says this ain't for you, I think you're going to hurt yourself." I: "Oh really?" "Yeah, so I didn't go anymore."

"I think yes because obviously sometimes when I have a flare up with my feet, I can be off work three or four days. But if I'm going to a gym and then doing that and then being off work for three days every two weeks, they're not going to put up with that forever. So I can't afford to lose my job just to try and get a bit more active if you know what I mean. I'm sort of caught between a rock and a hard place; I don't really know where to go from here."

"It's always easier, I seem to lose a lot more weight in the summer than I do in the winter, you haven't got no energy sort of thing in the winter. But in the summer it's warmer, it's lighter. It don't go dark until ten o'clock at night, so there's plenty you can do like."

Health aspirations and future outlook

Key insights:

- People want to feel more hopeful and optimistic about their future health and ageing well
- Independence is important for people - they want to be in control of their lives and their health, and to reduce their dependence on other people and the NHS. This could include taking less medication, being discharged by their health professional, or keeping their job, being able to do their own housework and managing their own garden.
- People want to see and feel the impact of physical activity, to know that it is "worth the effort"
- Outcomes from physical activity are very individual and include both physical and mental improvements. The most common aspirations are:
 - Improved mood
 - Increased mobility and function
 - Reduced symptoms
 - Reduced need for medication
 - Losing weight

- Whatever physical activity people aspire to be doing, they want to be doing it regularly, and able to maintain it over the long-term

"It would give me some of my life back. I think that's the only way I can describe it, because there's nothing happening just now. And hopefully if I am fitter in 18 months' time I shall be doing at least a bit of something I want to do."

"...all these years you obviously go it's going to get better, it's going to get better, but no it's going downhill. And even like today I was thinking to myself and I'm thinking am I ever going to be feeling better or is this is my life now?"

"Losing weight, my insulin level's looking a lot better because then, I'm 55 and I want to live until I'm a lot older to enjoy the girls."

"I'd like to not have, not be depressed. I could probably cope with the pain if I didn't get depressed a lot."

"I think so because like I almost need to be convinced really that it is worth it. Because I'm doing it because I think it is and when I do it I enjoy it but that thing of pushing myself is so hard."

"I think the problem with me is that I don't actually see the outcome of it. So you don't know really if how well what you're doing for your heart or your body. It's a bit of a woolly thing. Like healthy exercise, you've got the idea that it's good for your body but you can't tell."

Section Two

Interviews with health professionals

Interviews were carried out with 22 health professionals working across hospital and community settings in Sheffield.

Participants included:

- Clinical specialists in pain management
- Clinical specialist occupational therapists
- Diabetes specialist nurses
- Diabetes consultants
- Specialist diabetes dieticians
- Continence specialist nurses
- Specialist physiotherapists (Continence and MSK)
- Consultant orthopaedic surgeons and senior registrars
- Podiatrists
- Specialist and advanced specialist podiatrists (MSK)
- Enhanced role physiotherapists
- Spinal extended scope practitioners

9 themes were identified:

1. Addressing the patient's whole health and wellbeing
2. Feasibility and viability of physical activity pathways
3. Meeting professional responsibilities
4. Relevant knowledge, skills and training for professionals
5. Impact of physical activity
6. Personalisation of physical activity advice
7. Empowerment of patients
8. Organisation-wide engagement

Addressing the patients' whole health and wellbeing

Key insights:

- Health professionals believe that physical activity is part of a "whole person" model of mental, physical and social health that includes stress, diet, sleep and other lifestyle factors
- Health professionals believe that physical activity should be considered in relation to the practical activities people want and need to do on a day-to-day basis
- Health professionals believe that minimising pain is a key concern for patients at all stages of any physical activity pathway
- Health professionals acknowledge that patients often have one or more additional health conditions to deal with at the same time. They recognise that this should be taken into account when advising them on physical activity
- Health professionals believe that mental health is just as important as physical health to take into account when assessing and advising people about physical activity

- Physical activity interventions are likely to be accessed by people with a variety of mental health needs

"So often the way I look at it it's not just the actual pathology they're in front of me with, it's how is that impacting on their life and what they want to do. And trying to get all that together and turn that round so it's not impacting.....But everybody's an individual so it's relative. And that's the thing. I like to try and think, I'm not teaching the text book or treating the text book, I'm treating them individually"

"They've got a lot of problems, psychological, family, social, financial, and so the pain is often what they go to the GP for, but we find more often than not the pain isn't potentially the main issue. But that's the easy symptom that you can, you can't just go to the doctor and say my husband's a pig. But often that can be either a causatory factor or a continued stress that drives pain we see"

"So yeah, it's becoming more difficult because I think more and more people since I've been doing the job suffer with mental health problems. I also think mental health services' finances have been cut, so we're seeing more of them in the service as opposed to them going to the mental health physio that used to exist."

"...because I think physical and mental health, they're all pretty much one, looking at people holistically."

Feasibility and viability of physical activity pathways

Key insights:

- Health professionals are concerned about the cost of promoting physical activity considering limited current NHS resources
- Health professionals believe that where there is a cost attached this may act as a deterrent to accessing physical activity for some patients
- There are limitations on time within clinics, but at the same time health professionals value the idea of allocating adequate time for discussion around physical activity. Health professionals' perceptions of the time available may influence their likelihood to raise the issue of physical activity
- Factors influencing the accessibility of physical activity for individual patients include location, time of day, cultural sensitivity and the weather/season
- Health professionals are put off from referring to physical activity services if they consider the referral process to be too complex, time-consuming or unreliable

"But from working with patients there's still a lot of issues around financing. I know people have to go for walks, and there are some groups and things around it really, but I do think people do get a lot of benefit from things like swimming and the gym, and actually it is biased at the moment and not a lot of people can afford that. And so I do get a lot of frustration from people about the fact that OK well it's all very well these schemes are available, but I can't afford that."

"And the time might not suit them, they might have work commitments, they might work nine to five, Monday to Friday, they might not be able to come when it is or they might have to, then that might be a problem asking for time off work to come because they're not happy with their manager, and all of that."

"I think it's partly because there are several different tasks that we must do in the diabetes clinic, you know, and I actually had it on our proforma and it got taken off... But I think it's almost that there are so many different things to cover at annual review that it gets missed."

"And when you actually spend the time to explain why we need to do this, the benefits, the negatives, looking at some of the motivational interviewing things, what are the outcomes if you don't engage in this, or what are the outcomes if you do engage in this? And all that kind of thing. That works. Or it won't work if I just prescribe 10 minutes walking every day and I'll see you next week. People just do not do it."

Meeting professional responsibilities

Key insights:

- Health professionals want the care and advice they give to be evidence-based and consistent with the most current research
- Health professionals believe it is their professional and ethical responsibility to promote physical activity, but there is a lack of agreement between professionals about what they believe their specific role and responsibilities are regarding physical activity
- Health professionals are concerned about the risks of physical activity for individual patients and how to assess suitability of individuals for different types of physical activity. They feel a sense of professional liability for any adverse effects caused by their physical activity recommendations
- The advice, recommendations and actions from health professionals regarding physical activity is influenced by individual patient cases they come across, and

especially positive or negative experiences those patients have

"So, I think we don't want to rely on that purely, I still think we need face to face interaction and to discuss these things with the patients, are they doing it correctly, because I also see patients that throw themselves in too quickly."

"I wouldn't like to do that. I think I probably could, but no, because I haven't had specific training and I wouldn't want it to come back on me."

"But I think I do quite like the lead by example as well. I think patients find it difficult potentially taking dietary advice from an overweight nurse, dietician, physio. I think that's really, the credibility of the message giver is really important as well. And I think in the healthcare profession we do have a responsibility to look after ourselves and lead by example."

Relevant knowledge, skills and training for professionals

Key insights:

- Education, training, skills and communication style are essential to health professionals' ability to work with patients addressing physical activity.
- Health professionals would welcome the support of a specific person or organisation with specialised knowledge about physical activity for themselves or their team
- Health professionals feel more confident recommending physical activity where they can give the patient clear, detailed information
- Health professionals value experience, knowledge and training of how to deal with the psychological elements of people's health

"I hear, anecdotally I hear patients repeatedly say the doctor's told me I've got to...you know, I've got to exercise more. But again people don't say but I don't want it, it's I don't know how to, and so just telling someone to do something I don't think is a very useful thing."

"Yeah, if I was in charge then I would probably be wanting to employ people that specialised in sports and exercise, because I think that to increase the confidence of the team, to look at ways of promoting activity, and then also to provide that specialist support for patients.... And just someone to keep on top of everything that goes on, to keep everybody up to date with what services are available, how we refer, what things are asked. Like if we've got a psychologist in the team and you've got someone with mental health problems then you'll go to them and discuss what's best for that person. And so it'd be nice to have that opportunity, you know, to have someone who specialises in physical activity to do that with for individual cases."

"For me it's not so much when, it's how it's introduced. Whether it's done in a way that empowers people and makes people confident or whether it's done in a way that's again quite punitive really."

"So for me undergraduate level to healthcare professionals need to be more informed. I think it's getting there but if you look at a physiotherapy undergraduate course, I didn't have any psychology training, none. I mean when you think that your main, physiotherapists are mainly dealing with people in pain, and we had no psychological element to our theory."

Impact of physical activity

Key insights:

- Health professionals think that physical activity is most useful when considered in the context of a person's long-term health and wellbeing. This is a challenge for NHS services that have time-limited contact with patients
- Important outcomes of physical activity promotion are considered to be a combination of physical and mental changes, and how likely that person is to continue with any changes they have made to their physical activity habits
- Health professionals identify that some outcomes of physical activity can have benefits for both the patient and the NHS
- Feedback on the outcomes of physical activity support is important for both patients and professionals to reinforce the idea that it is worthwhile

"We tend to have a thing where people need to be ill before we tell them to go and do exercise. But I'm a great believer in prevention is better than cure."

"They feel like they can self-manage before we discharge, but we're also thinking about plans of how they're going to take it forward, how they're going to keep up with their activity or whatever changes they've made. Not just discharge them; it's looking at how you're going to continue with this. And then we often do think about well what services are available in the community to help them move forward. Or that's what should be happening anyway."

"I think that's the key, so they're doing it, they're doing more of it and they're enjoying it, because if they're doing that, they're more likely to carry on with it, so I suppose that's more important than a questionnaire response about how much they're doing at the moment in time. It's more about projecting whether they continue with it, because it's one thing getting someone exercising, it's another thing getting them to continue, so I'd say that's the most important, projecting whether that person will continue to do that."

Personalisation of physical activity advice

Key insights:

- Patients differ in terms of the level and intensity of support needed from health professionals regarding physical activity
- Health professionals believe that there is no 'one size fits all' and that they need to offer a variety of options appropriate for people with different needs
- Health professionals think that low-level and graded approaches to physical activity are best for patients with complex barriers to participating
- Health professionals believe that working together with the patient to develop shared goals around physical activity is most effective

"It could mean loads of different things. So it can be anything from making a cup of tea, putting your socks on, to going out and having a walk, to running a marathon. So really there's a massive range of, it's just moving in general. Yeah, not just exercises, it can sometimes maybe be just getting people doing things around the house or. But I think I'm tending to go with things that are important to that person, things that they want to be doing and trying to link that with activity."

"So I think a lot more very, very low grade starting points for people who just wouldn't think about doing exercise."

"But as part of a little kind of portfolio of support mechanisms to get people moving and being more active, that might be something to think about."

Empowerment of patients

Key insights:

- Health professionals think it is important that physical activity support is empowering rather than intimidating or enforced
- Informing patients about their condition and managing their expectations of their care and of any physical activity action plan is considered empowering
- Health professionals think patients should have choice and control over their care pathways including physical activity
- Health professionals think that peer support is a useful tool for empowerment

"If you prescribe medication you take some control from the patient. It's to give them, hand the control back and they can decide if they want to do really something about it. Medication will be still there, but if there is something else they can do themselves, why not, with support."

"...but I think it often depends a lot on the person's expectations as well of what they can do at our service or the experience that they're having, what they were expecting. Has anyone talked to them about that and what's available? And I think communication often can make a big difference"

"But like I was saying at the start, I think actually if there was that guideline of 30 minutes five times a week or whatever it was, then well that for one person is totally, might be too much. It might be if a person's really struggled to get out of the bed and off the settee for the past six months, two years, whatever, then actually something like that isn't realistic."

"I think we do various group education things and I think people are helped very much by group work...maybe sometimes it's easier to be influenced by somebody that you can connect with as having a similar experience than a distant health care professional."

Organisation-wide engagement

Key insights:

- Health professionals welcome the opportunity to learn and collaborate with other professionals and believe this has benefits for promoting physical activity
- Health professionals believe it is important to develop agreement between professionals at all stages of the care pathway regarding the role of physical activity for patients and the messages that should be promoted
- There is a lack of knowledge between services and professionals about best practice in physical activity promotion and what other departments or teams are doing

"I think the whole team, because it's about being consistent, because one person could see the same, you know, one person could see the whole team and we want for everyone to say the same thing really. So definitely everybody needs to be promoting it, because if you haven't got that joined-up approach from everybody, it can just be like one sentence from one health professional who just undoes all the good and the motivation that you've worked with someone to do to try to get them to be more active."

"I do think some physios are really good at it, and have got a lot of knowledge of what's going on in that particular area, and so might know. But I think we're definitely networking better than we were, and we're finding services like the health trainers, like Activity Sheffield, IAPTs as well are good at signposting and finding out what's locally around our surgeries a bit better as well. But I still think there's definitely room for improvement."

Appendix I: Patient persona building: characteristics and extremes

(Define phase)

Extreme	CHARACTERISTIC	Extreme
COGNITIVE		
Wants to try everything they can do before surgery / medication	Willingness to self-manage	Looking for a quick fix
Ok as long as controlled and comfortable	Fear of exacerbation of symptoms	Terrified of movement
Used to be very active / sporty	Previous experiences of PA	Has never really exercised
Trust and respect HP	Openness to prescriptive lifestyle advice	Priority is treatment of immediate symptoms. Perceive PA advice as nagging
Proactive and independent	Dependence on HPs / coping skills	Needs a high level of support to act on advice
Happy with NHS care to date - treatment has been quick and effective	Length and experience of care to date	Long term problems, several failed interventions, have seen multiple services - frustrated, disillusioned
Comfortable and open-minded about group settings	Ease within a group	Social phobias or shyness about group settings
Accept PA is a long-term strategy	Commitment	Needs to see fast results
Positive aspirations for future	Confidence in future health	Pessimistic about health deteriorating
Believe that PA is clearly linked to health outcomes	Engagement with idea of PA and association to health	Do not see the value or benefit of PA
Clear about what activity they would like to be able to do	Personal PA-related goals	No PA-related aspirations
MEDICAL		
No specific mental health needs	Mental health	Complex mental health needs
No pain	Daily pain levels	Pain is constant and debilitating, restricting ability to lead 'normal life'
No mobility issues	Functional mobility	Multiple complications restricting mobility
Simple health needs - clearly focused treatment and anticipated outcomes	Complexity of health circumstances	Multiple morbidities/possible contraindications mental and physical
PRACTICAL		
Flexible with personal time	Personal time and availability	Limited time - significant caring or work responsibilities
No cultural restrictions regarding PA	Social / cultural inhibitions to PA in group/community settings	Religious or cultural beliefs restrict PA options
Autonomous ("do-it-yourselfer")	Outside influences	Heavily influenced by family/friends
Up to date with latest gadgets/tech	Technology-mindedness	Still using a pay-as-you-go Nokia
Can afford to spend monthly or invest in PA equipment	Financial resources	No means of funding PA where cost is attached
Can travel wherever as necessary	Geographical mobility	Limited to immediate neighbourhood

Appendix J: Results of card sort exercise (identifying core design requirements) (Define phase)

Statement	Health professionals	Patients	Comments
Consider all/other health conditions (comorbidities) the person may have	NEED	NEED	
Consider the side effects of medication	NEED	NEED	
Consider mental health as well as physical health needs	NEED	NEED	
Consider the impact of health conditions on a person's life	NEED	NEED	
Consider patients' previous experiences of physical activity	NEED	NEED	
Address safety concerns and risk of injury or making health condition worse	NEED	NEED	
Consider what is practical for the individual: location, cost, time, culture	NEED	NEED	
Provide a variety of physical activity options to suit different preferences	NEED	NEED	
Provide low level starting points and graded approaches to physical activity for those who need them	NEED	NEED	

Statement	Health professionals	Patients	Comments
Take into account the different levels of support from health professionals that different people will need	NEED	NEED	
Define physical activity from an individual's point of view - e.g. include normal, everyday tasks at home and in the community as well as sports and exercise	NEED	NEED	
Consider physical activity in the context of their lifestyle and personal health priorities	NEED	NEED	
Evaluate the long-term impact on a person's physical activity habits	NEED	NEED	
Have a feedback system that provides motivation and accountability for patients	NEED	NEED	
Provide support for people to maintain changes in physical activity after they have left the service	NEED	NEED	
Address professionals' concerns regarding professional liability when advising on physical activity	NEED	NEED	This came as a surprise to members of the health professional group, who were naturally self-selected on the basis of their interest in PA. The researcher was able to provide some context describing the views of other health professionals from the interviews who expressed concerns about liability. This was a moment of realisation for the group to challenge their own beliefs and consider alternative viewpoints.

Statement	Health professionals	Patients	Comments
			In the patient workshop there was a vehement discussion about this card. Group members felt strongly that this "should not be an issue" because they expected health professionals to have the confidence to give PA advice. After discussion both groups conceded that since it had been highlighted by some health professionals as a barrier, it must be addressed.
Measure the impact on each persons' future treatment needs	NEED	NEED	
Ensure that a professional works together with the patient to agree physical activity goals and strategies	NEED	NEED	
Have individual, patient-determined outcomes	NEED	NEED	Health professionals were quick to categorise this as a definite "need to have". However, one member of the group (KS) challenged this asking whether, in the instance of accepting patient-determined outcomes, there was a risk that patients might determine the target behaviours, or levels of PA as being below the threshold to cause sufficient health benefits. This prompted a discussion about what constituted a health benefit, with the group accepting that on balance, any achievement, regardless of how small would be a benefit.
Consider the communication skills and style of the health professional	NEED	NEED	
Provide support for the person to ask questions or seek a second opinion	NEED	NEED	
Provide information about "what to expect" and the likely/expected pathway	NEED	NEED	

Statement	Health professionals	Patients	Comments
Facilitate the development of trust and rapport between patient and health professional	NEED	NEED	
Involve and include friends and family	NICE	NICE	<p>The immediate reaction to this by health professionals was that the NHS did not have the resources to provide PA support for non-patients. The co-facilitator (KS) challenged this, referring to an earlier statement by a group member that NHS professionals should promote PA in the widest possible sense, aiming to influence the whole population and not just individual patients. After discussion a compromise was reached and the card was marked "nice to have".</p> <p>Some members of the patient group suggested that involving others would undermine individual motivation to be physically active. They suggested it might create dependence on someone else (someone called it "a crutch") that could be detrimental to PA habits if that person ceased to attend. These people felt that if PA was part of their NHS treatment, that was private, and not something they wanted to involve family or friends. Others considered social support to be helpful for maintaining PA. The group compromised by ranking the card as "nice to have".</p>
Encourage peer support opportunities	NICE	NICE	
Provide continuity in patient-professional relationship	NOT IMPORTANT / OUTSIDE SCOPE	NOT IMPORTANT / OUTSIDE SCOPE	Both groups disagreed that patients should be seen by one specific health professional continuously, considering it counterintuitive to building independence. Both patients and health professionals concluded that patients' relationships with services were more important than any individual health

Statement	Health professionals	Patients	Comments
			professional, and that although good rapport was important it was not necessary, nor feasible, to restrict the relationship.
Consider pain management strategies	NICE	NEED	Health professionals only categorised this as "nice to have". Although they recognised that it would be important for some patients, they saw it not as a safety concern which might pose a barrier to PA, but instead as a compliance issue, i.e. something that might affect adherence if pain management became a problem as a result of increased PA.
Have a feedback system that allows health professionals to monitor their patients' progress with physical activity	NICE	NEED	
Give each patient choice and control over their physical activity pathway	NEED	NICE	The patient group thought that too much choice could sometimes be counterproductive. They suggested that sometimes patients did not know what was best for them, and although not wishing for them to dictate everything, that health professionals should be able to influence the pathway.
Address patients' frustration from living with long term conditions	NICE	NEED	There was some debate over whether these were "need to have" or "nice to have" and whether understanding one's health conditions was different to accepting them. Health professionals discussed how accepting physical limitations might be an outcome of PA for some people. There was thus an acknowledged "chicken or egg" element to acceptance.
Help patients to understand and accept their long term conditions	NICE	NEED	Conversely, patients felt that PA could not have a positive long-term impact on a person's life and their health without first addressing the reality of living with a long-term condition and their consequent attitudes.

Statement	Health professionals	Patients	Comments
Provide physical activity options suitable for people with a range of mental health needs	NOT IMPORTANT / OUTSIDE SCOPE	NEED	Health professionals considered it inappropriate to provide specific mental health groups. They felt that mental health needs should be considered during advice or prescription. They also suggested that PA options should be flexible enough to accommodate people with varying needs, related to other factors as well as mental health.
Develop health professionals' skills in dealing with mental health issues	NOT IMPORTANT / OUTSIDE SCOPE	NEED	Whilst both groups agreed this was important, health professionals decided it was outside the scope of the current project to address this.
Consider the impact of changes in the weather on a person's physical activity behaviour	NOT IMPORTANT / OUTSIDE SCOPE	NICE	Although recognised as a factor, this was not considered a 'dealbreaker' in relation to other issues being discussed. It was suggested to be part of a wider need to tailor and personalise PA strategies rather than a standalone issue.

Appendix K: "How might we" statements used for idea generation (Develop phase)

Health Professionals

How might we address health professionals' concerns regarding their professional liability when giving physical activity advice?

How might we optimise good communication between health professionals and patients?

How might we take into account a holistic assessment of a person's health and lifestyle when advising on physical activity?

How might we address patients' safety and concerns about the risk of injury or making their health condition worse?

How might we provide tailored solutions for patients that provide different physical activity options and levels of support?

How might we provide information about "what to expect" and the likely/expected pathway?

How might we ensure that goals and outcome measures are relevant to the individual patient?

How might we facilitate feedback about individual physical activity habits that provides motivation and accountability for patients?

How might we ensure that patients are supported to maintain physical activity habits over the long term?

Patients

How might we address health professionals' concerns regarding their professional liability when advising on physical activity?

How might we develop health professionals' communication skills and facilitate good rapport between patients and professionals in every interaction?

How might we assess each patient's starting point for physical activity looking at their mental and physical health and other lifestyle factors?

How might we address patients' safety concerns related to physical activity and possible injury or making their condition worse?

How might we provide information about what to expect regarding physical activity and allow patients to seek clarification?

How might we offer personalised, tailored physical activity options for each patient?

How might we provide different levels of support to different patients along the physical activity pathway?

How might we ensure that goals and outcome measures are individually determined and relevant?

How might we provide feedback and monitoring to facilitate motivation and accountability for both patients and professionals?

How might we ensure that physical activity has a long-term impact on a patients' whole health

Appendix L: Ideas generated in the brainstorm (Develop phase)

Core design requirement	Ideas generated by health professionals	Ideas generated by patients
Communication	<ul style="list-style-type: none"> • CPD and training in communication skills for HCPs – designed by patients • Informing patients beforehand that PA will be addressed in their appointment – e.g. questionnaire, leaflet • Building in extra time for PA conversation to existing appointments • Research evidence for a correlation between patient outcomes and HCP communication skills 	<ul style="list-style-type: none"> • Longer appointment times • Continuity in relationship with professional • TripAdvisor-style ratings by patients • Training in communication skills (e.g. by patients, learn from +ve examples e.g. John Lewis) • Central system to store information "about me"
Addressing professionals' concerns	<ul style="list-style-type: none"> • Certified, mandatory or e-learning for HCPs on PA • Defined PA referral pathway • Regular PA updates for professionals – latest evidence, local developments and services/programmes available • Hotline for professionals to get a second opinion or other support when giving PA advice/referrals • Contraindications list available for reference 	<ul style="list-style-type: none"> • Medical training includes PA • PA specialists with appropriate training • Joint agreement for PA plans / consent forms - shared responsibility • Insurance for professionals • Standardised PA in service - everyone is required to discuss PA • Low level starting points - non-threatening/remove risks
Providing information about what to expect and likely pathway	<ul style="list-style-type: none"> • Informing patients beforehand that PA will be addressed in their appointment – e.g. questionnaire, leaflet • Screensavers for professionals with reminders/prompts/updates about PA • Infographics to explain PA pathway • Video case studies and posters showing patient stories about PA • Branded city-wide PA campaign 	<ul style="list-style-type: none"> • Central helpine (directly answered) • Plain English leaflets written by patients • FAQ list • Anonymous PA website to share your story • Auto opt-in as standard • Link with GP and other HCPs involved in my care • Active consultations - test/observe ability and

	<p>and advertising</p> <ul style="list-style-type: none"> • TV advertising 	<p>confidence</p> <ul style="list-style-type: none"> • Personal care worker assigned for first month
Holistic assessment	<ul style="list-style-type: none"> • Standard part of assessment to ask about PA/lifestyle/health/hobbies • Using patient activation measures as part of assessment • Using a standardised brief measure to assess patients' current PA levels • One system for all health professionals in contact with patient to input PA-related information – system one/TPP/PA tree • Assets-based approach: start by asking 'what can this person do' 	<ul style="list-style-type: none"> • One:one assessment • Standard measure/model of 'what to ask' • "Selection box"
Tailored solutions	<ul style="list-style-type: none"> • Individual assessment for each patient to create a PA plan • Hub for information about local options – sponsored and regularly updated • Online menu – build PA plan 'expedia' style • Sport/PA activists or wizards who have PA skills and broader medical knowledge • Menu of free activity options for referral/signposting 	<ul style="list-style-type: none"> • Menu of options • Local hubs where you can try things out: tasters, community appropriate, led by local groups • Active cafes • Review list of providers • Subsidised, free or low cost • Different route options • Medi-coaches or specialist practitioners
Addressing safety/risk concerns	<ul style="list-style-type: none"> • Guided gym/walking sessions built into appointments so that patient can 'have a go' under supervision • Telephone follow-up/open appointment as a safety net to discuss any occurring issues with PA • Discuss and record concerns and contraindications for other health professionals to review – refer for medical review as appropriate • Build knowledge of condition and medication to increase capacity for self-management • Give each patient a personal PA card to take away "what can I do/what should I avoid" 	<ul style="list-style-type: none"> • Start slowly and build up • Activity swaps (like food) • Hand holding / supervised sessions • Feedback loop to service • Patient ambassadors

Person-centred goals and outcomes	<ul style="list-style-type: none"> • Regular and ongoing PA reviews as part of existing care • Combination of psychological and physiological measures to evaluate patient outcomes • Involve patients in selecting and/or designing evaluation measures 	<ul style="list-style-type: none"> • Set goals together: "I want to..." • Progress chart • Ongoing review at every appointment • Care/support worker feeds back on progress • Activity tracker/system for instant feedback
Feedback for motivation and accountability	<ul style="list-style-type: none"> • Provide graphs and tick off progress against the patients' PA and health goals • Use apps/fitbit- style technology to monitor actual PA- health professional can log in and check results • Illustrate link between health outcomes and PA 	<ul style="list-style-type: none"> • Progress chart • Ongoing review at every appointment • Care/support worker feeds back on progress • Activity tracker/system for instant feedback
Long-term support and impact	<ul style="list-style-type: none"> • Offer long-term NHS-rate memberships to PA clubs/gyms (no 12 wk cutoff) • Develop and facilitate a strong local support community, using social media • Self-referral option for a service providing ongoing support and motivation regarding PA • Local hub for PA with stable funding • Free and ongoing activity options • Continuing reviews 	<ul style="list-style-type: none"> • PA 'sponsor' like with addiction • 'Back on track' drop-in clinics in the community • Long term open appointment (can go back to the same HCP)

Appendix M: Qualtrics survey questions - gathering feedback from health professionals regarding idea prototypes (Develop phase)

Q6 Your views are extremely valuable to this project - without knowing what you think we cannot know how best to make a difference. The ideas being put forward are very early and intended to stimulate debate so please give as much detail as you can about what you like and do not like about them.

Q7 Priming patients to make it easier to talk about physical activity

The image below shows a standard appointment letter. We are exploring whether a paragraph such as the one highlighted in yellow could be added. The aim would be to prime patients so that it is more comfortable and more expected that physical activity will be discussed during their appointment. The example given is a letter from physiotherapy. Of course, this would be tailored for different services as appropriate.

Dear Mr Xxtestpatientafnz-Testf

NHS Number: 999 001 4574

An appointment has been made for you to attend the PhysioWorks Service as follows:

Date/Time:

Location:

Clinician:

What to expect:

Your appointment will include assessment and treatment by your clinician which is appropriate to your individual needs. We will also discuss your general physical activity habits and provide advice and support for your health and wellbeing.

If this appointment time, date or location is inconvenient the Single Point of Access (SPA) booking service will rearrange it for you. **Please call 0114 305 1460 from 8.00am to 8.00pm seven days a week.**

If we have your mobile telephone number we will text you to remind you of your appointment. If you do not wish to receive text reminders please inform SPA.

You must inform SPA at least 24 hours before your appointment if you wish to cancel, this enables us to offer an earlier appointment to another patient. If you do not attend your appointment, you will be discharged back to your GP.

Yours sincerely

**Patient Choice Officer
Single Point Access**



Q8 How useful do you think it is to change the appointment letter wording?


- Extremely useful (1)
 - Moderately useful (2)
 - Neither useful nor useless (3)
 - Moderately useless (4)
 - Extremely useless (5)
-

Q9 Please share your comments, concerns and suggestions about priming patients to talk about physical activity:


Q10 Assessing and talking to patients about physical activity


Imagine that patients are asked to complete a standard questionnaire before their appointment. The aim of this would be to get them thinking about physical activity, and to give you some information that could help you to raise the subject in a way that is appropriate to the individual. How useful would each of these measures be for you?

Please rate by clicking on the stars on the right of each image:

1. A brief measure of "Patient Activation" i.e. how likely they are to engage in self-management behaviours (1) 

2. Measure of current physical activity levels (2) 

3. Measure of self-reported "physical activity readiness" i.e. physical contraindications (3) 

4. Stages of change questionnaire e.g. whether the person is contemplating becoming more active, or is already taking action to become more active (4) 

Q11 How else could we make it easier to have the conversation about physical activity?
Please share any comments, concerns and additional suggestions about this below:

Q12 Risk stratification / decision tool Below is a rough prototype for a tool to help healthcare professionals decide what advice to give, or where to signpost people for physical activity. If developed fully, the white squares would be filled with recommended action or options for advice:

		Patient's engagement/readiness		
		No engagement or resistant	Some engagement but concerns or hesitation	Strong engagement and willingness to increase physical activity
Cardiac contraindication to PA	Current activity levels HIGH			
	Current activity levels MEDIUM			
	Current activity levels LOW			
Other possible contraindications or not known	Current activity levels HIGH			
	Current activity levels MEDIUM			
	Current activity levels LOW			
No contraindications to PA	Current activity levels HIGH			
	Current activity levels MEDIUM			
	Current activity levels LOW			

Q13 How useful would a decision tool like this be to guide your decisions about what advice to give, and where to refer patients regarding physical activity?

- Extremely useful (1)
 - Moderately useful (2)
 - Neither useful nor useless (3)
 - Moderately useless (4)
 - Extremely useless (5)
-

Q14 Please add your comments, concerns or suggestions re: assessing and talking to patients about physical activity during appointments:

Q15 Addressing physical activity in every appointment

Despite best efforts, physical activity often falls off the bottom of the task list during appointments, particularly with complex patients and when time is limited. To help physical activity become a more consistent part of every appointment, one suggestion is to create a formal place for physical activity-relevant conversations and actions to be recorded on the patient's electronic record. We know that for this to be helpful, the admin involved must be kept to a minimum. Below is an example of fields that could be added to SystmOne or Lorenzo. Please let us know what you think in the comments section below.

Physical activity quick entry

Current PA

IPAQ score

Discussion notes: physical activity habits, barriers, benefits relevant to symptoms

Goals set*

Drop-down menu	Mins per day	Mins per week
Increase walking		
Household physical activity		
Increase minutes of moderate-vigorous activity (examples:.....)		
Etc. (please add suggestions)		

Action agreed

Drop-down menu
Physical activity information leaflet given
Referred to Sheffield Physical Activity Referral Scheme
Referred to other provider
Referred to NCSEM coordinator
Referred to shoulder/back pain group
Referred to DESMOND
Referred to pain group
Self-directed or home-based physical activity plan agreed*
Etc. (please add suggestions)

*option - printable templates for agreed physical activity plan/goals for patient to take away

Q16 How useful is this likely to be to you?

- Extremely useful (1)
 - Moderately useful (2)
 - Neither useful nor useless (3)
 - Moderately useless (4)
 - Extremely useless (5)
-

Q17 Please share your comments below about the suggested additions to electronic systems, and more generally about raising the priority of physical activity during appointments:

Q18 New ways of working Please give us as much information as possible on how you think the ideas below could or would not work to help us prioritise and shape them.

Q19 Low level, introductory physical activity groups focusing on pacing and building confidence. These would be designed specifically for patients who are currently inactive, and/or people for whom fear of injury or exacerbation of their condition presents a significant barrier.

Q21 Interim group sessions or support - not specific to physical activity but designed to build social connections, confidence etc. as a stepping stone to physical activity in future

Q22 Enabling inter-service referral - i.e. making it possible for health professionals to refer patients directly to an exercise or physical activity group run by another service (e.g. a physiotherapist referring directly to a pain group, or a podiatrist referring to a DESMOND course)

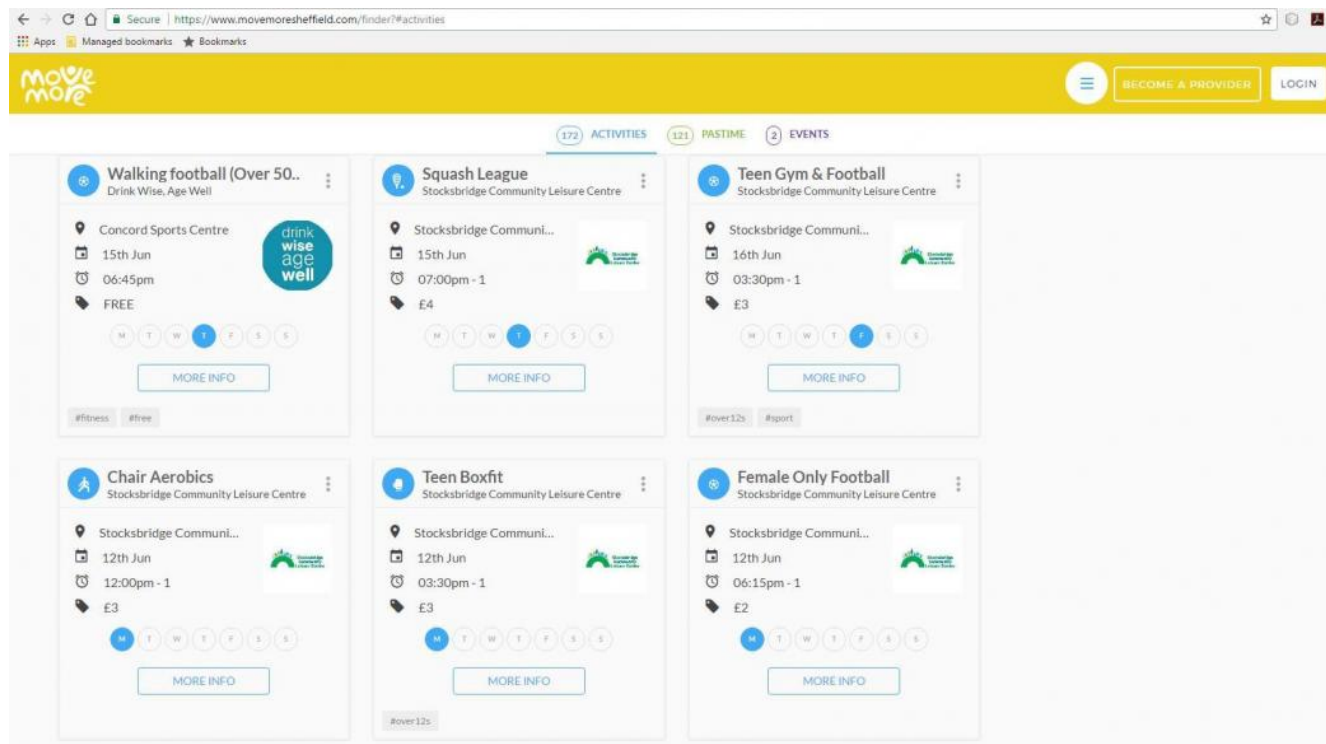
Q23 Introductory level physical activity sessions hosted jointly by NHS health professionals and leisure/fitness staff from NCSEM and other providers

Q24 An accessible diary and/or bookable slots for activity sessions taking place at NCSEM clinics - book your patient in there and then

Q20 What types of activity do you regularly recommend to patients that is currently not a formal referral option? (e.g. swimming, QiGong, yoga, other...)

Q25 Increasing physical activity options

Health professionals have told us that they want to encourage people to be in active in ways that suit their individual preferences. The problem for professionals is keeping track of all the options and services available to patients locally, and for whom they are suitable. It has been suggested that a central hub to search for relevant information, such as the MoveMore website shown below could help.



Q26 Would you be likely to use the MoveMore Sheffield online "activity finder" (shown above) to help patients search for suitable activities in their local area?

- Definitely yes (1)
 - Probably yes (2)
 - Might or might not (3)
 - Probably not (4)
 - Definitely not (5)
-

Q27 What additions or changes to the website would you request?

Q28 Please share any other comments, concerns or suggestions about encouraging patients to find suitable physical activity options:

Q29 Please use the space below for any final comments or suggestions:

Appendix N: General themes from semi-structured interviews with physical activity providers (Develop phase)

Relationships with the NHS and health professionals

For PA providers, the main advantage to working closely with NHS professionals was engaging more vulnerable patients who might not traditionally access their facilities and services, widening their clientele beyond the traditional self-referred group:

"...we don't want to go for the low hanging fruit, we want to get the hard to reach people. So I guess we see quite a lot of them coming through NHS referrals, doctor's referrals, that kind of thing, if that makes sense." (Community Project Officer)

PA providers identified a number of ways in which links between themselves and the NHS could be strengthened. Some of these reflected ideas already proposed by the co-design groups, for example improving feedback between the provider and the referring health professional, raising health professionals' awareness of the services they offered and making referral processes easier. They valued the importance of working in close proximity so that health professionals felt confident to make referrals:

"I just think it could be good to get to know each other. So we know the NHS professionals who are referring in to us; they know what we can do." (Exercise referral instructor 1)

Approaching health professionals individually was considered time-consuming and unrealistic, but shared training or workshops were suggested as one way to promote awareness:

"...perhaps if there was some sort of conference or meeting of [health professionals] that was themed on walking and exercise, just a ten minute slot within that programme would be more than enough just to raise the profile" (Volunteer walk leader)

Nevertheless, it was suggested that health professionals tended to dislike direct canvassing by providers, preferring to instigate the relationship themselves:

"It's as if it's got to come from them" (Volunteer walk leader)

A potential opportunity for improving awareness was identified within local 'social prescribing'

pilots, although this was currently more focused on GPs. Link workers could potentially fill some of the gaps between health professionals' knowledge of local services:

"I think the whole social prescribing initiative...that's fairly exciting... GPs for example being aware of what's available locally or at least having somebody they can signpost that patient to, then that person can signpost to what's available locally." (Director, Gardening for Health)

Considerations associated with taking referrals

Considerations associated with providing exercise referral services included the cost of employing staff suitably qualified to supervise patients with specific conditions:

"Obviously as a business we pay more for a referral instructor than what we do a normal gym instructor, because of the qualifications they've got etc." (Exercise referral manager)

Although none of the providers considered exercise referral a profit-making activity, they nonetheless had to cover organisational costs. This was achieved through retention of some patients into full-time memberships following the initial referral programme. This was only a consideration for those providers based within large centres and facilities with overheads and staff costs - the voluntary organisations did not highlight such concerns. Although some providers described themselves as 'breaking even', others suggested that they were currently subsidising the services, with viability under regular review:

"...its under, definitely under. But we want to persevere, we want to try and encourage the referrals and make it break even....keep that goodwill going as long as we can. But ultimately we need to be able to pay the staff really." (Health and wellbeing manager)

Whilst providers valued being responsive to the needs of the local community, they were limited in their capacity to pilot new services, needing assurance that demand would meet any resource expenditure:

"...I think our ability to trial things has been hugely reduced...if I want to spend a couple of thousands of pounds to try something, I'm not sure I can afford to do that." (Chief Executive, Community wellbeing centre)

To appropriately resource their services, providers found it useful to know who was 'coming in'. This is where formal health professionals' referrals conveying background medical information

about the patient was useful, allowing the provider to prepare to support the patient appropriately:

"I mean people can self-refer themselves and we're really happy with that. But generally we will do some follow-up... or try to make contact with somebody who can give us a referral form that, particularly assessing their physical and mental health needs, you know for getting... an objective sense of what their needs are so we can make sure we can accommodate those needs effectively". (Director, Gardening for Health)

Providers generally considered that service users coming via the NHS route may face more barriers to PA and needed more support than a general service user:

"I see it as a referral instructor's job to look at not only the barriers that a person's coming with but also any other issues that they might need help with. So it might be nutrition, it might be childcare issues, it might be well I can't afford bus fares or whatever it might be we try and cater something for that individual." (Exercise referral manager)

Although providers attempted to accommodate everyone regardless of their health needs, they identified certain groups who were harder to support such as people with severe mobility problems, or harder to engage, such as people with significant mental health issues. Providing for individuals with complex needs was possible but not always preferable from a viability point of view:

"It's not really a good use of our time spending an hour with one person, obviously it's a business and they'd like us to do a class with 20 people rather than one person" (Exercise referral instructor 1)

The voluntary groups and those with non-gym facilities, who did not have to cover the salary of qualified referral instructors, were more able to provide a flexible outreach service and adapt the type of PA to the individual:

"Quite a lot of our staff input goes into once somebody's been referred to us of contacting them by phone and offering to visit them at home to tell them about the project. And then offering to escort them to the sites for the first time... And I think that's something a lot of other organisations struggle to do, because obviously it involves time and time is money!" (Director, Gardening for Health)

Inter-provider collaboration

Some providers felt that they worked well as part of a local community network, and would signpost to other services, seeing their service as a gateway for the patients to engage with other types of health and social care support. The bigger providers found this more difficult because they were more facility-focused. Some providers noted that better collaboration between providers was essential for providing flexibility and patient choice:

"I think those levels of trust are important and I think some of that's there... there's something about that knowing that if person Y comes into a centre whether it's a virtual hub or whether it's a space where they go 'yeah I do actually, I would like to find out more'... it feels like they've got some genuine choices... So yeah to kind of like scale that up, would be great but it's getting the, the buy-in." (Chief Executive, Community wellbeing centre).

Appendix O: Higher and lower order themes from case study analysis (Deliver phase)

Data sources are colour coded as follows:

- Observations/notes from a Physioworks in-service training day where the pathway research and interim storyboards were presented for discussion and questions from staff
- Interviews with physiotherapists
- Interview with service lead
- Responses from Physioworks staff to the Qualtrics survey discussed in the previous phase (Chapter 6, *develop*)
- Email exchanges about the pathway map with an enhanced role physiotherapist who had participated in the co-design workshops

Higher order themes	Lower order themes	Sub-lower order themes	Raw data extracts
Appraisal of pathway	Positive value/benefits	Benefits for patient = benefits for clinician	<p>"particularly the patients that don't need a lot of input, it helps me to push them into where they need to go rather than keeping them which is what we used to do"</p> <p>"That sort of stuff is really important for people... giving them the messages but informally, and then they'll absorb it in their own time while they're waiting for us"</p> <p>"From a clinician point of view I think you're right in starting things early and even if they aren't ready for it, it's in the back of their mind for the next time... realise actually exercise might be beneficial for me, it's not something that's going to be a shock for them."</p> <p>"So I think not just from a patient perspective but from a service perspective if more patients already come, because they've had the right start to their journey, ready and open, then it may actually improve the capacity within the service for those patients who need more contact with the therapist."</p>
		Differing relevance for patients - who to target?	<p>"I think that they key, that first bit, their understanding that physical activity equals them being healthier. And pitching the question at the right level to where they are."</p> <p>"There are the ones that buy in and they're the ones that you want to be doing this. There are patients that don't want to change, I had a lady yesterday, she doesn't want to do exercise, she absolutely point blank refused."</p> <p>"2: some patients will quite happily admit that they don't exercise but they'd like to exercise and they don't see that as a barrier. But I just think what we're trying to do, we're not trying to get hold them anyway are we, they exercise already, or we can maybe just promote them to do something slightly different. I would say that the whole aim of the game here is to try and target the audience that really are not exercising. So you've got to go about that in a slightly different way.</p> <p>1: But willing to change. Because the others ones at the other end of the spectrum that you</p>

			<p>won't make a dent in at all. But I would say don't worry about them, because we can't change everybody, it's the ones that we can focus on. "</p> <p><19th April physioworks in-service training></p> <p>What is the pass going to help with - e.g. which people will benefit most, what will they get?</p> <p>"Because not everybody will go - yeah everybody will go into a blue box because - either you've planted a seed and they've rejected or, or will be doing it themselves, or will access one of the other options."</p>
		<p>Where the pathway adds value</p>	<p>"me personally I think the pathway's really good, I think it works really well, and having this idea of being able to tap back in [maintenance box] is really important."</p> <p>"I'm a big fan of sowing the seed at the start"</p> <p>"Me personally I love the pathway I think it's a really good idea."</p> <p>"I like the sort of pre-emptive stuff, using signage and videos in the waiting area. That sort of stuff is really important for people. It's kind of like the, giving them the messages but informally, and then they'll absorb it in their own time while they're waiting for us, so that's useful."</p> <p>"If there's lots of different options for us to send people to it would be positive I think. Because not everybody wants to do the same thing and not everybody enjoys the same thing."</p> <p>"So the appointment, the priming at the start.... I think from my perspective both as a clinician and as a clinical lead that's absolutely invaluable... if the patient is already open to that concept then you are starting two stepping stones along... And if that means that you're more, that conversation is more likely to engage somebody, then you've got a quick win as it were as opposed to having to start right at base for every patient."</p> <p>"So having a measure of somebody's activity levels before they start and then a measure of</p>

			<p>activity levels after they finish, and that might not be finished with physio it might be finished with an activity pathway as well... it might actually be quite useful to know whether their activity levels have actually increased or decreased from one episode to another"</p> <p>"That's really helpful to be able to acknowledge to the staff that we may not be able to convert everybody. That no matter how convincing we might be it's about the person taking hold of the information almost, and the drip-drip effect, and actually having an electronic record so that people can go back to the information and can reference it."</p> <p>"I think the thing that I really, really hope will work well is that communication with the patients right at the beginning. That things will be available for them in their waiting areas, that clinicians will have things in their hands to be able to give to the patients..."</p> <p>"Something really tangible in their hand... those sorts of things that will prompt the member of staff to at least begin the conversation, that will enable the patient to begin to engage with it, or will come back and say 'I don't want to talk about that thank you, I want you to fix my knee' - ok now we know where we stand! Which direction to take this conversation in....I look forward to it just being much more tangible and clear for the staff."</p> <p>"One of the things that's important is the provider feedback mechanism and reporting on the progress. That's the bit that we haven't had before. I think that's really valuable because if the patient has really engaged and that goes back into the patient record that is, that starts a conversation differently when the patient gets re-referred if they have the same or another problem in the future potentially."</p>
		<p>Value for clinician is as a prompt/guide and a way to embed PA into the care system</p>	<p>"if you had this as a prompt, almost to sort of like have it as a flow diagram. Because they can have those care pathways, have you seen on system one? ...you could almost be ticking them off, and so they've had the discussion about this is why you need to do, and almost like this is next bit you need to do, that comes up as a prompt before you even go into the next session potentially."</p>

			"It would be brilliant if you could have it as a prompt and say, 'right, this session we need to discuss this' or you know, 'this session we need to get the referral sent off' or, so it almost becomes part of the pathway of all physio sessions. And also so if we get to these patients that do not want to change yet, then it maybe comes back when they see the GP, it flicks up and says 'could you have a little chat with them about the thing that we suggested 2 weeks ago?' You know so you're constantly feeding back into the system."
		Potential to satisfy NHS regulatory bodies - service lead	"So that and the CQC were very keen that information wherever possible was provided in multiple languages. So that's the centrally driven message to get available like that."
	Negative value/disadvantages		
		Not perceived to benefit the HP	<p>1. we always seem to get every month something else added. And I think it's how you take it as a clinician.</p> <p>2: This is to help us though isn't it?</p> <p>1: No I know it is, this is to help a patient though. The whole goal of this is not to help a physiotherapist, it's to make a change to...</p> <p>"If you want an opinion on this: [electronic record box] the only thing I would say about that is it's great for statistical purposes, which is part and parcel of what you're wanting, because it then proves that we're doing our job correctly to a degree."</p> <p>"And it's not just a measure to tick somebody else's box, it's to inform clinical practice, and therefore there for the clinician's benefit, not for somebody who's fiddling with statistics in the background somewhere"</p>
		Could be detrimental for some patients if not pitched correctly - too	"But it might make their symptoms worse it might make the problem worse that they've got already....quite a lot and probably 50% of our people we see they're just not active at all and they're quite scared of activity. And so suggesting it early could be, it could be a little bit detrimental if it's not put in the right context."

		aggressive upfront?	<p>"Um, you've got to find out what their level of willingness to change is and pitch it in that level... rather than throw these are all the things that you can do, and almost overwhelming them"</p> <p>"...we have quite a significant number of patients with quite significant pathology where the first consultation is about safety first. Ensuring that they should be in physio, that there isn't something serious going on and ensuring that you're investigating any significant pathology with MRI scans or whatever... it doesn't fit with the '<i>let's just make sure you don't have cancer, oh by the way are you exercising?</i>' it's that's not the priority in that consultation"</p> <p>"... I think there are some cases where... it's not the most important for this person at this point in their pathway or their life... I don't want to get to a position where staff are being criticised for not having followed the pathway for a group of patient where it is clinically justified, or personally justified for that person.....If you've got absolutely rip-roaring leg pain actually what you need is a journey through services to get to the surgeon to have surgery then actually speaking to them about activity other than what they need to do to manage their hideous leg pain is not necessary. And it will be when they've had their leg pain sorted and they're ready to engage, but that might not be in this service, right here at this time. "</p>
	Coherence	Complicated to look at - overwhelming for health professional	<p>"It's just too busy for me so I wouldn't be able to understand it."</p> <p>"It's not that busy, I think a lot of people could take that on board."</p>
		Balancing simplification with choice of 'tools'	"My main suggestion would be trying to simplify the 'finding whats right' and 'agreeing/taking action' sections, namely the blue boxes as there are many to choose from. We would need to ensure staff understand the differences between all of these or somehow try to streamline them."
		Breaking it down	"Initially looking at it, it's quite a lot to look at. But breaking it down it kind of makes sense from my point of view."

			<p>"You know you can sometimes get those mind map sort of things where you can click on that and then it creates the next arrow? So if you're going to do it in clinic like we were talking about so it almost becomes like a prompt, you can almost go 'have you discussed whether the patient is physically active? No, right these are the things you need to discuss, or yes, right these are the next bits"</p> <p>"...I think people like to see the big picture... I'm just reflecting on feedback I've had about other things. If some people know about this bit, some people know about that bit then everybody realises that they don't really understand what's going on. Whereas if everybody's got the big picture... I think more staff will utilise bits of it in different contexts."</p>
		Makes sense	"This pathway looks very comprehensive and makes sense to me."
	Novelty	Pathway is just a formal version of current practice (what health professionals do with selected patients/non-routine)	<p>"It's not, not what we're doing now, but we don't do it with every patient, is what I'd say."</p> <p>"We don't do it for every patient. We do it for selective ones."</p> <p>"It doesn't completely mirror what we do at the moment, but we do certain elements of it."</p> <p>"I wouldn't say we use any of these tools routinely."</p> <p>"Yeah [PHE AHP clinical champion for PA] came and did a session in Physioworks in Jan or Feb this year about the work that she's been involved with about integrating activity and general health into consultations. And I believe from her feedback that we were in a position that people were engaging with that, it wasn't a foreign concept."</p> <p>"... if you'd have asked me a year ago and I know you probably did, I think I'd have been optimistically saying this doesn't look distinctly different to what we do. I think now we do it much more because we've been able to develop the beginnings of things much further. If you asked me again in another year I would hope to be saying yeah we definitely, this really does reflect what we do. I think what you've achieved is describing best practice of things which exist which the new way of working that we've been given the opportunity of encouraging and doing more of because we've had Graves, we're now just at the point where yes it is what we're</p>

			<p>doing."</p> <p>"So I think there are things that this describes that didn't really solidly, properly exist."</p>
		Needs to be differentiated from other existing services	Seems to need clarity on how this offer differs from SPARS - also from discussions in workshops, will need to justify why there is a different referral form (a bugbear for HCPs as hard to remember what form goes where)
		Reinventing the wheel	"So I think it's just sort of re-inventing the wheel, but there's some really good points on it, there really are."
	Changes suggested	Catch contemplators	<p>"So they may need time to think about it, and quite a lot of our patients who plant the seed like you say, and they may not then decide to make that behavioural change. They may do it with us, or on their own, but actually can we plant something in here [loop] to give them a little, a think about of, before they have to go back to the GP for a flare or you know whatever that next trigger."</p> <p>"But it's whether you could plant that seed, or continue to initiate that idea that they need to be more physically active, before they go back round the system again. Which is quite difficult to get people to engage, but I know I've had patients who are like, 'well actually it's not a great time now' but then you're gonna lose them aren't you because they'll go back into their normal routine."</p>
		Re-evaluating goals	"...being able to re-evaluate their goals, in here somehow [activity period box]. Because their goals might change, they might do too little, or they might change the way they do things, so I thought that some sort of way of re-evaluating where they are."
		Enhance behavioural insights overarching the	<p>"an hour's footage, keep it as a rolling thing at Graves, as they're sat there, ok and they're thinking, and they might just pick something up"</p> <p>[See BI node]</p>

		pathway	
		Stratify pathway more based on patient attitudes	"how important is activity to maintaining your health' on a score, and then you maybe it give it so that it leads them down a set of questions that changes depending on how they set out. I wonder if that would give you a way of not offending and pitching it at the right level?"
		Wording changes	"I wonder whether it could say intra- or inter-service referral because that acknowledges that you might transfer the patient within your service to an activity option rather than across services."
Engagement/Buy-in	Obstacles to adoption	Current practice deemed sufficient	<p>e.g. electronic recording (survey and FG): "Any specific plan for walking or other ex is also already recorded integrally in my treatment notes - and also any onward referral plan." (survey response)</p> <p>"And we actually do. If you have a look on here [computer], you know if we're going to save a patient we actually do that don't we? We have to record what we've done, if we've sent them away with home exercise program, group exercise program, advice about exercise, that sort of thing...</p> <p>2: Yeah but you wouldn't do it in that much detail would you? But if you've gone 'yeah I've pointed him to the MoveMore activity folder and we've gone through it together and we've picked out this activity on a Tuesday' I wouldn't document it that much.</p> <p>1: No I wouldn't, no."</p>
		Conflict should do vs. can do	"But I think it's good, it's not something we do regularly with every patient because we don't have time to, but I think every patient should have that conversation and I try to do it with every patient."
		Belief that a different approach is needed	"I suppose I can be a little bit sceptical at times... Because I've seen these sorts of things happen so many times ok... you see it in other realms of industry and it just falls flat on its face. Unless you can get it spot on. And I just think do you have to go completely around the other way? Hence why I was saying about the alternative psychology of introducing patients when they don't even realise they're being introduced to it."
		Do what's	"It just needs to be made simple and easy, otherwise people just go back to the stuff they're

		comfortable	<p>happy doing and they've always done."</p> <p>"From my point of view I'm comfortable referring to SPARS, so I do it loads, 'cos it's the one I know where the referral form is, it's quick to do"</p>
		No obligation to use - individual HPs dictate their own practices based on perceived effort	<p>"I don't use the System One templates"</p> <p>"So yeah I think they could be useful but personally I've not used them, it's being aware of them isn't it? And again I think I saw it in the survey document and said that's a good idea, but no one's ever got us to do them or encouraged us to do them, you kind of just go with what your gut suggests will help that person. "</p> <p>"...people would just basically scrap it and think 'I haven't got time'."</p> <p>"The sooner we start having to print off things, fill out lots of forms it won't get done. Some people might, but the majority won't"</p> <p>"I think you'll find that different staff at different locations with different caseloads will use different parts of it... it's a bit like, at the moment we've got every member of staff has an induction with the gym so that they can take patients into the gym. But only a proportion of staff are doing it."</p> <p>"It'll be a success if staff engage well and have the resources but it won't if they don't."</p>
		Low priority in package of care	<p>"I think it really depends on whether you feel that that is part of their package of care."</p> <p>"Because we have thirty minutes and you're trying to rule out nasty stuff, and it's the bottom, why they're coming to us and then it's something on top of that that we want to be pushing, but not necessarily priority day one. But it maybe should be- but I think if someone's got back pain and radicular pain we're trying to figure out what's going on there. And then later down the line, rehab wise this is where we need to be, this is sort of management stuff"</p>
		Low feasibility -	<p>"I agree that a prompt on system one would be useful but this all seems a bit lengthy. The</p>

		time	<p>assessment template is already long and this would increase it further."</p> <p>"Still too much extra to fill in"</p> <p>"So we're not actually, number one having the time to discuss that."</p> <p>"it's definitely more in depth than what we're doing at the moment, because we just haven't got the resources to be, you know, looking at every certain area here."</p> <p>"You're never going to get all this done in your initial assessment."</p>
		Individual working restricts collective buy-in?	<p>"The problem with our service is that we're all working as individuals in individual clinic rooms. If we all spent more time together these sorts of things would get shared between us. But you're kind of swimming alone a lot of the time and you're trying to sort of manage your caseload, and you forget about stuff like this."</p> <p>"...our staff survey last year the NHS survey last year and we did a SurveyMonkey in June time and the staff were reporting high stress levels. And part of this was around lone working and not seeing very much of each other and that sort of thing."</p> <p>"So there is no communal space anywhere for anybody to spend any time with each other. So the staff room at Graves is too small and when they have very short, they have a half hour non-paid lunch break. By the time they get out of their clinic and get up there and turn round again, they're not bothering.... something as simple as not being able to use the [back] door has had an enormous impact on something that we believe is a really important thing for them to be able to see each other, spend time with each other and compare notes together in the hot-desking area and ask each other questions and share clinical information and knowledge."</p> <p>"... it's a historical thing that all the staff spaces have been taken away in order to provide more clinical activity space in virtually everywhere you go but actually if you work and belong in a department there are still spaces that you can spend time with each other and have some of those conversations"</p>

			<p>"What I've done to try and compensate for that, but I don't think there's anything I can do to get away from the fact it's much better to see each other on a daily basis is that I in the last year put all the staff into a pathway team. They all see any patient that walks through the door when they're in clinic but they've all got sort of affiliation with a team. ...As well as in-service training they'll be meeting quarterly in that team. It's service-specific training but it's where they would talk about things like that activity pathways and what works, what doesn't work, that kind of thing. So the people that work in the groups meet together quarterly, the people that work in the biomed lab meet quarterly, [etc.] that sort of thing so they have more contact with each other... And those are all good things but they may well not replace the same value as being in the same place at the same time and just talking."</p>
		Different health professionals' attitudes	<p>"if you took the evaluation of who actually refers to SPARS, and could probably pick the people out. Whereas if you get the people that never refer, they're the ones that are going to struggle with this. And probably they're the ones that are going to have more issues with it... it's changing their mind-set"</p> <p>"So just making sure that some of these first principles and our grass roots are brought back to the surface for those who may not be initially a first thing that they think of or automatically integrated into their practice... So I don't know what feedback you've had from the staff but I suspect there'll be a range"</p>
		Current systems seen as barriers to change	<p>"system one is system one."</p> <p>"They'd have to go back to the GP for a referral through the ERS system because that's the way by which we have to accept referral... I see no reason for a diabetic nurse to not identify that the patient would benefit from something that exists within PSW it's the clunky mechanism by which it needs to happen that is the issue at the minute... But from a patient-centred, patient first perspective it's something that we need to look at how we get around as opposed to something that should be a dead stop."</p>

			<p>"...when we had the staff doing the IAPT training it was then very difficult for them to integrate exactly that way of working into a physical health service which was not set up with the timeframes that the IAPT staff have to use the same skills... And that became quite stressful for the members of staff that were trying to find a way of integrating the two into one consultation with less time. So we've gotta be careful when we integrate new things into existing frameworks"</p>
		Passive role in implementation	<p>"I just think whatever you want to implement needs to be easy for us to do and that's the most important thing from our point of view."</p> <p>"From a clinician point of view I think you're right in starting things early..."</p> <p>"And I don't know if that's part and parcel of what you're planning on doing, or whether that's taking it to another level."</p> <p>"..you have our support for getting it implemented in Physioworks."</p>
	Facilitators to adoption	Minimal effort solutions - automation	<p>"In my own experience as a clinician I like prompts such as drop down menus and information as part of record keeping because it helps me to reinforce practice and means that I will use a range of appropriate options rather than being limited to what I recall"</p> <p>"Have drop down lists may make this task quicker"</p> <p>"Needs to be very easy to do - within system one so no extra admin otherwise it won't happen"</p> <p>"It definitely needs to be automated doesn't it, if we're going to ask that as part of the assessment thing. Or even having that link of do they fill something in before they come into clinic that then comes up, then we can discuss it once we're in clinic would be really helpful... So if we can get that information before and it comes up as part of their record, that would be really good... you have it at the start, but you can talk about it because you have that in front of you... Almost if it pops up in front of you, is something that you can have access to before they</p>

			<p>even came, you know even if they get a text message before and it comes up as part of their record, would be really helpful I think."</p> <p>"And likewise any of these tools that you're trialling and looking at, if they're easily accessible on system one in a section somewhere, where you can access it without too much looking around for it"</p> <p>[Clicks!] "Clicking is better than writing information"</p> <p>"If there's lots more buttons to click and forms to fill it gets more complicated, you're unlikely to do it. It needs to be like two clicks, three clicks, sticking a patient name onto a form."</p> <p>"Making it really straightforward paperwork where you've just got to do a couple of clicks."</p> <p>"if everybody's got capacity to get the resources and the resources are always available to get more of then they can make sure they're stocked with the business cards or the leaflets, or the whatever it is and they can just start carrying that around with them in the same way that they do appointment cards"</p>
		<p>Needs to be perceived as simple/easy to do (+in relation to existing practices)</p>	<p>"If staff can sign post or refer easily with simple pathways and no unnecessary paperwork this will increase compliance"</p> <p>"As long as it's a simple process, referral forms are easily & quickly accessed & the process doesn't keep changing!!"</p> <p>"And ease of implementation is always they key bit. If it's easy to do it, we'll do it"</p> <p>"If it's dead quick and dead easy to do, you'll do it. If things get more tricky and you're trying to find out what services are available it gets more difficult. You're less likely to do it because you're pushed for time."</p>

			<p>"It just needs to be made simple and easy, otherwise people just go back to the stuff they're happy doing and they've always done. If you want to make changes it needs to be simplified and not overcomplicated."</p>
		<p>Treating the pathway as part of the care package</p>	<p>"Implementing its going be interesting, if you give us an extra 10 minutes that would be good! [laughter]."</p> <p>"But I would say if for example, if in that patient's package of care you could have 10 minutes to talk about this, you could add value. If money was no object and you actually had specific time or a specific person"</p> <p>"I think it really depends on whether you feel that that is part of their package of care. Whereas I would say I would happily spend time filling something like this because that's what they need. But I think historically and with some of the physios in our service it will be physio, and then we refer them on to somewhere else. Whereas I don't see that I see this as all part of the same thing."</p>
		<p>Changes in service over last 12 months</p>	<p>"So one of the things that we've worked at really hard over the last 12 months is ensuring that every single member of staff spends at least a day of our week in a locality such as Graves or Concord where they are working in a building with... other professionals of a lower or higher grade and also with podiatrists and physios working alongside each other. And they're people who have been peers in the same service for years but who've never worked next door to each other and who haven't had that co-located work. As a build on from that within Physioworks in the last 12 months we've also got more activities, more exercise groups happening and we've also in the last few weeks been able to start to use the biomed lab at Graves so we've got Physios, ERPs and podiatrists working in 3 of them in the biomed lab for 2 sessions and that's really about education between the professions and up and down the grades... we've worked over the last 12 months at having co-located all cross-service working whereby pain clinic clinicians and PSW clinic and have worked at the same place and the pain clinic clinicians have treated the PSW patients which is a necessity to encourage crossover and communication and learning and in-service training and that sort of thing and we've repeated the same sort of thing across therapy services and ERPs have cross-worked, there's foot and ankle, physio enhanced</p>

			<p>role, extended scope physio has been working in PSW and we've now joint-funded a post."</p> <p>"I think what it does it, if you'd have asked me a year ago and I know you probably did, I think I'd have been optimistically saying this doesn't look distinctly different to what we do. I think now we do it much more because we've been able to develop the beginnings of things much further. If you asked me again in another year I would hope to be saying yeah we definitely, this really does reflect what we do. I think what you've achieved is describing best practice of things which exist which the new way of working that we've been given the opportunity of encouraging and doing more of because we've had Graves, we're now just at the point where yes it is what we're doing."</p> <p>"...we've got 40% of people using MyPathway so if it goes out on MyPathway at the beginning then 40% of patients have had that information before they've arrived in the building."</p>
		Benefits of NCSEM locations	<p>"...And so again what we're finding is we're able to use the national centre to more it's that some of the physios are finding it exciting to get back to those principles that are at the core of what we're doing, that we have the facility to do that again.... we're in an environment now as a service that we can be developing and building that back in."</p>
		Helping staff see the relevance for their caseload	<p>"So pretty much every member of staff either delivers an exercise group or an education group or works in the biomed lab or whatever. And so they will have purpose for needing to know this information and then that should hopefully help them to blend it into what they're doing when they're doing..."</p> <p>"...if you came to the in-service training and presented it to the whole service, you could get people to go into their pathway teams and think about which part of it would be most applicable to their caseload or their group of patients. And so they're having to apply what you've just told them to their caseload. And that helps them to apply it next week."</p>
	Communicating to staff	Avoid email - don't have time to take in new information	<p>"I think sending stuff by email is difficult for us to get our heads around. Because we kind of check our emails in between patients and you can half read it, and then your next patient comes, and by the time that's happened you've forgotten that bit. So honestly emails aren't the</p>

		in clinic	<p>best way, we get a lot of stuff by email....Maybe we should have a system of flagging us back to it but most of us don't."</p> <p>"Yeah don't do it by email because it'll get...."</p>
		Awareness raising	<p>"...it's being aware of them isn't it?"</p> <p>"We need to all be taught about it and understand it, and be aware that it exists"</p> <p>"I bet you'd have a lot of referrals from a small number of clinicians probably and not many from a lot of others, maybe for these sorts of reasons that they don't know where it is and how it works."</p>
		How to communicate new practices to staff	<p>"Maybe if we had big posters in our clinic rooms of the referral pathway, I don't know if that might be an option. Just to remind us, because we forget, we get told so many things and things change all the time... So we could have some sort of updated regular poster thing, I don't know, maybe?"</p> <p>"Because although we've had people come to our away day and explain it, the staff still go out going 'so what are we doing?' They just have so many options in their heads, they have so many options depending on where they're working sat today and yesterday and tomorrow... So I think the most exciting thing going forward is resource, resource, resource, not incentive stuff just up to date things that staff and patients have got in their hands."</p>
		Team training / supported by service leads	<p>"you need to have some sort of team training session for us."</p> <p>"I'd do a launch event. And I'd happily arrange for that to happen in Physioworks at one of the in-service trainings or at the away day. Where somebody came and had the time and the space to clearly explain the steps and the process to have the resources there to see, and these are the things take what you need for the venues that you want them in. This is how you can get more, this is the website, this is how you can access it, these are the referral pathways and this</p>

			<p>is how you do it. And that we you know give you a vehicle to launch it to the staff. And give them opportunities to play around with the stuff, you know if there's websites, letting them have the, go away..."</p> <p>"So for instance if we have got a meeting with all the people who do groups, we could invite you to the next one of those to engage with those key players. We could have an event at the in-service training where you did a session for everybody. You could do one for the people who work in the integrated pain team, where they have their meeting. So you could get people, and they'd all utilise different aspects of this differently. I'd go drip drip-drip if I were you."</p> <p>"... if you came to the in-service training and presented it to the whole service, you could get people to go into their pathway teams and think about which part of it would be most applicable to their caseload or their group of patients. And so they're having to apply what you've just told them to their caseload. And that helps them to apply it next week. It's going to the application part of the learning and not just being a passive recipient of information."</p> <p>"I wonder whether a training need is about communication? Physios are generally quite good at communication but there are always situations where somebody could have communicated something better. And maybe in that session if you feel that it's within your gift and I suspect it is, is to talk to them about engaging ways of communicating with people or asking those where you wonder if the answer's gonna be no and the answer's shoved straight back in your face, different communication styles around having those conversations. And how you have that bottom box conversation of the stepping stone, the drip-drip maybe how you have a different conversation..."</p>
		<p>Present as research output and therefore evidence-based practice - benefit</p>	<p>"... the staff are very engaged with evidence based practice and we've got a quite a lot of low-grade active research staff so I think they really value the fact that this has come from research, it's been really carefully looked at...They've all met you before, apart from the new people. They often like to know well if we've invested to this point what happened with it. So yeah I'm sure they'd like to see you at some point."</p>

		of service engagement throughout PhD	
		Emphasise and preserve clinician autonomy	"What is really demoralising for staff is to feel that somebody is telling them they have to do something which means that they no longer feel like they've got the clinical discretion which they are due. As a senior professional or just a professional to make that call or that they would be criticised for not having done something when it's justifiable to not do. That would be great if that would be acknowledged in there somewhere"
Incorporating the pathway into current practice	Collective appraisal	Clinicians' informal sharing with peers	<p>"I know that people I kind of work with regularly, use it because we mention the benefits of a SPARS referral. And we all sort of talk about it to each other. Some clinicians I don't ever see and I don't know what they're doing. Maybe they are doing it maybe they aren't."</p> <p>"So again like the classes up in the North know about that, but I don't know if anybody else would, because I know about it because I was told directly by the person that runs it. There's maybe not enough sort of sharing of services available."</p> <p>"So the staff room at Graves is too small and when they have very short, they have a half hour non-paid lunch break. By the time they get out of their clinic and get up there and turn round again, they're not bothering. But there are now some groups that are meeting in the café area, that go for walk together. They have to be proactive in meeting each other even when they're in the same building as each other. They were reflecting that when we worked at Old Station Drive they used to go together on Thursday evenings for dinner at Tescos, and they miss that. So it's those sorts of things, the fact that they don't come to the hot-desking area... So something as simple as not being able to use the door has had an enormous impact on something that we believe is a really important thing for them to be able to see each other, spend time with each other and compare notes together in the hot-desking area and ask each other questions and share clinical information and knowledge."</p> <p>"... actually it's quite difficult to have some of those conversations in the cafe at Graves because of what is overheard. And you don't, yeah, people are professional about what they speak</p>

			about in public places."
		Pathway Teams	<p>"... in the last year put all the staff into a pathway team. They all see any patient that walks through the door when they're in clinic but they've all got sort of affiliation with a team. And their work, they may well be involved with, they'll work more closely with people of that team. And it's the beginnings of something so I think the value and the benefit probably hasn't filtered through to the staff fully yet but those would be the sorts of forums that they'll meet in. As well as in-service training they'll be meeting quarterly in that team. It's service-specific training but it's where they would talk about things like that activity pathway sand what works, what doesn't work, that kind of thing. So the people that work in the groups meet together quarterly, the people that work in the biomed lab meet quarterly, [etc.] that sort of thing so they have more contact with each other."</p> <p>"So for instance if we have got a meeting with all the people who do groups, we could invite you to the next one of those to engage with those key players. We could have an event at the in-service training where you did a session for everybody. You could do one for the people who work in the integrated pain team, where they have their meeting. So you could get people, and they'd all utilise different aspects of this differently. I'd go drip drip-drip if I were you."</p>
		Staff champions	<p>"One of the things that's always valuable is for them to have a link back to somebody to either whether it be a super-user in PSW where they're the person who really has engaged with it and got to grips with it that they contact and say 'I can't remember how to do this, where's that referral kept, what do I with this, how am I sending it to so-and-so, what's the mechanism?' and somebody to feedback 'oh that website's crashing' or 'this is happening'. So I would say a key worker who links with somebody who's got teeth to sort it out."</p> <p>"... I would definitely go with having a super-user and I know who's already engaged with using the SPARS referrals, I know who are the movers and shakers when speaking to staff and who go into things with positive attitudes so yeah I would be able to give you some link people who would be the people who would speak about it, send emails out about it, talk to people about it, remind people in their training sessions and supervision."</p>

	Maintaining/ normalising use	Need time to familiarise and develop confidence with new working practices	<p>"...it's a case of getting the time to get your head around it. Once you've done this stuff a few times and get your head around it you're fine, it's getting people to do it the first couple of times and understanding how to do it."</p> <p>"So I think it's somewhat this first round of here's how it works, and then some way of working out who isn't using it and what are the barriers for them"</p>
		Standardisation / equality of access	<p>Comment by one physio - placing financial filter or setting other types of eligibility 'criteria' just creates more barriers - ideally want something for everyone, no difficult decisions about who etc.</p> <p>PfP seem to consider 900 passes generous (clearly they can't offer these on an unlimited basis) whereas physio staff point out 2000 referrals to their service every month - how to determine which patients / raises question about equality of access?</p> <p>"I note or keep in mind is that only a third of the PhysioWorks patients are seen at graves and a smaller number at concord. The rest are not seen in an exercise environment and we are often on able to put up posters or put leaflets out for patients in the other localities. We need to look at how we allow equal access to care for all patients no matter where they are seen and it is almost more important that we engage those who are seen in these venues as they are less likely to make the connection of their own accord between exercise and health."</p> <p>"Systems which work across all venues not just Graves and Concord."</p> <p>"Yeah if you can have it standardised across the city, we'll use it. I use SPARS because I can use it all over the city, in any clinic."</p> <p>"Some of the localities that we work in, the National Centres only make about a third to a half our capacity... So we're looking at multiple options for different venues so that everybody has got some access to something but it may not be that everybody has the same experience everywhere they go. So venues where we can [implement priming ideas] we need to be using</p>

			those options as often as we can."
		Reminders	<p>"Maintainable after the launch of systems and information. Regular updates. Face to face engagement with staff."</p> <p>"Just to remind us, because we forget, we get told so many things and things change all the time...So we could have some sort of updated regular poster thing, I don't know, maybe?"</p> <p>"So yeah presenting it to us. And then probably doing a reinforcement session after that a few months later because it gets, we cover a lot in in-service training so it will get forgotten about probably by some people. But if it keeps getting reinforced every few months this sort of thing will gradually get incorporated into our practice probably."</p> <p>"So you probably need in-service training and then like a follow-up email to remind everyone and then a reminder session, maybe in an informal manner."</p> <p>"there'll be a need for us to keep reminding each other in training sessions and supervision and when we co-work with each other to bring that back into the fore of what we're doing."</p>

Appendix P: Summary of participants' feedback and evaluation forms following the co-design workshops

What do you think about the ideas we have generated as a group?

Healthcare professionals	Patients
<p>"Huge variety of ideas, some more practical than others. We've tried to keep the individual patient at the heart of everything. A tailor-made approach for each person."</p> <p>"Interesting, valid ideas that would be good to see put in action."</p> <p>"Innovative ideas that would change the way the NHS works."</p> <p>"Rather excited by the prospect of the ideas being used in the future rather than theoretical. The ideas were still not concrete enough to enable implementation when I attended last time (I did miss the last session though due to AL)."</p> <p>"I think we generated a lot of ideas. Quite a number of them were very similar which I guess is good as suggests they are important. I think we had good representation from HCP who were exercise enthusiasts and prioritised activity as part of their lives and promoted it with their patients. I think this enthusiasm was important for much of the idea generation. Although I also think it would have been useful to get ideas from GPs and primary care nurses and medics from secondary care for some aspects of the discussion. I felt like sometimes we were discussing 'ideas' that were already happening but because we didn't have people in the room who had the knowledge of this, we couldn't learn from these experiences and build on things. For example - training of primary care staff in 'health coaching'."</p>	<p>"I felt warm and cosy. But in reality could it work. Not all illness can be cured, this counselling and ongoing support is needed."</p> <p>"I believe that some very good ideas have been generated by the group as a whole."</p>

Please rate the following statements according to whether you agree or disagree:

"We have created solutions to the problems I think are important"

	1 Not at all	2 A little	3 Neither	4 Quite a lot	5 Very much
Patient ratings				1	1
HCP ratings				4	

"I felt confident about the improvements we generated"

	Not at all	A little	Neither	Quite a lot	Very much
Patient ratings			1	1	
HCP ratings				3	1

How involved have you felt in the group activities and discussions? How could we have made you feel more involved?

Healthcare professionals	Patients
<p>"Felt listened to. Very involved."</p> <p>"Very involved - no changes to make feel further involved."</p> <p>"I always felt very involved and valued."</p> <p>" Very involved. At times I felt we were given too much ability to have input i.e. we drove discussions off in directions that did not directly enable us to make as much progress on the pathway as possible. We did struggle to cover the planned content in time and this may have been one factor."</p> <p>"I did feel very involved through the activities we did and the wider group discussions. The strategies that were used worked well at getting everyone involved. I think the smaller group work was easier to get more ideas across due to the time factor."</p>	<p>"I felt very involved."</p> <p>"Everyone has been involved in the discussions and all points of view have been considered."</p>

"I felt involved throughout the process"

	Not at all	A little	Neither	Quite a lot	Very much
Patient ratings					2
HCP ratings					4

What do you think you have learned from this process?

Healthcare professionals	Patients
<p>"That other health professionals are having the same challenges engaging people in activity and same frustrations with lack of activity options available for patients."</p> <p>"Impact of working across disciplines and in a small group with facilitation. Very effective."</p> <p>"How to discuss physical activity with patients on a more approachable level."</p> <p>"Very good to think of service provision ideas outside of the constraints of day to day pressures in a truly patient centred manner to start with. The challenge of setting up a pathway is far more challenging than I would have thought initially."</p> <p>"Everyone has an important contribution to make. Don't dismiss ideas you don't instantly agree with. Change in the NHS is frustratingly slow (well it confirmed it once more). Lots of HCP have barriers to discussing activity. If ideas are good they will keep coming up. Personae are really valuable to have to refer back to in future."</p>	<p>"It's complicated."</p> <p>"I have learnt that it will be a long process to get people to move more but it is a path that should be pursued."</p>

"I learnt something from taking part in this process"

	Not at all	A little	Neither	Quite a lot	Very much
Patient ratings				1	1
HCP ratings				2	2

Do you feel that you will do anything differently as a result of being involved?

Healthcare professionals	Patients
<p>"Keep engaged and liaising with other activity providers, groups etc. to be aware of different options for patients."</p> <p>"Involve physical activity even more in my consultations."</p> <p>"Yes. I will definitely bring physical activity into my consultations."</p> <p>"It has re-enforced many of my beliefs about exercise promotion. It will make me evaluate pathways differently in the future and may well enable me to encourage such focus groups and study into similar lines of enquiry/topics too."</p> <p>"I will look out for any future work relating to this study and try to be involved to help it move forward as it is important and a lot of time and effort has gone into it."</p>	<p>"No."</p> <p>"I think I will be more considerate of the work people do within the NHS as I have realised the processes involved are more complicated than anyone realises."</p>

"I feel that I have the power to influence change"

	Not at all	A little	Neither	Quite a lot	Very much
Patient ratings			1	1	
HCP ratings			1	3	

How well did you understand what the facilitators were saying and why we were doing each activity?

Healthcare professionals	Patients
<p>"Very well explained."</p> <p>"Well."</p> <p>"First few sessions I found I was 'getting my head' around the concept."</p> <p>"Very clear. Good at facilitating directions of discussion but several enthusiastic, talkative people at a time made things run a little slow at times I felt. Not quite sure how you would control for that though!"</p> <p>"I felt I understood the facilitators most of the time or could clarify if not. Although in week one it was explained the methods we were going to use and why they were being used I didn't really think too much about why we were doing things - I just went along with it! Although it did feel like one week followed on from the other and our contributions had been valued and incorporated into the next weeks discussions which gave me confidence just to go with the flow."</p>	<p>"Sometimes felt over tired. Thinking outside the box can be taxing."</p> <p>"The facilitators explained everything really well and I understand why we went through each process."</p>

"I understand how our meetings fit into the research that is being done"

	Not at all	A little	Neither	Quite a lot	Very much
Patient ratings				1	1
HCP ratings				2	2

Would you be inclined to take part in something like this again? What would you say to someone you know who was asked to take part in similar work in the future?

Healthcare professionals	Patients
<p>"Yes definitely. Very inspiring and a privilege to be part of the project."</p> <p>"Yes - it's an interesting and valuable learning experience."</p> <p>"I would be very interested in doing further research and would definitely recommend others to do the same."</p> <p>"I would gladly volunteer for such things again and would highly recommend others do so too."</p> <p>"I think it depends on the project and the facilitators. I was interested in the topic and I had confidence in the facilitator that it would be done well and it would be time well spent."</p>	<p>"I don't know if I would take part again. I would say if you are interested take part."</p> <p>"Yes I definitely would do this again. I have found the process very interesting and would encourage others to do the same thing."</p>

What would you like to see happen next with this research?

Healthcare professionals	Patients
<p>"Develop assessment tools and pathways to health professionals refer to appropriate activity options for patients. Improved activity options for patients. Improve relationship between activity providers and NHS."</p> <p>"Steps put in place to move into use with patients."</p> <p>"I would like to see it implemented nationwide."</p> <p>"The ideas generated need refinement and coherence then real world applicability applying before they could be rolled out (missed the last session though so this may have happened). I would like to see a change to the current Physical Activity options in Sheffield and have one, reliable and well-funded/stable pathway that can be trusted to provide for our patients."</p> <p>"I would like to see it presented to the commissioners CCG along with a reminder to them of the evidence behind physical activity and health. Ask how can we incentivise GPs to promote physical activity? How can it be linked to the STPs? I would like it to be linked in with different activity promotion work that is going on in the city so things aren't duplicated and all the good work is joined up. Move More, Outdoor City, NCSEM.</p> <p>I would like it to be linked to the person centred care planning in primary care. Utilising the care planning section on system one, building on training primary care are receiving on motivational approaches to behaviour change. Consider building on the PAM assessment to generate discussions on PA.</p> <p>I would hope to see HCP and health trainers and other staff from relevant social care organisations encouraged more to discuss physical activity with people and be provided with training for this."</p>	<p>"It depends where it is going! Maybe individual case can be studied so a clear picture can be seen. It would show where problems have been and where improvements could take place."</p> <p>"I would hope to see a change in peoples' attitude to exercise and would also like to see health professionals stress its importance more than ever."</p>

Other comments

Healthcare professionals	Patients
<p>"I think your study is a great idea and very much needed at the present time. I really hope this translates into changes for the people of Sheffield and beyond."</p> <p>"All contributions were valued. Facilitation excellent - non-judgemental, well considered, well informed. Good luck with taking all this forward in the future. Hopefully the findings will be translated into ideas on changing practice."</p>	<p>"In an ideal world, we would be treated properly and promptly. Money can buy you good health and good service. NHS is lacking funds to help everyone."</p> <p>"I hope to see some of the ideas we have generated put into practice in the future."</p>