



THE UNIVERSITY *of* EDINBURGH

This thesis has been submitted in fulfilment of the requirements for a postgraduate degree (e.g. PhD, MPhil, DClinPsychol) at the University of Edinburgh. Please note the following terms and conditions of use:

This work is protected by copyright and other intellectual property rights, which are retained by the thesis author, unless otherwise stated.

A copy can be downloaded for personal non-commercial research or study, without prior permission or charge.

This thesis cannot be reproduced or quoted extensively from without first obtaining permission in writing from 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.

The impact of financial incentives on the implementation of asthma self-management in primary care in Northern Ireland: a mixed methods programme of work



Tracy Jackson

Submitted for the degree of Doctor of Philosophy

The University of Edinburgh

2018

Declaration

I confirm that this thesis presented for the degree of Doctor of Philosophy of Population Health Sciences, has

- i) been composed entirely by myself
- ii) been solely the result of my own work
- iii) not been submitted for any other degree or professional qualification

Tracy Jackson

Abstract

Introduction: Asthma is a common chronic respiratory condition which is responsible for substantial morbidity and economic impact. Supported self-management including asthma action plans improves asthma control, minimises exacerbations and reduces the use of emergency healthcare resources. Despite this evidence an Asthma UK survey (2013) identified that less than a quarter of people with asthma owned an action plan. The exception is Northern Ireland, where a Local Enhanced Service (LES) introduced in 2008 has provided financial incentives to primary care practices for providing asthma action plans; ownership was reported by 63% of individuals with asthma surveyed.

Aims and objectives: The aim of this PhD was to 1) systematically review the evidence investigating the impact of financial incentives on implementation outcomes, health outcomes and individual behaviour outcomes for individuals with asthma or diabetes 2) observe trends in implementation and health outcomes associated with the introduction of the LES and 3) explore the process by which organisational change was implemented in primary care in Northern Ireland from the perspective of primary care staff.

Methods: The programme of work proceeded in three phases:

1. Following Cochrane methodology, I systematically reviewed the evidence investigating the impact of financial incentives on provision of supported self-management in asthma and diabetes (another long-term condition with a robust evidence base) on implementation outcomes (action plan ownership); health outcomes (asthma control/attacks) and individual behaviour outcomes (self-efficacy). I used a Population, Intervention, Comparison, Outcome and Setting (PICOS) search strategy and duplicate screening, data extraction and Downs' and Black's (1998) quality assessment. Studies were weighted by robustness of design, number of participants and the quality score. Narrative synthesis was conducted due to heterogeneity of studies.

2. I explored the context of Northern Ireland and its healthcare system using routine data to observe trends in: asthma-related hospitalisations; asthma-related deaths and asthma action plan provision across Northern Ireland over a five-year period.
3. In the qualitative phase, I conducted telephone interviews with a representative involved with delivering the LES in up to 20 primary care practices and undertook four case studies involving in-depth interviews with clinical and administrative staff members and document analysis. The Adams et al (2014) financial incentives framework underpinned the topic guide; interviews were recorded, transcribed verbatim and analysed using two approaches:
 - a. Grounded Theory approach to explore primary care staff perceptions of the LES and self-management for asthma.
 - b. Framework approach informed by the Normalization Process Theory (NPT) (May et al., 2009).

Results:

1. I included 12 studies (from 2,541 initial hits) in the systematic review. Results were mixed. Delivery of care improved in three diabetes studies; was unchanged in six and deteriorated in one. There were fewer hospitalisations/emergency department visits in one diabetes study. In the one asthma study, the proportion of patients receiving an action plan increased from 4% to 88%, but health outcomes were not measured. Authors highlighted the importance of context when implementing a financial incentive scheme.
2. Routine LES data were available from 2011; deaths since 2008. Asthma action plan provision has remained high in Northern Ireland since 2011/2012 with primary care reporting 76% of eligible patients having been provided an asthma action plan. Asthma related hospital admissions have increased between 2011/12 and 2015/16 by over 300

admissions/year. There were 31 deaths in 2008 and this has fluctuated over the years with no clear trend.

3. Fifteen semi-structured telephone interviews, six individual in-depth interviews and two group interviews were conducted with 23 participants (five general practitioners; five nurses; 13 administrative staff) from 15 primary care practices. Four of the participants in the scoping semi-structured interviews also took part in either an individual in-depth interview or a group interview. Themes were agreed in discussion with a multi-disciplinary group which included contributions from the primary care, secondary care and patient perspective.
 - a. Themes clustered around targeting poor asthma control; communicating with patients; strategies for achieving targets; financial incentives. All participants highlighted the difficulty of getting patients with asthma to attend appointments, with some expressing feelings of frustration at lack of patient involvement and uncertainty of how to improve patient engagement, particularly in patients with poorly controlled asthma.
 - b. Processes created since the introduction of the LES appear successfully embedded into primary care practice routines. Working together in multi-disciplinary teams was frequently discussed by participants in relation to the scheme, from inception to implementation and delivery in primary care practices. Significant support from the Public Health Agency and pharmaceutical companies in providing funding and training for nurses was acknowledged as a key to the successful embedding of new processes for asthma self-management, but there was concern regarding reduction in funding from both of these sources and the impact on the future provision of asthma self-management education in primary care.

Asthma care was identified as a nurse-led process. Participants were generally positive about receiving financial incentives for the extra work

undertaken, however the payments were viewed as necessary in able to complete the additional work required by the financial incentive scheme. Providing the best quality of care for patients, however, was the frequently cited as the main motivator for clinical staff.

Conclusions: Financial incentive schemes have inconsistent impact on implementation and health outcomes; context is likely to be an important factor in determining success. In Northern Ireland, three quarters of people with asthma have been provided with an action plan over the last five years of the LES; alongside a possible trend to an increase in asthma-related hospital admissions and deaths. The financial incentives of the LES were received positively by primary care staff; however patient health was the highest priority when delivering care. Primary care staff identified multi-disciplinary teamwork throughout the lifespan of the LES as key to its “normalization”, which was now so embedded that concerns were expressed regarding threats to funding and withdrawal of external support. Understanding how practices reacted to the LES and normalized this healthcare scheme could inform further policy on similar initiatives.

Lay summary

Background

Helping people to look after their asthma by giving them an action plan as part of supported self-management), improves asthma control. This leads to less time off school/work, fewer asthma attacks and fewer asthma symptoms. However, it is hard to put supported self-management in place and only around 25% of people with asthma in the UK have an action plan.

An Asthma UK survey (2013) found over 60% of the people with asthma in Northern Ireland said they had an action plan. GP practices in Northern Ireland have been part of a programme to improve asthma care, called the Northern Ireland Local Enhanced Service (LES). GP surgeries are encouraged to give self-management education to those with asthma and other long term conditions. If they do this they receive a financial incentive from the LES.

Aims

I wanted to find out:

1. What financial incentive schemes for increasing self-management in asthma or diabetes looked had been reported before
2. In Northern Ireland:
 - a. how many practices are giving patients with asthma an action plan?
 - b. how many asthma related hospital admissions are there each year?
 - c. how many asthma related deaths have there been?
3. What do practice staff (GPs, nurses, practice managers) think about the LES which pays them financial incentives for giving patients with asthma an action plan
4. When the LES started, what changes did practice staff make to how they worked?

Results

Reviewing previous literature

I reviewed research papers which looked at financial incentive schemes for asthma and diabetes and found 12 papers which matched what I was looking for. I included diabetes because there were not enough papers looking at asthma self-management; diabetes is another long term condition which uses self-management. Results showed that financial incentives increased the asthma action plans given by GPs and nurses in one study but the results in the diabetes studies were mixed.

Looking at the numbers

Between 2011 and 2016, the number of action plans given by GPs and nurses in Northern Ireland to patients remained high, asthma related hospital admissions stayed the same (apart from the Belfast area where they increased) and there were fewer deaths due to asthma in males, but more in females.

Hearing the views of GP practice staff

I interviewed 23 staff members from 15 GP practices (GPs, nurses, practice managers) and investigated four 'case study' practices in depth. I asked what they thought of getting financial incentives for giving patients asthma self-management education and what changes they made in their work to support the LES.

Everyone interviewed said it was hard getting patients with asthma to come into the practice every year for an asthma review. Staff tried different ways to increase attendance in patients with asthma, and in particular patients with poorly controlled asthma. Nurses were leading asthma care in most of the practices and staff members worked together to reach their targets. Participants said they needed the financial incentives to pay for the extra work undertaken and were worried what would happen if the payments stopped. Giving patients the best quality of care was very important for all participants.

Understanding how practices felt about this scheme and what changes staff made in their practices could help when planning similar healthcare programmes in the future. More research is needed in this area.

Acknowledgements

I would like to thank my supervisors Hilary Pinnock, Mike Shields, Liam Heaney and Marilyn Kendall, for dedicating their time and expertise to this project. Hilary provided an infinite supply of support, encouragement and advice without which I doubt this programme of work would have been completed. Mike and Liam provided guidance and knowledge of the Northern Ireland healthcare system that I would have been lost without. Marilyn provided support on my qualitative phases and listened patiently to my ideas.

I am grateful to the Asthma UK Centre for Applied Research (AUKCAR) for the immense amount of support and opportunities they have provided throughout my PhD. In particular: Lynn Morrice for her advice with ethics applications and keeping me on track with my budget spending; Rebecca Campbell and Laura Gonzalez Rienda for all their administration work; Maria Moller, Gwyn Davies and Hilary Pinnock for arranging PhD training sessions; Mome Mukherjee for her advice on statistical analysis; Susan Morrow for sharing her knowledge from the IMP²ART study; Io Hui and Christina Pearce for being secondary reviewers of my systematic review and my fellow AUKCAR PhD students who have accompanied me on this journey.

I would particularly like to thank Melissa Goodbourn and Allison Worth for introducing me to Patient and Public Involvement and their help in arranging sessions with patients throughout my PhD. To the members of the AUKCAR PPI group, I extend my appreciation for their contribution to my work including: sharing their experiences on living with asthma; providing feedback on my topic guides and participant literature; assisting with my qualitative analysis; listening to my presentations and expertise on writing my lay summary. In particular, I would like to thank Elisabeth Ehrlich who has contributed at every stage of PPI collaboration in my PhD.

I would like to thank Marshall Dozier and Richard Parker for their expertise and patience as I undertook my systematic review searches and analysis.

In Northern Ireland, I extend my appreciation to the Public Health Agency, the Health and Social Care Board and all the practice GPs, nurses and administration staff who were involved with and participated in my work.

Finally, my most significant thanks belong to my family. Thank you to my parents for their unwavering support in everything that I choose to do and for continually encouraging me to be the best possible version of myself. Thank you to my Nanny Jean for her boundless enthusiasm and being an inspiration to me. And to my husband Al, thank you for believing in me even when I didn't, thank you for being by my side every step of the way, and most of all, thank you for always being my number one cheerleader.

Contents

Declaration	ii
Abstract	iii
Lay summary	vii
Acknowledgements	x
List of tables	xx
List of figures	xxi
List of appendices	xxii
Contributions to science	xxiv
Publications and presentations	xxiv
Peer-reviewed publications	xxiv
Abstracts	xxiv
Abbreviations	xxvi
Chapter 1 Overview of thesis	1
1.1 Overview of this PhD	1
1.2 Asthma UK Centre for Applied Research	2
1.2.1 Research environment and available expertise	2
1.2.2 Patient and Public Involvement.....	3
Chapter 2 Introduction	4
2.1 Current understanding of asthma	4
2.1.1 What is asthma?	4
2.1.2 Asthma in the UK & globally.....	4
2.2 Supported self-management	5
2.2.1 What is self-management?	5
2.2.2 Self-management for long term conditions.....	6
2.2.3 Supported self-management for asthma	8
2.3 Financial incentive schemes.....	12
2.3.1 Quality and Outcome Framework (QOF) for Long Term Conditions.....	13
2.3.2 Northern Ireland Local Enhanced Service for Chronic Respiratory Conditions.....	14
2.4 Implementation science	16

2.4.1	What impacts on implementation?	17
2.4.2	Implementation science terminology used in this thesis.....	18
2.5	Summary and next steps	19
Chapter 3	Aims and objectives.....	20
3.1	Aims & Objectives of this PhD	20
3.1.1	Aim of systematic review.....	20
3.1.2	Aim of quantitative phase.....	20
3.1.3	Aim of qualitative phase	21
Chapter 4	Methodology overview	22
4.1	Introduction.....	22
4.2	Study design.....	22
4.3	Financial Incentives Framework	23
4.4	Mixed methods	25
4.4.1	Pragmatic approach.....	25
4.4.2	Defining mixed methods research.....	26
4.4.3	Strengths and weaknesses of using mixed methods	27
4.4.4	Justification for using mixed methods	28
4.4.5	Characteristics of mixed methods design in this thesis	28
4.4.6	Triangulation	29
4.5	Overview of the research design in relation to the objectives	30
4.5.1	Objectives one and two.....	31
4.5.2	Objective three and four.....	32
4.5.3	Objective five	32
4.5.4	Objectives six and seven	32
4.5.5	Objective eight	33
4.6	Ethical approval	34
4.7	Reflexivity and the researcher role	34
4.8	Summary and next steps	37
Chapter 5	Systematic review	39
5.1	Introduction.....	39
5.2	Aims of the systematic review	39
5.2.1	Objectives	39

5.3	Methods.....	40
5.3.1	Inclusion and Exclusion criteria.....	40
5.3.2	Search strategy.....	41
5.3.3	Quality assessment.....	43
5.3.4	Outcomes.....	45
5.3.5	Data extraction.....	45
5.3.6	Analysis and synthesis.....	46
5.4	Results.....	47
5.4.1	Study characteristics.....	47
5.4.2	Study quality and weight of evidence.....	48
5.4.3	Impact of the schemes on process, behavioural and health outcomes.....	51
5.4.4	Features of the financial incentive schemes.....	73
5.4.5	Authors' conclusions.....	77
5.5	Discussion.....	83
5.5.1	Statement of principal findings.....	83
5.5.2	Interpretation of findings in relation to previously published work	84
5.5.3	Strengths and limitations.....	90
5.6	Conclusion.....	91
5.7	Summary and next steps.....	92
Chapter 6 Context of Northern Ireland and supporting quantitative		
	data.....	93
6.1	Introduction.....	93
6.2	Health and social care in Northern Ireland.....	93
6.2.1	Primary care in Northern Ireland.....	97
6.2.1.1	GP Led Care Working Group.....	97
6.2.1.2	GP Federations and Integrated Care Partnerships.....	98
6.3	Northern Ireland Local Enhanced Service for Chronic Respiratory Conditions (LES).....	99
6.3.1	Background.....	99
6.3.2	How are the financial incentive payments calculated?.....	103

6.4	Features of the financial incentives framework	104
6.5	Aim of the quantitative phase	105
6.5.1	Initial plans, limited availability of data, and revised aims	105
6.5.2	Revised objective of the quantitative phase	106
6.6	Methods.....	106
6.6.1	Design.....	106
6.6.2	Ethical considerations and permissions	107
6.6.3	Assessment and definition of asthma.....	107
6.6.4	Study populations	108
6.6.5	Outcome measures.....	108
6.6.6	Analysis.....	110
6.7	Results.....	110
6.7.1	Prevalence	111
6.7.2	Asthma action plan provision	112
6.7.3	Asthma related hospital admissions.....	115
6.7.4	Asthma related deaths	118
6.8	Discussion	121
6.8.1	Implementation outcome.....	121
6.8.2	Health outcomes	123
6.8.3	Using routine data	126
6.8.4	Strengths and limitations.....	128
6.9	Patient and public involvement contribution.....	130
6.10	Conclusion.....	131
6.11	Summary and next steps	132
	Chapter 7 Qualitative phase methods.....	133
7.1	Introduction.....	133
7.2	Aims and objectives of the qualitative phase	133
7.2.1	Aims	133
7.2.2	Objectives	133
7.3	Methods.....	134
7.3.1	Design.....	134
7.3.2	Scoping interviews	138

7.3.3	Case studies	140
7.3.4	Analysing the data	146
7.3.5	Patient and public involvement contribution	157
7.4	Summary and next steps	158
Chapter 8	Constructing themes using a grounded theory approach.	159
8.1	Introduction	159
8.2	Results.....	159
8.2.1	Themes	162
Chapter 9	Case study analysis	180
9.1	Introduction	180
9.2	Results.....	180
9.2.1	Themes within case studies	181
9.2.2	Case study 1	184
9.2.3	Case study 2	194
9.2.4	Case study 3	204
9.2.5	Case study 4	211
9.3	Cross-case analysis and discussion	217
9.3.1	Communicating with patients	218
9.3.2	Financial incentives.....	220
9.3.3	Improved care vs improved reporting.....	221
9.3.4	Impact of context.....	223
9.3.5	Strengths and limitations.....	224
9.3.6	Patient and public involvement contribution	225
9.4	Conclusion	226
9.5	Summary and next steps	227
Chapter 10	Framework analysis	228
10.1	Introduction	228
10.2	Methods related to the NPT analysis	228
10.2.1	Framework analysis.....	229
10.2.2	Using the NPT toolkit.....	229
10.3	Results.....	229
10.3.1	Themes	230

10.3.2	NPT toolkit: assigning strengths to NPT components.....	245
10.4	Discussion	254
10.4.1	Making sense of the LES (coherence).....	255
10.4.2	Constructing the value of the LES (cognitive participation) ..	256
10.4.3	Undertaking the work for the LES (collective action)	257
10.4.4	Appraisal of the work for the LES (reflexive monitoring).....	258
10.4.5	Themes outside of the NPT framework	260
10.4.6	Strengths and limitations	261
10.4.7	Patient and public involvement contribution	262
10.5	Conclusion	262
10.6	Summary and next steps	263
Chapter 11	Thesis discussion	265
11.1	Introduction.....	265
11.2	Summary of findings	265
11.2.1	To determine the impact of financial incentives for implementation of supported self-management in asthma or diabetes on implementation outcomes, health outcomes and individual behaviour (Objective 1)	265
11.2.2	To describe the features of financial incentive schemes as defined by the Financial Incentive Framework and determine any association with positive outcomes (Objective 2).....	265
11.2.3	To observe trends in the provision of asthma action plans and asthma related hospital admissions in Northern Ireland from 2010 to 2011 and in asthma related deaths from 2001 to 2014 (Objective 3 [revised]).....	266
11.2.4	To describe the features of the LES as defined by the Financial Incentive Framework (objective 4).....	266
11.2.5	To identify primary care practices with different approaches and success levels in achieving the LES targets (objective 5).....	267
11.2.6	To explore different approaches and perceptions of primary care staff in reaction to the implementation of the LES (objective 6) ..	267

11.2.7	To undertake an in-depth exploration into primary care staff accounts of their understanding and experiences of the LES and self-management for asthma (objective 7)	267
11.2.8	To explore if/how the LES was implemented and normalized in primary care in Northern Ireland using the Normalization Process Theory (objective 8)	269
11.3	Strengths and limitations of this study	270
11.3.1	Using a mixed methods approach	270
11.3.2	Methodological issues related to data collection of staff perceptions	271
11.3.3	Evaluating the impact of the LES on implementation and health outcomes	271
11.3.4	Understanding patient perspectives	272
11.3.5	Patient and public involvement.....	272
11.3.6	Dissemination of findings.....	273
11.4	Interpretation of findings in relation to previously published work	273
11.4.1	Financial incentives	273
11.4.2	Impact of context	274
11.4.3	Multi-disciplinary teamwork	275
11.4.4	Communicating with patients.....	276
11.4.5	Measuring effectiveness of financial incentive interventions	277
11.5	Patient and public involvement contribution.....	278
11.6	Summary and next steps	279
Chapter 12	Implications	280
12.1	Introduction.....	280
12.2	Implications for policy and practice	280
12.2.1	Policy makers	280
12.2.2	Primary care practices.....	282
12.3	Implications for research.....	283
12.4	Implication for patient organisations	284
References		285
Appendices		306

Appendix 1: Systematic review protocol registered on PROSPERO ..	306
Appendix 2: Access NI Certificate.....	320
Appendix 3: Letter from NHS Ethics	321
Appendix 4: Quantitative phase Level 1 ethics form	323
Appendix 5: Qualitative phase Level 2 ethics approval letter.....	325
Appendix 6: Poster presented at ERS Conference 2016	326
Appendix 7: Published systematic review in PLOS ONE	327
Appendix 8: Letter and information leaflet for practices	347
Appendix 9: Scoping interviews participant information leaflet	349
Appendix 10: Scoping interviews topic guide.....	351
Appendix 11: Case study practice information sheet	352
Appendix 12: Case study participant information sheet	353
Appendix 13: Case study in-depth interviews topic guide.....	355
Appendix 14: Additional interview quotations in support of qualitative findings	357
Appendix 15: Excerpt of case study 1 annual review invitation letter..	363
Appendix 16: Excerpt of case study 1 asthma action plan.....	364
Appendix 17: Excerpt of case study 2 annual review invitation letter..	366
Appendix 18: Public Health Agency leaflet for parents of children with asthma	367
Appendix 19: Public Health Agency asthma action plan for age 14+ ..	369
Appendix 20: Public Health Agency asthma action plan (A8)	371
Appendix 21: Asthma UK “What to do in an asthma attack”	372
Appendix 22: Chiesi asthma action plan (A8)	373
Appendix 23: Chiesi asthma action plan (A5)	374
Appendix 24: Excerpt of case study 3 annual review invitation letter..	376
Appendix 25: Excerpt of case study 4 annual review invitation letter..	377

List of tables

Table 1: Asthma action plan ownership rates across the UK	11
Table 2: Translational pathway domains and examples	16
Table 3: Terminology, definitions and utilisation in this thesis.....	18
Table 4: Domains of the financial incentive framework.....	23
Table 5: Elements of Pragmatism Worldview and implications for practice .	25
Table 6: Outline of objectives and respective research phases	30
Table 7: PICOS search strategy	41
Table 8: Study designs – descriptions, strengths and limitations.....	43
Table 9: Characteristics and outcomes of included studies	52
Table 10: Decisions underpinning the harvest plot	65
Table 11: Features of the financial incentives framework utilised in studies with positive results in both implementation and health outcomes.....	78
Table 12: Features of the financial incentives framework utilised in studies with no effect results in both implementation and health outcomes	79
Table 13: Features of the financial incentives framework utilised in studies with negative results in both implementation and health outcomes	80
Table 14: Summary of authors’ conclusions	81
Table 15: Number of practices and registered patients in Northern Ireland and the five Local Commissioning Groups in 2017	98
Table 16: Features of the Financial Incentives Framework utilised by the Northern Ireland LES	105
Table 17: Data sources for each outcome	107
Table 18: Practices participating in the LES (2011/12 to 2015/16)	113
Table 19: Questions to ask about documents	149
Table 20: Within- and cross-case analytic strategies	151
Table 21: Constructs and components of the Normalization Process Theory	152
Table 22: Coding framework for the implementation of the LES.....	154
Table 23: Recruitment methods and participation numbers.....	159
Table 24: Characteristics of scoping interview practices.....	161
Table 25: Themes and sub-themes of scoping interviews	162

Table 26: Characteristics of case study practices	181
Table 27: Summary table of themes by case study site	182
Table 28: UK Royal College of Physicians “3 Questions” screening tool ...	186
Table 29: Constructs and components of the Normalization Process Theory	230

List of figures

Figure 1: Asthma UK action plan	10
Figure 2: Visual model of research strategy	29
Figure 3: PRISMA Flow Diagram	49
Figure 4: Hierarchy of included studies	50
Figure 5: Harvest plot.....	64
Figure 6: Graph showing population estimates for Northern Ireland 2001-2016	94
Figure 7: Outline of Health and Social Care structure in Northern Ireland ...	96
Figure 8: Map of the five Local Commissioning Group and Health and Social Care Trust areas in Northern Ireland	97
Figure 9: Timeline depicting the evolution of the LES in Northern Ireland .	101
Figure 10: Example of the LES financial incentive payment calculation	104
Figure 11: Asthma prevalence in Northern Ireland 2007-2017	111
Figure 12: Asthma prevalence in Northern Ireland split by Local Commissioning Group	112
Figure 13: Percentage of patients with asthma (Step 2-5) that received an annual review, including an asthma action plan.....	114
Figure 14: Percentage of patients with asthma (Step 2 - 5) that received an annual review split by age.....	114
Figure 15: Percentage of patients with asthma (Step 2 - 5) that received an annual review split by Local Commissioning Group.....	115
Figure 16: Asthma related admissions in Northern Ireland	116
Figure 17: Number of asthma related admissions per Health and Social Care Trust (all ages)	116

Figure 18: Number of asthma related admissions per Health and Social Care Trust (16+ years)	117
Figure 19: Asthma related admissions per Health and Social Care Trust (0-16 years).....	118
Figure 20: Asthma related deaths in Northern Ireland, 2001-2016	119
Figure 21: Asthma related deaths in Northern Ireland, 2001-2016	120
Figure 22: Asthma related deaths in women in Northern Ireland, 2001-2016	120
Figure 23: Asthma related deaths in men in Northern Ireland, 2001-2016.	121
Figure 24: Flow chart of selection process.....	134
Figure 25: Radar plot identifying strengths allocated to NPT constructs and components	246
Figure 26: Radar plot identifying strengths allocated to components of the Coherence construct of the NPT.....	246
Figure 27: Radar plot identifying strengths assigned to components of the Cognitive Participation construct of the NPT.....	248
Figure 28: Radar plot identifying strengths assigned to the components of the Collective Action construct of the NPT.....	250
Figure 29: Radar plot identifying strengths assigned to components of the Reflexive Monitoring construct of the NPT	252

List of appendices

Appendix 1: Systematic review protocol registered on PROSPERO

Appendix 2: Access NI Certificate

Appendix 3: Letter from NHS Ethics

Appendix 4: Quantitative phase Level 1 ethics form

Appendix 5: Qualitative phase Level 2 ethics approval letter

Appendix 6: Poster presented at ERS conference 2016

Appendix 7: Published systematic review in PLOS ONE

Appendix 8: Letter and information leaflet for practices

Appendix 9: Scoping Interviews participant information leaflet

Appendix 10: Scoping interviews topic guide

Appendix 11: Case study practice information sheet

Appendix 12: Case study participant information sheet

Appendix 13: Case study in-depth interviews topic guide

Appendix 14: Additional interview quotations in support of qualitative findings

Appendix 15: Excerpt of case study 1 annual review invitation letter

Appendix 16: Excerpt of case study 1 asthma action plan

Appendix 17: Excerpt of case study 2 annual review invitation letter

Appendix 18: Public Health Agency leaflet for parents of children with asthma

Appendix 19: Public Health Agency asthma action plan for age 14+

Appendix 20: Public Health Agency asthma action plan (A8)

Appendix 21: Asthma UK “What to do in an asthma attack”

Appendix 22: Chiesi asthma action plan (A8)

Appendix 23: Chiesi asthma action plan (A5)

Appendix 24: Excerpt of case study 3 annual review invitation letter

Appendix 25: Excerpt of case study 4 annual review invitation letter

Contributions to science

Publications and presentations

Peer-reviewed publications

- Jackson T, Shields MD, Heaney LG, Kendall M, Pearce CJ, Hui CY, Pinnock, H. The impact of financial incentives on the implementation of asthma or diabetes self-management: A systematic review. PLOS ONE. 2017 12(11): e0187478.

Abstracts

- Oral presentation: Jackson T, Heaney L, Shields M, Kendall M, Pinnock H. Exploring primary care staff experiences of financial incentives for implementing asthma self-management: a qualitative study in Northern Ireland using Normalization Process Theory. Presented at Society for Academic Primary Care Annual Scientific Meeting (London, July 2017)
- Oral presentation: Jackson T, Heaney L, Shields M, Kendall M, Pinnock H. Perceptions among primary care staff towards financial incentives to promote implementation of asthma self-management: a qualitative study in Northern Ireland. Presented at International Primary Care Respiratory Group 9th World Conference (Porto, June 2017)
- Oral presentation: Jackson T, Heaney L, Shields M, Kendall M, Pinnock H. Professional and staff perceptions of financial incentives promoting implementation of asthma self-management: a qualitative study in Northern Ireland primary care practices. Presented at AUKCAR Annual Scientific Meeting (Bristol, January 2018)
- Oral presentation: Jackson T, Heaney L, Shields M, Kendall M, Pinnock H. Professional and staff perceptions of financial incentives promoting implementation of asthma self-management: a qualitative study in Northern Ireland primary care practices. Presented at Primary Care Respiratory Society UK Conference (Telford, September 2017)
- Oral presentation: Jackson T, Heaney L, Shields M, Kendall M, Pinnock H. Professional and staff perceptions of financial incentives promoting implementation of asthma self-management: a qualitative study in Northern Ireland primary care practices. Presented at AUKCAR - MRC Asthma UK Joint meeting (London, September 2017)
- Oral presentation: Jackson T. Researcher perspective: Impact of PPI. AUKCAR Patient Involvement Fair (Edinburgh, March 2017)
- Poster presentation: Jackson T, Heaney L, Shields M, Kendall M, Hui CY, Pearce C, Pinnock H. The impact of incentives on the implementation of

- asthma self-management: a systematic review. Presented at AUKCAR Annual Scientific Meeting (Edinburgh, November 2016)
- Poster presentation: Jackson T, Heaney L, Shields M, Kendall M, Hui CY, Pearce C, Pinnock H. The impact of incentives on the implementation of asthma self-management: a systematic review. Presented at Primary Care Respiratory Society UK Conference (Telford, October 2016)
 - Poster presentation: Jackson T, Heaney L, Shields M, Kendall M, Hui CY, Pearce C, Pinnock H. The impact of incentives on the implementation of asthma self-management: a systematic review. Presented at European Respiratory Society International Congress (London, September 2016)
 - Poster: Jackson T, Heaney L, Shields M, Kendall M, Hui CY, Pearce C, Pinnock H. The impact of incentives on the implementation of asthma self-management: a systematic review. Presented at Usher Institute Annual Research day (Edinburgh, June 2016)
 - Oral presentation: Jackson T, Heaney L, Shields M, Kendall M, Hui CY, Pearce C, Pinnock H. The impact of incentives on the implementation of asthma self-management: a systematic review. Presented at International Primary Care Respiratory Group 8th World Conference (Amsterdam, May 2016)
 - Poster: Jackson T, Heaney L, Shields M, Kendall M, Pinnock H. The impact of incentives on the implementation of asthma self-management: a mixed methods assessment. Presented at AUKCAR Annual Scientific Meeting (Manchester, November 2015)
 - Poster: Jackson T, Heaney L, Shields M, Kendall M, Pinnock H. The impact of incentives on the implementation of asthma self-management: a mixed methods assessment. Presented at Annual Research day at the Centre for Population Health Sciences (Edinburgh, June 2015)

Abbreviations

AUKCAR	Asthma UK Centre for Applied Research
BTS/SIGN	British Thoracic Society/Scottish Intercollegiate Guidelines Network
EPOC	Effective Practice and Organisation of Care
GP	General Practitioner
GTA	Grounded Theory Approach
HbA1c	Glycated haemoglobin
LES	Northern Ireland Local Enhanced Service
LTC	Long Term Condition
NHS	National Health Service
NRAD	National Review of Asthma Deaths
NPT	Normalization Process Theory
PAAP	Personalised Asthma Action Plan
PICOS	Population, Intervention, Comparison, Outcome and Setting
PPI	Patient and Public Involvement
QOF	Quality and Outcome Framework
StaRI	Standards for Reporting Implementation Studies
SOA	Super Output Area
UK	United Kingdom
CP	Christina Pearce
CYH	Io Hui
EE	Elisabeth Ehrlich
HP	Hilary Pinnock
LH	Liam Heaney
MD	Marshall Dozier
MK	Marilyn Kendall
MM	Mome Mukherjee
MS	Mike Shields
RP	Richard Parker

Chapter 1 Overview of thesis

1.1 Overview of this PhD

The Local Enhanced Service (LES) for Chronic Respiratory Conditions was introduced into Northern Ireland in 2008 and pays a financial incentive to primary care practices who provide an annual review, including the provision of a personalised asthma action plan, to patients with asthma. This programme of work aimed to explore the impact of financial incentives on the implementation of asthma self-management in primary care through a mixed methods programme of work.

The programme had three stages:

- Systematic review (Chapter 5) - investigated the impact of financial incentives on promoting process changes, specifically in regards to self-management of long term conditions, and provided an evidence base to inform the second and third stages of this project.
- Quantitative phase (Chapter 6) - I utilised quantitative methods to observe the trends in implementation and health outcomes in Northern Ireland over a five year period.
- Qualitative phase:
 - Chapter 8 - telephone screening interviews with key informants in 15 practices.
 - Chapter 9 – I travelled to Northern Ireland and completed case studies, including in-depth interviews and document analysis, in four practices. The transcripts from these interviews were analysed by a grounded theory approach (Charmaz, 2006).
 - Chapter 10 - I conducted a framework analysis using the Normalization Process Theory (NPT) (May et al., 2009) on the scoping and case study interview transcripts.

This work will be of interest to policy makers and commissioners and providers of healthcare services seeking to embed supported self-management for asthma into routine clinical care (Implications are in Chapter 12). By exploring

how the LES was embedded into routine practices in primary care, there is the opportunity to inform policymakers and those considering the standards for the Quality and Outcome Framework (QOF).

1.2 Asthma UK Centre for Applied Research

The Asthma UK Centre for Applied Research (AUKCAR) is a virtual centre of leading asthma researchers from 13 universities in the United Kingdom (UK). AUKCAR is focused on improving the lives of individuals with asthma through better asthma control and reducing asthma related hospital admissions and deaths. Programme 1 of the AUKCAR aims to answer “How do we empower and enable people to take control of their asthma so they can live full and active lives?”. As part of a wider programme of work within AUKCAR investigating the implementation of supported self-management for asthma this project will directly inform programme 1.

1.2.1 Research environment and available expertise

PhD studentships within the AUKCAR are required to have supervisory teams comprised of supervisors from more than one university, and my supervisors were affiliated to the University of Edinburgh (HP and MK) and Queen’s University Belfast (MS, LH). In addition to their academic roles, three of my supervisors also hold clinical positions within primary care (HP) and secondary care (MS, LH). After I made the decision to have a qualitative focus in the mixed methods design, Dr Marilyn Kendall was approached due to her qualitative research expertise and agreed to join the supervisory team for this programme of work.

The AUKCAR provides an infrastructure which is available to support the programme of work. In addition to a UK-wide Postgraduate Training Scheme for Asthma Researchers and the collaboration of the UK’s leading applied asthma researchers, this infrastructure includes methodological support (UK Methodology Service for Asthma Trials), practical resources (UK Database of Asthma Research Volunteers, UK Asthma Observatory), structures for robust

Patient and Public Involvement, and support and guidance on imaginative, proactive dissemination.

The Usher Institute of Population Health Sciences and Informatics at the University of Edinburgh provided office space and a full range of support services including library facilities and computing support. The AUKCAR has an on-going programme of asthma related work including routine data research and the involvement of social scientists and clinicians which provides a wide range of in-house methodological expertise.

1.2.2 Patient and Public Involvement

The AUKCAR Patient and Public Involvement (PPI) platform's main role is to ensure that research carried out within AUKCAR is relevant to people affected by asthma. To ensure this role is fulfilled, the Centre involves individuals affected by asthma and collaborates with them on research. The role of PPI is different to the role of the participant as PPI volunteers are sharing their experiences on living with asthma and can contribute at every stage of the research, rather than being a participant in a study. There has been PPI collaboration throughout my PhD including: project design; research management; undertaking the research; analysis of results; interpretation of findings; dissemination of findings. Further information on the PPI contribution can be found in the following five sections of this thesis: 6.9 (quantitative phase); 7.3.5 (qualitative phase methods); 9.3.6 (case study results); 10.4.7 (framework analysis results); 11.5 (thesis discussion).

Chapter 2 Introduction

2.1 Current understanding of asthma

2.1.1 What is asthma?

Asthma is a common chronic respiratory condition characterised by symptoms such as wheezing, breathlessness and coughing, which vary in severity over time and between patients. Asthma is defined by the Global Initiative for Asthma (2016) as “*a heterogeneous disease, usually characterized by chronic airway inflammation. It is defined by the history of respiratory symptoms such as wheeze, shortness of breath, chest tightness and cough that vary over time and in intensity, together with variable expiratory airflow limitation*”. Asthma is an inflammatory airway disorder, and a relationship between asthma, rhinitis and eczema has been identified (Bjermer, 2001).

There is no cure for asthma, however it can be managed through medication which is predominantly delivered by inhaler. This method delivers the medication directly to the lungs reducing the absorption into the patient’s circulatory system. Inhaler technique can be difficult for patients to master, and direction is required from a health care professional to ensure optimal administration of medication. Adherence to asthma medication is low with rates below 50% frequently being reported (Koster et al., 2014; Bidwal et al, 2017) and low adherence is associated with higher risk of severe asthma exacerbations (Engelkes et al., 2014).

2.1.2 Asthma in the UK & globally

There are 3.6 million people in the UK currently being treated for asthma and asthma imposes a considerable burden on healthcare provision costing £1.1 billion annually in primary care, disability claims and hospital care (Mukherjee et al., 2016). Globally up to 334 million people are affected by asthma and it has been ranked the 14th most important disorder in the world in terms of the duration and burden of disability (Global Asthma Network, 2014). Asthma accounts for a quarter of all emergency room visits in America (National Centre

for Health Statistics, 2001) and is responsible for three deaths a day in the UK - one of the worst asthma death rates in Europe (Asthma UK, 2018).

In 2014, the National Review of Asthma Deaths (NRAD) reported that two in three asthma related deaths in the UK could have been prevented by better management including: personalised asthma action plans; annual reviews and prescription of more appropriate medication (Levy et al., 2015). However, in 2016, Asthma UK reported that two thirds of people with asthma were still not receiving the basic care they needed to manage their asthma and 70% of people who had been admitted to hospital with asthma had not received a follow up appointment with a GP or nurse. Prioritising the provision of supported self-management within healthcare organisations is recommended as it improves asthma control, minimises exacerbations and reduces the emergency use of healthcare resources (Pinnock et al., 2017).

2.2 Supported self-management

2.2.1 What is self-management?

The prevalence of long-term conditions is increasing, and supported self-management is promoted as a strategy to enable healthcare services to cope with this increase (Coulter, Robert & Dixon, 2013). Self-management has been defined as *'the tasks that individuals must undertake to live with one or more chronic conditions. These tasks include having the confidence to deal with medical management, role management and emotional management of their condition'* (Corrigan, Greiner & Adams, 2004), allowing the patient to have a major role in managing their symptoms. By including *"tasks that individuals must undertake"* it implies that patients have a role in the self-management of their own condition.

Self-care is a similar concept to self-management and focuses on the actions individuals can take to maintain their health. The Department of Health (2005) defines self care as *"The actions people take for themselves, their children and their families to stay fit and maintain good physical and mental health; meet social and psychological needs; prevent illness or accidents; care for minor*

ailments and long term conditions; and maintain health and wellbeing after an acute illness or discharge from hospital.” However, key differences between self-care and self-management have been identified including: self-management patients undertake tasks which were traditionally health professional tasks (Wilson et al., 2006); self-management is more specific than self-care, with patients identifying symptoms and identifying when to seek medical attention (Tung et al., 2013).

Patients require self-efficacy to perform the tasks required to effectively manage their symptoms. Self-efficacy is a behavioural concept and refers to an individual's belief (or confidence) in their ability to undertake certain tasks (Bandura, 1982). Awareness of this concept helps healthcare professionals determine whether individuals have the confidence to undertake the tasks required in self-management of their condition. Self-efficacy alone does not guarantee that a patient will carry out the tasks. Patient activation is a related concept and is defined as *“patients who have the motivation, knowledge, skills, and confidence to make effective decisions to manage their health”* (Greene & Hibbard, 2012). This concept mentions confidence, similar to self-efficacy, but also includes the practical components of knowledge and skill, which are necessary to ensure the tasks are being performed correctly. Motivation is also included in this definition and refers to the reasons why people undertake tasks and the strength individuals apply to these reasons. Patient activation is a complex composition of these essential components and differs from person to person and over time. By understanding a patient's activation level, healthcare professionals can create treatment and management plans appropriate to individual needs.

2.2.2 Self-management for long term conditions

Commencing in 2002, The Department of Health Expert Patient Programme was undertaken to place patients at the centre of their health care and provide patients with more control over their condition (Office of the Regulator of Community Interest Companies and Department for Business Innovation & Skills, 2013). It aimed to make people feel more confident about their condition

by providing skills to manage their symptoms and treatment, increase patients' quality of life and increase effective communication with healthcare professionals. Patients who have trained in self-management are more confident and have reduced health anxiety (Lorig et al., 2001) and the Expert Patient Programme is a cost-effective intervention (Richardson et al., 2008). However, there have been difficulties engaging individuals from different ethnic backgrounds due to unawareness of, or poor tailoring to, specific cultural needs (Hipwell et al., 2008).

A recent practical review of self-management support (PRISMS) examined self-management interventions for 14 long term conditions (LTS) to identify what works, for whom and in what contexts (Taylor et al., 2014). There are fourteen components proposed for healthcare organisations to consider when planning support for patients with long-term conditions:

- Education about condition and management
- Information about available resources
- Provision of/agreement on specific action plans and/or rescue medication
- Regular clinical review
- Monitoring of condition with feedback to patients
- Practical support with adherence (medication or behavioural)
- Provision of equipment
- Provision of easy access to advice or support when needed
- Training/rehearsal to communicate with Healthcare professionals
- Training/rehearsal for everyday activities
- Training/rehearsal for practical self-management activities
- Training/rehearsal for psychological strategies
- Social support
- Lifestyle advice and support

This taxonomy is a guide and not all 14 components will be applicable to all long term conditions, with the recommendation that healthcare organisations chose components applicable to the target long term condition.

2.2.3 Supported self-management for asthma

Self-management education is essential for individuals with asthma as it reduces asthma morbidity in adults (Gibson et al., 2003) and children (Guevara et al., 2003). Supported self-management including education and personalised asthma action plans have consistently been proven to improve asthma control, minimise the risk of exacerbations and reduce unscheduled use of healthcare resources (Taylor et al., 2014; Tapp et al., 2007; Gibson & Powell, 2004; Powell & Gibson, 2002). Self-management enables patients and clinicians to be proactive regarding asthma control rather than reactive after an exacerbation has occurred. Health care professionals should be providing asthma care and assessing asthma control, adherence and inhaler technique at every appointment with the patient (Mintz et al., 2009).

The relationship between the patient and the health care provider is important for effective self-management and should be viewed as a partnership, with the patient gaining knowledge, confidence and skills to adopt a main role in managing their condition (Global Initiative for Asthma, 2017). Supported self-management is a shared-care approach with patients involved in decision making about their treatment and feeling confident enough to express their concerns and expectations. To achieve positive outcomes from self-management, good communication is required (Partridge & Hill, 2000; Maguire & Pitceathly, 2002). However, factors including ethnicity, health literacy, self-efficacy and patients' individual beliefs can all affect engagement with self-management (Global Initiative for Asthma, 2018). This highlights the importance of health care professionals working together with patients when developing self-management plans to ensure they are suitable for individual needs.

2.2.3.1 Asthma action plans

Supported self-management for asthma aims to empower individuals to manage their condition, and action plans are a key element of this. Action plans are written in conjunction with the patient and help them to recognise when their symptoms worsen, advise them how to make short-term changes to their asthma treatment in response to their symptoms, and when they need to access medical assistance (Fishwick et al, 1997 & Gibson & Powell, 2004). In addition to being a reference for patients, action plans are also tools for encouraging discussions between the patient and their healthcare provider to develop an individualised management strategy to improve the patient's asthma control.

One of the most commonly used asthma action plans in the UK for adults is the Asthma UK action plan (Figure 1), which is widely available and can be downloaded from the Asthma UK website. Medication, peak flow measurement and symptoms are used to determine the patient's asthma control, which is divided into three zones: green for well-controlled asthma; yellow (or amber) for deteriorating asthma and red for emergency medical attention required. Plans must be personalised for the individual and this is accomplished by good communication between the patient and the healthcare professional. By developing plans together between the patient and healthcare professional, it ensures that the patient understands the plan, believes it is achievable and increases their feeling of ownership and responsibility for managing their condition (Newell et al., 2015). Healthcare professionals must also decide the best time to provide patients with an action plan: newly diagnosed individuals were perceived as having lower self-efficacy in regards to action plans and determining when to use them (Douglass et al., 2002).

The British Guideline on the Management of Asthma recommends that all individuals with asthma should be provided with self-management education and offered an action plan (British Thoracic Society, Scottish Intercollegiate Guideline Network, 2014). The inclusion of an action plan in self-management education is vital; interventions without an action plan have been found to be

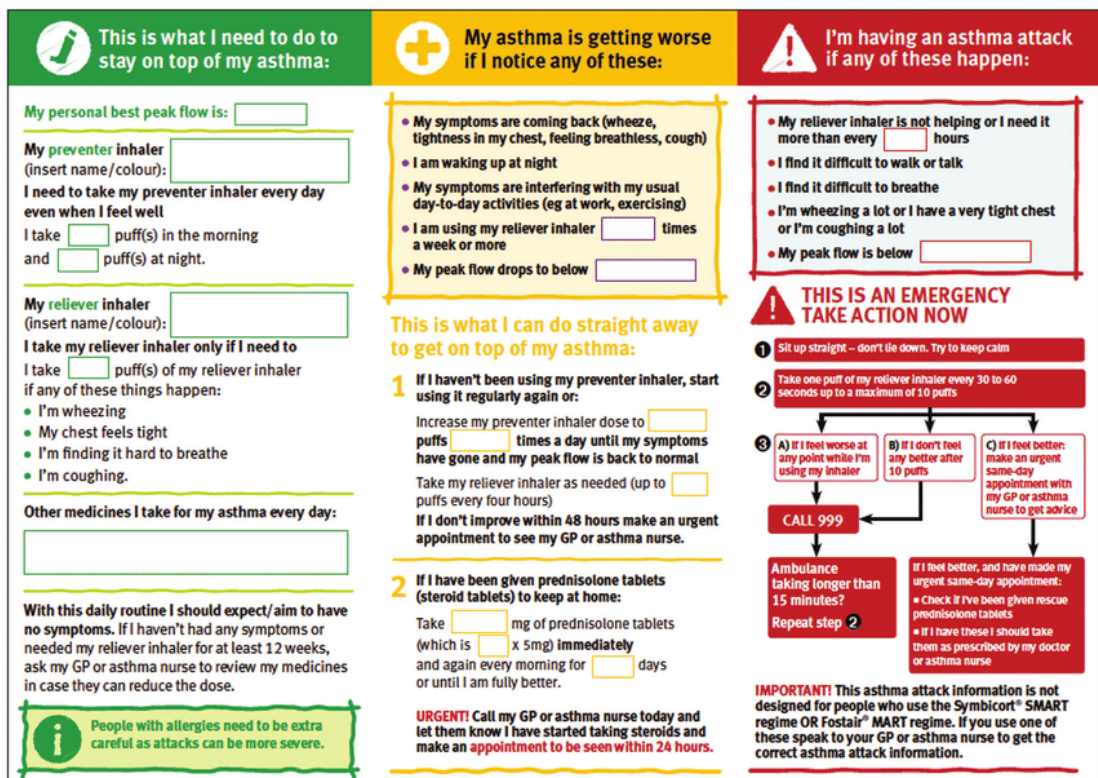


Figure 1: Asthma UK action plan (copyright of Asthma UK and reproduced with their permission)

less effective (Reddel et al., 2015) and individuals without an asthma action plan are four times more likely to have an exacerbation requiring hospitalisation (Asthma UK, 2015). Due to the variable nature of asthma symptoms, asthma action plans should be regularly reviewed, along with the provision of self-management education, in order to maximise their effectiveness (Gupta & Kaplan, 2018). A recent Cochrane review (Gatheral et al., 2017) concluded that there was no evidence which associated increased benefit or risk with an asthma action plan. However, action plans have been identified as a marker that a treatment review with education has been completed (Gibson, 2004).

2.2.3.2 Action plan ownership in the UK

Non-deliverance of action plans was identified by the National Review of Asthma Deaths as a potential factor in preventable deaths with only 44 (23%) of the 195 people who died from asthma having a record of being provided with an action plan (Levy et al., 2014). Despite the evidence in support of

asthma action plans, Asthma UK report ownership to be low with only 24% of people with asthma claiming to be in possession of an action plans in 2013. (Table 1). There was, however, considerable discrepancy between the individual countries within the UK. Northern Ireland had the highest ownership rate with 60% and Wales the lowest with 19%. Responders to the Asthma UK surveys are potentially an interested group (the survey is sent to Asthma UK members and advertised on their website and social media) therefore these figures are likely to be an overestimate. In their work for IMP²ART, Pinnock et al (2018) manually inspected primary care records in England and observed rates of 10%.

Asthma UK considered the Northern Ireland Local Enhanced Service (LES) to have contributed to the greater ownership rate in Northern Ireland compared to the rest of the UK; my PhD programme of research was undertaken to explore these survey results further. While action plan ownership rates have increased across the rest of the UK since 2013, they are still lagging behind Northern Ireland's rates.

Table 1: Asthma action plan ownership rates across the UK (Asthma UK 2014-2017)

	2013	2014	2015	2016	2017
Northern Ireland	60%	61%	64%	57%	61%
Scotland	32%	39%	42%	48%	51%
England	22%	29%	34%	41%	41%
Wales	19%	22%	33%	40%	33%
UK	24%	30%	36%	42%	45%

2.2.3.3 Challenges of implementing supported self-management

A core responsibility of professionals and healthcare organisations is to provide support to enable people with long-term conditions to manage their own condition (Pearce et al., 2016). However, implementation of self-

management can be challenging and researchers have identified practical, conceptual and organisational barriers in clinical practice which reduce the use of action plans in primary care. Practical barriers included a lack of time in practice to provide the plan, lack of resources or not having a plan immediately available when needed (Wiener-Ogilvie et al., 2007; Morrow et al., 2017). An example of a conceptual barrier is the provision of medically written action plans that are not patient friendly and do not consider the patient's needs (Ring et al., 2011). The final type of barriers are organisational and include the lack of flexible systems within the practice that allow for effective communication between the patient and the healthcare professional (Kielmann et al., 2010).

2.3 Financial incentive schemes

The use of financial incentives has been identified as a potential method for changing physician behaviour to improve quality of care. Financial incentives for physicians can be implicit (salary, capitation or fee for service) or explicit (pay for performance, bonuses or withholdings). Fee for service is a payment model in which every visit, test and procedure is charged separately. Capitation is when the healthcare professional or healthcare organisation is paid per patient registered with them and is not affected by the frequency of care provision. The pay for performance model is when healthcare organisations are paid a financial incentive based on their achievement of performance targets. The use of financial incentive schemes in healthcare organisations is growing, but there is insufficient evidence to ascertain the effectiveness of these schemes in increasing the quality of care in primary care (Health and Social Care Information Centre, 2017).

Previous work has shown the effect of penalties on physicians as being effective for reducing resource use but the use of bonus payments showed mixed results (Department of Health, 2016). Despite mixed results, evidence shows that pay for performance can be effective in healthcare but providers need to be involved with programme design and it needs to be tailored to the setting (Armour et al, 2001). In order to produce effective financial incentive schemes for quality of care, incentives need to be tied to improvements in

information systems and quality reporting standards (Flodgren et al., 2011) and policy makers must carefully review the evidence weighing up the potential benefits against the potential risks in their particular setting (Dudley et al., 1998).

However, it must be remembered that as well as determining the effectiveness of incentives on increasing quality of care, there may also be unintended consequences. GPs interviewed about the Quality and Outcome Framework (QOF) in the UK advised that there was the potential for reduced continuity of care, lack of attention to non-incentivised conditions and potential damage to healthcare professional's internal motivation as a result of financial incentive schemes (Milstein & Schreyoegg, 2016). The implementation of financial incentive schemes can be met with resistance from staff members who can feel stressed, under pressure and bombarded by initiatives (Allan et al., 2013). Therefore, planning and consideration is required when developing financial schemes to ensure effective implementation and normalization of the new processes into routine care.

2.3.1 Quality and Outcome Framework (QOF) for Long Term Conditions

In recent years financial incentives have been introduced to achieve set targets hoping to improve quality of care in practice. Since 2004 in the UK, clinical performance targets have been included in the contracts of GPs, enabling them to gain additional income through financial incentives received from attaining targets within the QOF (Downing et al, 2007). Currently it covers England, Wales and Northern Ireland as the Scottish Government chose to abolish QOF in Scotland in 2016. Its origins can be traced back to the late 1990s, when clinical audits, evaluations and computerised systems identified that there was considerable variation in the management of chronic conditions in primary care (McShane & Mitchell, 2015).

The QOF focuses on nineteen clinical areas including asthma (NHS Employers, 2014/15). The QOF targets for asthma are: establishing and maintaining an asthma register and providing an annual review to assess

asthma control, response to assessment and adjustment of management and explore perceptions and support self-management (Pinnock et al., 2010), however provision of asthma action plans is not an incentivised target.

2.3.2 Northern Ireland Local Enhanced Service for Chronic Respiratory Conditions

Established in 2008, Northern Ireland's Local Enhanced Service (LES) for Chronic Respiratory Conditions includes a scheme which pays a financial incentive to general practices that provide self-management education, including an action plan to people with asthma (Department of Health, 2008). The LES builds on work undertaken through the QOF and seeks to reduce pressure on secondary care while improving the long-term health of patients. The LES is a self-report scheme where GP practices provide the results of the previous year to the Public Health Agency on the 31st March each year. The Public Health Agency records the results and pays the amount to the GP practice in one payment annually.

The LES is intertwined with the Service Framework for Respiratory Health and Wellbeing, also referred to as the Respiratory Framework, which was introduced in 2009 by the Northern Ireland Department of Health, Social Services and Public Safety. With the aim of making services safe, effective and person-centred, this framework outlines the standards of care that individuals with respiratory conditions, their carers and wider family can expect to receive from health and social care services in Northern Ireland. Standard 21 in the Department of Health, Social Service's and Public Safety's Service Framework for Respiratory Health and Wellbeing (2015-18) states "*All people with asthma and their carers should be given the opportunity to learn about their condition and receive a written individualised self-management asthma action plan*". This standard highlights the emphasis the Northern Ireland Public Health Agency in Northern Ireland put on supported self-management for asthma. Key performance indicators include:

- percentage of individuals with asthma Step 2 and above who have received face to face information and a written self-management action plan
- number of individuals over 15 years old with newly diagnosed asthma (Step 2 or above) who have attended and completed a structured education programme regarding asthma management
- number of individuals over 15 years of age with an asthma diagnosis that attended their annual asthma review and were asked to demonstrate their inhaler technique.

The BTS/SIGN guideline (2014) provides a stepwise approach for the pharmacological management of asthma. Clinicians are to start patient's treatment at the most appropriate stage for them and regularly check inhaler technique, encourage adherence, assess control and support self-management. Clinicians then step the patient up or down depending on their response to treatment. The BTS/SIGN guideline (2014) steps include:

- Step 1 – Mild intermittent asthma (reliever inhaler used as required by the patient)
- Step 2 – Introduction of regular treatment with inhaled corticosteroids
- Step 3 – Initial add-on therapy
- Step 4 – Persistent poor control
- Step 5 – Continuous or frequent use of oral steroids

In this thesis, I cite the BTS/SIGN guideline (2014), as opposed to the latest version (2016), because these were the steps referred to in the LES. The BTS/SIGN guideline were changed substantially in the 2016 update when the stepwise management (Steps 1-5) was removed. The BTS/SIGN guideline (2016) is not compatible with the LES targets which explicitly refer to patients with asthma (Step 2 or above).

The context of Northern Ireland and the LES are described in further detail in section 6.3.

2.4 Implementation science

Implementation science is defined as “*the scientific study of methods to promote the systematic uptake of research findings and other evidence-based practices into routine practice, and, hence, to improve the quality and effectiveness of health services and care*” (Eccles & Mittman, 2006). Implementation science strives to bridge the chasm between research and delivery of findings in real world practice by generating evidence which can be used to influence policy and develop effective public health programmes.

The time lag between research evidence reaching clinical practice has been widely identified as 17 years (Morris et al., 2011) and implementation science has developed to promote the uptake of evidence-based practices into routine clinical practice (Bauer et al., 2015). The translational pathway outlines four domains between biomedical research and improved global health (Harvard Catalyst) (Table 2). The journey from “*bench to bedside*” commences at T1 with basic scientists identifying molecular information and testing for clinical effect and/or applicability. T2 investigators trial interventions under controlled environments to determine their efficacy. T3 researchers seek to identify the most effective ways of implementing the recommendations from T2 into clinical practice. Finally, T4 investigators research ways to implement interventions at population level. This linear model provides a logical order of the stages between basic science and population health implementation, however the direction is not one-way and backwards translation can occur when knowledge is fed back to earlier stages (Van der Laan & Boenink, 2015). Collaboration between each of domains is essential for the effective translation of critical insights from laboratory to clinical practice.

Table 2: Translational pathway domains and examples

Domain	Examples
T1 - Translation to humans	Human physiology Phase 1 clinical trials
T2 - Translation to patients	Phase 2 & 3 clinical trials

T3 - Translation to practice	Health services research (including implementation)
T4 - Translation to population health	Social determinants of health

2.4.1 What impacts on implementation?

There are three main factors which impact on the implementation of an intervention: characteristics of the intervention; stakeholders; context. The characteristics of an intervention are important in terms of cost-effectiveness, adaptability and complexity. Significant financial cost of an intervention is identified as a barrier to implementation (Sadeghi-Bazargani et al., 2104) and if financial incentives are deemed too small it can impact on the effectiveness of the healthcare schemes (Conrad & Perry, 2009; Iezzi et al 2014). Low powered financial incentives, where the financial risk is divided between the payer and the provider, can be effective in engaging all stakeholders involved (Kantarevic & Kralj, 2012).

With regards to stakeholder involvement, it is essential to consider both healthcare professionals and patients in implementation science as they will be providing or receiving the care respectively. Although evidence-based practice is viewed positively by nurses it is adopted into practice to a lesser extent. However, likelihood of implementation is increased if evidence-based practice working groups are involved (Stokke et al., 2014). Engagement with individuals impacted directly by an intervention provides an opportunity to understand their perspectives and address concerns regarding the introduction of change in routine practice, and can lead to improved outcomes (Carman et al., 2013).

Contextual factors can be social, economic, cultural, or institutional. Interventions are not 'one size fits all' and setting-specific interventions are likely to be most effective (Cabana et al., 1999). The importance of context cannot be underestimated, with evidence suggesting that context and implementation processes are as influential to the effectiveness of an

intervention as the intervention itself (Dy et al., 2005). In addition to thinking of context as a place, it could also be thought of as a process which acknowledges the importance of roles, interactions and relationships involved in implementation strategies (May et al., 2016). However, there is still insufficient understanding of the relationship between context and interventions which widens the translational gaps between basic science and clinical practice (Pfadenhauer et al., 2017).

2.4.2 Implementation science terminology used in this thesis

Implementation studies are often poorly reported and recently guidelines for reporting implementation studies have been published to improve accuracy of reporting in healthcare research (Pinnock et al., 2017). The Standards for Reporting Implementation Studies (StaRI) checklist is a 27 item list and was informed by a systematic review and eDelphi with items discussed and agreed in a two day multi-disciplinary working group attended by 15 international experts. The StaRI reporting standards are underpinned by two concepts: describing the dual strands of the implementation strategy strand and the intervention, and applicability to a broad range of research methodologies. In this thesis, I have adopted the language outlined in the StaRI reporting standards and Table 3 outlines terms, definitions and application to this programme of work.

Table 3: Terminology, definitions and utilisation in this thesis (adapted from Pinnock et al., 2017)

Term used in this thesis	Definition	Application in this thesis
Implementation strategy	Methods or techniques used to enhance the adoption, implementation and sustainability of a clinical programme or practice	LES
Implementation outcome	Process or quality measures to assess the impact of the implementation strategy, such as adherence to a new practice, acceptability, feasibility, adaptability, fidelity, costs and returns	Provision of asthma action plans

Intervention	The evidence-based practice, programme, policy, process, or guideline recommendation that is being implemented (or deimplemented). In the context of healthcare, this might be a preventive, diagnostic or therapeutic clinical practice, delivery system change, or public health activity being implemented to improve patient's outcomes, system quality and efficiency, or population health.	Supported self-management education for asthma
Health outcome	Patient-level health outcomes for a clinical intervention, such as symptoms or mortality; or population-level health status or indices of system function for a system/organisational-level intervention.	Asthma related hospitalisations Asthma related deaths

2.5 Summary and next steps

Asthma is one of the most common chronic conditions and, while it cannot be cured, optimal treatment regimes and effective self-management can help improve asthma control which should minimise the risk of exacerbations resulting in reduction in usage of emergency healthcare resources (Pinnock et al., 2017). However, implementation of supported self-management is challenging and action plan ownership remains poor across the UK, with Asthma UK reporting that approximately a quarter of individuals with asthma were in possession of an action plan in 2013. Northern Ireland was identified as having the highest rate of action plan ownership in the four UK countries, and suggested that the LES is a contributor to this. The LES is a healthcare scheme which pays GPs a financial incentive to provide self-management education, including an asthma action plan to patients with asthma. This PhD programme of work was undertaken to explore the process by which practices addressed the standards of the LES and its impact on the implementation of asthma self-management in primary care in Northern Ireland. In the next chapter I will outline my aims and objectives of this research.

Chapter 3 Aims and objectives

3.1 Aims & Objectives of this PhD

The aim of this PhD was to observe trends in implementation and health outcomes associated with the introduction of the LES and to explore the process by which organisational change was implemented in primary care in Northern Ireland from the perspective of primary care staff.

3.1.1 Aim of systematic review

To systematically review the evidence investigating the impact of financial incentives for supported self-management on implementation outcomes, health outcomes and individual behaviour outcomes for individuals with asthma or diabetes.

Objectives of systematic review

1. To determine the impact of financial incentives for implementation of supported self-management in asthma or diabetes on:
 - implementation outcomes (provision of action plans, asthma/diabetes reviews),
 - health outcomes (asthma/diabetes control, risk of exacerbation, hospital admittance rates),
 - individual behaviour (self-efficacy, activation, adherence to preventer medication, adherence to insulin medication)
2. To describe the features of financial incentive schemes as defined by the Financial Incentive Framework and determine any association with positive outcomes.

(Information on the inclusion of diabetes in the systematic review is provided in section 5.3.1)

3.1.2 Aim of quantitative phase

To observe the association between the introduction of financial incentives promoting the implementation of supported self-management for asthma (the

Northern Ireland LES) and implementation outcomes and health outcomes for individuals with asthma in Northern Ireland.

Objectives of quantitative phase

1. To observe the association between the LES and the provision of asthma action plans, asthma related hospitalisations and asthma morbidity in Northern Ireland.
2. To describe the features of the LES as defined by the Financial Incentive Framework.

3.1.3 Aim of qualitative phase

To explore primary care clinicians' and managers' perceptions of the impact of financial incentives on the implementation of supported self-management for asthma (the LES) on implementation outcomes in primary care practices in Northern Ireland and the process by which change in implementation of supported self-management for asthma was normalized in primary care as a result of the LES.

Objectives of qualitative phase –grounded theory analysis

1. To identify primary care practices with different approaches and success levels in achieving the LES targets.
2. To explore different approaches and perceptions of primary care staff in reaction to the implementation of the LES.
3. To undertake an in-depth exploration into primary care staff accounts of their understanding and experiences of the LES and self-management for asthma.

Objectives of qualitative phase – framework analysis

1. To explore if/how the LES was implemented and normalized in primary care in Northern Ireland using the Normalization Process Theory.

Chapter 4 Methodology overview

4.1 Introduction

This chapter provides an overview of the various methods utilised in this PhD, why they were chosen and how they are combined. The methods are then described in further detail in their respective chapters. Combining the quantitative analysis of routine data measuring action plan provision, asthma related hospitalisations and asthma related deaths in Northern Ireland, with qualitative interviews involving primary care staff and practice case studies, consisting of interviews and document analysis, provides a broad understanding of the impact of the LES in relation to health outcomes and implementation outcomes, explores primary care staff perceptions of the LES, providing self-management education to patients with asthma, and if/how these processes were normalized into routine practice in primary care.

4.2 Study design

The selection of study design was, to some extent, bound by the initial outline of the research study devised by my supervisors (HP; MS; LH) in their application for an Asthma UK Centre for Applied Research (AUKCAR) studentship funded by the University of Edinburgh. While the application stipulated a mixed methods assessment exploring the implementation of the LES in Northern Ireland, there was an option for the study to have a qualitative or quantitative priority. I had conducted mixed methods research for my Master's degree and I considered that a qualitative focus would provide richer data for this programme of research because I could explore the perceptions of the individuals involved with the implementation of the LES to provide an understanding of how the change was affected in primary care. Therefore, for this programme of research, I chose a qualitative focus with quantitative methods providing a supplemental role. The decision to choose a qualitative focused mixed methods design proved advantageous as I encountered significant difficulties in the quantitative phase where the routine data were not as available or comprehensive as anticipated (see sections 6.5; 6.6.5.3 and 6.6.5.4 for further information).

4.3 Financial Incentives Framework

Financial incentive schemes are complex and vary widely creating difficulty in defining the features which effectively change behaviour. Adams et al. (2014) propose a framework for documenting financial incentive schemes targeted to change health behaviours. This enables researchers to establish the domains, and configurations of these domains, that are most effective at achieving the desired change (Adams et al., 2014). The framework contains nine domains which identify features of the scheme and enable a detailed description (Table 4):

- direction (positive reward or avoidance of penalty);
- form (cash or healthcare costs);
- magnitude (total value of incentive available to participant);
- certainty (certainty of receiving payment if behaviour is successfully changed: certain, certain chance or uncertain chance);
- target behaviour (process, intermediate or outcome);
- frequency of reward (all or some instances incentivised);
- immediacy (time between behaviour and payment);
- schedule (fixed or variable)
- recipient(s) of incentives (clinicians).

Table 4: Domains of the financial incentive framework (adapted from Adams et al. 2014)

Domain	Dimension	Example
Direction	Positive Reward	Receiving a reward for completing a task
	Avoidance of penalty	Avoiding a penalty by completing a task
Form	Cash	Cash incentive.
	Vouchers	Vouchers to be exchanged for goods or services.
	Specific goods/service	Receiving goods or services directly.
Magnitude	Continuous variable	The total value of the incentive that is available to the participant on successfully

		completing the task.
Certainty	Certain	Participant will definitely receive an incentive
	Certain chance	Participant may not receive an incentive but they know the likelihood of receiving it.
	Uncertain chance	Participant may not receive a reward and unsure of likelihood of this.
Target behaviour	Process	Behaviours which will lead to healthy behaviour but are not necessarily healthy in themselves e.g. smoking cessation course.
	Intermediate	Behaviours which are healthy and lead to another healthy behaviour e.g. physical activity intervention for improved lung function.
	Outcome	Behaviours representing health behaviours e.g. optimal HbA1c levels.
Frequency	All instances incentivised	Incentive received every time the behaviour occurs.
	Some instances incentivised	Incentive received once a percentage target is achieved of the behaviour e.g. instead of every HbA1c test incentivised, GPs are rewarded if they achieve a percentage target.
Immediacy	Continuous variable	The duration of time between performing the behaviour and receiving the incentive.
Schedule	Fixed	The incentive amount remains the same.
	Variable	The incentive amount changes depending on targets achieved.
Recipient	Individual	Individual receives the reward.
	Group	Group has to achieve target to receive incentive.
	Significant other	Significant other receives incentive if participant achieves target.
	Clinician	Clinician receives reward.
	Parent	Parent receives incentive for child achieving target.

I used this framework to identify and compare features of financial incentive schemes included in the systematic review, to outline features of the LES in the quantitative phase and also to frame some questions in the qualitative interviews. Utilising this framework to document LES features enabled me to compare the LES to similar financial incentive schemes in the systematic review and identify domains, or configurations of domains, included in effective strategies for implementing asthma self-management in primary care.

4.4 Mixed methods

4.4.1 Pragmatic approach

I have taken a pragmatic position in this PhD combining both quantitative and qualitative data in a mixed methods design. Table 5 outlines the elements of a pragmatic worldview with implications for practice. Pragmatism is referred to as an approach rather than a paradigm as it proposes ideas of what constitutes knowledge but does not profess to be all-embracing worldview (Biesta, 2010). Instead it enables researchers to utilise qualitative and quantitative methods, acknowledging what is meaningful from both perspectives. This PhD is multi-purpose, observing the trends in routine data for health and organisational outcomes and exploring the perceptions of primary care staff towards the LES, and how the LES was implemented into routine practice in primary care in Northern Ireland. Using a pragmatic approach enabled me to address research aims which do not lie solely within a quantitative or qualitative paradigm, allowing me to utilise methods which are appropriate for the research aims.

Table 5: Elements of Pragmatism Worldview and implications for practice (adapted from Creswell & Plano Clark, 2011)

Element	Description	Pragmatism
Ontology	What is the nature of reality?	Singular and multiple realities

		(e.g., researchers test hypotheses and provide multiple perspectives)
Epistemology	What is the relationships between the researcher and that being researched?	Practicality (e.g., researchers collect data by “what works” to address research question)
Axiology	What is the role of values?	Multiple stances (e.g., researchers include both biased and unbiased perspectives)
Methodology	What is the process of research?	Combining (e.g., researchers collect both quantitative and qualitative data and mix them)
Rhetoric	What is the language of the research?	Formal or informal style (e.g., researchers may employ both formal and informal styles of writing)

4.4.2 Defining mixed methods research

Mixed methods research has been described as the “third methodological movement” (Tashakkori & Teddie, 2003) with the first and second being quantitative and qualitative respectively. It is the utilisation of both quantitative and qualitative research methods in one study, not viewed as two separate entities, but rather results from both methods are combined and discussed

together. Mixed methods are frequently used in health services research, and particularly in health service evaluations (O'Cathain et al, 2007). Mixed methods are best suited for research in which: one data source is insufficient; an explanation of results is required; generalisation of findings is required; the utilisation of a theoretical stance is required or an additional method is required to enhance the initial method (Creswell & Plano Clark, 2011). The combination of both qualitative and quantitative methods can utilise the strengths of each method, reduce the weaknesses of a single method and provide more comprehensive data giving a completeness to the findings. This approach is particularly effective for researching health service interventions and understanding the impact of living with chronic illness (Tariq & Woodman, 2010). Mixed methods can be used sequentially or concurrently in a research project and can be integrated with one method informing the other, or independent where the methods are distinct with all aspects remaining separate until their amalgamation in the discussion and conclusion of the overall study.

4.4.3 Strengths and weaknesses of using mixed methods

Qualitative methods can enhance quantitative results by providing meaning to numbers, just as statistical results can contribute precision to narrative results and their combination can answer a broader range of research questions as the researcher is not restricted to one method. Mixed methods provide a stronger evidence base for the legitimisation of results through consistency and verification of findings by multiple methods: the principle of triangulation (see section 4.4.6 for further information). However, time can be a barrier to undertaking mixed methods; it can be challenging for one researcher to undertake both research methods and it may need a team-based approach, particularly if the research is a concurrent mixed methods design. The mixing of two distinct research methods can cause difficulties when deciding how to combine them, especially when results are conflicting. One of the main criticisms of mixed methods research came from purists who believe that the two paradigms should not be mixed as they are incompatible (Creswell & Plano Clark, 2011).

4.4.4 Justification for using mixed methods

In Northern Ireland, the proportion of people owning an action plan is considerably higher than the rest of the UK and this has been attributed to the inclusion of action plan provision as a LES requirement (Asthma UK, 2013). This PhD was undertaken to explore the impact of the LES on the implementation of supported self-management for asthma. The quantitative phase observed the trends between the introduction of the LES and health outcomes including asthma related hospitalisation rates and asthma related death rates. The quantitative phase also looked at the association between the implementation outcome of action plan provision and the introduction of the LES. The qualitative phase explored the perceived impact of the LES on implementation outcomes from the perspective of primary care staff involved with the LES; providing an understanding of how new processes were implemented and normalized into routine practice. Using a mixed methods design provided a broader understanding of the impact of the LES on the implementation of supported self-management for asthma in Northern Ireland including impact on implementation outcomes and health outcomes.

4.4.5 Characteristics of mixed methods design in this thesis

I used an embedded mixed methods design (Figure 2) in which the data were collected concurrently and the quantitative phase was supplemental to the main qualitative study (Creswell & Plano-Clark, 2011). The qualitative phase involved interviews with primary care staff and case studies in primary care practices to explore their perspective of the LES and its impact on organisational processes. In addition, I performed a document analysis of annual review invitation letters and action plans to study how practices engaged with patients through written communication. The quantitative phase included observations of routine data to provide an overview of action plan provision rates and health outcomes since the introduction of the LES. The qualitative and quantitative methods were independent of each other: neither strand was dependent on results from the other strand with results combined in the final interpretation. Embedded mixed methods design is a popular model within health services research, particularly for evaluating interventions, and is

recognised by one form of data being nested within a larger study design (Creswell, 2014). Within embedded mixed methods design the qualitative phase is identified as constructivist (Creswell, 2014).

Embedded mixed methods

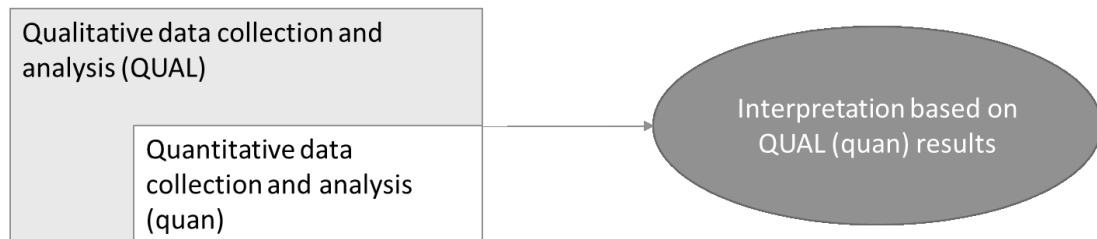


Figure 2: Visual model of research strategy (adapted from Creswell & Plano-Clark, 2003)

4.4.6 Triangulation

Denzin (1970) identified five ways that triangulation can be utilised in research: data triangulation; theory triangulation; methodological triangulation (between-methods); methodological triangulation (within-methods); investigator triangulation. In this PhD I have used four of these methods:

1. Data triangulation involves comparing and cross-checking information received from multiple varied sources to legitimise results from a range of perspectives. In this programme of work, I have interviewed different members of primary care staff (GPs; nurses; management and administration staff) from the same and different primary care practices across Northern Ireland using the same topic guide. This enabled me to construct a picture of primary care in Northern Ireland from a range of viewpoints within primary care.
2. Theory triangulation is the use of multiple perspectives to interpret a single set of data. Within the qualitative phase of this PhD I have: used a financial incentives framework (Adams et al., 2014) to frame some questions in the topic guide; adopted a constructivist grounded theory approach (Charmaz, 2006) to data collection and analysis; and conducted an analysis of interview transcripts influenced by the Normalization Process Theory (NPT) (May et al., 2009). The

combination of these theories provides a broader understanding to the impact of the LES in primary care in Northern Ireland.

3. Methodological triangulation (within methods) is the use of similar methods in a project. In my qualitative phase I used both semi-structured scoping interviews and case studies which involved in-depth individual and group interviews and document analysis.
4. Methodological triangulation (between methods) is the use of different methods within the one project. I used interviews and case studies in my qualitative phase and observations of routine data in my quantitative phase. By using different methods, I was able to measure the impact of the LES from different viewpoints: routine data enabled me to observe any association between the introduction of the LES and health outcomes and the qualitative interviews provided an exploration of implementation outcomes including primary care staff perspectives of the LES and supported self-management for asthma.

4.5 Overview of the research design in relation to the objectives

Table 6: Outline of objectives and respective research phases

	PhD Objectives	PhD phase and methods
1	To determine the impact of financial incentives for implementation of supported self-management in asthma or diabetes on implementation outcomes, health outcomes and individual behaviour.	Systematic review
2	To describe the features of financial incentive schemes and determine any association with positive outcomes.	Systematic review
3	To observe any association between the LES and the provision of asthma action plans, asthma related hospitalisations and asthma morbidity in Northern Ireland.	Quantitative phase Observation of routine data

4	To identify primary care practices with different approaches and success levels in achieving the LES targets.	Qualitative phase Scoping interviews
5	To explore different approaches and perceptions of primary care staff in reaction to the implementation of the LES.	Qualitative phase Scoping interviews Case studies
6	To undertake an in-depth exploration into primary care staff accounts of their understanding and experiences of the LES and self-management for asthma.	Qualitative phase Case studies
7	To explore how the LES was implemented and normalized in primary care in Northern Ireland using the Normalization Process Theory.	Qualitative phase Framework analysis

4.5.1 Objectives one and two

The systematic review fulfils objectives one and two: to determine the impact of financial incentives on implementation of supported self-management in asthma or diabetes (included to increase the evidence available: see section 5.3.1) on implementation outcomes, health outcomes and individual behaviour, and to describe the features of financial incentive schemes and determine any association with positive outcomes.

The systematic review chapter describes the features of financial incentive schemes promoting supported self-management to individuals with asthma or diabetes, (another long-term condition with an established evidence base for self-management (see section 5.3.1 for further information)), and evaluates the impact of the schemes on implementation outcomes, health outcomes and individual behavioural outcomes. The protocol is available on PROSPERO, registration number: CRD42016027411 (Appendix 1), and the procedures described in the Cochrane Handbook for Systematic Reviews of Interventions (Higgins & Green, 2011) were followed. The searches were run in November

2015, updated in May 2017 and results have been published in a peer reviewed journal (Jackson et al., 2017).

4.5.2 Objective three and four

The quantitative phase fulfils objectives three and four: to observe the association between the LES and the provision of asthma action plans, asthma related hospitalisations and asthma morbidity in Northern Ireland and to describe the features of the LES as defined by the Financial Incentive Framework.

The quantitative chapter provides contextual information on Northern Ireland and its health service and observes the association between the introduction of the LES and health outcomes including: asthma related hospitalisations and asthma related deaths and the implementation outcome of action plan provision. Routine data from Northern Ireland Public Health Agency were utilised to observe the trends over time of asthma action plan provision, asthma mortality and asthma morbidity in Northern Ireland since the introduction of LES.

4.5.3 Objective five

The qualitative phase scoping interviews fulfil objective five: to identify primary care practices with different approaches and success levels in achieving the LES targets.

The scoping interview results chapter presents the findings of telephone interviews conducted with primary care staff across Northern Ireland to explore the diverse organisational processes in each practice for providing supported self-management for asthma. At the end of each interview, where appropriate, I explained the case study stage of the qualitative phase to the participants and asked if they would be interested in their practice participating.

4.5.4 Objectives six and seven

The qualitative phase scoping interviews and case studies fulfil objective six: to explore the perceptions of and approaches taken by different primary care practices to achieve the standards required by the LES. The case studies fulfil

objective seven: to undertake an in-depth exploration into primary care staff accounts of their understanding and experiences of the LES and implementing self-management for asthma.

Scoping telephone interviews and case studies involving in-depth interviews and document analysis were employed to explore the perspectives of primary care staff in Northern Ireland involved with the LES. A grounded theory approach was adopted for data generation and analysis with an iterative process undertaken: continually reviewing, reflecting and synthesising the data collected from interviews with results from earlier interviews impacting later interviews (Charmaz, 2006). A three-stage process was adopted for case study analysis: case study description; within case analysis and cross case analysis (Stake, 2009). Interview transcripts from the case study interviews and scoping interviews were coded through a process of line by line coding and focused coding to construct themes and subthemes.

4.5.5 Objective eight

The qualitative phase framework analysis fulfils objective eight: to explore how the LES was implemented and normalized in primary care in Northern Ireland using the Normalization Process Theory.

During the qualitative data collection and analysis, there was a recurring topic of “embedded processes”, with participants stating they did not remember the introduction of LES, they either did not work in primary care prior to the introduction of the LES or simply could not remember organisational processes pre-LES. The LES appeared to have been successfully embedded into routine practice and I conducted a framework analysis on the qualitative transcripts using the Normalization Process Theory (NPT) (May et al., 2009) to understand how the LES had been normalized in primary care. The scoping and case study interview transcripts were combined and coded with a framework based on the NPT to explore how the LES became embedded in primary care.

4.6 Ethical approval

The initial protocol for the qualitative phase of this PhD involved interviewing primary care staff and patients and I prepared an NHS ethics application through the Integrated Research Application System. I also applied for an enhanced disclosure certificate, called “Access Northern Ireland”, from the government organisation Access Northern Ireland as the interviews were taking place in Northern Ireland. Being a student at a Scottish University I was unable to apply directly for this disclosure and a Northern Ireland based company had to apply on my behalf. I identified a suitable company (NIAMH Wellbeing – a mental health charity), completed an online application and I attended their office in Belfast with valid ID. The charity confirmed my identity and applied on my behalf and I was granted enhanced disclosure (Appendix 2). Prior to submitting my completed NHS ethics forms, I supplied them to the Academic and Clinical Central Office for Research and Development, who are the sponsor for University of Edinburgh research projects. They defined my work as a service evaluation and not research, advising I did not require NHS ethical approval or NHS Research and Development (Appendix 3).

Subsequently, I applied for ethical approval from the Centre for Population Health Sciences ethics committee. My quantitative phase required Level 1 ethical review, which is a self-audit checklist (Appendix 4). My qualitative phase required Level 2 ethical review which involves completing a form outlining the methods and research procedures of the study and providing all participant facing literature and interview topic guides. All concerns raised were remedied with minor revision to information sheets, consent forms and study invitation letters and approval was granted (Appendix 5).

4.7 Reflexivity and the researcher role

Reflexivity is defined by Charmaz as “the researcher’s scrutiny of his or her researcher experience, decisions, and the interpretations in ways that bring the researcher into the process and allow the researcher to assess how and to what extent the researcher’s interests, positions and assumptions influenced inquiry” (Charmaz, 2006). When conducting qualitative research

reflexivity is strongly advocated as “the researcher is both written into and writes the story” (Walkerdine et al, 2012).

Being Northern Irish influenced my decision to apply for this PhD exploring the LES in Northern Ireland, particularly as the research proposal had detailed how action plan ownership in Northern Ireland was higher than the rest of the UK and understanding this could inform implementation in the rest of the UK. My first degree was in Psychology and my Masters was in Health Psychology, and I have previously conducted research involving the Theory of Planned Behaviour (Ajzen, 1991). The Theory of Planned Behaviour focuses on the relationship between attitude, subjective norm, perceived behavioural control and behaviour, believing that behavioural intentions are essential to influencing behaviour outcome. This psychological approach of producing testable hypotheses from a theory may have inhibited me from fully engaging with a grounded theory approach where theories are developed from the data (Charmaz, 2006).

My previous research involved focus groups with individuals conducted in a meeting room in a local library. The experience of interviewing clinical and administration staff was different and a little intimidating, as I was interviewing health professionals in their practice and it may have impacted on the way I presented myself and conducted the interviews. Having only experienced the role of an interviewer in focus groups, conducting semi-structured and in-depth interviews was a new experience and required taking a more prominent role in the interviews and I attended training courses prior to the interviews in preparation.

My interviews involved participants residing in Northern Ireland and all participants bar one were Northern Irish. Only a small number of the scoping interviews were prearranged and the opportunity to build rapport with participants was limited, however, I believe having a Northern Irish accent assisted me with this. In addition to this, a number of participants presumed that my interest in supported self-management for asthma and the LES was

due to being a nurse or GP and were surprised when I informed them my background was health psychology. With the nurses I was able to discuss a number of conferences at which we had both been delegates such as the Primary Care Research Society (UK) Conference, the International Primary Care Respiratory Group World Conference and the European Respiratory Society Congress. This mutual interest in respiratory and experience of attending conferences helped build a temporary connection that lasted throughout the interview. I noticed this further when participants made comments about patients with asthma using phrases such as “sure, you know what they’re like”, indicating that they believed I had an awareness of the situation they were describing.

I was aware of the change in my voice when speaking with participants as my accent became stronger and I adopted phrases and words used in Northern Ireland, this was confirmed when listening to interview recordings. Participants were interested in my life in Scotland and why I had decided to move and live there, with one asking if I would ever consider “coming back home”, meaning return to live in Northern Ireland. One of the participants was Scottish and she drew comparisons between us due to the fact that I was from Northern Ireland but lived in Scotland and she was Scottish but lived in Northern Ireland, “it’s just you’re from here, but over there and I’m from there, and I’m here”.

Prior to starting interviews, some participants expressed feelings of nervousness about being interviewed which may have been in relation to the interview experience itself and what to expect but may also be attributed to the fact that I had stated in the information leaflet that we had consulted with the Public Health Agency. The Public Health Agency in Northern Ireland are the government funded body with responsibility for health improvement and development to improve overall public health in Northern Ireland. To calm nerves, I advised it was not an assessment of their knowledge of the LES, stressing there were no right or wrong answers, I was interested in anything they wanted to tell me with regards asthma care in their practice. I highlighted that while the interviews were being recorded, all data would be non-

identifiable and not provided to anyone outside of the research team. I adopted a friendly and chatty nature with participants in the hope it would make the interview feel less formal and encourage the participant to speak more freely. At times this meant the interview strayed from the topic of financial incentives and supported self-management for asthma, but I chose to be flexible and not revert to the research questions immediately so as to reduce the formality of the interview. This produced unexpected rich information and given the iterative nature of grounded theory approach (Charmaz, 2006), I was able to modify my topic guide to include questions to retrieve this information from later participants. One example of this occurred in my very first interview: the participant identified a particular demographic of patients with asthma that were the most difficult to engage. This question was then included in subsequent interviews and became important in the identified themes, which are discussed further in section 8.2.1 as the majority of participants highlighted the difficulty engaging some patients with asthma.

I enjoyed the interview experience and preferred the case studies and face to face interviews to the scoping interviews which were conducted by telephone. I believe this was due to the interviews being pre-arranged (most of the scoping interviewees requested to answer the questions at the time rather than arranging a subsequent appointment) and I did not feel I was disturbing people at their work, which I did experience with the practices called without prearrangement. In addition to paying the practices £300 for participating as a case study, I also took a box of chocolates as a small token of thanks for taking part which was well received in all of the practices.

4.8 Summary and next steps

In this chapter I have provided an overview and justification of the methods utilised in this programme of work, further information on each study is contained in the respective chapters. An embedded mixed methods design using a priority qualitative approach and a supplemental quantitative phase was employed as it was appropriate to the broad nature of the research topic: the impact of financial incentives on the implementation of asthma self-

management. Quantitative analysis of routine data is combined with information on Northern Ireland to provide a contextual understanding of health care in Northern Ireland. A grounded theory approach (Charmaz, 2006) to qualitative data generation was undertaken to explore primary care staff perceptions of the LES and supported self-management. Results from this phase influenced an additional analysis of interview transcripts using NPT to understand how the LES was embedded into routine practice. The next chapter discusses the systematic review undertaken to understand existing evidence on the impact of financial incentives on the implementation of supported self-management for asthma or diabetes on implementation outcomes, health outcomes and individual behavioural outcomes.

Chapter 5 Systematic review

5.1 Introduction

This chapter reports the methodology and findings of a systematic review describing the features of financial incentive schemes promoting supported self-management to individuals with asthma or diabetes, (another long-term condition with an established evidence base for self-management), and evaluates the impact of the schemes on quality of care, specifically implementation outcomes, health outcomes and individual behaviour outcomes.

The work presented in this chapter has been presented at three conferences and published in a peer reviewed journal (Appendices 6 and 7).

5.2 Aims of the systematic review

To systematically review the evidence investigating the impact of financial incentives for supported self-management on implementation outcomes, health outcomes and individual behaviour outcomes for individuals with asthma or diabetes.

5.2.1 Objectives

1. To determine the impact of financial incentives for implementation of supported self-management in asthma or diabetes on:
 - a. implementation outcomes (provision of action plans, asthma/diabetes reviews),
 - b. health outcomes (asthma/diabetes control, risk of exacerbation, hospital admittance rates),
 - c. individual behaviour outcomes (self-efficacy, activation, adherence to preventer medication, adherence to insulin medication)
2. To describe the features of financial incentive schemes as defined by the Financial Incentive Framework and determine any association with positive outcomes.

5.3 Methods

The protocol is available on PROSPERO, registration number: CRD42016027411 (Appendix 1), and the procedures described in the Cochrane Handbook for Systematic Reviews of Interventions (Higgins & Green, 2011) were followed. The searches were run in November 2015 and updated in May 2017.

5.3.1 Inclusion and Exclusion criteria

This systematic review was undertaken to understand more about existing schemes where healthcare professionals were financially incentivised to provide supported self-management. Therefore, the population inclusion criteria were: healthcare professionals incentivised (or whose organisation was incentivised) to provide supported self-management for asthma and/or diabetes, and/or individuals with asthma or diabetes receiving care from an organisation which was receiving financial incentives. Articles in which the individual with asthma or diabetes was incentivised were excluded. Schemes in which the incentive was not financial were excluded and schemes which did not promote supported self-management were excluded.

Initially I aimed to understand financial incentives specifically in the context of supported self-management for asthma, however, on completion of initial scoping, it was apparent that there were very few studies which had reported on financial incentive schemes which included asthma. I decided that a larger evidence base was required and the search criteria needed expanding to include another condition. Diabetes was selected as it is another long-term condition largely managed within primary care in the UK, its management contains substantial self-management aspects, there is a good evidence base for self-management (Taylor et al., 2014) and it is the target of existing financial incentive schemes in the UK (Quality & Outcome Framework, 2016). It therefore provided a rich evidence base for investigation and informed the key theme of my thesis, the impact of financial incentive schemes on the supported self-management of a chronic condition.

It was anticipated that most of the papers included would be reporting implementation studies which typically use a range of methodologies (Pinnock et al., 2017), therefore randomised controlled trials (RCTs), quasi experimental studies, controlled before and after studies, interrupted time series and repeated measures were all included in the search criteria. Reviews, systematic reviews, and meta-analyses, guidelines, surveys, abstracts and study protocols were all excluded, though published results were sought when a relevant protocol or abstract was identified. While systematic reviews were excluded, I reviewed their reference lists for studies that potentially matched my inclusion criteria. Editorials, opinion pieces, letters, case reports and audits were also excluded from the results.

5.3.2 Search strategy

The Population, Intervention, Comparison, Outcome and Setting (PICOS) search strategy is shown in Table 7. Electronic searches were carried out in eight databases: Cochrane Central Register of Controlled Trials (CENTRAL); Cochrane Database of Systematic Reviews (CDSR); MEDLINE; PsychInfo; CINAHL; ScienceDirect; Web of Science; Embase. Once the keywords were identified, the search strategies were piloted and results discussed with a Senior Liaison Librarian (MD) at the University of Edinburgh who advised on terms and word combinations in order to ensure the searches were highly sensitive and optimally balanced between recall and precision (Chang et al., 2012). The strategies used Boolean logic searching for asthma OR diabetes AND financial incentives AND self-management keywords (Appendix 1 contains a detailed search strategy) and the date range was not restricted. The bibliographies of all eligible studies were examined to identify potential studies for inclusion, and registries were searched for studies in progress.

Table 7: PICOS search strategy

Component	Description, inclusion/exclusion criteria
Population	<ul style="list-style-type: none"> Healthcare professionals incentivised (or whose organisation was incentivised) to provide supported self-management

	<ul style="list-style-type: none"> • Individuals with asthma or diabetes receiving care from an organisation which was receiving financial incentives
Intervention	<ul style="list-style-type: none"> • Any financial incentive provided to a healthcare organisation and/or healthcare professionals that was designed to improve supported self-management in asthma or diabetes
Comparison	<ul style="list-style-type: none"> • Healthcare professionals not incentivised (or whose organisation was not incentivised) to provide supported self-management. • Individuals with asthma or diabetes who received usual, non-incentivised care
Outcomes	<ul style="list-style-type: none"> • Organisational process: increase in quality of care, action plan provision and/or asthma/diabetes reviews • Disease control: decrease in exacerbations and/or hospitalisations, improved asthma/diabetes control • Individual behaviour: self-efficacy, activation, adherence to medication
Setting	<ul style="list-style-type: none"> • Any healthcare setting
Study Design	<ul style="list-style-type: none"> • Randomised controlled trials (RCTs) • Quasi experimental • Longitudinal • Controlled before and after studies • Interrupted time series • Repeated measure studies

5.3.2.1 Study selection

I conducted an initial search in November 2015 and an updated search in May 2017, and 2,541 articles were identified (Figure 3). A colleague (HP) and I independently screened a random selection of 100 papers, compared and discussed decisions in order to reach agreement on the application of the inclusion/exclusion criteria. Following this training process, I screened the remaining titles and abstracts for potentially relevant papers. Full text screening was undertaken and independently screened by a colleague (CYH) with uncertainties and disagreements resolved in discussion with another colleague (HP). After discussion, we achieved 100% agreement with articles

selected for inclusion.

5.3.3 Quality assessment

I expected to include a diverse range of methodologies so, in order to weight the papers, I adopted the approach of Pinnock et al. (2015) and classified papers by robustness of study design, the number of participants and the quality score, calculated by using Downs and Black checklist (1998). Table 8 lists the different study designs and their strengths and limitations to illustrate the classification of their robustness. The Downs and Black checklist (1998) was selected as it is recommended in the Cochrane Handbook for Systematic Reviews of Interventions (Higgins & Green, 2011) as one of the most useful tools for assessing methodological quality of non-randomised studies of interventions. However, as identified by Pinnock et al. (2015), the Downs and Black Checklist (1998) is not always appropriate for assessing the quality of implementation studies due to the importance it places on items that are inapplicable in implementation studies. There has been work towards developing reporting standards for implementation studies (Pinnock et al., 2017) but until a validated checklist is available, Downs and Black checklist (1998) is the best option. This is why I have adopted the approach of Pinnock et al. (2015) and included robustness of study design and number of participants to more accurately reflect the weight of the included studies.

Table 8: Study designs – descriptions, strengths and limitations (Cochrane Effective Practice and Organisation of Care [EPOC], 2017; Friis & Sellers, 2010)

Study Design	Description	Strengths	Limitations
Randomised controlled trials (RCTs)	A study in which participants are randomly assigned to different interventions	Randomisation Establishes causation Decreases selection bias	Volunteer bias Expensive Time consuming Do not reflect real life

		<p>Minimises confounding</p> <p>Blinding</p>	
Quasi-experimental	A study in which individuals are assigned to different interventions by methods which are not random	<p>Less time and logistical constraints than with RCTs</p> <p>Less-artificial research environment</p> <p>Useful in identifying general trends</p>	<p>Lack of randomisation</p> <p>Limited generalisability of results</p> <p>Reduced internal validity</p>
Controlled before and after studies	A study in which observations are made before and after the intervention	<p>Some control over potential confounding variables</p> <p>Protection against secular trends</p>	<p>Difficult to identify comparable control groups</p> <p>No direct comparison between study and control groups</p> <p>Cannot prove causality</p>
Interrupted time series	A study in which observations are made at multiple time points before and after the intervention (typically 3 before and 3 after)	<p>Shows trends over time</p> <p>Easier to control for confounding variables</p> <p>Real life study</p>	<p>Difficult to collect sufficient data points if over a long period</p> <p>Attrition</p>
Repeated measures	A study in which measurements are made in the same individual at different time points	<p>Fewer participants required</p> <p>Less time consuming</p> <p>Inexpensive</p> <p>Assesses an effect over time</p>	<p>Confounding</p> <p>Order effects</p>

5.3.4 Outcomes

Outcomes of interest were defined in three categories: implementation, health and individual behaviour. Implementation outcomes measure the impact of the implementation strategy; health outcomes measure the effectiveness of the intervention that was implemented (Pinnock et al., 2017). Implementation outcomes are listed first as the implementation strategy, how the intervention was implemented, is the primary focus of implementation science. The purpose of this systematic review was to investigate financial incentives as an implementation strategy aimed at influencing organisational adoption of supported self-management intervention:

1. Implementation outcomes. Specific examples are: provision of a personalised asthma action plan; patient attendance at self-management courses for diabetes or asthma; attendance at reviews providing supported self-management of asthma or diabetes.
2. Health outcomes. Examples are: symptom control, reducing asthma exacerbations, unscheduled care or use of emergency health services (Reddel et al., 2009), and measuring glycaemic control for people with diabetes (glycated haemoglobin (HbA1c) levels reflect the overall glycaemic exposure over the previous 2–3 months) (Woerle et al., 2006).
3. Individual behaviour outcomes. Examples include: self-efficacy, activation (see section 2.2.1 for further details), adherence to preventer medication, adherence to insulin regimes.

5.3.5 Data extraction

I extracted data from included papers using a previously piloted customised version of the Effective Practice and Organisation of Care (EPOC) Good Practice data extraction form (2013) and compared with data independently extracted by a colleague (CP). Disagreements were resolved by discussion. Details about the interventions were extracted under the following headings: “setting”, “risk of bias assessment”, “participants”, “intervention groups” “methods”, “outcomes” and “results”.

In order to supplement the information available and to provide context, any linked papers of the included studies were checked for descriptions of interventions, nested qualitative studies, and process evaluations and combined with the original included paper to represent one study in the analysis.

5.3.6 Analysis and synthesis

Due to the broad scope of the inclusion criteria and implementation focus, substantial heterogeneity in study design and intervention was anticipated (Pinnock et al., 2017). Substantial heterogeneity in study designs prohibits the possibility of conducting a meta-analysis. Asthma and diabetes papers were analysed separately and then synthesised. I approached the analysis in two ways: classification and by utilising a framework.

5.3.6.1 Effectiveness

Classification was undertaken according to whether the financial reward was for achieving process standards (e.g. attendance at a diabetes course) or health outcomes (e.g. reduced unscheduled care). A matrix of interventions was developed with the interventions shown to be effective or ineffective under the headings of: “implementation outcomes” and “health outcomes”, none of the studies reported results for our third outcome, “individual behaviour”.

Results of the classification were synthesised in the form of Harvest plots, which represent all relevant data in one plot and are therefore a useful method for illustrating the different effects of interventions (Ogilvie et al., 2008). Harvest plots can be customised depending on the data being illustrated. In the Harvest plots in my thesis, each bar represents an individual study, the bar colour indicates the study design, the bar height reflects the number of participants in the study and the number reflects the Downs and Black (1998) quality score.

5.3.6.2 Framework

I used a framework which has been specifically designed for documenting financial incentive interventions (Adams et al., 2014) (refer back to section 4.3

for further details). The framework contains nine domains which were used to identify the features and describe the schemes in detail (Table 4). These domains are: direction (positive reward or avoidance of penalty); form (cash or healthcare costs); magnitude (total value of incentive available to participant); certainty (certainty of receiving payment if behaviour is successfully changed: certain, certain chance or uncertain chance); target behaviour (process, intermediate or outcome); frequency of reward (all or some instances incentivised); immediacy (time between behaviour and payment); schedule (fixed or variable) and recipient(s) of incentives (clinicians). Articles were also grouped by impact on outcomes (positive, no effect, negative) to identify if any of the framework domains were successful predictors of the effectiveness of a scheme.

5.4 Results

From the 2,541 papers identified, 12 papers were eligible for the systematic review (Figure 3 is the PRISMA diagram with details of the selection process). I contacted 12 authors, 10 replied, none provided any further data to be included in this review. A statistician (RP) reviewed the articles and confirmed that a meta-analysis was not appropriate due to the heterogeneity of methodologies used in the included studies and a narrative synthesis was therefore undertaken.

5.4.1 Study characteristics

The 12 papers were published between 2004 and 2017: seven were conducted in the United States of America (Beck et al., 2004; Chien et al., 2012; Conrad et al., 2013; Fagan et al., Mandel & Kotagal, 2007; Rosenthal et al., 2005; Young et al., 2007), four in the UK (Gulliford et al., 2007; Kontopantelis et al., 2013; Pape et al., 2015; Vamos et al., 2011) and one in Canada (LeBlanc et al., 2017). One study reported on an asthma-only scheme (Mandel & Kotagal, 2007), three focused on diabetes-only schemes (Beck et al., 2004; Chien et al., 2012 & LeBlanc et al., 2017) and the remaining eight looked at diabetes within a multiple condition scheme (Conrad et al., 2013;

Fagan et al., 2010; Gulliford et al., 2007; Kontopantelis et al., 2013; Pape et al., 2015; Rosenthal et al., 2005; Vamos et al., 2011; Young et al., 2007).

5.4.2 Study quality and weight of evidence

The study designs varied (Figure 34) with quasi-experimental (5/12); interrupted time series (3/12); longitudinal (2/12); repeated measures (1/12) and controlled before and after study (1/12) designs included.

The quality scores ranged from 10 to 18 (Table 9). In common with other reviews assessing the quality of implementation studies (Pinnock et al., 2015), it was observed that some questions in the Downs and Black checklist (1998) were not applicable to studies involving financial incentives. For example, blinding of participants is not relevant in schemes which rely on publicity to promote financial incentives awarded for achieving pre-set targets. Similarly, questions regarding the randomisation process were not applicable to the quasi experimental studies.

The features which determine overall weight (Pinnock et al., 2015), the robustness of the study design (Figure 4), number of participants and quality score, are summarised in the second column of Table 9. This information is also included whenever a paper is cited in the main text of the results section using the format [study design, N practices/units, n participants, D&B = xx].

The size of the studies, in terms of patients, varied widely from 16 children admitted to hospital with an episode of diabetic ketoacidosis (Beck et al., 2004), to 1,174,294 patients with diabetes whose health insurance company, PacifiCare, trialled a pay for performance scheme in their California medical groups and compared results with their medical practices in Oregon and Washington (Rosenthal et al., 2005). In three of the studies, the total number of eligible patients was not always clear (Pape et al., 2015; Rosenthal et al., 2005, Young et al., 2007). However, from the number of physicians in this latter study it was possible to estimate the number of patient participants in the scheme.

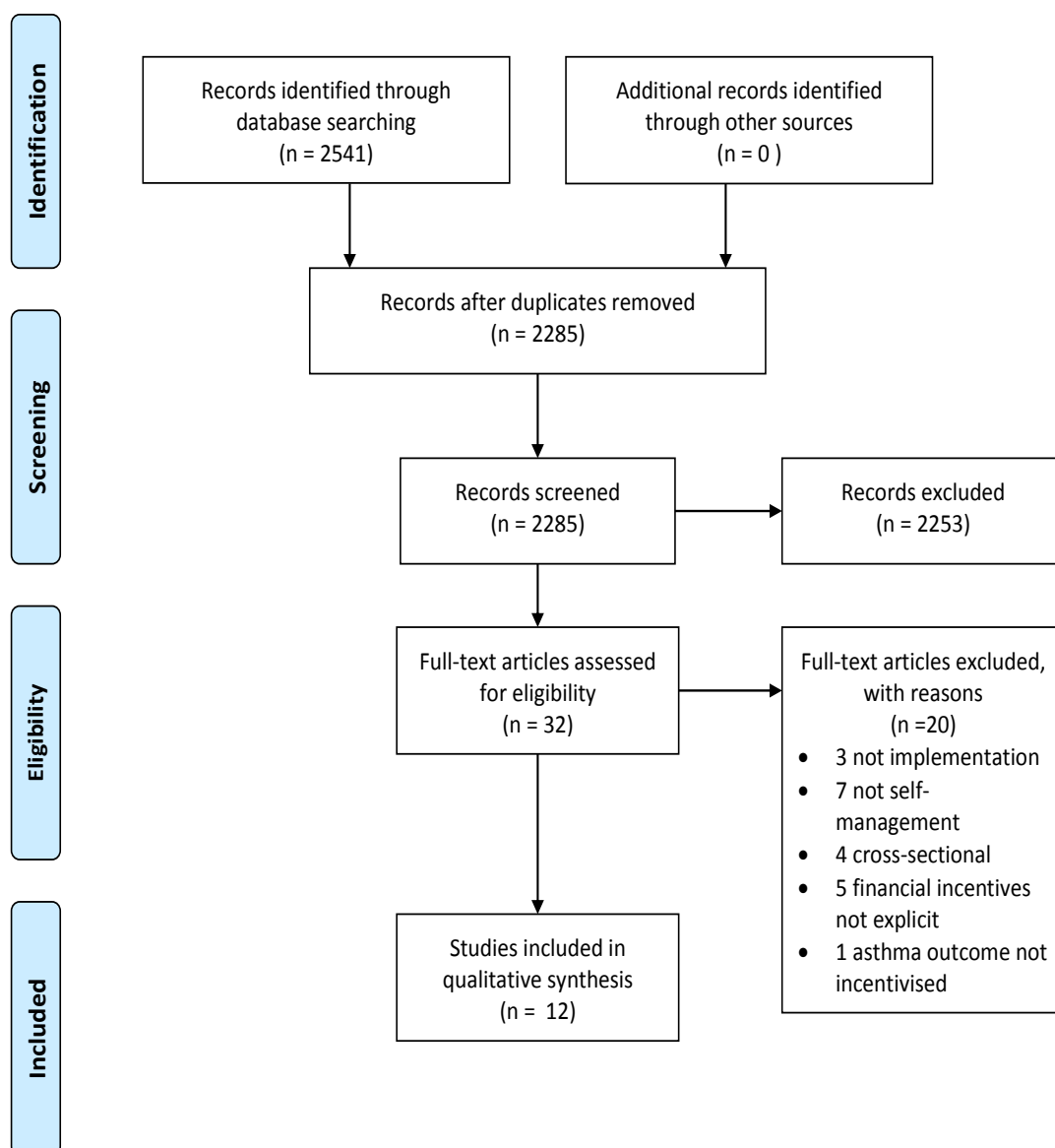


Figure 3: PRISMA Flow Diagram

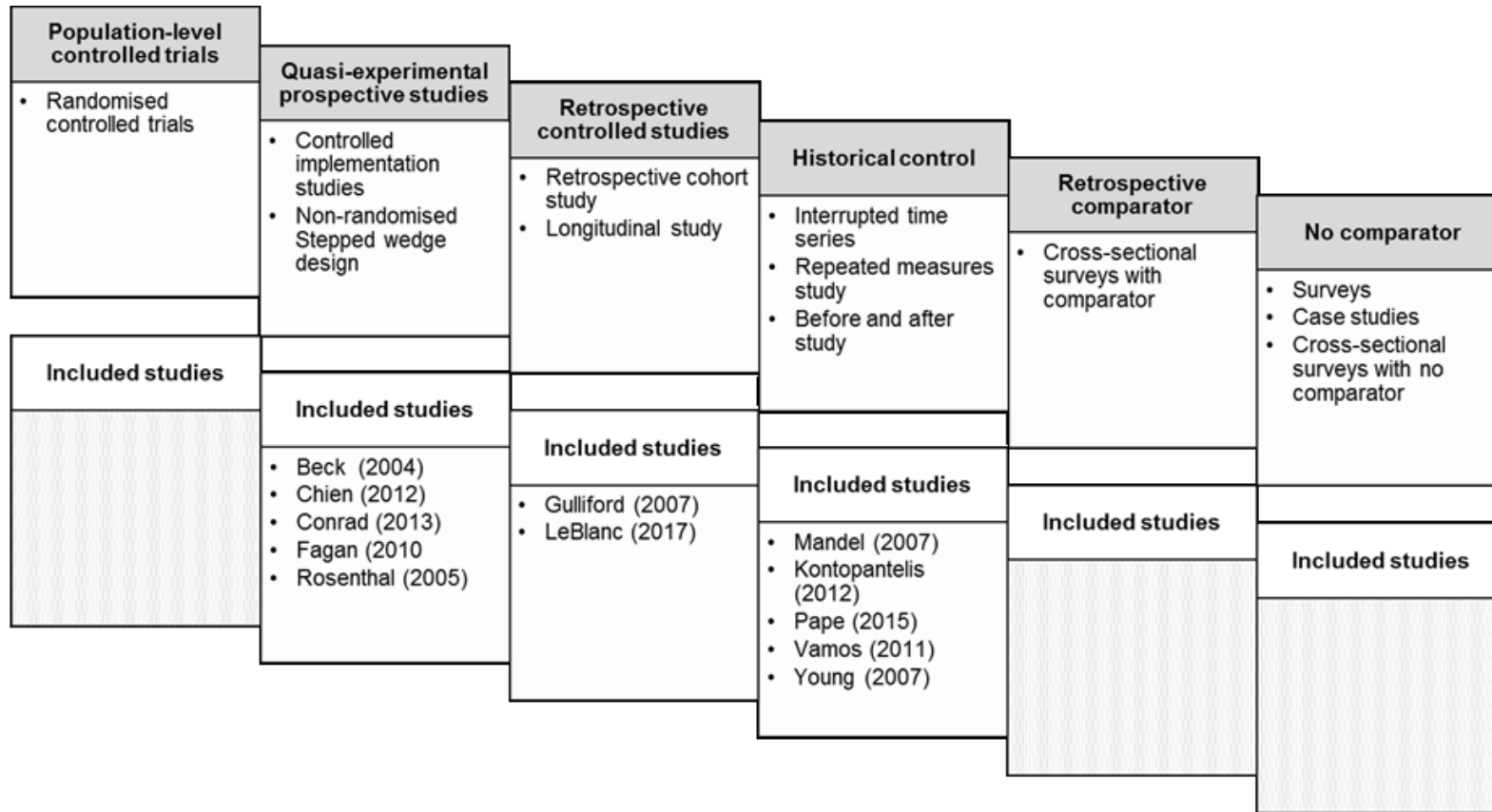


Figure 4: Hierarchy of included studies

Hierarchy based on: randomisation and status of comparator groups; prospective/retrospective design. These categories overlap and other factors will influence the robustness of the evidence (adapted for this review from Pinnock et al. 2015).

Due to the nature of financial incentive schemes, there are areas of bias which are unavoidable, such as participant blinding or allocation concealment. In addition to these, participants in Beck et al.'s (2004) study had volunteered to take part in the intensive case management programme and the control group were those who had chosen not to, creating a non-randomised sample biased by willingness to participate. However, the number willing to participate is an important outcome as it shows the uptake in a real-world implementation situation. Understanding how this was achieved is important as it could help increase engagement in future interventions. The participating group in Conrad et al. (2013) were selected by the health insurer, participants in Fagan et al.'s (2010) study were selected by the managed care organisation as they had a "leadership which was willing to champion the proposed quality improvement initiative", and participants in Gulliford et al.'s (2007) study were a self-selected group that agreed to participate in an evaluation of diabetes care.

5.4.3 Impact of the schemes on process, behavioural and health outcomes

Table 9 summarises the key findings from each of the studies and Figure 5 illustrates the synthesis with supporting information in Table 10.

Table 9: Characteristics and outcomes of included studies

Author, date, country, LTC, intervention length	Design, participants and quality	Intervention (domains of financial incentives framework*) Recipient = clinician for all studies	Comparison group	Results (all statistical details given where available)	Impact
Beck et al. (2004) USA Diabetes 1-15 months	Quasi-experimental. 1 hospital, 16 paediatric patients who had an incident of diabetic ketoacidosis. Quality score = 15	Paediatric Diabetes Intensive Case Management <ul style="list-style-type: none"> • Direction: avoidance of penalty • Form: healthcare costs • Magnitude: variable • Chance: uncertain • Target: process • Frequency: all instances incentivised • Immediacy: unclear 	Participants who opted out of intervention	Implementation outcomes Programme participation <ul style="list-style-type: none"> • Participants greater telephone contact (16 crisis management calls vs 0 in the comparator group; p=0.001) Health outcomes Hospital admissions <ul style="list-style-type: none"> • Fewer hospital admissions from intervention group compared to control group (1 emergency department visit or diabetic ketoacidosis episode vs 5 diabetic ketoacidosis hospitalisations; p=0.039) 	Positive for all outcomes

		<ul style="list-style-type: none"> • Schedule: variable 			
<p>Chien et al. (2012) USA</p> <p>Diabetes</p> <p>5 years</p>	<p>Quasi-experimental.</p> <p>118 practices, 5557 patients with diabetes</p> <p>Quality score = 13</p>	<p>Hudson Health Plan P4P program</p> <ul style="list-style-type: none"> • Direction: positive reward • Form: cash • Magnitude: % of fee schedule • Chance: certain • Target: process • Frequency: all instances incentivised • Immediacy: annually • Schedule: fixed 	<p>Medicaid-focused health plans within New York</p>	<p>Implementation outcomes</p> <p>Proportion with HbA1C tested</p> <p>Intervention group</p> <ul style="list-style-type: none"> • HbA1c tested : 2003 = 84% & 2004=85%, 2006 = 86% & 2007 = 91% $\Delta\%$ +5 <p>Control Group</p> <ul style="list-style-type: none"> • HbA1c testing : 2003 = 83% & 2004=85%, 2006 = 86% & 2007 = 87% $\Delta\%$ +3 • Difference in difference (Pre-post) $\Delta\%$ +2 <p>Health outcomes</p> <p>HbA1c levels</p> <p>Intervention group</p> <ul style="list-style-type: none"> • HbA1c <9b: 2003 = 36% & 2004 = 35%, 2006 = NA & 2007 = 32% 	<p>No significant effect on either outcome</p>

				<p>Control group</p> <ul style="list-style-type: none"> HbA1c <9b: 2003 = 43% & 2004 = 38%, 2006 = NA & 2007 = 33% <p>(The coefficient on intervention*post (difference in difference) was reported as not significant in these results, no p value provided.)</p>	
<p>Conrad et al. (2013) USA Diabetes 4 years</p>	<p>Quasi-experimental. 19 medical groups, 21,365 patients Quality score = 10</p>	<p>Washington state P4P scheme</p> <ul style="list-style-type: none"> Direction: positive reward Form: cash Magnitude: % of revenue Chance: certain Target: process Frequency: some instances incentivised Immediacy: annually Schedule: variable 	<p>5 Medical groups not part of the QSC or QIP (not randomised)</p>	<p>Implementation outcomes</p> <p>HbA1c testing</p> <p>Quality Incentive Programme</p> <ul style="list-style-type: none"> regression results : 2003-04= -0.001 & 2005-07 = -0.04 Quality scorecard regression results: 2003-04 = -0.019 & 2005-07 = -0.004 	<p>Negative</p>

<p>Fagan et al. (2010) USA Diabetes 12 months</p>	<p>Quasi-experimental. 20,943 65+ year old patients. Quality score = 16</p>	<p>Chronic care improvement initiative consisting of P4P practice-based care co-ordination</p> <ul style="list-style-type: none"> • Direction: positive reward • Form: cash • Magnitude: % of capitation fee • Chance: certain • Target: process • Frequency: some instances incentivised • Immediacy: annually • Schedule: variable 	<p>No financial incentive but retained a call centre disease management program</p>	<p>Implementation outcomes</p> <p>HbA1c testing</p> <ul style="list-style-type: none"> • Intervention Group – Odds ratio = 1.66; 95%CI (1.14, 2.43) • Comparison Group – Odds ratio = 3.76; 95%CI (3.42, 4.13) • Intervention relative to Comparison – Odds ratio = 0.44; 95%CI (0.30, 0.65) 	<p>No effect</p>
<p>Gulliford et al. (2007) UK Diabetes</p>	<p>Longitudinal.</p>	<p>Quality Outcome Framework (QOF)</p> <ul style="list-style-type: none"> • Direction: positive reward 	<p>Pre QOF</p>	<p>Implementation outcomes</p> <p>HbA1c testing</p>	<p>Positive for both outcomes</p>

12 months	26 general practices, 2099 patients. Quality score = 17	<ul style="list-style-type: none"> • Form: cash • Magnitude: Set £ value per point • Chance: certain • Target: process • Frequency: some instances incentivised • Immediacy: annually • Schedule: variable 		<ul style="list-style-type: none"> • HbA1c recorded in year (mean): 2000 = 60, 2001 = 72, 2002 = 80, 2003 = 78, 2005 = 95 <p>Health outcomes</p> <p>HbA1c levels</p> <ul style="list-style-type: none"> • HbA1c ≤7.4% (mean): 2000 = 22, 2001 = 32, 2002 = 37, 2003 = 38, 2005 = 57 • HbA1c ≤10% (mean): 2000 = 52, 2001 = 64, 2002 = 70, 2003 = 72, 2005 = 89 <p>(No further statistics provided on these outcomes)</p>	
Kontopantelis et al. (2012) UK Diabetes 6 years	Interrupted time series. 148 practices, 23,920 patients.	Quality Outcome Framework (QOF) <ul style="list-style-type: none"> • Direction: positive reward • Form: cash 	Pre QOF	<p>Implementation outcomes</p> <p>HbA1c testing</p> <ul style="list-style-type: none"> • HbA1c recorded in year (SD): 2000/1 = 71.1 (45.3), 2001/2 = 77.9 (41.5), 2002/3 = 82.8 (37.7), 2003/4 = 89.2 (31.1), 2004/5 = 93.0 (25.5), 2005/6 = 93.7 (24.3), 2006/7 = 93.5 (24.6) 	Positive for both outcomes

	Quality score = 17	<ul style="list-style-type: none"> • Magnitude: Set £ value per point • Chance: certain • Target: process • Frequency: some instances incentivised • Immediacy: annually • Schedule: variable 		<p>Health outcomes</p> <p>HbA1c levels</p> <ul style="list-style-type: none"> • HbA1c ≤7.4% (SD): 2000/1 = 45.5 (49.8), 2001/2 = 48.4 (50.0), 2002/3 = 50.2 (50.0), 2003/4 = 52.2 (50.0), 2004/5 = 55.6 (49.7), 2005/6 = 56.4 (49.6), 2006/7 = 59.3 (49.1) • HbA1c ≤10% (SD): 2000/1 = 88.5 (31.9), 2001/2 = 90.4 (29.4), 2002/3 = 90.8 (28.9), 2003/4 = 91.8 (27.4), 2004/5 = 92.6 (26.3), 2005/6 = 92.5 (26.3), 2006/7 = 92.7 (26.0) 	
LeBlanc et al. (2017) Canada Diabetes 10 years	Longitudinal. 583 physicians, 83,580 adult patients Quality score = 13	New Brunswick P4P Scheme <ul style="list-style-type: none"> • Direction: positive reward • Form: cash • Magnitude: set \$ value per patient • Chance: certain 	Pre-incentive scheme	<p>Implementation outcomes</p> <p>HbA1c testing</p> <ul style="list-style-type: none"> • ≤2 HbA1c tests per year: univariate model OR = 1.16 (p<0.0001); 99%CI (1.11 1.20). <p>Multivariate model OR = 1.23 (p<0.0001); 99%CI (1.18, 1.28)</p> <p>Health outcomes</p> <p>HbA1c levels</p>	Positive implementation outcomes

		<ul style="list-style-type: none"> • Target: process • Frequency: all instances incentivised • Immediacy: ongoing • Schedule: fixed 		<ul style="list-style-type: none"> • All patients: univariate model OR = 0.00; 99%CI (-0.03, 0.02). Multivariate model OR = -0.01; 99%CI (-0.03, 0.02) • HbA1C 6.5% to 7.0%: univariate model OR = -0.02 (p<0.0001); 99%CI (-0.04, 0.01). <p>Multivariate model OR = -0.02 (p<0.0001); 99%CI (-0.04, 0.01).</p> <ul style="list-style-type: none"> • HbA1C 7.1% to 8.9%: univariate model OR = 0.03; 99%CI (-0.01, 0.08). <p>Multivariate model OR = 0.02; 99%CI (-0.02, 0.06).</p> <ul style="list-style-type: none"> • HbA1C ≥9%: univariate model OR = 0.04; 99%CI (-0.06, 0.15).Multivariate model OR = 0.00; 99%CI (-0.10, 0.10) 	No effect for health outcomes
Mandel & Kotagal (2007) USA Asthma 26 months	Repeated measures. 44 paediatric practices 13 380 children.	Cincinnati Children's Hospital Medical Center asthma improvement collaborative • Direction: positive reward	Pre-incentive scheme	Implementation outcomes Asthma action plan provision. • 19 (70%) achieved the 80% threshold for the action plan provision.	Positive

	Quality score = 16	<ul style="list-style-type: none"> • Form: cash • Magnitude: % of fee schedule • Chance: certain • Target: process • Frequency: some instances incentivised • Immediacy: unclear • Schedule: variable 		<p>The cumulative percentage of the network all-payer asthma population receiving “perfect care” increased from 4% to 88%, with 18 of 44 practices (41%) achieving a perfect care percentage of 95% or greater</p> <p>(no statistics reported)</p>	
<p>Pape et al. (2015) UK Diabetes 1 year</p>	<p>Before and after study.</p> <p>1 primary care trust, 6,142 patients.</p> <p>Quality score = 18</p>	<p>Quality Outcome Framework "stretch" scheme (QOF+)</p> <ul style="list-style-type: none"> • Direction: positive reward • Form: cash • Magnitude: Set £ value per point • Chance: certain 	Pre QOF+	<p>Health outcomes</p> <p>HbA1c levels</p> <p>HbA1c of ≤8% :</p> <ul style="list-style-type: none"> • Exception reporting Baseline = 0.085, Secular trend effect = 0.001 (p = 0.910), QOF+ baseline = 0.060 (p=0.018) • Controlled Patients Baseline = 0.725, Secular trend effect = 0.015 (p=0.005), QOF+ baseline = 0.002 (p=0.968) <p>HbA1c of ≤9% :</p>	No effect

		<ul style="list-style-type: none"> • Target: process • Frequency: some instances incentivised • Immediacy: annually • Schedule: variable 		<ul style="list-style-type: none"> • Exception reporting Baseline = 0.062, Secular trend effect = 0.001 (p = 0.891), QOF+ baseline = 0.043 (p=0.049) • Controlled Patients Baseline = 0.822, Secular trend effect = 0.015 (p=0.002), QOF+ baseline = 0.003 (p=0.934) 	
Rosenthal et al. (2005) USA Diabetes 1 year	Quasi-experimental. 205 physician groups, 1,174,294 patients. Quality score = 18	PacifiCare P4P program <ul style="list-style-type: none"> • Direction: positive reward • Form: cash • Magnitude: set \$ value per patient once target met • Chance: certain • Target: process • Frequency: some instances incentivised • Immediacy: quarterly • Schedule: fixed 	Same performance figures but no financial incentives	Implementation outcomes HbA1c testing Intervention group <ul style="list-style-type: none"> • Pre Quality Incentive Programme - 62.0%, after QIP 64.1%, • Difference (Post-pre), 2.1% (SE 1.0) • P value .02 Control group <ul style="list-style-type: none"> • Pre Quality Incentive Programme - 62.0%, after QIP 64.1%, • Difference (Post-pre), 2.1% (SE 1.0) • P value .02 	No effect

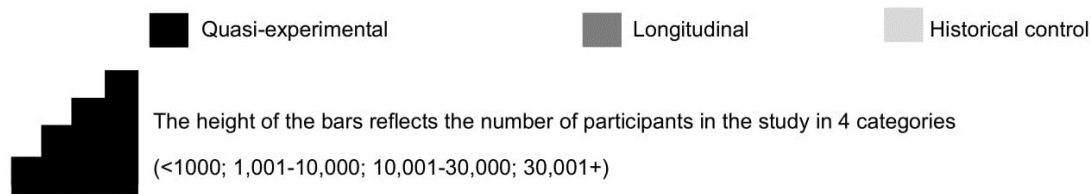
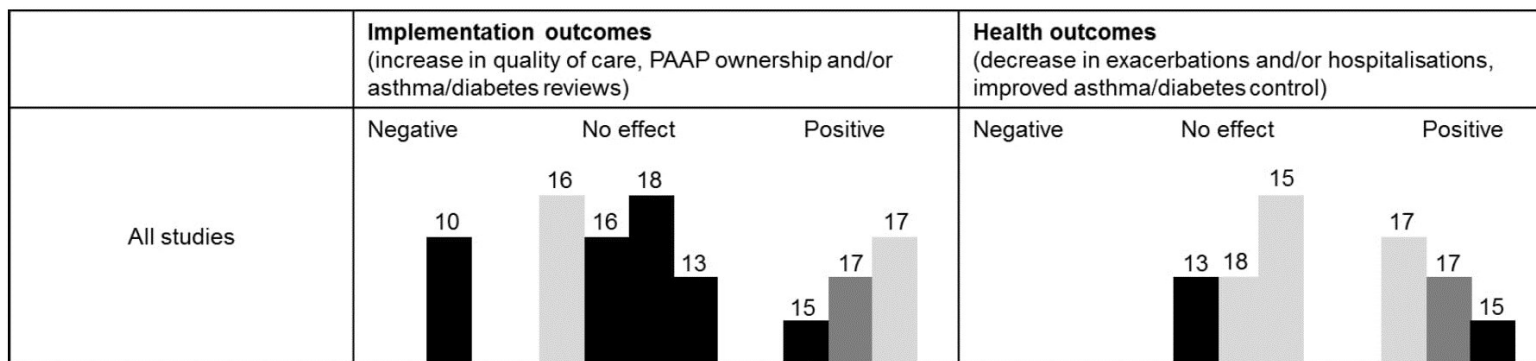
<p>Vamos et al. (2011) UK Diabetes 1 year</p>	<p>Interrupted time series.</p> <p>422 general practices 154 945 patients.</p> <p>Quality score = 15</p>	<p>Quality Outcome Framework (QOF)</p> <ul style="list-style-type: none"> • Direction: positive reward • Form: cash • Magnitude: Set £ value per point • Chance: certain • Target: process • Frequency: some instances incentivised • Immediacy: annually • Schedule: variable 	<p>Pre-QOF</p>	<p>Implementation outcomes</p> <p>HbA1c measured</p> <ul style="list-style-type: none"> • HbA1c measured (95% CI)- 1997, by quintile: 32.8 (31.8-33.7), 31.2 (30.2-32.0), 34.6 (33.7-35.6), 32.2 (31.2-33.0), 37.7 (36.7-38.7) • HbA1c measured (95% CI)- 2005, by quintile: 74.0 (73.4-74.6), 76.4 (75.8-76.9), 77.3 (76.7-77.8), 73.9 (73.3-74.5), 76.2 (75.6-76.8) <p>Health outcomes</p> <p>HbA1c mean levels</p> <ul style="list-style-type: none"> • HbA1c mean (95% CI)- 1997, by quintile, 7.6 (7.5-7.7), 7.6 (7.5-7.7), 7.7 (7.6-7.8), 7.5 (7.4-7.6), 8.2 (8.1-8.3) • HbA1c mean (95% CI)- 2005, by quintile, 7.5 (7.5-7.5), 7.4 (7.4-7.4), 7.4 (7.4-7.4), 7.5 (7.4-7.5), 7.4 (7.4-7.5) • Baseline proportion of patients meeting HbA1c <7.0% in 1997: 35.3, 95% CI = 31.0-39.7, p<0.05 	<p>No effect</p>
-----------------------------------------------------------	--------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------

				<ul style="list-style-type: none"> • Annual change before introduction of P4P: 2.0, 95% CI = 1.3-2.7, p<0.05 • Annual change in the year P\$P introduced: 0.8, 95% CI = -1.8-3.5, • Annual change after P4P was introduced: -2.2, 95% CI = -4.0- -0.4, p<0.01 	
<p>Young et al. (2007) USA</p> <p>Diabetes</p> <p>2 years</p>	<p>Interrupted time series.</p> <p>334 Primary care physicians, unknown number of patients.</p> <p>Quality score = 16</p>	<p>Rochester (New York) Individual Practice Association P4P program</p> <ul style="list-style-type: none"> • Direction: positive reward % avoidance of penalty • Form: cash • Magnitude: % of incentive pool comprised of % of physician fees • Chance: certain • Target: process 	Pre-incentive scheme	<p>Implementation outcomes</p> <p>HbA1c testing</p> <ul style="list-style-type: none"> • Adherence rates: mean (SD) pre-intervention: 1999 = 0.56 (0.23), 2000 = 0.57 (0.19), 2001 = 0.59 (0.17) • Adherence rates: mean (SD) post-intervention: 2002 = 0.62 (0.17), 2003 = 0.61 (0.18), 2004 = 0.63 (0.18) • Change in adherence rate: 2000-2001 = 0.018; 2001-2002= 0.026, p<0.05 • Difference in rate of change (2001-2000)(vs (2002-2004) = 0.009 (no p value given) 	No effect

		<ul style="list-style-type: none"> • Frequency: some instances incentivised • Immediacy: annually • Schedule: variable 			
--	--	---------------------------------------------------------------------------------------------------------------------------------------------------------	--	--	--

P4P = Pay for performance **HbA_{1c}**= glycated haemoglobin

***Financial incentive framework** (Adams J, Giles EL, McColl E, Sniehotta FF, 2014) **consists of 9 domains:** **Direction-** whether the reward is positive gain or avoidance of negative penalty; **Form-**nature of incentive e.g. cash, vouchers etc.; **Magnitude** – value of incentive available to participant; **Certainty-** likelihood of receiving incentive if behaviour changes; **Target-** type of behaviour being targeted; **Frequency-** number of instances of behaviour that are incentivised; **Immediacy-** how soon after the behaviour the incentive is provided; **Schedule-** whether the incentive amount its fixed or variable; **Recipient-** who is in receipt of incentives



The height of the bars reflects the number of participants in the study in 4 categories (<1000; 1,001-10,000; 10,001-30,000; 30,001+)

Figure 5: Harvest plot

Illustrating the impact of financial incentive schemes on implementation and health outcomes. Notes: Each bar represents an individual study. The colour of the bar indicates the study design, the height of the bar reflect the number of participants in the study and the number is the Downs and Black (1998) quality score. The decisions that underpin this plot are detailed in Table 10.

Table 10: Decisions underpinning the harvest plot

All results as reported in the included papers and the decision process underpinning the Harvest plot

Where outcomes within a category were conflicting, the decision process attached priority as follows:

- Defined primary outcomes in an adequately powered study
- Outcomes that measured impact in the whole eligible population (typically using routine data rather than data from a sub-group who accepted/completed the intervention or were recruited for the evaluation)
- Outcomes which were measured with a validated instrument (as opposed to responses to non-validated questions)
- Outcomes that were clinically as well as statistically significant (e.g. achieved a defined minimum clinically important difference)

Finally, if there were any remaining doubt, the authors' interpretation was considered as providing the context for our decision.

Abbreviations used in this table

Study Design: ITS: Interrupted time series
Longitudinal

B&A: Before and after

HbA1c testing: Glycated haemoglobin testing

RM: Repeated measures

Long:

QE: Quasi experimental

QOF: Quality Outcome Framework

Citation design, size and quality	Reported outcomes * indicates the primary outcome (if stated).	Researcher's interpretation for the Harvest plot
Beck 2004 QE	Implementation outcomes Programme participation <ul style="list-style-type: none"> • Participants greater telephone contact (16 crisis management calls vs 0; p=.001) Health outcomes	Organisational processes and disease control both improved.

1 hospital, 16 paediatric patients who had an incident of DKA. Quality score = 15	Hospital admissions <ul style="list-style-type: none"> Decrease in hospital admissions from intervention group (1 emergency department visit or diabetic ketoacidosis episode vs 5 diabetic ketoacidosis hospitalisations; p=.039) 	Illustrated as positive effect
	Individual behaviour outcomes Not assessed	
Chien 2012 QE 118 practices, 5557 diabetes patients. Quality score = 13	Implementation outcomes * Hba1C testing Intervention group <ul style="list-style-type: none"> HbA1c testing : 2003 = 84% & 2004=85%, 2006 = 86% & 2007 = 91% Control Group <ul style="list-style-type: none"> HbA1c testing : 2003 = 83% & 2004=85%, 2006 = 86% & 2007 = 87% 	Diabetes care processes and outcomes did not improve significantly Illustrated as no effect
	Health outcomes HbA1c levels Intervention group <ul style="list-style-type: none"> HbA1c <9b: 2003 = 36% & 2004 = 35%, 2006 = NA & 2007 = 32% Control group <ul style="list-style-type: none"> HbA1c <9b: 2003 = 43% & 2004 = 38%, 2006 = NA & 2007 = 33% The coefficient on intervention*post (difference in difference) was reported as not significant in these results, no p value provided.)	
	Individual behaviour outcomes Not assessed	

<p>Conrad 2013</p> <p>QE 19 medical groups, 21,365 patients Quality score = 10</p>	<p>Implementation outcomes Quality Incentive Programme</p> <ul style="list-style-type: none"> • regression results : 2003-04= -0.001 & 2005-07 = -0.04 <p>Quality scorecard</p> <ul style="list-style-type: none"> • regression results: 2003-04 = -0.019 & 2005-07 = -0.004 	<p>no significant positive effect on general clinical quality</p> <p>QIP 05-07 statistically significant negative result showing a reduction in quality</p> <p>Illustrated as negative effect</p>
	<p>Health outcomes Not assessed</p>	
	<p>Individual behaviour outcomes Not assessed</p>	
<p>Fagan 2010</p> <p>QE 20,943 65+ year old patients. Quality score = 16</p>	<p>Implementation outcomes *HbA1c testing</p> <ul style="list-style-type: none"> • Intervention Group – Odds ratio = 1.66; 95%CI (1.14, 2.43) • Comparison Group – Odds ratio = 3.76; 95%CI (3.42, 4.13) • Intervention relative to Comparison – Odds ratio = 0.44; 95%CI (0.30, 0.65) 	<p>Illustrated as no effect</p>
	<p>Health outcomes Not assessed</p>	
	<p>Individual behaviour outcomes Not assessed</p>	
<p>Gulliford 2007</p> <p>Long, 26 general practices, 2099 patients.</p>	<p>Implementation outcomes HbA1c testing</p> <ul style="list-style-type: none"> • HbA1c recorded in year: 2000 = 60, 2001 = 72, 2002 = 80, 2003 = 78, 2005 = 95 	<p>•Increase in tests performance (until 2002)</p>
	<p>Health outcomes HbA1c levels</p>	

<p>Quality score = 17</p>	<ul style="list-style-type: none"> • HbA1c \leq7.4%: 2000 = 22, 2001 = 32, 2002 = 37, 2003 = 38, 2005 = 57 • HbA1c \leq10%: 2000 = 52, 2001 = 64, 2002 = 70, 2003 = 72, 2005 = 89 <p>(No further statistics provided on these outcomes)</p> <p>Individual behaviour outcomes Not assessed</p>	<ul style="list-style-type: none"> ▪ increase in HbAc1 target of <7.4% & HbA1c <10% <p>Illustrated as positive effect</p>
<p>Kontopantelis 2012</p> <p>ITS 148 practices, 23,920 patients. Quality score = 17</p>	<p>Implementation outcomes HbA1c testing</p> <ul style="list-style-type: none"> • HbA1c recorded in year (SD): 2000/1 = 71.1 (45.3), 2001/2 = 77.9 (41.5), 2002/3 = 82.8 (37.7), 2003/4 = 89.2 (31.1), 2004/5 = 93.0 (25.5), 2005/6 = 93.7 (24.3), 2006/7 = 93.5 (24.6) <p>Health outcomes HbA1c levels</p> <ul style="list-style-type: none"> • HbA1c \leq7.4% (SD): 2000/1 = 45.5 (49.8), 2001/2 = 48.4 (50.0), 2002/3 = 50.2 (50.0), 2003/4 = 52.2 (50.0), 2004/5 = 55.6 (49.7), 2005/6 = 56.4 (49.6), 2006/7 = 59.3 (49.1) • HbA1c \leq10% (SD): 2000/1 = 88.5 (31.9), 2001/2 = 90.4 (29.4), 2002/3 = 90.8 (28.9), 2003/4 = 91.8 (27.4), 2004/5 = 92.6 (26.3), 2005/6 = 92.5 (26.3), 2006/7 = 92.7 (26.0) <p>Individual behaviour outcomes Not assessed</p>	<ul style="list-style-type: none"> ▪ Increase in tests performance (until 2005/6) ▪ Increase in HbAc1 target of \leq7.4% ▪ Increase in HbAc1 target of \leq10% (until 2004/5). <p>Illustrated as positive effect</p>
<p>LeBlanc 2017</p> <p>Long 583 physicians, 83,580 adult patients Quality score = 13</p>	<p>Implementation outcomes HbA1c testing</p> <ul style="list-style-type: none"> • \leq2 HbA1c tests per year: univariate model OR = 1.16 (p<0.0001); 99%CI (1.11, 1.20). • Multivariate model OR = 1.23 (p<0.0001); 99%CI (1.18, 1.28) 	<p>Illustrated as positive effect</p>

	<p>Health outcomes HbA1c levels</p> <ul style="list-style-type: none"> All patients: univariate model OR = 0.00; 99%CI (-0.03, 0.02). Multivariate model OR = -0.01; 99%CI (-0.03, 0.02) HbA1C 6.5% to 7.0%: univariate model OR = -0.02 (p<0.0001); 99%CI (-0.04, 0.01). Multivariate model OR = -0.02 (p<0.0001); 99%CI (-0.04, 0.01). HbA1C 7.1% to 8.9%: univariate model OR = 0.03; 99%CI (-0.01, 0.08). Multivariate model OR = 0.02; 99%CI (-0.02, 0.06). HbA1C ≥9%: univariate model OR = 0.04; 99%CI (-0.06, 0.15). Multivariate model OR = 0.00; 99%CI (-0.10, 0.10) 	<p>•No statistically significant changes in mean HbA1c levels</p> <p>Illustrated as no effect</p>	
	<p>Individual behaviour outcomes Not assessed</p>		
<p>Mandel 2007</p> <p>RM 44 paediatric practices 13 380 children. Quality score = 16</p>	<p>Implementation outcomes Asthma action plan provision.</p> <ul style="list-style-type: none"> 19 (70%) achieved the 80% threshold for the action plan. The cumulative percentage of the network all-payer asthma population receiving “perfect care” increased from 4% to 88%, with 18 of 44 practices (41%) achieving a perfect care percentage of 95% or greater <p>(no statistics reported)</p>	<p>Illustrated as positive effect</p>	
	<p>Health outcomes Not assessed</p>		
	<p>Individual behaviour outcomes Not assessed</p>		
<p>Pape 2015</p> <p>B&A 1 primary care trust, 6,142 patients. Quality score = 18</p>	<p>Implementation outcomes Not assessed</p>		
	<p>Health outcomes HbA1c levels HbA1c of ≤8% :</p>	<p>•No statistically significant improvements in mean HbA1c levels</p>	

	<ul style="list-style-type: none"> Exception reporting Baseline = 0.085, Secular trend effect = 0.001 (p = 0.910), QOF+ baseline = 0.060 (p=0.018) Controlled Patients Baseline = 0.725, Secular trend effect = 0.015 (p=0.005), QOF+ baseline = 0.002 (p=0.968) <p>HbA1c of ≤9% :</p> <ul style="list-style-type: none"> Exception reporting Baseline = 0.062, Secular trend effect = 0.001 (p = 0.891), QOF+ baseline = 0.043 (p=0.049) Controlled Patients Baseline = 0.822, Secular trend effect = 0.015 (p=0.002), QOF+ baseline = 0.003 (p=0.934) 	<ul style="list-style-type: none"> Increase can be attributed to increase in exception reporting since intro of QOF+ <p>Illustrated as no effect</p>
	<p>Individual behaviour outcomes Not assessed</p>	
<p>Rosenthal 2005</p> <p>QE 205 physician groups, 1,174,294 patients. Quality score = 18</p>	<p>Implementation outcomes HbA1c testing Intervention group</p> <ul style="list-style-type: none"> Pre Quality Incentive Programme - 62.0%, after QIP 64.1%, Difference (Post-pre), 2.1% (SE 1.0) P value .02 <p>Control group</p> <ul style="list-style-type: none"> Pre Quality Incentive Programme - 62.0%, after QIP 64.1%, Difference (Post-pre), 2.1% (SE 1.0) P value .02 	<ul style="list-style-type: none"> Slight improvement but not significantly different from comparison group <p>Illustrated as no effect</p>
	<p>Health outcomes Not assessed</p>	
	<p>Individual behaviour outcomes Not assessed</p>	
<p>Vamos 2011</p> <p>ITS,</p>	<p>Implementation outcomes</p> <ul style="list-style-type: none"> HbA1c measured (95% CI)- 1997, by quintile: 32.8 (31.8-33.7), 31.2 (30.2-32.0), 34.6 (33.7-35.6), 32.2 (31.2-33.0), 37.7 (36.7-38.7) 	

<p>422 general practices 154 945 patients. Quality score = 15</p>	<ul style="list-style-type: none"> HbA1c measured (95% CI)- 2005, by quintile: 74.0 (73.4-74.6), 76.4 (75.8-76.9), 77.3 (76.7-77.8), 73.9 (73.3-74.5), 76.2 (75.6-76.8) 	
	<p>Health outcomes HbA1c mean levels</p> <ul style="list-style-type: none"> HbA1c mean (95% CI)- 1997, by quintile, 7.6 (7.5-7.7), 7.6 (7.5-7.7), 7.7 (7.6-7.8), 7.5 (7.4-7.6), 8.2 (8.1-8.3) HbA1c mean (95% CI)- 2005, by quintile, 7.5 (7.5-7.5), 7.4 (7.4-7.4), 7.4 (7.4-7.4), 7.5 (7.4-7.5), 7.4 (7.4-7.5) Baseline proportion of patients meeting HbA1c <7.0% in 1997: 35.3, 95% CI = 31.0-39.7, p<0.05 Annual change before introduction of P4P: 2.0, 95% CI = 1.3-2.7, p<0.05 Annual change in the year P\$P introduced: 0.8, 95% CI = -1.8-3.5, Annual change after P4P was introduced: -2.2, 95% CI = -4.0- -0.4, p<0.01 	<ul style="list-style-type: none"> No significant additional improvement <p>Illustrated as no effect</p>
<p>Young 2007 ITS, 334 Primary care physicians, unknown number of patients. Quality score = 16</p>	<p>Implementation outcomes HbA1c testing</p> <ul style="list-style-type: none"> Adherence rates: mean (SD) pre-intervention: 1999 = 0.56 (0.23), 2000 = 0.57 (0.19), 2001 = 0.59 (0.17) Adherence rates: mean (SD) post-intervention: 2002 = 0.62 (0.17), 2003 = 0.61 (0.18), 2004 = 0.63 (0.18) Change in adherence rate: 2000-2001 = 0.018; 2001-2002= 0.026, p<.05 Difference in rate of change (2001-2000)(vs (2002-2004) = 0.009 (no p value given) 	<ul style="list-style-type: none"> No difference between post & pre-intervention trends. Overall increase in performance result of secular trends <p>Illustrated as no effect</p>
	<p>Health outcomes Not assessed</p>	
	<p>Individual behaviour outcomes Not assessed</p>	

5.4.3.1 Organisational process

Asthma

The one asthma study reported a scheme which had a positive effect on the proportion of patients with asthma receiving “perfect care” which increased from 4% before the intervention to 88% after (Mandel & Kotagal) [repeated measures study, 44 practices, 13,380 children, D&B = 16]. “Perfect care” was assessed on performance of components including: provision of a written action plan; provision of controller medication (if required); and recording patients’ control based on National Heart, Lung, and Blood Institute guideline recommended classification. Mandel and Kotagal (2007) described an asthma improvement collaborative in Cincinnati which consisted of a three-level reward system. Practices had to reach a set target in each level in order to be eligible to proceed to the next level. Written action plans for patients with asthma were part of the criteria for the third level of the reward system.

Diabetes

Three of the nine diabetes studies reported that financial incentives had a positive effect on increasing frequency of HbA1c testing (Gulliford et al., 2007 [longitudinal, 26 general practices, 2099 patients, D&B=17]; Kontopantelis et al., 2013 [ITS, 148 practices, 23,920 patients, D&B=17]; LeBlanc et al., 2017 [longitudinal, 583 physicians, 83,580 patients, D&B = 13]). Five reported that the financial incentive scheme had no effect (Chien et al., 2012; Fagan et al., 2010; Rosenthal et al., 2005; Vamos et al., 2011; Young et al., 2007 [ITS, 334 primary care physicians, unknown patients, D&B=16]) and one study reported a negative impact which was a reduction in the number of HbA1c tests performed (Conrad et al., 2013) [Quasi-experimental, 19 medical groups, 21,365 patients, D&B=10]. Fagan et al. (2010) [Quasi-experimental, 20,943 65+ year old patients, D&B = 16] found that although the intervention group improved, it did not improve as much as the comparison group; the authors concluded that the study did not generate significant evidence to support a pay for performance scheme.

Chien et al. (2012) [quasi-experimental, 118 practices, 5,557 participants, D&B = 13] found no statistically significant improvement in patterns of care or clinical outcomes. They identified that younger adults and those with more comorbidities were less likely to receive recommended care and more likely to experience a diabetes-related emergency department visit. However, two studies noted that practices in lower socio-economic status areas required additional support to overcome barriers (Gulliford et al., 2007; Rosenthal et al., 2005 [Quasi-experimental, 205 physician groups, 1,174,294 patients, D&B=18]).

5.4.3.2 Health outcomes

Three of the seven studies reported a positive effect on health outcomes: one for reduction in hospital admissions (Beck et al., 2004) [quasi-experimental, 1 hospital, 16 children, D&B = 15]; two reported improved HbA1c levels test results (Gulliford et al., 2007; Kontopantelis et al., 2013). Three studies however, reported no effect on the HbA1c levels (Chien et al., 2012; Pape et al., 2015 [B&A, 1 primary care trust, 6,142 patients, D&B=18]; Vamos et al., 2011 [ITS, 422 general practices, 154, 945 patients, D&B= 15]). One study Beck et al. (2004) [quasi-experimental, 1 hospital, 16 children, D&B = 15] evaluated an intensive case management scheme offered to 16 children who had been hospitalised after an incident of diabetic ketoacidosis. They reported that participation in the intensive programme was associated with fewer subsequent hospitalisations resulting in lower costs for participants (\$1063 per individual) than non-participants (\$2396 per individual).

5.4.3.3 Individual behaviour

None of the studies reported on self-efficacy, activation or adherence to medication which was classified as “individual behaviour”.

5.4.4 Features of the financial incentive schemes

Table 9 (section 5.4.3) described the characteristics of the studies; the key features of the schemes mapped to the financial incentive framework for documenting financial incentive interventions to change health behaviours

(Adams et al., 2014) are listed in the “Intervention” column. The studies are described below using the domains of this framework.

5.4.4.1 Direction and form

One scheme used avoidance of penalty (Beck et al., 2004), ten studies used positive rewards (Chien et al., 2012; Conrad et al., 2013; Fagan et al., 2010; Gulliford et al., 2007; Kontopantelis et al., 2013; LeBlanc et al., 2017; Mandel & Kotagal, 2007; Pape et al., 2015; Rosenthal et al., 2005; Vamos et al., 2011) and one study used a mixture of avoidance of penalty and positive rewards (Young et al., 2007) as the reward component of the incentive scheme. One study evaluated a reimbursement scheme in which the insurance company refunded practices for preventative self-management education costs (Beck et al., 2004), the remaining eleven schemes were cash incentives paid to the clinicians or practice for achieving targets.

5.4.4.2 Magnitude and certainty

One study observed the impact of a scheme which paid a financial incentive for each HbA1c test that was completed (Chien et al., 2012). One study described a scheme which involved receiving a payment for each performance target met or exceeded (Rosenthal et al., 2005). One study described a scheme where physicians were paid a set amount per patient that received two HbA1c tests per year (LeBlanc et al., 2017). Eight studies looked at a target achievement scheme where there were pre-set “percentage of patients” targets that physicians had to achieve in order to receive the financial incentive (Conrad et al., 2013; Fagan et al., 2010; Gulliford et al., 2007; Kontopantelis et al., 2013; LeBlanc et al., 2017; Mandel & Kotagal, 2007; Pape et al., 2015; Vamos et al., 2011; Young et al., 2007). Ten studies had ‘certain’ incentives (i.e. practices were guaranteed the reward if they successfully achieved targets) (Chien et al., 2012; Fagan et al., 2010; Mandel & Kotagal, 2007; Gulliford et al., 2007; Kontopantelis et al., 2013; LeBlanc et al., 2017; Pape et al., 2015; Rosenthal et al., 2005; Vamos et al., 2011; Young et al., 2007). One scheme had an ‘uncertain’ chance of receiving the financial incentive if they changed their behaviour at the start of the scheme (years 2003-2004) as the

payments were only paid to top scoring groups (Conrad et al., 2013). In the second phase of the scheme (years 2005-2007) this was altered and all groups had a certain chance of receiving a payment if they changed their behaviour. Beck et al.'s (2004) study of children with diabetes in Oklahoma showed practices had an uncertain chance of receiving a return on the amount spent on the incentive case management scheme, as it depended on whether, and how many times, the participant was re-hospitalised.

5.4.4.3 Target and frequency

All schemes focussed on “process” behaviours, which are clinician actions that are likely to improve health outcomes. All of the studies included in this review assessed the impact of financial incentives on clinician behaviour. There were four studies that focussed on a single condition, asthma or diabetes (Beck et al., 2004; Chien et al., 2012; LeBlanc et al., 2017; Mandel & Kotagal, 2007). The rest of the studies looked at multiple condition schemes which included diabetes (Conrad et al. 2013; Fagan et al., 2010; Gulliford et al., 2007; Kontopantelis et al., 2013; Pape et al., 2015; Rosenthal et al., 2005; Vamos et al., 2011; Young et al., 2007). Two schemes (Beck et al., 2004; Chien et al., 2012) incentivised all instances of the behaviour and the remaining studies had some instances incentivised as they had to reach percentage targets (Conrad et al., 2013; Fagan et al., 2010; Gulliford et al., 2007; Kontopantelis et al., 2013; LeBlanc et al., 2017; Mandel & Kotagal, 2007; Pape et al., 2015; Rosenthal et al., 2005; Vamos et al., 2011; Young et al., 2007).

5.4.4.4 Immediacy and schedule

The financial incentive framework (Adams et al., 2014) defines immediacy as how soon the recipient receives the incentive payment after the behaviour. If the time between behaviour and reward is too long, recipients may not link the two and the incentive will not be effective. Eight of the included schemes paid incentives on an annual basis (Chien et al., 2012; Conrad et al., 2013; Fagan et al., 2010; Gulliford et al., 2007; Kontopantelis et al., 2013; LeBlanc et al., 2017; Pape et al., 2015; Vamos et al., 2011; Young et al., 2007). Two studies reported an explicit link between performance and payment; Rosenthal et al.

(2005) described a scheme which paid a quarterly bonus of \$0.23 per member per month for each performance target that was met or exceeded by the physician group and Chien et al. (2012) reported that practices received \$100 for each patient for which missing care processes were completed. It was unclear in the article by LeBlanc et al. (2017) as to when the physicians received the payment for achieving the target of two HbA1c tests per year.

In the only asthma study included (Mandel and Kotagal, 2007), the Cincinnati asthma improvement collaborative comprised of three stages with two different payment phases: all awards were assessed on 31 December 2004 and first-level fee schedule increases implemented from 1 May 2004 through to 31 December 2005; second and third-level fee schedule increases effective from 1 March 2005, through to 31 December 2005.

Beck et al. (2003) developed a 15-month scheme with a less tangible reward of reduced healthcare costs, where they calculated financial impact of participation in the programme versus the healthcare costs per participant and non-participant.

5.4.4.5 Recipients

Although all studies looked at a financial incentive paid to either the clinician or the practice, the papers differed in the way in which they reported numbers of study participants: nine articles noted number of patients (Beck et al., 2004; Chien et al., 2012; Conrad et al., 2013; Fagan et al., 2010; Gulliford et al., 2007; Kontopantelis et al., 2013; LeBlanc et al., 2017; Mandel & Kotagal, 2007; Vamos et al., 2011); seven referred to the number of practices/medical groups (Chien et al., 2012; Conrad et al., 2013; Fagan et al., 2010; Gulliford et al., 2007; Kontopantelis et al., 2013; LeBlanc et al., 2017; Mandel & Kotagal, 2007; Vamos et al., 2011); one study discussed a primary care trust (administrative body responsible for primary healthcare services in England) (Pape et al., 2015) and one discussed number of physicians (Young et al., 2007). Fagan et al. (2010) described an intervention for individuals with diabetes aged 65 years plus, two studies focussed on a targeted population of children (Beck et al., 2004; Mandel & Kotagal, 2007) and Chien et al. (2012) evaluated the

impact of a scheme which targeted lower socio-economic populations. Table 11, Table 12 and Table 13 show the studies grouped together by the impact of the intervention on outcomes (positive, no effect, negative), none of the framework domains were identified as being consistently associated with an effective intervention.

5.4.5 Authors' conclusions

The schemes did not identify a feature which was consistently associated with an effective intervention. I summarised the authors' conclusions in order to explore what the researchers observed as barriers and facilitators to the effectiveness of their intervention (Table 14). Eight of the articles highlighted the importance of infrastructure and human resources (Chien et al., 2012; Fagan et al., 2010; Gulliford et al., 2007; LeBlanc et al., 2017; Mandel & Kotagal, 2007; Rosenthal et al., 2005; Vamos et al., 2011; Young et al., 2007). There was an emphasis on understanding the patient population, particularly subsets of the population that may require specialised care, such as: newly diagnosed patients (Kontopantelis et al., 2012; LeBlanc et al., 2017); patients with comorbidities (Chien et al., 2012; Kontopantelis et al., 2012; LeBlanc et al., 2017) and patients from areas of high deprivation (Chien et al., 2012; Gulliford et al., 2007; Kontopantelis et al., 2012). Complex interventions take time to become part of routine practice (or 'normalized') so sufficient time needed to have passed before an evaluation of the interventions' effectiveness could detect optimal change (Chien et al., 2012; Rosenthal et al., 2005; Young et al., 2007). Collaborative working was identified as being a facilitator to a scheme's effectiveness by four studies (Beck et al., 2004; Conrad et al., 2013; Fagan et al., 2010; Mandel & Kotagal, 2007). Five studies discussed the importance of the size of the incentive and how it should correspond to the work needed to be undertaken in order to achieve the target (Conrad et al., 2013; Fagan et al., 2010; Kontopantelis et al., 2012; Rosenthal et al., 2005; Young et al., 2007).

Table 11: Features of the financial incentives framework utilised in studies with positive results in both implementation and health outcomes

Study	Direction	Form	Magnitude	Certainty	Target Behaviour	Frequency of reward	Immediacy	Schedule	Recipient
Beck (2004)	Avoidance of penalty	Healthcare costs	Variable	Uncertain	Process	All	Unclear	Variable	Clinician
Gulliford (2007)	Positive reward	Cash	Set £ value per point	Certain	Process	Some	Annually	Variable	Clinician
Kontopantelis (2012)	Positive reward	Cash	Set £ value per point	Certain	Process	Some	Annually	Variable	Clinician
LeBlanc (2017)	Positive Reward	Cash	Set \$ value per patient	Certain	Process	All	Ongoing	Fixed	Clinician
Mandel (2007)	Positive reward	Cash	Fee schedule %	Certain	Process	Some	Unclear	Variable	Clinician

Table 12: Features of the financial incentives framework utilised in studies with no effect results in both implementation and health outcomes

Study	Direction	Form	Magnitude	Certainty	Target Behaviour	Frequency of reward	Immediacy	Schedule	Recipient
Chien (2012)	Positive reward	Cash	Fee schedule %	Certain	Process	All	Annually	Fixed	Clinician
Fagan (2010)	Positive reward	Cash	Capitation fee %	Certain	Process	Some	Annually	Variable	Clinician
Pape (2015)	Positive reward	Cash	Set £ value per point	Certain	Process	Some	Annually	Variable	Clinician
Rosenthal (2005)	Positive reward	Cash	Set \$ value per patient	Certain	Process	Some	Quarterly	Fixed	Clinician
Vamos (2011)	Positive reward	Cash	Set £ value per point	Certain	Process	Some	Annually	Variable	Clinician
Young (2007)	Positive rewards & avoidance of penalty	Cash	% of incentive pool comprised of physician fees	Certain	Process	Some	Annually	Variable	Clinician

Table 13: Features of the financial incentives framework utilised in studies with negative results in both implementation and health outcomes

Study	Direction	Form	Magnitude	Certainty	Target Behaviour	Frequency of reward	Immediacy	Schedule	Recipient
Conrad (2013)	Positive reward	Cash	Revenue %	Certain	Process	Some	Annually	Variable	Clinician

Table 14: Summary of authors' conclusions

Author, date, country, LTC, impact	Conclusions
Beck et al. (2004) USA Diabetes Positive	<ul style="list-style-type: none"> • Working with third-party payers to produce an intervention has the potential to reduce financial burden of paediatric diabetes care • Lack of understanding about preventative schemes from payers
Chien et al. (2012) USA Diabetes No effect	<ul style="list-style-type: none"> • Adequate time is required for physicians to respond to scheme before measuring effectiveness • Young people and individuals with comorbidities require individualised outreach and management • Providers require specialised training relevant to provide culturally tailored programs • Targets need to be tailored to practice population and environment • Sufficient quality improvement program support required • Incentive size should reflect practice commitments to improving quality (tailored to practice population and settings)
Conrad et al. (2013) USA Diabetes Negative	<ul style="list-style-type: none"> • Medical advisory group with leaders from practices could have encouraged spread of quality • Size of the incentive is important • Involvement of large party payers had no impact • Scheme was not well-aligned with existing compensation methods • Group nature of incentive was a limitation • No penalties may contribute to failure to improve outcomes
Fagan et al. (2010) USA Diabetes No effect	<ul style="list-style-type: none"> • Size of the incentive is important • Context of intervention is associated with the effects • Practice “champions” are effective leaders in implementation • Practice factors including: access to services; patient-physician ratio and support staff increase understanding of findings • Defined job role and job satisfaction of co-ordinators important
Gulliford et al. (2007) UK	<ul style="list-style-type: none"> • Organisation of services at practices explains variation in outcome performance • Targets tailored to practice population and environment

Diabetes Positive	<ul style="list-style-type: none"> • Smaller patient to GP ratio practice provided higher quality care • Access to services is lower in areas of high deprivation contributing to lower target achievement • Clinical information, staff training and practice management potentially contribute to chronic illness management systems.
Kontopantelis et al. (2012) UK Diabetes Positive	<ul style="list-style-type: none"> • Practices in affluent areas responded more quickly to scheme • Patients in deprived areas and inequalities between populations were less likely to benefit from scheme • Newly diagnosed patients require more time to establish glycaemic control • Women and younger people recorded as receiving poorer care • Patient with co-morbidities receive more care • Size of incentive is important
LeBlanc et al. (2017) Canada Diabetes Positive	<ul style="list-style-type: none"> • Patients with least complex conditions more likely to be treated • Female physicians more likely than male physicians to deliver HbA1c tests • Targets should assess changes depending on initial HbA1c levels • Highlight importance of understanding context • Newly diagnosed patients require more time to establish glycaemic control
Mandel & Kotagal (2007) USA Asthma Positive	<ul style="list-style-type: none"> • Incentive for all participants for committing to and investing resources in improvement efforts. • Incentive for achieving “group-level” performance to encourage collaborative working • Support from large commercial or government payers can positively impact providers focus • Additional incentives for extreme high achievers to continually encourage improvement • Reward improvement capability and sustainability behaviours i.e. electronic register of patient population
Pape et al. (2015) UK Diabetes No effect	<ul style="list-style-type: none"> • Measures required to control exception reporting • Balance needed between incentives for better care and monitoring costs

Rosenthal et al. (2005) USA Diabetes No effect	<ul style="list-style-type: none"> • Adequate time is required for physicians to respond to scheme before measuring effectiveness • Incentivise improvement from baseline and target achievement • Size of incentive is important • Investment in infrastructure and human resources required • Incentive design matters
Vamos et al. (2011) UK Diabetes No effect	<ul style="list-style-type: none"> • Different size practices have different strengths and no size benefits from incentives more • Self-management outcomes (e.g. HbA1c) may be more sensitive to the practice's organisational characteristics.
Young et al. (2007) USA Diabetes No effect	<ul style="list-style-type: none"> • Adequate time is required for physicians to respond to scheme before measuring effectiveness • Efficient infrastructure is integral to improving quality of care • Size of incentive is important

5.5 Discussion

5.5.1 Statement of principal findings

A total of 12 papers (three diabetes; one asthma; eight multiple condition schemes including diabetes but not asthma) reporting on supported self-management interventions met the inclusion criteria and were included in the review. The impact of financial incentives paid to healthcare professionals for implementing supported self-management to patients with asthma or diabetes is inconsistent. Although most showed no effect (Chien et al., 2012; Fagan et al., 2010; LeBlanc et al., 2017; Pape et al., 2015; Rosenthal et al., 2005; Vamos et al., 2011; Young et al., 2007) or a positive impact (Beck et al., 2004; Gulliford et al., 2007; Kontopantelis et al., 2013; LeBlanc et al., 2017; Mandel & Kotagal, 2007) on implementation or health outcomes, one study targeting organisational processes showed a negative effect on the proportion of people receiving HbA1c testing (Conrad et al., 2013). No articles were found which

analysed the impact of financial incentives on individual patient behaviour outcomes. None of the nine domains of the financial incentives framework (Adams et al., 2014) were consistently associated with positive or negative findings which implies the individual features of the healthcare schemes were not predictors of their effectiveness. Instead authors highlighted the importance of context. Understanding the patient population, practice location and amenities, the size of incentive relative to effort and baseline levels, and collaborative working with commercial and/or government partners were all identified by several authors as facilitators to the schemes' effectiveness.

5.5.2 Interpretation of findings in relation to previously published work

5.5.2.1 Inconsistent results

The schemes in the included studies showed varied impact on organisational results.

Effective implementation strategies involve a multifaceted approach accommodating patient, professional and organisational aspects (Taylor et al., 2014) but financial incentive schemes do not incorporate all of these aspects. Typically, financial incentive schemes focus on the professionals (e.g. QOF) or the patients (Giuffrida & Torgerson, 1997) separately but do not take a whole systems approach which is required for successful implementation.

5.5.2.2 Impact of context

The authors' conclusions suggest that it is not specific features of the scheme that were key to determining an intervention's effectiveness, but the context in which the intervention is being implemented. Understanding is required about the practice, including staff and infrastructure (Chien et al., 2012; Fagan et al., 2010; Gulliford et al., 2007; LeBlanc et al., 2017; Mandel & Kotagal, 2007; Rosenthal et al., 2005; Vamos et al., 2011; Young et al., 2007), the patient population (Chien et al., 2012; Gulliford et al., 2007; Kontopantelis et al., 2012; LeBlanc et al., 2017) and support needed from internal and external colleagues (Beck et al., 2004; Conrad et al., 2013; Fagan et al., 2010; Mandel & Kotagal, 2007) as these are critical to the success of an intervention.

Transplanting an intervention from one place or one condition to another will affect the impact as one size does not fit all.

There has been criticism that financial incentive schemes are more likely to reward already high performing practices and potentially demotivate practices that are struggling to perform (Rosenthal et al., 2005). Suggestions to counteract this are to provide targets that are measuring improvement from baseline (LeBlanc et al., 2017; Rosenthal et al., 2005) or provide extra incentives for high achievers (Mandel & Kotagal, 2007). It is often the areas with the least access to satisfactory healthcare that are in the greatest need (Hart, 1971; Leese & Bosanquet, 1995) and support from external partners such as commercial or government can be beneficial (Beck et al., 2004; Felt-Lisk et al., 2007; Mandel & Kotagal, 2007), however Conrad et al. (2013) reported large third party payers having no influence on the results of the scheme in their study.

5.5.2.3 Targeting specific conditions

Flodgren et al. (2011) completed an overview of systematic reviews evaluating the impact of financial incentives on healthcare professionals' behaviour and patient outcomes. They found that financial incentives were "generally effective" in improving processes of care and in providing care for a patient or specific population. Of the studies included in my review one described an asthma-only intervention and three included diabetes only schemes (Beck et al., 2004; Chien et al., 2012; LeBlanc et al., 2017; Mandel & Kotagal, 2007). Three out of the four studies reported a positive impact from the intervention on organisational processes (Beck et al., 2004; LeBlanc et al., 2017; Mandel & Kotagal, 2007). Only one of the studies reported a positive impact on health outcomes (Beck et al., 2004), and the other two diabetes studies showed no significant effect (Chien et al., 2012; LeBlanc et al., 2017). The asthma study did not measure any health outcomes.

Eight of the included studies looked at multiple condition schemes but only three included the results from other conditions in addition to their diabetes results (Conrad et al., 2013; Pape et al., 2015; Rosenthal et al., 2005). Conrad

et al. (2013) was the only article reporting a negative effect of financial incentives on quality indicators and this was consistent across four of the conditions included: diabetes; asthma; cervical cancer and coronary artery disease. The only positive parameter reported in this study was the use of blood pressure medication (ACE-inhibitors) in patients with diabetes, but there was a significant negative effect on HbA1c and LDL cholesterol testing among patients with diabetes. Rosenthal et al. (2005) reported an increase in cervical cancer screening due to a financial incentive scheme but no increase in mammography rates or HbA1c testing. Pape et al. (2015) found that increases in target achievements in hypertension, coronary heart disease and diabetes could be attributed to increased exception reporting of patients. Only the indicator measuring blood pressure of less or equal to 150/90 in patients with a history of stroke improved significantly and not affected by exception reporting.

Evidence has shown that quality of care for asthma and diabetes improved significantly after the introduction of QOF compared to coronary heart disease, which improved but not significantly (Campbell et al., 2007). This analysis was extended two years later and found that quality of care for coronary heart disease and asthma plateaued whereas diabetes quality of care continued to increase but less rapidly than immediately after the introduction of QOF (Campbell et al., 2009). Diabetes related outcomes have improved with the introduction of QOF (Oluwatowoju et al., 2010; Khunti et al., 2007; Ryan & Doran, 2012), however, there is not the same evidence base for asthma or other conditions included in the QOF which suggests that results for diabetes quality of care are not generalisable to other conditions.

5.5.2.4 Relationship to financial incentive framework domains

The financial incentive schemes were diverse and incorporated features across all the domains of the financial incentives framework (Adams et al., 2014). It was difficult to draw conclusions on which type of scheme was the most effective in changing healthcare professionals' behaviour in relation to providing supported self-management to individuals with asthma or diabetes.

Four of the studies that reported no statistically significant effect noted that the magnitude of the financial incentive might have contributed to the lack of effect (Chien et al., 2012; Conrad et al., 2013; Fagan et al., 2010; Rosenthal et al., 2005). This is supported by findings from Iezzi et al. (2014), who noted the importance of the size of the incentive. If the health care professional deems the size of the incentive too modest for the effort and money required to achieve the expected targets, they are unlikely to change their behaviour. The only paper with a negative effect from implementing a pay for performance scheme highlighted the modest size of the incentive as a major factor in the lack of success of the scheme (Conrad et al., 2013). Another factor that Conrad et al. (2013) mentioned as being significant is whether the incentive is targeted to the group or to the individuals, with the latter being more successful in achieving desired behaviour change. However, Eijkenaar (2013) found that group incentives were preferred to individual incentives. Therefore, considering not only the magnitude of the incentive is important for its effectiveness but also who is in receipt of the incentive.

5.5.2.5 Unintended consequences

The one paper illustrating a negative result is a reminder that providing financial incentives may have unintended consequences and the implementation of financial incentive schemes must be approached with caution. Previous work (Glasziou et al., 2012) has identified the potential negative impact of financial incentive schemes and produced a checklist to prevent inappropriate implementation. Glasziou et al.'s (2012) checklist consists of nine questions and is divided into two parts: "Part A: Is a financial incentive appropriate?" and "Part B: Implementation". All six questions in Part A must be answered yes before continuing to considering implementation in Part B. One question in the checklist addresses the potential for unintended consequences and specifically highlights harm to the patient-clinician relationship. They provide evidence from a report showing that some UK clinicians became reluctant to register patients with complex poorly controlled conditions that would make it difficult for them to achieve their QOF targets (McDonald et al., 2010). Within QOF guidelines, practices are able to exclude

patients from their reporting if the intervention is considered inappropriate, or is declined by the patient. Two studies identified overuse of 'exception reporting' as a strategy for potentially achieving more favourable results (Gulliford et al., 2007; Pape et al., 2015). Gulliford et al., (2007) raised concerns that an increase in 'excepted' cases was a potential reason for high QOF achievements. Pape et al., (2015) found that with the introduction of QOF+ (a UK scheme with more ambitious targets than the national QOF scheme), 'exception reporting' increased significantly in the indicators for HbA1c and concluded that financial incentive schemes had no significant effect. When applying the financial incentives framework (Adams et al., 2014) to schemes for clinicians, the 'Recipient' domain does not take into consideration the patient population or whether the scheme was targeted at a specific population. For example, lower socio-economic status was a population identified by two authors as having barriers which require additional support (Gulliford et al., 2007; Rosenthal et al., 2005).

5.5.2.6 Impact on inequalities

Glazsiou et al.'s (2012) checklist for implementing a financial incentive scheme identifies the importance of understanding and assessing the potential barriers to changing clinician behaviours. Evidence has shown that while financial incentives have the potential to reduce the inequalities in achievement related to area deprivation, differences do still exist (Doran et al., 2008) and must be taken into consideration when designing future financial incentive schemes aimed at clinician behaviour. Conrad et al. (2013) found higher Deyo scores (a clinical comorbidity index (Deyo et al., 1992)), in patients with diabetes were positively related to HbA1c testing which supports evidence from Millett et al. (2009) who found that individuals with diabetes who had comorbidities were more likely to benefit from a pay for performance scheme than those who did not. However, these benefits did not extend to African and South-Asian patients. This differs from Chien et al.'s (2012) findings which found that younger adults with diabetes who had co-morbidities were less likely to receive the recommended level of care, and had a higher likelihood of accessing secondary care through hospitalisation or emergency department attendance.

This area needs more exploration, especially as individuals with co-morbidities have a higher incidence of being excluded from targets due to exception reporting (Dalton et al., 2011). Ethnicity and co-morbidities also need to be considered when developing financial incentive schemes and providing care. The importance of tailoring incentive schemes and care to different populations should not be underestimated, and it is essential that healthcare providers are involved in programme design to ensure that the schemes are tailored to the setting and patient populations (Eijkenaar, 2013; Flodgren, 2011). The number of conditions targeted by the scheme, a domain which is not included in the financial incentives framework (Adams et al., 2014), was not consistently associated with positive or negative findings, and further research is required into whether an incentive scheme focussing on a single condition rather than multiple conditions would produce more positive results. Of the three papers in this systematic review that focussed on a single condition, two reported positive results (Beck et al., 2004; Mandel & Kotagal, 2007). The paper which showed no effect in a narrowly focussed scheme commented that the incentive amount and programme support may not have been substantial enough to successfully influence behaviour change (Chien et al., 2012). However, there is evidence to suggest that having a narrowly focussed patient population that is well defined is likely to be more beneficial (Iezzi et al., 2014).

5.5.2.7 Improved care vs improved coding

Financial incentives should target organisational processes such as information systems or quality reporting guidelines that require improvement (Dudley, 1998), however it is important to look at disease control and organisational processes holistically rather than as individual components. Previous research has identified that providing physicians with incentives to improve their organisational processes may not improve the patient's disease control (Coleman et al., 2007). By incentivising clinicians to arrange two HbA1c tests a year for patients with diabetes, there was an increase in the number of tests provided to patients, but no improvement in blood sugar control. Campbell et al. (2007) identified that QOF could have promoted better record keeping in primary care rather than an increase in quality of care, as it

is self-reporting on care recorded and not on care provided. Also, there is the potential that by incentivising practices to provide rapid appointments in a bid to see more patients, this can negatively impact patients' experience and their continuity of care (Campbell et al., 2010).

5.5.3 Strengths and limitations

The heterogeneity of methodologies used in studies investigating financial incentives paid to health care professionals for providing self-management education to their patients with asthma or diabetes, adds a layer of complexity to assessing the weight that can be given to the individual studies. Therefore, the approach of Pinnock et al. (2015) was adopted and papers were classified by robustness of methodology, number of participants and quality score. A number of questions on the quality checklist employed in this review (Downs & Black, 1998) were not appropriate for the papers included which led to low quality scores. A recently published quality standard for reporting implementation studies may in the future form the basis of a more appropriate quality assessment for implementation research (Pinnock et al., 2017).

All studies were conducted in either the United States of America, Canada or the UK which limits the generalisability of the findings. Research looking at financial incentives aimed at healthcare professionals uses data provided by clinicians, either self-reported or through routine data collected via computer systems, in the majority of cases, which presumes that all information provided is accurate and truthful and, in the case of routine data, is susceptible to changes in coding.

All the studies were non-randomised studies which are inherently more biased than randomised control trials (Peinemann et al., 2013), though the risk of bias in the included studies was assessed as low or unclear in the majority of the studies. Selection bias, purposive sampling, and selective outcome reporting were also identified in the selected studies.

Funnel plots to measure the extent of publication bias were not possible as a narrative analysis, not a meta-analysis, was completed due to the

heterogeneity of the study designs. However, the results of the included studies were a mixture of positive, no effect and negative on health and process outcomes in relation to supported self-management of asthma or diabetes, which suggests that there was not a high percentage of publication bias (Song et al., 2013).

Time and resource constraints meant that the initial screening of title and abstracts was conducted by a single reviewer. However, training and quality assessment were undertaken on 5% of the title/abstracts screened to reduce subjectivity and minimise potential inaccuracies. Full text screening and data extraction was completed by two reviewers.

5.6 Conclusion

The evidence provided in this systematic review showed mixed results as to whether financial incentives have an impact on behaviour change in healthcare professionals to provide supported self-management to individuals with asthma or diabetes. Due to the diversity of the schemes, it is difficult to draw conclusions on what aspects of the incentives are most effective. However, size of financial incentives, exception reporting and socio-economic status of patient population were all reported as being influential. The number of conditions in an incentive scheme, i.e. targeted on one condition or multiple condition scheme, was not associated with the success of the scheme. In addition, context of scheme including: practice infrastructure; human resources; collaborative working were all identified as being influential in the effectiveness of incentive schemes. Authors also highlighted the need for a reasonable timescale between implementation and evaluation to allow for interventions to become 'normalized' prior to measuring their effectiveness. Further research is required in order to understand the complex nature of behaviour changing interventions on healthcare professionals in relation to increasing self-management in individuals with asthma or diabetes.

5.7 Summary and next steps

In this chapter I have reported on the results of my systematic review detailing the evidence investigating the impact of financial incentives on implementation outcomes, health outcomes and individual behaviour outcomes for individuals with asthma or diabetes.

What has emerged from this systematic review is the need for greater investigation looking at financial incentive schemes focussed on supported self-management for asthma. While there are a number of qualitative studies exploring practitioner perspectives on financial incentives (Campbell et al., 2011; McDonald et al., 2007), none have looked specifically at the LES, which emerged due to recognition of specific healthcare needs for a certain population and implemented at a local level. What is lacking is an exploration of clinician and administrative staff perspectives on asthma focussed financial incentives targeting supported self-management, and their impact on clinician behaviour and asthma care. Therefore, a mixed methods approach was deemed most appropriate for exploring the impact of the LES in Northern Ireland.

None of the features of the financial incentive framework appear to be significantly influential in determining the success of a financial incentive scheme. However, the conclusions of the authors suggested that context was an important factor in the impact of a financial incentive scheme.

In the next chapter I discuss the context of Northern Ireland and detail the trends observed in routine data collected by Northern Ireland's Public Health Agency on asthma management plan provision rates, asthma related hospitalisations and asthma morbidity across the five Local Commissioning Groups in Northern Ireland.

Chapter 6 Context of Northern Ireland and supporting quantitative data

6.1 Introduction

The previous chapter detailed the results of my systematic review discussing the evidence investigating the impact of financial incentives on the implementation of asthma and/or diabetes self-management. While studies reported mixed results on the effectiveness of the financial incentive schemes on implementation outcomes and health outcomes, the authors' conclusions highlighted the importance of context. This chapter outlines the context of Northern Ireland and reports findings of my quantitative study using routine data from Northern Ireland's Public Health Agency and Health and Social Care Board.

6.2 Health and social care in Northern Ireland

Northern Ireland is one of the four countries that make up the United Kingdom (UK). It is situated on the North East of the island of Ireland, sharing a land border with the Republic of Ireland and is comprised of six counties (Fermanagh, Antrim, Armagh, Down, Tyrone and Derry/Londonderry). It is the smallest nation within the UK with an estimated population of 1,862,100 in 2016, 2.9% of the UK Population (Office for National Statistics, 2017), and has increased by 173,299 (10%) between 2001 and 2016 (Figure 6).

Since 1974, health and social care have been provided as an integrated service in Northern Ireland delivered by the Health and Social Care Board (including five Local Commissioning Groups) and six Health and Social Care Trusts, and funded by the Department of Health, one of nine Northern Ireland Government Departments (Figure 7). Health care in Northern Ireland is free and residents are not advised of the cost of their care or treatment, with prescription charges being phased out in 2010.

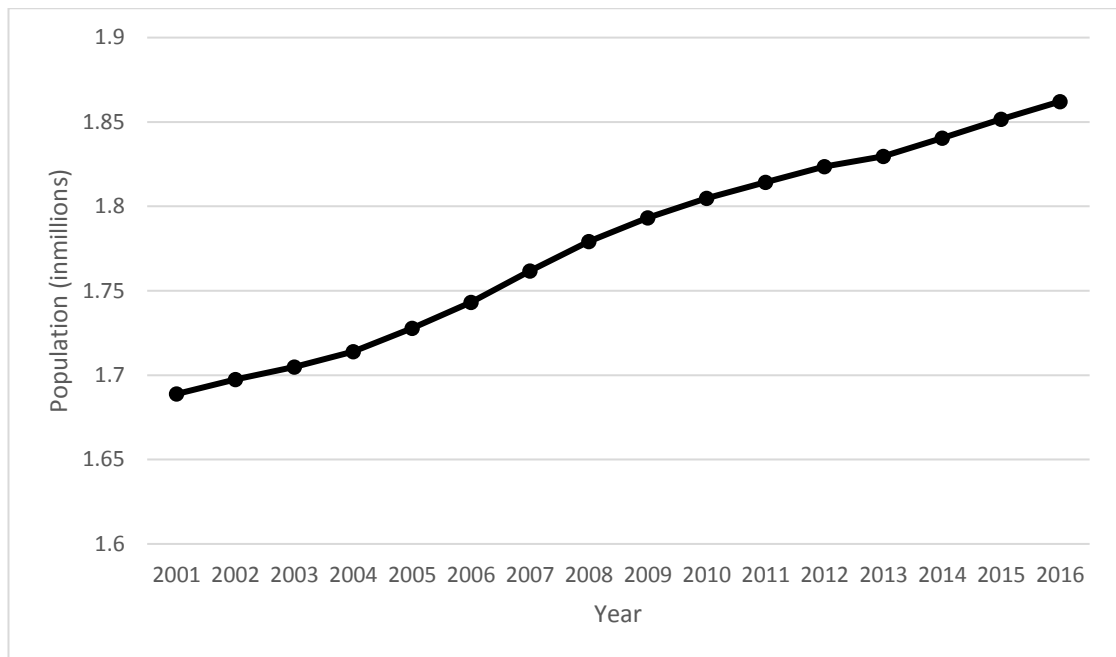


Figure 6: Graph showing population estimates for Northern Ireland 2001-2016

The original four Health and Social Services Boards were reorganised in 2009 under the Health and Social Care (Reform) Act (Northern Ireland) into a single Board with the establishment of five Local Commissioning Groups to work in parallel with five Health and Social Care Trusts. A sixth Health and Social Care Trust is the Northern Ireland Ambulance Service who provide emergency, urgent and primary care services throughout Northern Ireland. Oversight of health and social care within Northern Ireland is now the responsibility of the Public Health Agency.

GP providers are contracted directly by the Health and Social Care Board, from whom they receive their funding and to whom they are directly accountable. The five Local Commissioning Groups (Belfast; Northern; South Eastern; Southern and Western) are responsible for the commissioning of services to address the health and social care needs of their local population within the same geographical area as their Health and Social Care counterparts (Figure 8). The Health and Social Care Trusts manage and administer hospitals, health centres, residential homes, day centres and other care facilities.

The duty of the Department of Health is to promote a health care system designed to secure the improvement of mental and physical health of the population of Northern Ireland and increase prevention, diagnosis and treatment of illness. Their role also includes improving the provision of social care to the people of Northern Ireland resulting in increased social well-being. The Health and Social Care Board identifies health needs through the Local Commissioning Groups and purchases care from the six Health and Social Care Trusts for the respective geographical areas.

At the time of writing this thesis, there has been political deadlock in Northern Ireland since January 2017, when the Northern Ireland Assembly collapsed due to the resignation of deputy First Minister Martin McGuinness in protest at the First Minister Arlene Foster's role in the controversial Renewable Heat Incentive scheme. The absence of an Executive means all funding allocation decisions are the responsibility of the Northern Ireland Civil Service, including funding for health and social care services. The Secretary of State for Northern Ireland has chaired talks between the two main political parties in Northern Ireland, the Democratic Unionist Party and Sinn Féin, with cross border support from the Irish Government, however this has had little success. The previously set deadline to re-establish the Executive, October 2017, has passed and, in lieu of an Executive, the Secretary of State for Northern Ireland had to legislate for the Northern Ireland Budget 2017-2019 (Bowers, 2017). A YouGov poll, commissioned by the Royal College of General Practitioners, reported that over 80% of people in Northern Ireland were concerned about potential delays in essential healthcare improvements as a result of the political instability (Higgins, 2018).

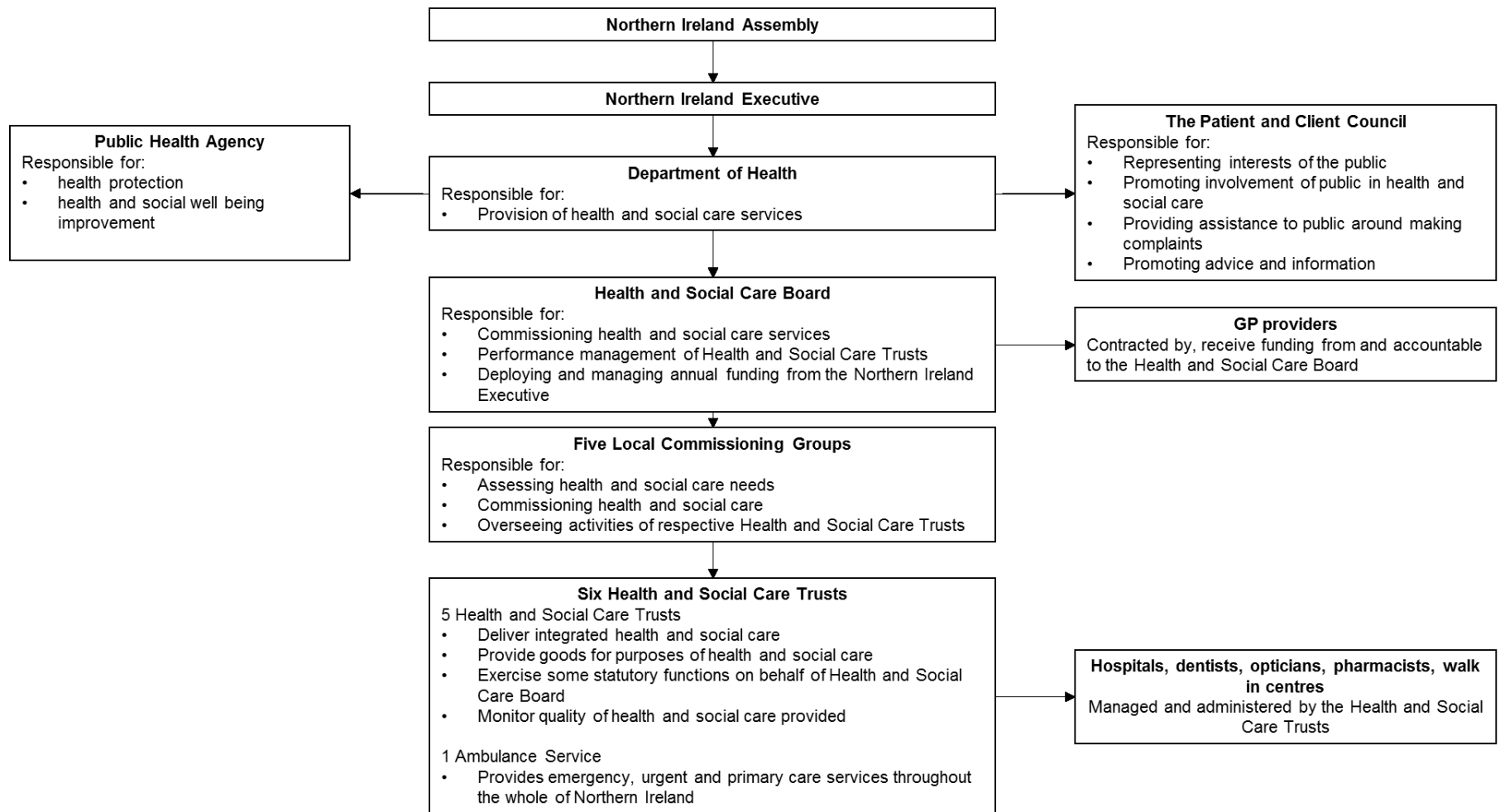


Figure 7: Outline of Health and Social Care structure in Northern Ireland

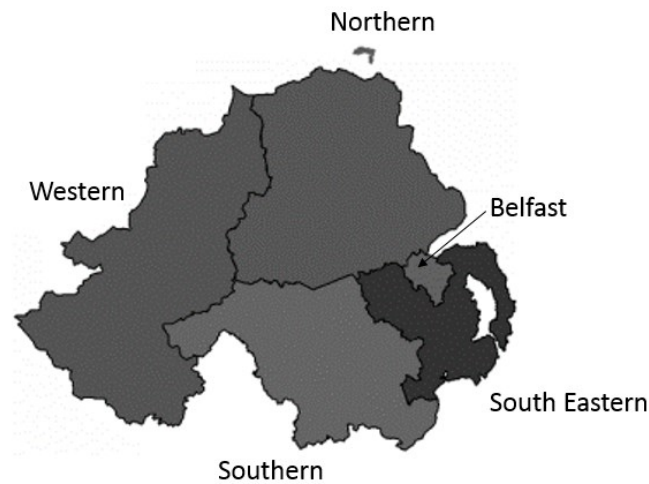


Figure 8: Map of the five Local Commissioning Group and Health and Social Care Trust areas in Northern Ireland

6.2.1 Primary care in Northern Ireland

As of January 2018 there were 337 primary care practices in Northern Ireland delivering care to 1,970,735 registered patients (Table 15), with practice lists ranging from 1,208 to 15,139 patients (OpenDataNI, 2018). Compared to England where there are 80 GPs per 100,000 patients, Northern Ireland has only 65 GPs per 100,000 patients and has the highest health needs of the four United Kingdom nations (National Audit Office, 2012). Despite this, practices in Northern Ireland and Scotland were more likely to score better than England or Wales on the QOF, a differential that remained in Northern Ireland even when exception reporting was taken into consideration (National Audit Office, 2012).

6.2.1.1 GP Led Care Working Group

A GP-led Care Working Group was established in October 2015. Led by Department of Health officials it brought together General Practice, Nursing, Allied Health Professionals, and Health and Social Care Trusts to look at issues concerning primary care in Northern Ireland (Department of Health, 2015). Their recommendations identified the key role primary care plays in providing a fully integrated health and social care service to the people of Northern Ireland, highlighting the need to increase allocated funding and

Table 15: Number of practices and registered patients in Northern Ireland and the five Local Commissioning Groups in 2017

Area	Patients registered	Practices
Northern Ireland	1,970,735	337
Northern	465,967	75
Southern	400,072	73
South Eastern	340,566	56
Western	328,222	50
Belfast	435,908	82

reduce unnecessary bureaucracy that was prohibiting the provision of health care to patients (Department of Health, 2016). In addition to the political instability present in Northern Ireland, hundreds of GPs in Northern Ireland signed undated letters of resignations in December 2016 due to concerns surrounding inadequate funding and strain on primary care workforce. GPs worked with the Northern Irish Health Minister to agree a “rescue package” which included increased GP training places and undergraduate medical students spending more time in general practice in a bid to create more interest in a career as a GP (BBC News, 2017). However, due to the lack of a Northern Ireland Executive, this “rescue package” remains unfulfilled.

6.2.1.2 GP Federations and Integrated Care Partnerships

Under the Transforming Your Care: A Review of Health and Social Care in Northern Ireland initiative (Health and Social Care, 2013), more treatments were transferred to primary care and the GP Federations, developed and funded by family doctors, were set up to help deliver these changes by supporting primary care practices. Under the 17 GP Federations, GP practices maintain full autonomy, with no staff sharing, but work in collaborative GP Federations.

For example, if the GP Federation decided to undertake a certain process, then it would be expected that all GPs within the Federation would comply but this is not mandatory or enforceable. The Health and Social Care Board agreed with the formation of the GP Federations, on condition that they work

in conjunction with 17 Integrated Care Partnerships. Integrated Care Partnerships are multi-disciplinary networks consisting of primary and secondary care staff; social workers; voluntary and community sectors; local council representatives; service users and carers (Health and Social Care Board, 2018). These partnerships work collaboratively to identify and target care to people most in need; support care providers; review planning and delivery of health and social care to ensure benefits are achieved.

6.3 Northern Ireland Local Enhanced Service for Chronic Respiratory Conditions (LES)

Northern Ireland's Local Enhanced Service for Chronic Respiratory Conditions (LES) includes a scheme which pays a financial incentive to general practices that provide self-management education, including the provision of an action plan to people with asthma (Department of Health, Social Services, and Public Safety, 2008). Asthma UK (2013), estimated that the proportion of people with asthma who own an action plan in Northern Ireland was 60%, which is double the proportion in Scotland, and identified the LES as the major contributor to this.

6.3.1 Background

The LES evolved from healthcare providers and the Public Health Agency in Northern Ireland wanting to improve the standard of care provided to individuals with respiratory conditions (Figure 9). They reviewed existing organisational processes and identified areas requiring improvement to facilitate higher quality care for respiratory patients. Providing an enhanced service within primary care, with a focus on self-management, could lead to a reduction in use of secondary care resources including emergency admission to hospitals. Motivated by providing high quality care to patients, in the early 1990s one GP and one practice nurse started to provide specialist respiratory care to patients in a primary care practice in the Eastern Health and Social Care Board (now the South Eastern Local Commissioning Group area). Appraisal of this work identified that enhanced respiratory care in GP practices was feasible and could be effective in improving overall quality of care provided

to respiratory patients, and in 1996 the Eastern Health and Social Care Board developed a Directed Enhanced Service based on this work.

A report published by the Public Health Agency in the mid-1990s made recommendations for a number of different respiratory services that Health Boards should provide including: smoking cessation; non-invasive ventilation; specialist respiratory nurses; pulmonary rehabilitation. Each of the Health Boards in Northern Ireland adopted the recommendations, adapting them for their individual areas. These adaptations resulted in different respiratory services being provided in different areas of Northern Ireland. These area-specific enhanced services then combined from the different services to develop the first Northern Ireland Directed Enhanced Service for Long Term Conditions which had chronic obstructive pulmonary disease, asthma and obesity as its priorities. This Directed Enhanced Service further evolved to focus on chronic obstructive pulmonary disease and asthma, published by the Department of Health and Social Services in 2008 as the Respiratory Framework. The respiratory key performance indicators of the Enhanced Service targeted processes recommended in clinical guidelines but not included in the QOF, such as the provision of an asthma action plan. Action plans have been included as a form of measurement since the inception of enhanced respiratory services within Northern Ireland in 2008.

Standard 21 in the Department of Health, Social Service's and Public Safety's Service Framework for Respiratory Health and Wellbeing (2015-18) states that "All people with asthma, and their carers, should be given the opportunity to learn about their condition and receive a written individualised self-management asthma action plan". The framework specifically targeted patients who were recorded as having asthma between Step 2 –Step 5 on the BTS/SIGN guideline (2014). This refers to patients with asthma who have been prescribed preventer medication.

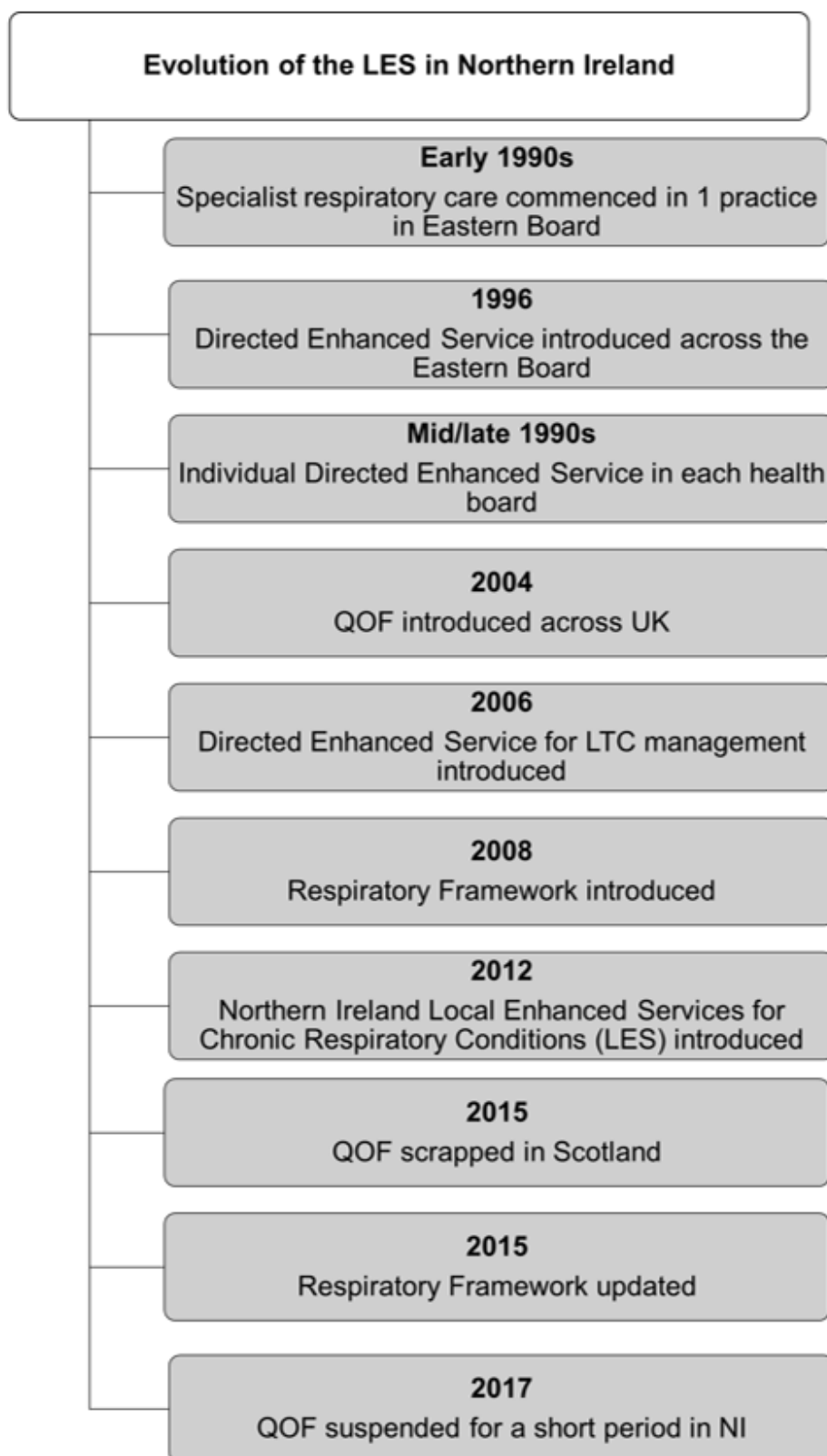


Figure 9: Timeline depicting the evolution of the LES in Northern Ireland

Key performance indicators in the respiratory framework are:

- percentage of individuals with asthma Step 2 and above who have received face to face information and a written self-management action plan.
- number of individuals over 15 years old with newly diagnosed asthma (Step 2 or above) who have attended and completed a structured education programme regarding asthma management.
- individuals over 14 years of age with an asthma diagnosis that attended their annual asthma review and were asked to demonstrate their inhaler technique.

A Northern Ireland Directed Enhanced Service for long term condition management was introduced in 2006/2007 with three main components: chronic obstructive pulmonary disease; asthma and obesity, which were the three regional health priorities at that time. The asthma component was developed to build on work being undertaken in primary care for the QOF and sought to reduce pressure on secondary care while improving the long term health of patients. The Direct Enhanced Service paid a financial incentive, in addition to QOF, to general practices that provided self-management education, including an action plan to people with asthma. The Health Boards in Northern Ireland were to support practices by ensuring that the corresponding Trusts provided information on local amenities to support the implementation of self-management in primary care. Guidance provided to practices advised that a basic asthma action plan had to include:

- Advice about taking medication for asthma (reliever and preventer inhalers and other asthma medication)
- A definition of a deterioration in asthma that requires action (increasing symptoms or a peak flow level at which medication should be changed)
- What to do in the event of a deterioration (what change to make in medication to be used and how long for)
- When to go back to maintenance medication
- When to seek urgent medical help

The Northern Ireland Local Enhanced Services for Chronic Respiratory Conditions (LES) was introduced in 2012, and is still in place across Northern Ireland. There are a number of differences between the initial enhanced service and the current LES including the targeted population and the way payments are calculated. In the earlier enhanced service, all patients with asthma were targeted to be provided with self-management education including an asthma action plan. In contrast, the LES targets patients who are registered on primary care practice systems as being between Step 2- 5 according to BTS/SIGN guideline (2014).

6.3.2 How are the financial incentive payments calculated?

Initially, financial incentives were calculated by a three-tiered increment method dependent on whether the general practice delivered supported self-management to 50%, 65% or 75% of the individuals with asthma on their practice register (Department of Health, Social Services, and Public Safety, 2008).

For LES 2017 calculations, each primary care practice has their own register which includes patients with asthma: this becomes their target population list and is the practice's denominator in calculations for achievement. The LES specifies that all patients registered as Step 2 or above (BTS/SIGN, 2014) should have an action plan provided at review and the percentage calculation for achievement is based on the number of action plans provided (numerator) against their QOF register. The payment is then weighted based on disease prevalence and relative list size. In terms of asthma, the £ value for achievement is based on a sliding scale of 40-90% of £5573.76 and will be weighted by the practice adjusted disease prevalence factor (ADPF) for that domain and the contractor population index (CPI) at January 2018 (Figure 10).

The payment process is outlined in the LES specification provided to participating practices. Payments from the QOF are made in a similar manner (sliding payment scale, weighted based on prevalence and list size) so practices who participate in QOF should be familiar with this process.

Payment = £5573.76 x (% achieved - 40%) x adjusted disease prevalence factor x contractor population index (CPI)

For example: A practice achieves 70% in asthma, has a QOF ADPF of 0.91 and a CPI (weighted list) of 1.1.

The £ achievement calculation is £5573.76 x 30% x 0.91 x 1.1

The 35% achievement figure is: 75% minus the lower threshold (40%)

Figure 10: Example of the LES financial incentive payment calculation

In addition to the LES specification provided, practices are able to contact their local Health and Social Care Board if further advice or support on the process is required.

6.4 Features of the financial incentives framework

I utilised Adam et al's (2014) financial incentive framework in my systematic review to identify domains that were successful predictors of the effectiveness of a scheme. None of the included studies' domains were constantly associated with positive or negative findings however, this framework remains important as it outlines the nine domains essential for describing any financial incentive scheme (Adams et al., 2014). Utilising this framework to document LES features (Table 16) enabled me to compare the LES to similar financial incentive interventions and identify domains, or configurations of domains, considered to be most effective in implementing asthma self-management in primary care. In addition, it enables my study to contribute to existing research on financial incentive schemes and the most effective domain configurations for assisting individuals in health related behaviour change.

Comparing the financial incentive framework (Adam et al., 2014) features of the LES with the incentive schemes analysed in the systematic review (see section 5.4.4 for further information) (Jackson et al., 2017), the LES is most

Table 16: Features of the Financial Incentives Framework utilised by the Northern Ireland LES

Direction	Positive reward
Form	Cash
Magnitude	Fee schedule %
Certainty	Certain
Target Behaviour	Process
Frequency of reward	Some
Immediacy	Annually
Schedule	Variable
Recipient	Practice

closely aligned in terms of domain configurations with Mandel & Kotagal's (2007) paper, which was effective in increasing asthma action plan provision. This was the only asthma study retrieved in the systematic review and showed a positive result in implementation outcomes. The implementation outcome measured was provision of action plans and the results showed an increase of "perfect care" from 4% to 88% of the asthma population with 41% of practices achieving a "perfect care" percentage of 95% or greater (Mandel & Kotagal, 2007).

6.5 Aim of the quantitative phase

6.5.1 Initial plans, limited availability of data, and revised aims

I initially aimed to observe the association between financial incentives on the implementation of supported self-management for asthma (LES) and implementation outcomes and health outcomes for individuals with asthma in Northern Ireland.

6.5.1.1 Implementation outcomes

It had been anticipated that there would be data for asthma action plan provision rates pre-2008 (introduction of the LES), so that any changes in these outcomes over the timescale of the LES could be observed. However, there were no pre-2008 asthma action plan provision rates available for the practices and the data available for the initial three years of the LES were not provided for analysis due to concerns regarding its reliability.

6.5.1.2 Health outcomes

There were no asthma related hospitalisation data available from the Public Health Agency prior to 2010, so I was unable to observe any impact on asthma related hospital admissions prior to the introduction of the LES or for the first three years after its introduction. Asthma related death data were also unavailable from the Public Health Agency, due to challenges surrounding identifiable data (see section 6.6.5.4) and were extracted from the Northern Ireland Statistics and Research Agency website at country level.

6.5.1.3 Revised aims

I took the decision, in discussion with my supervisors and a Senior Data Analyst at University of Edinburgh with experience of using routine data from the UK (MM), to observe trends in asthma action plan provision rates and asthma related hospitalisations between 2011/2012 to 2015/16 across the five Local commissioning Group Areas of Northern Ireland.

6.5.2 Revised objective of the quantitative phase

To observe trends in the provision of asthma action plans and asthma related hospital admissions in Northern Ireland from 2010 to 2011 and in asthma related deaths from 2001 to 2014.

6.6 Methods

6.6.1 Design

The quantitative study involved using routine data from the Northern Ireland Health and Social Care Board as well as national data sets depicting asthma

related hospital admissions and asthma related deaths in Northern Ireland. Table 17 shows the data sources used to measure each of the outcomes.

Table 17: Data sources for each outcome

Outcome and date range	Data source
Prevalence (2007-2017)	Northern Ireland Statistics and Research Agency
Asthma register (2007-2017)	Northern Ireland Department of Health
Asthma related deaths (2011/12-2015/16)	Northern Ireland Statistics and Research Agency
Asthma related hospital admissions (2011/12-2015/16)	Northern Ireland Department of Health
Asthma action plan provision (2011/12-2015/16)	Northern Ireland Health and Social Care Board

6.6.2 Ethical considerations and permissions

No patient level data were being accessed or utilised in any of the qualitative phase, therefore I did not need to obtain ethical approval from the NHS. Asthma related hospitalisation data were provided with permission from the Public Health Agency and annual LES returns were provided with permission from the Health and Social Care Board. Asthma related deaths data were extracted from the Northern Ireland Statistics and Research Agency website where open access to the official information on Northern Ireland's population and socio-economic conditions is provided. Information on this website is subject to Crown copyright protection, meaning it is allowed to be reproduced free of charge under the Open Government Licence and I did not have to seek any additional permissions.

6.6.3 Assessment and definition of asthma

For the asthma related deaths and asthma related hospital admissions, asthma was identified by ICD-10 code of J45 for asthma and J46 for status asthmaticus. In LES guidelines, practice performance is assessed according to the provision of asthma action plans to patients recorded as having asthma between Step 2 – Step 5 of the BTS/SIGN guideline (2014). This refers to all patients with asthma who are prescribed a regular preventer medication within

the previous 12 months; this is the target population for the Health and Social Care Board supported self-management LES.

6.6.4 Study populations

The denominator in each of the data sets was the population in the respective data sets rather than the official population provided by the Office for National Statistics. To illustrate, the estimated population on 30 June 2016 was 1,862,100 and in the same year there were 1,956,021 patients registered in primary care. This could potentially be due to: duplication of registered patients in primary care; individuals living in border areas living in the Republic of Ireland but registered with a GP in Northern Ireland; immigration (individuals registered at a GP but not included in the census); transient student populations; delay in deregistration after patient moves on or after a death. Therefore, if I had used the official population of Northern Ireland rather than the number of patients registered for the denominator it would have resulted in an artificially increased prevalence.

6.6.5 Outcome measures

6.6.5.1 Prevalence

I defined asthma prevalence as the proportion of the population with clinician diagnosed asthma and registered with a Northern Ireland primary care practice. To calculate prevalence, I used registered patients with asthma as the numerator and total patients registered as the denominator. Prevalence estimates were extracted from the Northern Ireland Statistics and Research Agency website.

6.6.5.2 Asthma action plan provision

To assess the proportion of patients with asthma (Step 2 and above) who received self-management education, including an action plan, from each practice, I observed the annual LES return rates, provided by the Health and Social Care Board. Practices in Northern Ireland self-report their key performance indicators to the Health and Social Care Board annually; the LES year runs from April to March. The Health and Social Care Board pay financial incentives to practices based on these data and according to the level that has

been achieved (see section 6.3.2, for further information). One of the key performance indicators for asthma is Standard 21a of the Respiratory Services Framework: “Percentage (%) of people with asthma Step 2 and above who have had individualised face to face information and self-management action planning” (Department of Health, Social Services, and Public Safety, 2015).

Data for the LES annual returns were to be provided by the Health and Social Care Board covering the period since the introduction of the LES in 2008. Annual action plan provision had not been recorded by the Health and Social Care Board prior to this time period so I was unable to conduct any before and after analysis. The Health and Social Care Board provided me with these routine data, which are anonymous and non-identifiable, for years 2010/2011 to 2015/2016 advising that there was no available data for the two years immediately after the implementation of the LES, 2008/2009 and 2009/2010. When reviewing the data, I identified discrepancies with the numbers and reported this to the Health and Social Care Board. After an internal investigation, data provided for the year covering 2010/11 was found to be inaccurate and I therefore removed it from my analysis. The reason for the difference in numbers was the result of changes in organisational processes with practices moving from submitting paper annual return forms to completing an online system.

6.6.5.3 Asthma related hospital admissions

To observe health outcome trends, I analysed asthma-related hospital admission rates over a five year period to identify any changes in use of secondary care resources in Northern Ireland.

The Public Health Agency initially advised that they would provide out-of-hours data on exacerbations, accident and emergency department attendance for asthma and hospital admissions for asthma. However, this was not possible and instead I obtained asthma related hospital admission rates split at health board level from 2011/12 to 2015/2016 which aligned with the time period of the LES annual returns provided by the Health and Social Care Board.

The data were anonymised and non-identifiable and provided in an excel spreadsheet, showing crude rates for asthma related (diagnostic code J45 (asthma) and J46 (status asthmaticus)) admissions in the five Northern Ireland Health and Social Care Trust areas.

6.6.5.4 Asthma related deaths

I experienced great difficulty in gaining access to asthma related death data in Northern Ireland. Due to the size of the population and small numbers of asthma related deaths there were concerns regarding individuals being identifiable. To publish any information discussing these deaths could, unintentionally, allow an individual to be identified and reveal confidential information about that person. Similar concerns constrained the presentation of results from Northern Ireland in the analysis of the Royal College of Physicians' National Review of Asthma Deaths (Levy et al., 2014).

The Public Health Agency advised that it would be challenging for them to provide asthma death figures but they would investigate. Ultimately, the Public Health Agency were unfortunately unable to provide asthma related death figures. As an alternative, I extracted data on asthma related deaths from the Northern Ireland Statistics and Research Agency website. I downloaded an excel spreadsheet and filtered for asthma related (diagnostic code J45 (asthma) and J46 (status asthmaticus)) deaths between 2001 and 2014 in Northern Ireland.

6.6.6 Analysis

I discussed the data with a Senior Data Analyst (MM) who confirmed there was enough information to observe trends in the data but no statistical analysis was possible. The data were entered into Microsoft excel and graphs produced to observe trends.

6.7 Results

There are 337 practices in Northern Ireland (Business Services Organisation, Health and Social Care, 2017), however as participation in the LES is voluntary the number of participating practices varies each year. Practice closures (three in the past five years), GP mergers (seven facilitated by the Health and

Social Care Board and an undocumented number of voluntary mergers in the past five years) and GP retirement (three of the 15 known to be retiring by March 2017 were single handed practices) have also contributed to a fluctuation in participating practices each year (Health and Social Care Board, 2017).

6.7.1 Prevalence

The raw prevalence of clinician diagnosed asthma in 2017 was 61.1 per 1000 people which equates to 120,018 people on the asthma register in Northern Ireland and this has increased by 3.3 per 1000 people since 2007 (Figure 11).

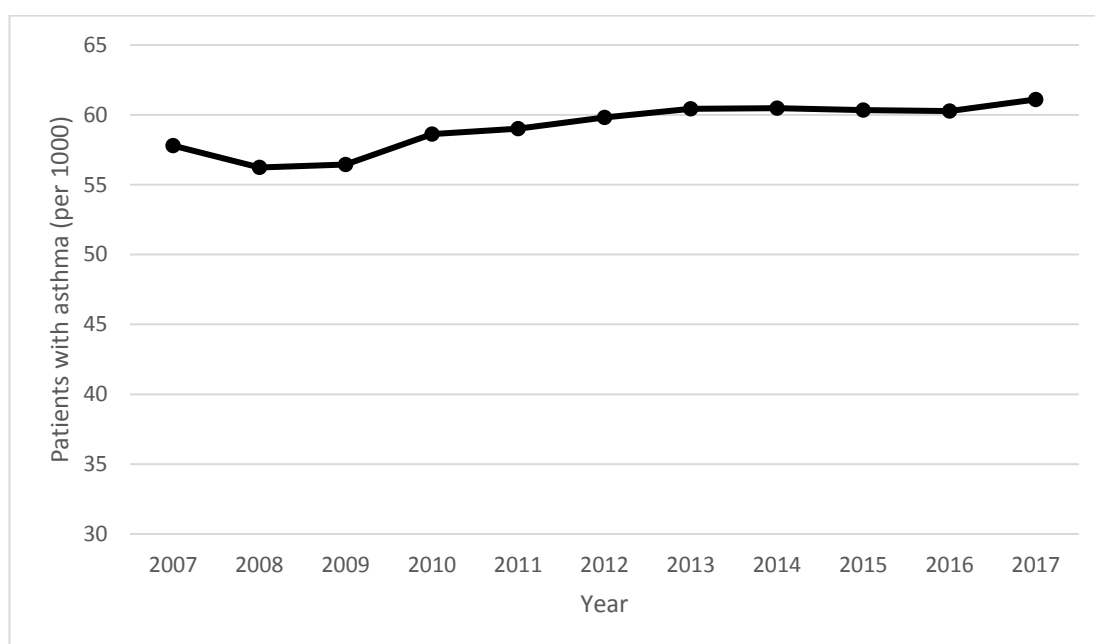


Figure 11: Asthma prevalence in Northern Ireland 2007-2017

The South Eastern Local Commissioning Group area has the highest prevalence of active asthma (recorded on the asthma register and having had asthma medication prescribed in the previous 12 months) with 65.61 per 1000 registered patients and the Southern Local Commissioning Group had the lowest prevalence with prevalence of 54.82 per 1000 registered patients recorded as having asthma (Figure 12).

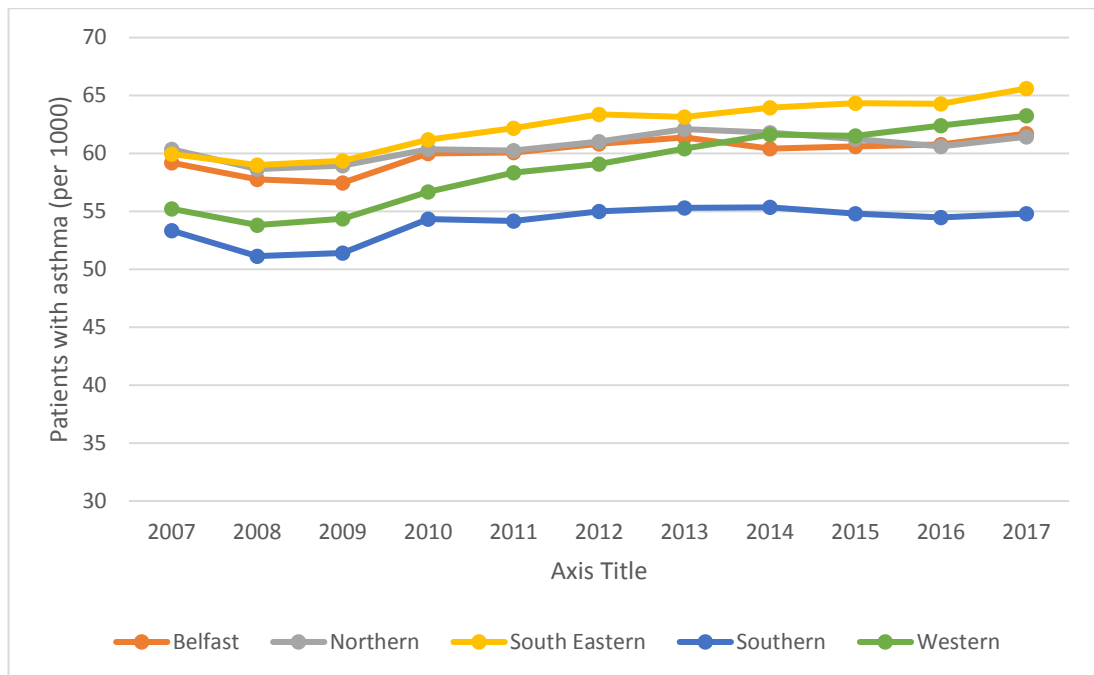


Figure 12: Asthma prevalence in Northern Ireland split by Local Commissioning Group

6.7.2 Asthma action plan provision

The annual returns data provided at Northern Ireland level were split into two age groups; under and over 15. I was unable to determine gender as this information was not collected on the LES annual return forms. The data at Local Commissioning Group level identified: the number of practices in each area; total number of patients in primary care practices on the active asthma register and managed at Step 2-5 of the BTS/SIGN guideline (2014); number of patients provided with an asthma action plan; action plan provision percentage.

Participation in the LES is voluntary and although overall participation across Northern Ireland has remained consistent since 2011/12, there are local fluctuations. Changes within Local Commissioning Group areas have been: a small increase of seven practices in the Western; a reduction of three practices in Belfast; reduction of 1 practice in Northern and reduction of 1 practice in Southern. There has consistently been 54 participating practices in the South Eastern area between 2011/12 and 2015/2016 (Table 18).

Table 18: Practices participating in the LES (2011/12 to 2015/16)

	2011/12	2012/13	2013/14	2014/15	2015/16
Belfast	86	83	84	84	83
Northern	78	78	78	78	77
S. Eastern	54	54	54	54	54
Southern	76	76	76	75	75
Western	50	57	57	57	57
Total	344	348	349	348	346
Contracting position: 2010/11 & 2011/12 based on Annual Data Returns 2012/13 to 2015/16 based on the GMS Contract Review Reports					

In 2015/2016, there were 87,392 patients with asthma (Step 2-5) and 66,088 patients were recorded as being provided with an asthma action plan. There has been small decline in the percentage of patients provided an asthma action plan with 79% provided in 2011/2012 and 76% provided in 2015/2016 (Figure 13). There was a similar action plan provision rate observed in children (75%) and adults (78%) (Figure 14).

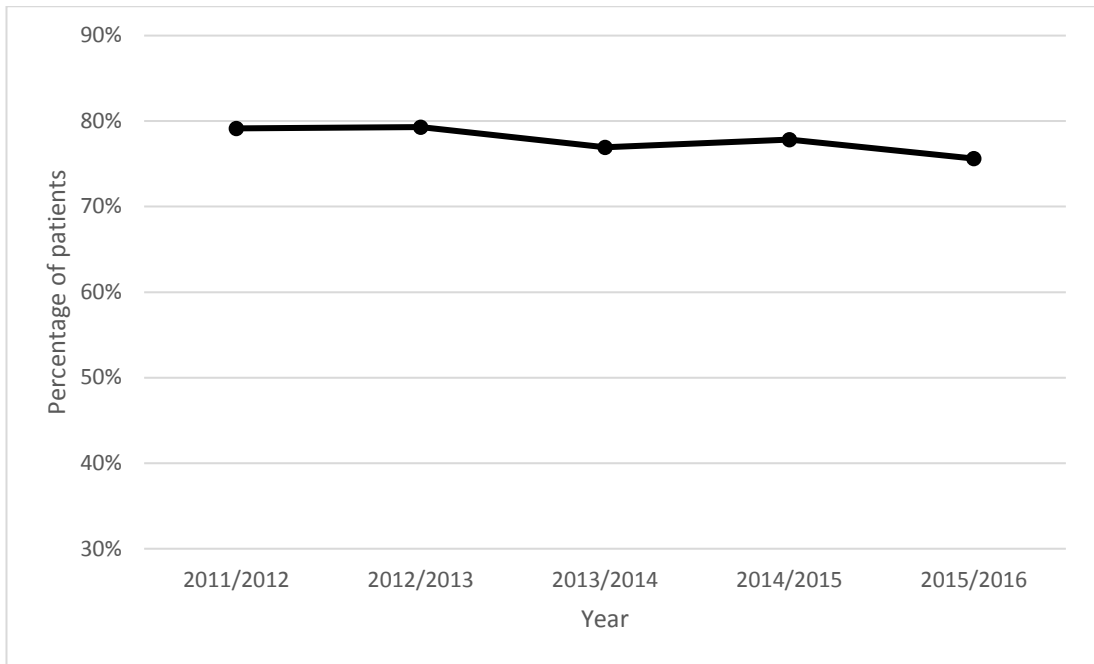


Figure 13: Percentage of patients with asthma (Step 2-5) that received an annual review, including an asthma action plan

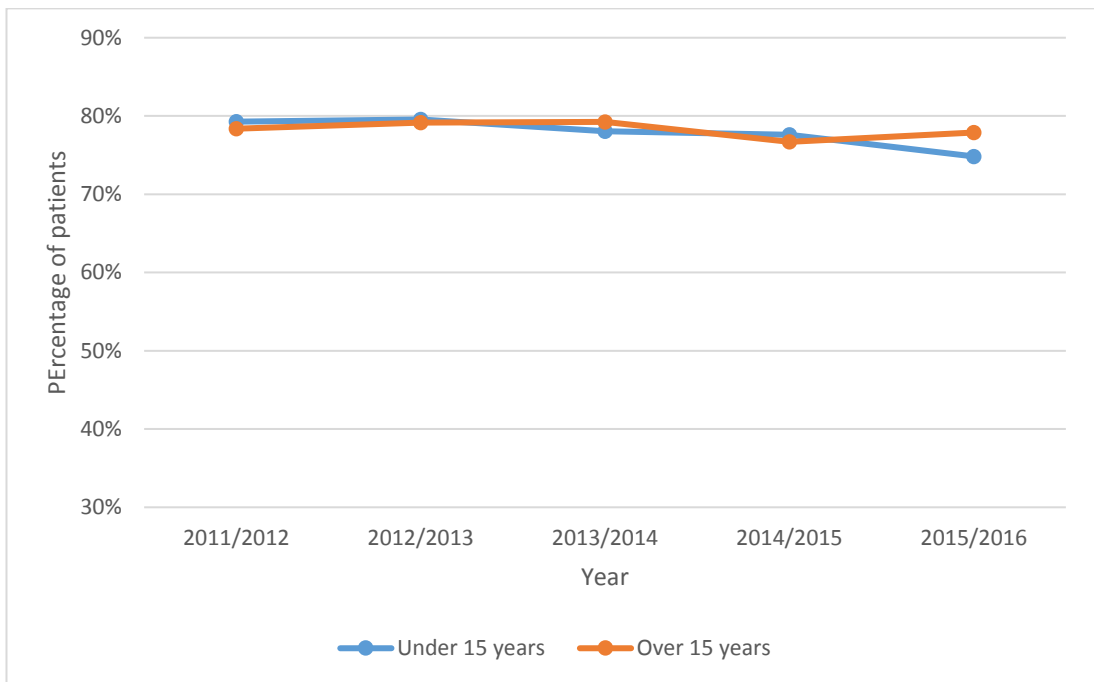


Figure 14: Percentage of patients with asthma (Step 2 - 5) that received an annual review split by age

Action plan provision levels have been consistently high for all five Local Commissioning Groups between 2011/2012 and 2015/2016 (Figure 15). The lowest rates were in Belfast in 2013/2014 with participating primary care practices reporting provision of an action plan to 74% of registered patients with asthma (Step2-5). The highest rate was recorded in the South Eastern Local Commissioning Group at 83% in 2014/2015.

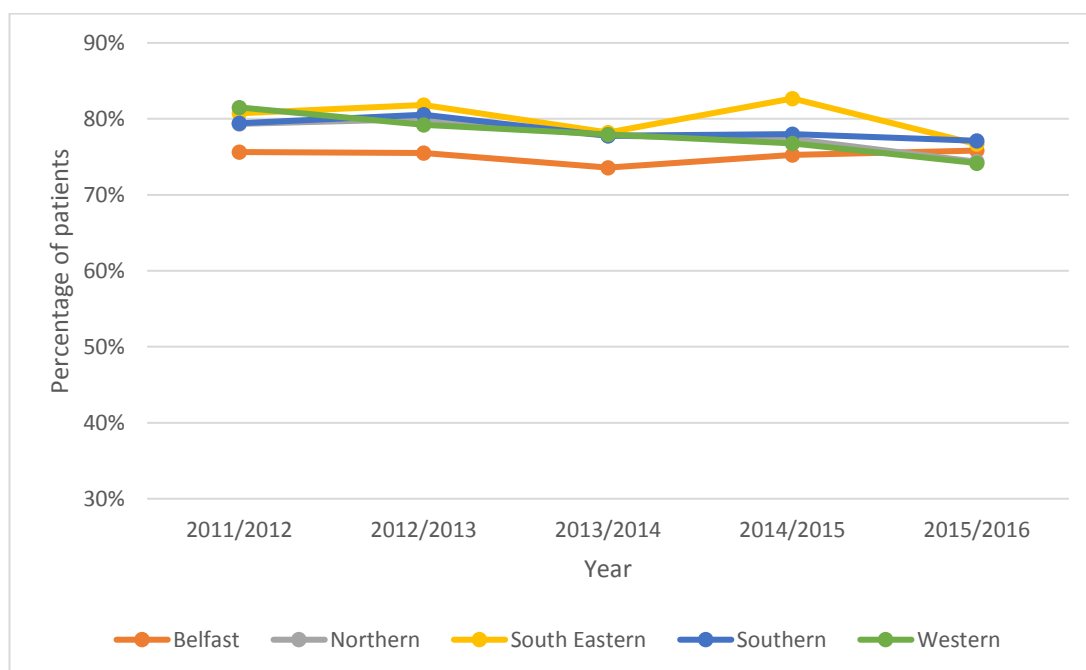


Figure 15: Percentage of patients with asthma (Step 2 - 5) that received an annual review split by Local Commissioning Group

6.7.3 Asthma related hospital admissions

The asthma related hospitalisation data provided were split by age (0-16 and 16+) and at Health and Social Care Trust level. Information on gender, readmission rate or length of stay were not provided. There was an increase in absolute numbers of asthma related hospital admissions from 1,621 in 2011/2012 to 1,932 in 2015/2016 (Figure 16) and this linear trend has been across all Local Commissioning Group areas for all ages (Figure 17). I was unable to calculate the prevalence of asthma related hospital admissions for individuals diagnosed with asthma due to the difference in number of patients

with asthma registered in primary care potentially being artificially inflated (see section 6.6.4 for further explanation).

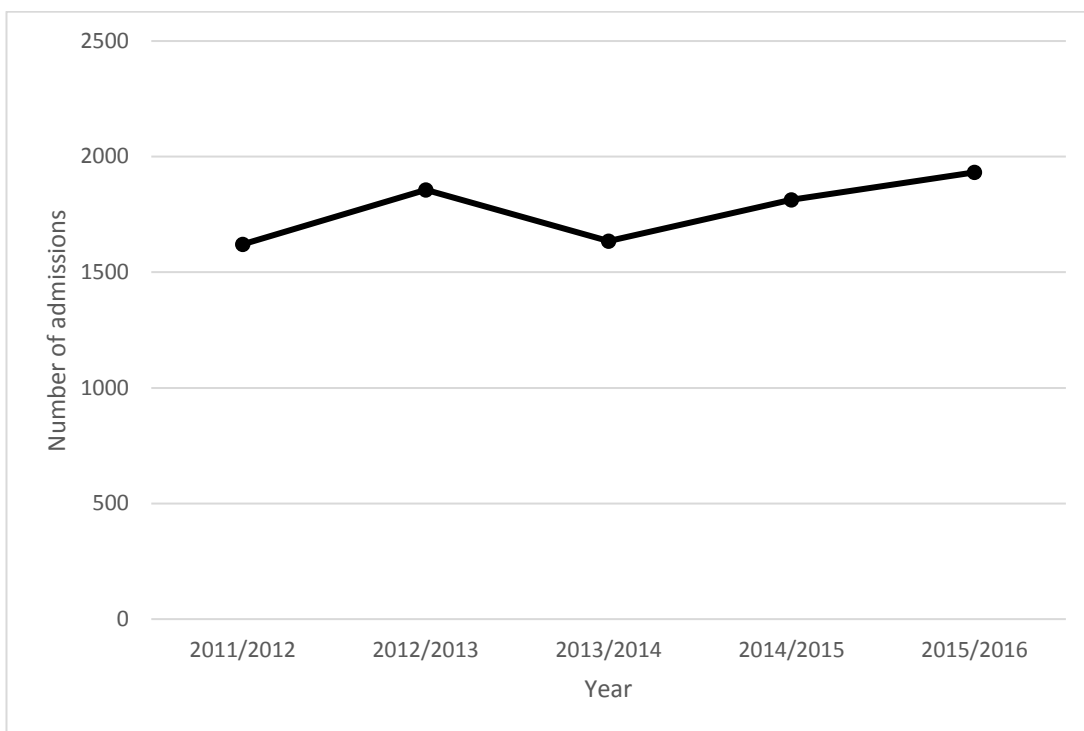


Figure 16: Asthma related admissions in Northern Ireland

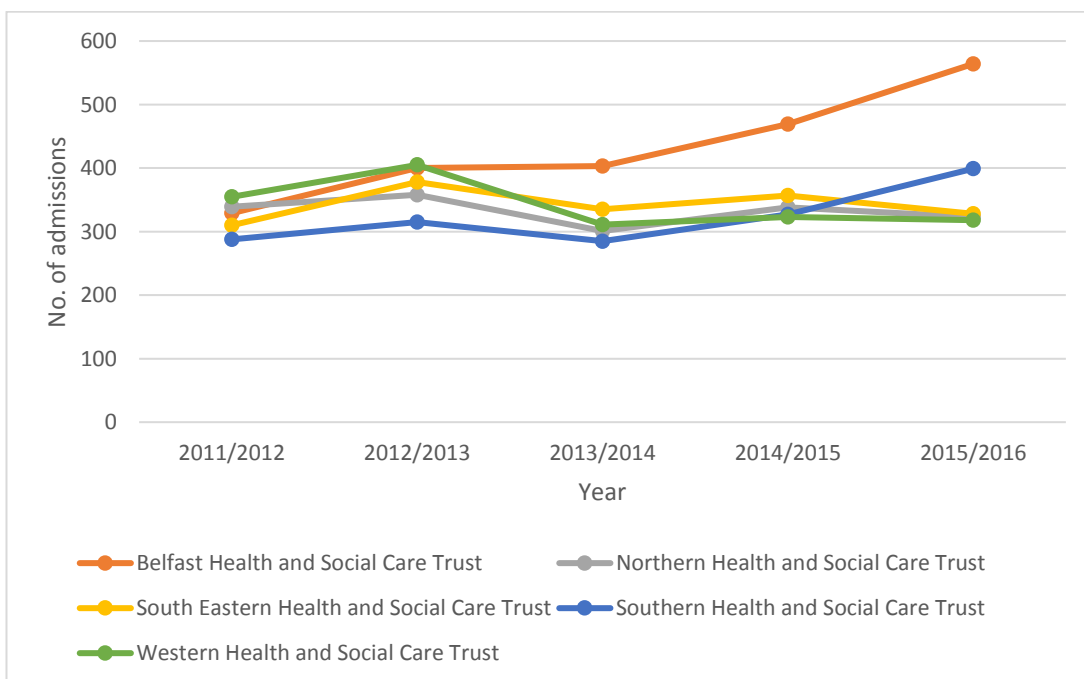


Figure 17: Number of asthma related admissions per Health and Social Care Trust (all ages)

When split by ages, the trend for asthma related hospital admission in 16+ years is linear (Figure 18), whereas the asthma related hospital admissions in children (0--16years) is more variable (Figure 19). In children, asthma related admission have decreased in the Western, Northern and South Eastern Local commissioning Group area, but have increased in the Belfast and Southern Local Commissioning Group areas. The largest annual increase was in the Belfast Local Commissioning Group area, with an increase of 95 asthma related hospital admissions between 2014/15 and 2015/2016.

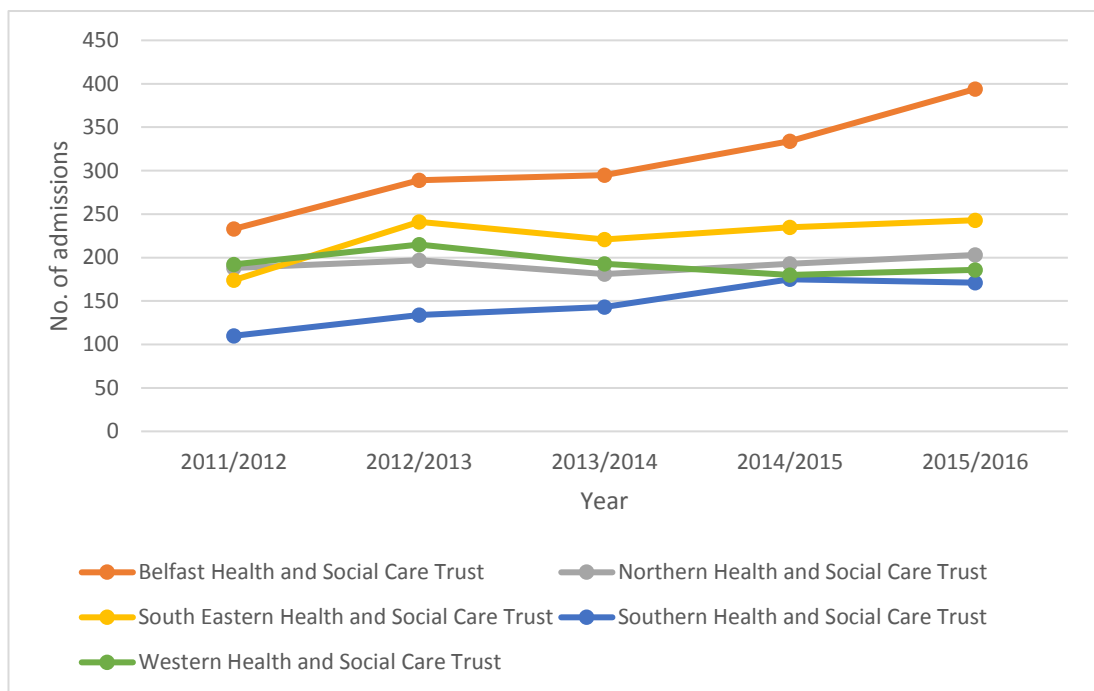


Figure 18: Number of asthma related admissions per Health and Social Care Trust (16+ years)

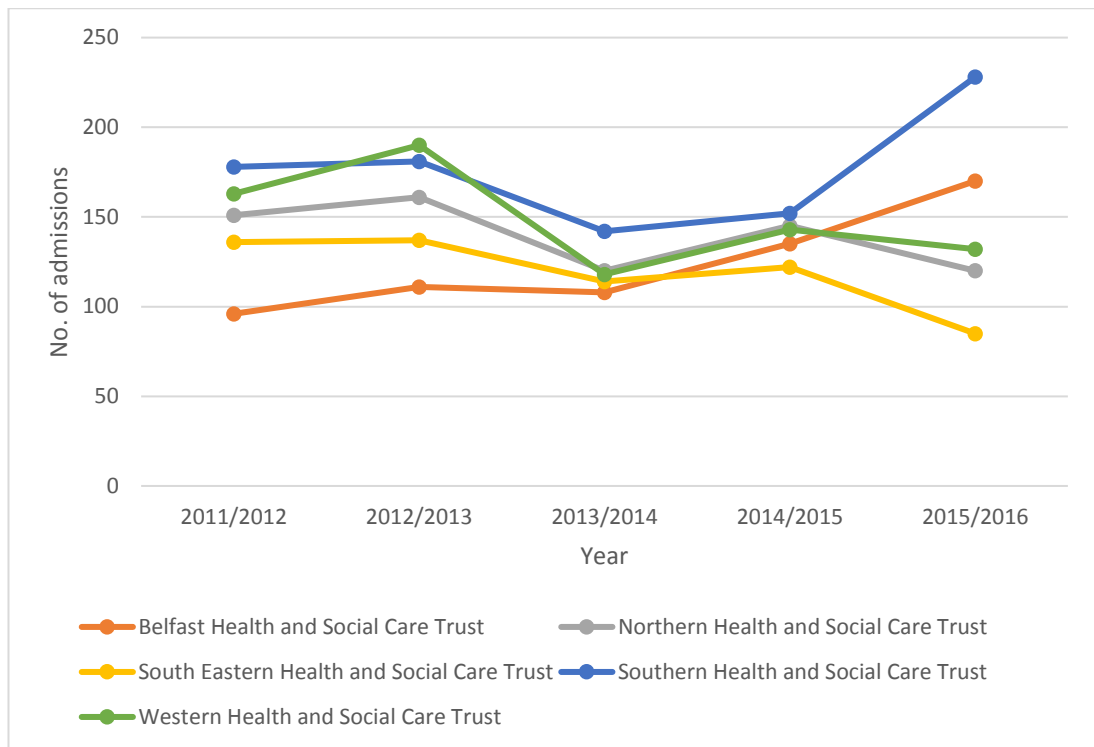


Figure 19: Asthma related admissions per Health and Social Care Trust (0-16 years)

6.7.4 Asthma related deaths

There were 546 recorded asthma related deaths in Northern Ireland between 2001 and 2016 (Figure 20). Due to duplications of registered patients in primary care, and therefore on the asthma register, I was unable to calculate the death rate for individuals with asthma. Between 2001 and 2016 there has been an increase of two asthma related deaths per year. A peak of 44 deaths in 2004 was followed by a decline to 23 deaths in 2009, however there has been an increase since then to 44 deaths in 2015 and 40 deaths in 2016. However, it should be noted that the numbers of asthma related deaths in Northern Ireland are small and fluctuation in the rate means that care has to be taken not to over-interpret results.

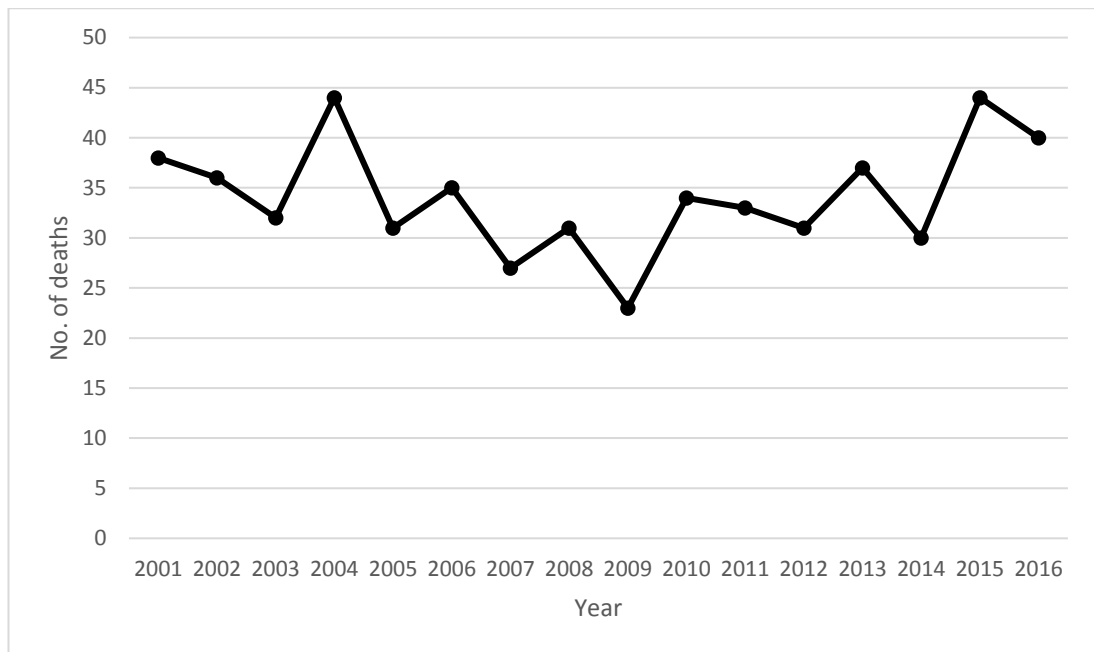


Figure 20: Asthma related deaths in Northern Ireland, 2001-2016

There were consistently more female asthma related deaths than male asthma related deaths, apart from in 2007 when there were 13 female and 14 male asthma related deaths (Figure 21).

The age ranges with the highest asthma related deaths in women were 85-89 and 90+ years, both with 57 deaths between 2001 and 2016 (Figure 22). For men, the age range with the highest recorded asthma related deaths was 80-84 years with 29 deaths between 2001 and 2016 (Figure 23).

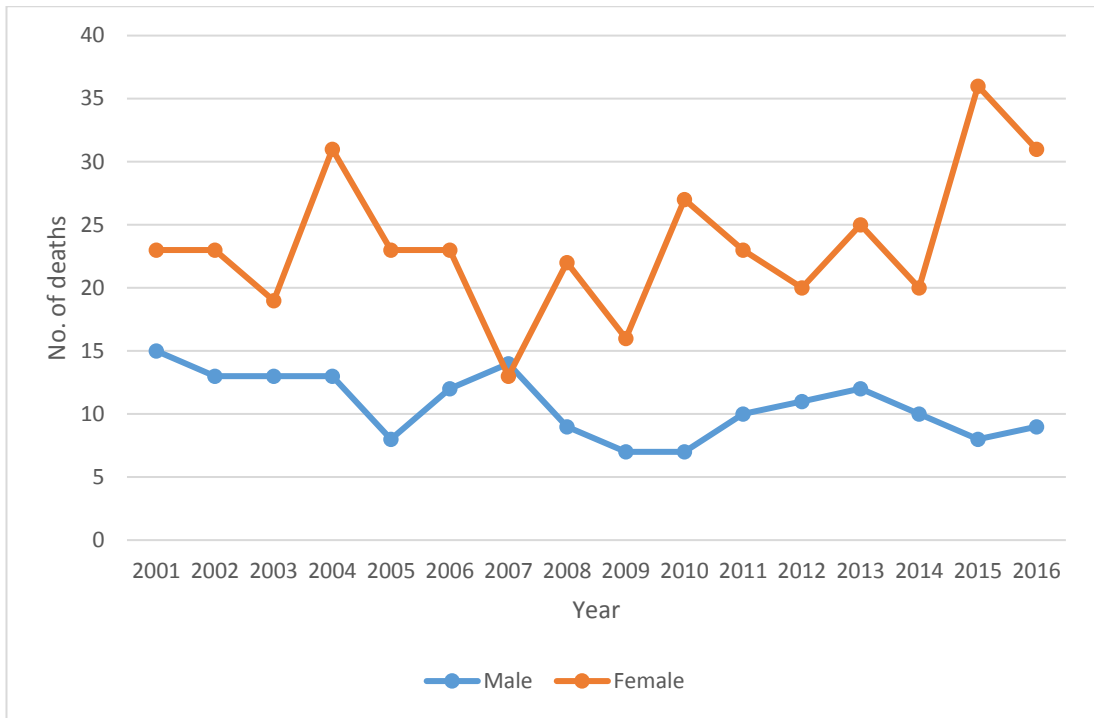


Figure 21: Asthma related deaths in Northern Ireland, 2001-2016

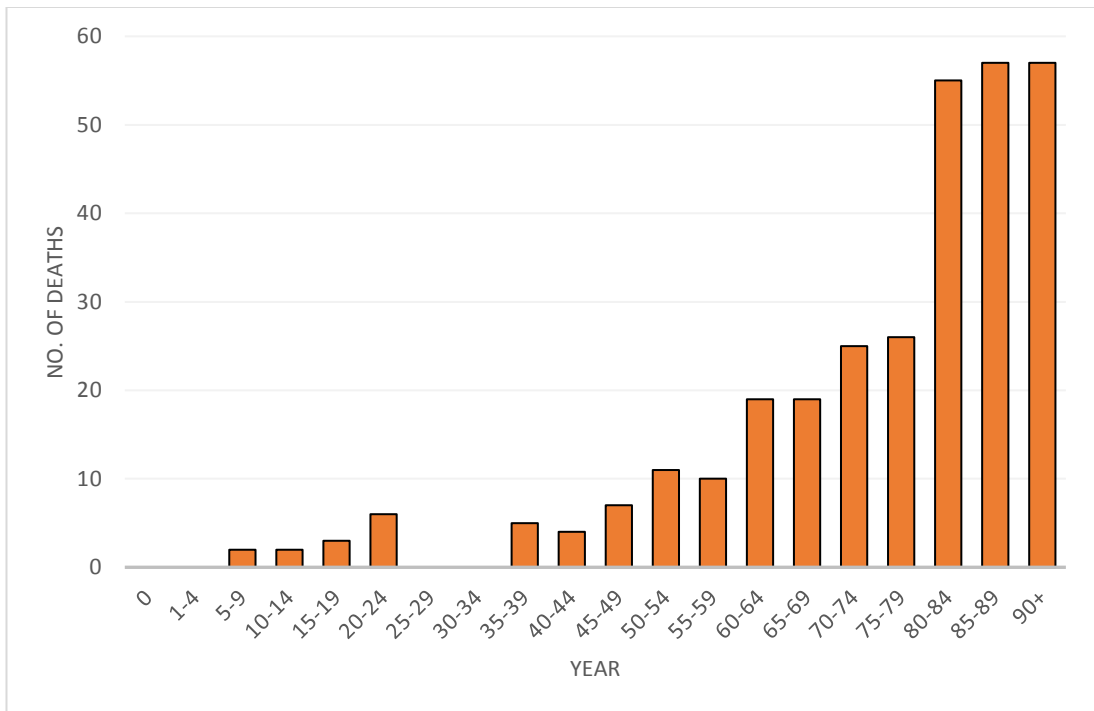


Figure 22: Asthma related deaths in women in Northern Ireland, 2001-2016

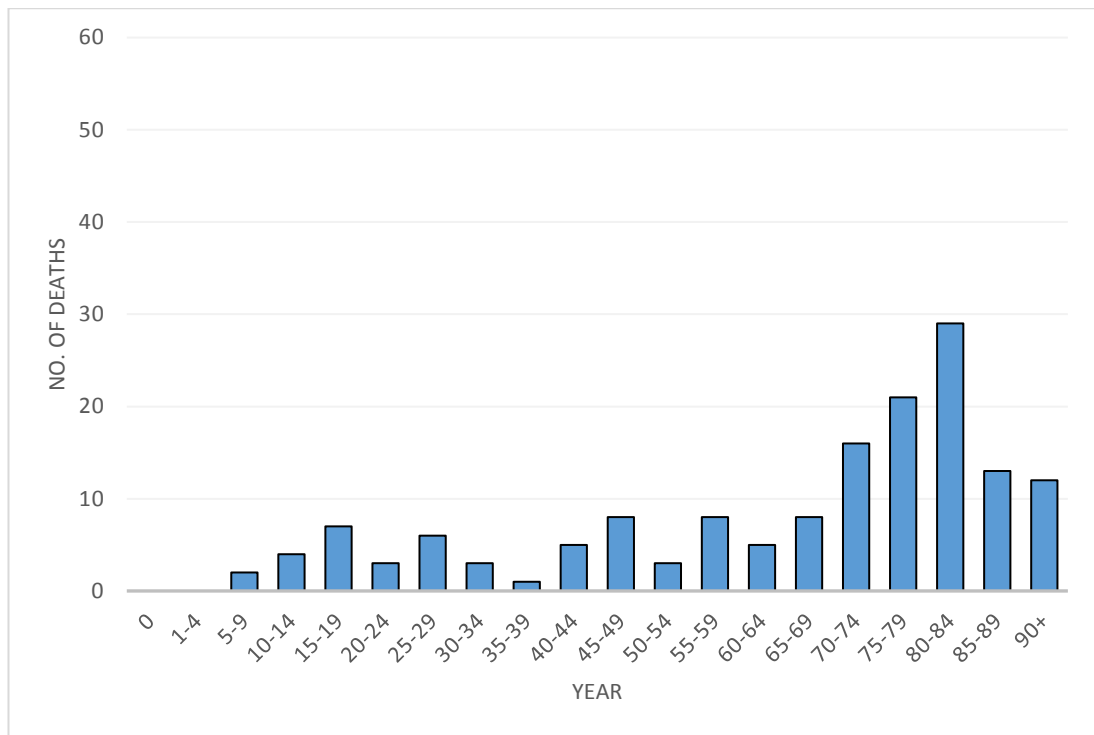


Figure 23: Asthma related deaths in men in Northern Ireland, 2001-2016

6.8 Discussion

This chapter describes the context of Northern Ireland, outlines the development of the LES, describes how LES financial incentives are calculated and presents data on action plan provision, asthma related hospital admissions and asthma related deaths in Northern Ireland. Asthma was made a priority by the Health and Social Care Board, who implemented the LES in 2008, and GPs were paid a financial incentive to provide self-management education, including an action plan to patients with asthma between Steps 2-5 on the BTS/SIGN guideline (2014). In 2017, there were 120,018 patients on the asthma register in Northern Ireland. Observational data shows that action plan provision remains high with practices providing an action plan to over 75% of patients registered as having asthma between Step 2-5 (BTS/SIGN, 2014).

6.8.1 Implementation outcome

6.8.1.1 Asthma action plan provision

Despite clinical guideline recommendations to provide action plans to patients with asthma, patient reported ownership is low (Reddell et al., 2013), as is physician reported provision (Gagné & Boulet, 2017; Ring et al, 2015).

However, asthma action plan provision has remained high in Northern Ireland since 2011/2012 with primary care reporting 76% of patients with asthma (Step2-5) have been provided an annual review, including an asthma action plan. This was consistent over the age groups with 78% of targeted patients 16 and over being provided an action plan and 75% of eligible patients aged 0-16 years (or their parents) recorded as having received an action plan. Unfortunately, lack of available data prior to and immediately after the LES meant I was unable to conduct a before and after analysis on action plan provision rates.

Asthma UK's annual report identified that in 2017, 61% of respondents from Northern Ireland reported having an asthma action plan which is higher than the UK average (45%) and the three other nations (Scotland, 51%; England, 41%; Wales, 33%). Northern Ireland asthma action plan ownership rates have been consistent since 2013 (2013, 60%; 2014, 61%, 2015, 64%; 2016, 57%; 2017) (Asthma UK, 2018). However, action plan ownership rates recorded by Asthma UK are lower than the reported rates of action plan provision by primary care practices in Northern Ireland. It is important to highlight the distinction between provision of asthma action plans and asthma action plan ownership as action plan provision is from the perspective of the clinician and ownership is from the perspective of the patient.

There is no assessment within the LES of the quality of the asthma reviews or the action plans provided. Therefore how these asthma action plans were provided is not known. Guidelines recommend that they should be completed in partnership with the patients as part of an educational discussion, but in some cases they may have been completed for patients; handed to the patient with little/no explanation or even posted to patients. This may contribute to the large discrepancy between reported provisions and reported ownership of action plans in Northern Ireland. Self-management education for asthma is more effective if provided by trained asthma educators (Boulet et al., 2015) and it is known to be predominantly nurse-led in UK primary care (Morrow et al., 2017). Although Northern Ireland has high rates of asthma action plan provision, the level of specialist respiratory nurses is low (Public Health

Agency, 2016) which might impact on the quality of self-management education provided to individuals with asthma.

Practice sizes in Northern Ireland range from 1,208 to 15,139 patients (OpenDataNI, 2018), but what could not be determined was the ratio of trained respiratory nurses to patients with asthma. Some practices will have larger asthma registers than other practices but only one respiratory-interested GP or one respiratory nurse, therefore the ratio of patients to clinical staff able to provide supported self-management for asthma would be much higher. In smaller practices and/or practices with fewer patients on their asthma registers, the ratio of patients to respiratory lead is much smaller, potentially offering a higher chance of reaching LES targets in these practices. However, smaller practices face a multitude of other factors including funding issues and underlying health of practice population, and have been associated with lower scores in the QOF (Kelly & Stoye, 2014).

6.8.2 Health outcomes

6.8.2.1 Asthma related hospital admissions

Asthma related hospital admissions have increased between 2011/12 and 2015/16 by over 300 admissions a year. The increase in asthma related hospital admissions was linear between 2011/12 and 2015/2016, this was largely driven by a very large increase in Belfast Health and Social Care Trust who, at 394, had the highest asthma related hospital admissions in 2015/16 across all the Health and Social Care Trusts and had increased from 233 hospital admissions in 2011/12 (61% increase). The asthma related hospital admission rate in the Northern Health and Social Care Trust area remained constant between 2011/12 and 2015/16 and the Western Health and Social Care Trust area admission rate reduced from 192 in 2011/12 to 186 in 2015/16. The hospital admission rates in the two remaining Health and Social Care Trust areas increased over the five year period (South Eastern by 28; Southern by 61).

A key factor in this is the number of accident and emergency department closures in recent years and now largely all emergencies are directed to the

two largest accident and emergency departments which are both located in the Belfast Health and Social Care Trust area: The Royal Victoria Hospital and the Ulster Hospital. The Royal Victoria Hospital also has a specialised respiratory medicine department. Almost two thirds of Northern Ireland's population live within 40 minutes travel of this hospital, and it provides respiratory services to patients from Belfast as well as patients across Northern Ireland who require specialist advice and treatment. This may contribute to the higher rate of asthma related hospital admissions in the Belfast Trust area. The data provided by the Public Health Agency for hospital admissions was at Trust area level so I was unable to determine the rates for individual hospitals.

Asthma related hospital admissions in children had increased in two of the Health and Social Care Trusts (Belfast and Southern), and decreased in the remaining Trusts between 2011/12 and 2015/16 (Northern, South Eastern and Western). There is only one hospital in Northern Ireland with specialised paediatric respiratory services, the Royal Belfast Hospital for Sick Children (Belfast), which has five respiratory medicine consultants. All other hospitals in Northern Ireland have general paediatricians, one of which will be "asthma-interested". The Children's hospital in Belfast is part of the biggest hospital complex in Northern Ireland, approximately two thirds of the population of Northern Ireland live within 40 minutes travel of the site, and it provides most of the regional paediatric specialities for Northern Ireland. The higher rate in children's hospital admissions in the Belfast area could be attributed to this.

Prior to puberty, there is a higher prevalence of asthma symptoms in males than females, which then switches in early teenage years when females have a higher prevalence compared to males (Vink et al., 2010). Unfortunately, due to the level of data available, I was unable to observe if there was a gender difference in asthma related hospital admissions in Northern Ireland. Further information would be required to thoroughly investigate hospital admissions including: gender; time of year; area of GP practice registered at; which hospital admitted to and distinguishing between whether these were readmissions or individual incidences.

6.8.2.2 Asthma related deaths

The data on asthma related deaths were obtained from the Northern Ireland Statistics and Research Agency website and were at Northern Ireland level. Due to the small number of asthma related deaths in Northern Ireland, data could potentially be identifiable if provided at Health and Social Care Trust Level. The LES was introduced in Northern Ireland in 2008 and at this time there was a reduction from 31 deaths in 2008 to 23 deaths in 2009. However, since then asthma related deaths have continued to increase in Northern Ireland since 2009 with 44 deaths in 2015, although decreased to 40 deaths in 2016. However, these increases and decreases in asthma related deaths are in the context of variation in small numbers and findings support previous evidence that asthma related deaths have plateaued in Northern Ireland, as in the rest of the UK (Mukherjee et al., 2016).

There were more asthma recorded female deaths than male deaths per year between 2001 and 2016, apart from in 2017 when there were 13 female deaths and 14 male deaths. Asthma is more prevalent in females than males after the onset of puberty and is 20% more frequent in females than males over the age of 35 years (Leynaert et al., 2012; Zein & Erzurum, 2015), with endogenous and exogenous hormones in females associated with the onset of adult asthma in females (McCleary et al., 2018; Jenkins et al., 2006; Salam et al., 2006). The difference between genders in asthma related deaths is consistent with previous research (Leynaert et al., 2012; McCleary et al., 2018; Zein & Erzurum, 2015), adding external validity to the data I received and contributing to the importance of exploring the difference in asthma prevalence in males and females with males more likely to present with asthma symptoms prior to puberty and females after puberty.

Females over the age of 85 had the highest rate of recorded asthma related deaths in Northern Ireland with both the 85-89 and 90+ age groups having 57 recorded asthma related deaths each between 2001 and 2016 and for men, the age range with the highest recorded asthma related deaths was 80-84

years with 29 deaths between 2001 and 2016. These gender difference in asthma related deaths may be related to more women than men having asthma, and women living longer than men. Menopause has been associated with lower lung function and an increase in respiratory symptoms (Real et al., 2008) and the use of oestrogen alone as a postmenopausal hormone therapy has been associated with an increase in newly diagnosed asthma (Romieu et al., 2010). There were no asthma related deaths recorded for males or females between the ages of 0-4 years between 2001 and 2016 in Northern Ireland. Although asthma symptoms may develop in children under the age of five, there are challenges in diagnosing asthma due to the difficulty determining asthma symptoms from childhood wheeze and/or colds, which are episodic and not chronic, and the unfeasibility of undertaking tests such as spirometry in very young children (Sawicki & Haver, 2018). In the last 10 years there has been a trend in paediatric respiratory medicine to differentiate pre-school wheezing into two distinct groups: episodic viral wheeze with a natural history for the wheezing to stop as the child gets older and multi-trigger wheezing or classical atopic asthma which naturally becomes asthma over time.

The use of death certificates in health research is problematic and inaccuracy can affect national mortality statistics and health research (Brooks & Reed, 2015; McGivern et al, 2017). The UK National Review of Asthma Deaths (Levy et al, 2014) identified that in a high proportion of the deaths attributed to asthma (classified by the WHO ICD-10 codes), asthma was not the underlying cause. The inaccuracy of death certificates affects national mortality statistics meaning that asthma related deaths in Northern Ireland are potentially inflated, and therefore lower than reported. These low numbers are unreportable due to issues surrounding confidentiality and identifiability.

6.8.3 Using routine data

Routine administrative data is an important source of information regarding health care and can provide a large database of real world data for researchers (Sarrazin & Rosenthal, 2012). Due to the size of these databases, results can

be considered generalisable and representative of a population and can be used to compare the impact of patient or place demographics in health care evaluations (Hashimoto et al., 2014). However, a limitation of using routine data in health care research is that the original use for which the dataset was created is usually clinical, administrative or managerial, meaning the data may not be as robust as necessary for research purposes (Hashimoto et al., 2014). The annual LES returns data collected enables the Health and Social Care Board to provide financial incentives to the GPs who have sent the forms and achieved targets, but it was not detailed enough to assess the impact of the LES on action plan provision rate, especially as no data had been provided prior to the introduction of the LES. In addition, there is the potential risk of bias due to GP strategic labelling in order to increase the level of financial incentives received. For example, QOF requirements for diagnosing and monitoring depression increased the burden on practices and GPs avoided coding “depression”, using alternative codes such as “stress” or “low mood” instead to avoid compromising their QOF depression score (Mitchell et al., 2011).

I was unable to perform any analysis on the impact of action plan provision on asthma related hospital admissions or asthma related deaths due to a number of issues:

- Inability to link the data from the Health and Social Care Board with data from the Health and Social Care Trust. The GP action plan provision data provided by the Health and Social Care Board were GP self-reported annual returns and the population in each area is registered at GPs in that area. However, with asthma related hospital admissions, the data provided was for the population attending the hospital in that area and not the area in which patients are registered in a GP practice.
- The numbers registered at GP practices (1,961,258 in October 2016, [OpenDataNI, 2016]) differs from the estimated population of Northern Ireland (1,862,100 in 2016, [Office for National Statistics, 2017]) and

linking these data would result in an artificially deflated asthma related hospital admissions prevalence.

- Hospital admissions data does not identify whether patients' had been previously prescribed asthma preventer medication and the LES figures only captures patients identified as having received asthma preventer medication and does not include individuals who may have received asthma reliever medication.
- Lack of available data on asthma reviews or asthma related hospital admissions preceding the LES. Figure 9 outlines the timeline of the evolution of the LES, and self-management for asthma emerged in Northern Ireland in the early 1990s, therefore identifying a time point from which to measure impact is impossible.

6.8.4 Strengths and limitations

With such low levels of asthma related deaths in Northern Ireland, it would be interesting to investigate the reasons behind this figure and the processes in place. However, due to the number being so small, there would be the potential to identify the individuals who had died from asthma in Northern Ireland, therefore I was unable to obtain any asthma related deaths data beyond national population level.

A limitation of this quantitative phase is the level of data available to analyse the impact of financial incentives on the implementation of asthma self-management. I experienced difficulty obtaining asthma related health data spanning the introduction of the LES from Northern Ireland to analyse, consistent with previous researchers (Mukherjee et al., 2016), and was unable to conduct any statistical analysis on implementation or health outcomes. The information for the LES returns was at Health and Social Care Board level which meant I was unable to identify practice's individual performances in the LES and analyse if there were any differences between practices demographics. The LES returns are self-reported data from GP practices, who have each individually interpreted the guidelines of the LES when implementing into their practices. The delivery method of self-management

plans was not defined by the LES, allowing practices to decide how they should achieve these targets. Action plans may have been provided prior to the introduction of the LES but not coded. However, after its introduction, action plans were a key indicator in the LES and their coding was integral to completing end of year returns for receiving financial incentives. The qualitative phase of the PhD explored the perceptions of practice staff on asthma self-management and receiving financial incentives and how the LES was interpreted and delivered in primary care.

This project was investigating the impact of the LES on the implementation of asthma action plans in Northern Ireland but when there are no data available about action plan provision rates prior to the LES it is impossible to identify an association between the LES and action plan provision rates. Also, unreliable data for the first 3 years after the introduction of the LES, which I was advised existed but would not be provided due to its unreliability, means that I could not observe the initial association between the LES and action plan provision rates. It highlights the importance of ensuring relevant information is recorded correctly when introducing an intervention, as without satisfactory reliable data it creates difficulties in evaluating the effectiveness of the intervention.

There are also different governance regulations in Northern Ireland compared to the rest of the UK as identified by the National Review of Asthma Deaths (Levy et al., 2014), “Data from Northern Ireland were processed separately before uploading to the database in order to comply with information governance regulations.” and “Anonymised information from sources in Northern Ireland was returned to and entered by the NRAD [National Review of Asthma Deaths] satellite team in Belfast to comply with local data-protection regulations”. In addition, on page 22 of the National Review of Asthma Deaths report a map of the UK is presented with a footnote on Northern Ireland stating, “Owing to information governance regulations, Northern Ireland organisations cannot be portrayed on this map”.

I obtained data on Northern Ireland asthma related deaths from the Northern Ireland Statistics and Research Agency website, where cause of death is

attributed to what is stated on the death certificate. The National Review of Asthma Deaths (Levy et al., 2014) identified that a high proportion of the deaths attributed to asthma, were not actually due to asthma which highlights the potential inaccuracies with death certificate data. There is currently no other option available for measuring cause of death at population level but a new death certificate reform is to be instigated in England in April 2019 which may improve the accuracy of death certificate data (Luce & Smith, 2018). With the proposed reform, all death certificates issued by treating doctors will be checked by local medical examiners to ensure they have been completed accurately and in accordance with coroner notification obligations.

6.9 Patient and public involvement contribution

A meeting of five PPI representatives was arranged after the analysis and the context of Northern Ireland and the supporting quantitative data was provided. While part of the UK, the representatives were surprised to see differences in the Northern Ireland healthcare system including: the LES; lower number of GPs per 100,000 patients and the impact of the collapse of the Northern Ireland Assembly.

All of the PPI representatives were female and were shocked to see that there were more female than male asthma related deaths. We discussed the difficulty with using routine data, particularly in areas with small populations. Representatives were interested in what potential options could be put in place so people could wave their rights to anonymity after death if their healthcare data could be useful for future research. Multimorbidities in older patients was discussed, and some of the representatives highlighted how older generations spent many years as young people without modern asthma medication which could have left weakness in their respiratory systems.

The difference between action plan ownership and action plan provision provided an interesting debate on the accuracy of GP reported figures. None of the PPI representatives mentioned that they thought GPs shouldn't be

provided with financial incentives, but they highlighted the need for effective quality control on the measures used to evaluate the care provided to patients.

With regards the asthma related hospital admissions, the PPI representatives were interested in the steep increase in the Belfast Health and Social Care Trust area. Reasons for this were deliberated, including: increase in clinician awareness of the severity of asthma; Northern Ireland specialist respiratory hospital located in Belfast; potential increase in planned admission and potential protocol change in secondary care. I queried the possibility of a change of protocol with my supervisor (MS) who is a consultant in secondary care in Northern Ireland, but they advised there had been no changes. An interesting theory suggested was that the increase in self-management education for patients with asthma, may have made patients more aware of their symptoms and the severity of asthma which increased the hospital admission rate, where before the self-management education these patients may have just carried on without accessing secondary care. This input highlights the importance of speaking with patients to explore their perception and experiences of supported self-management for asthma.

6.10 Conclusion

This chapter explored the context of Northern Ireland, the structure of its health care system and the development of the respiratory LES for asthma care provision in primary care. The high number of patients per GP in Northern Ireland and the impact of political instability are barriers primary care staff encounter when providing care to patients. Despite these issues, asthma action plan provision has remained high between 2011/12 and 2015/16 and asthma related deaths have reduced in males. There has been an increase in female asthma related deaths, with a high percentage being in elderly females which identifies a higher risk population requiring targeting. However patients in this age group often have multimorbidities and there can be difficulty identifying the main cause of death. I encountered difficulties using routine administrative data which limited the analysis I could undertake. This highlights the chasm between data collected for clinical, managerial and

administrative reasons and data required for research purposes and this needs to be bridged to provide more robust data for effective analysis and evaluation.

6.11 Summary and next steps

In this chapter I have described the context of Northern Ireland and discussed the quantitative study examining routine data reporting on asthma management plan ownerships rates, asthma related hospital admissions and asthma morbidity in Northern Ireland between 2010-2016. Quantitative data provides us with what general practices have recorded as action plan provision rates but does not explain what it means to “provide asthma education including an asthma action plan”. How has this been interpreted and defined within individual general practices and what processes have they introduced to ensure that this is achieved? To explore how the LES was implemented in primary care in Northern Ireland, a qualitative phase was undertaken. In the next chapter, I discuss the qualitative methods undertaken in this PhD including the grounded theory approach to explore the perceptions of primary care staff towards the LES and self-management support for asthma as well as the framework analysis using NPT which evaluated the implementation of the LES in primary care in Northern Ireland.

Chapter 7 Qualitative phase methods

7.1 Introduction

The previous chapter provided background to the LES by discussing the context of Northern Ireland and observed health outcomes since the introduction of LES. To gain a deeper understanding of the impact of LES on primary care in Northern Ireland, I conducted scoping interviews and case studies with primary care practice staff involved with the LES. This chapter describes the qualitative methods I undertook to collect data from primary care practices in Northern Ireland. A grounded theory approach to data generation and analysis was used to explore primary care staff perceptions of the LES and a framework analysis using the Normalization Process Theory was conducted to explore if/how the LES was normalized into routine practice in primary care.

7.2 Aims and objectives of the qualitative phase

7.2.1 Aims

To explore the perceived impact of financial incentives on the implementation of supported self-management for asthma (LES) on implementation outcomes in primary care practices in Northern Ireland.

To explore the process by which implementation of supported self-management for asthma was normalized in primary care as a result of the LES.

7.2.2 Objectives

1. To identify primary care practices with different approaches and success levels in achieving the LES targets.
2. To explore the different approaches and perceptions of primary care staff in reaction to the implementation of the LES.
3. To undertake an in-depth exploration into primary care staff accounts of their understanding and experiences of the LES and self-management for asthma.

4. To explore how the LES was implemented and normalized in primary care in Northern Ireland using the Normalization Process Theory.

7.3 Methods

7.3.1 Design

The qualitative study is comprised of two stages: scoping interviews with key informants from general practice and case studies in selected general practices. The case studies consisted of individual and group interviews with key clinical and administrative personnel and document analysis. Figure 24 is a flow diagram of the recruitment process I used. I aimed to recruit up to 20 practices for scoping interviews and four case study practices with in-depth interviews with up to five practice staff members in each practice. Twenty interviews are an appropriate sample size for a grounded theory approach (Creswell, 1998) and likely to generate sufficient data to address the research questions. Four case studies were chosen as anything below this limits the benefits of a multicase study (Stake, 2006). Purposive sampling was used to recruit a range of practices of different sizes with a variety of approaches of providing self-management for asthma to patients.

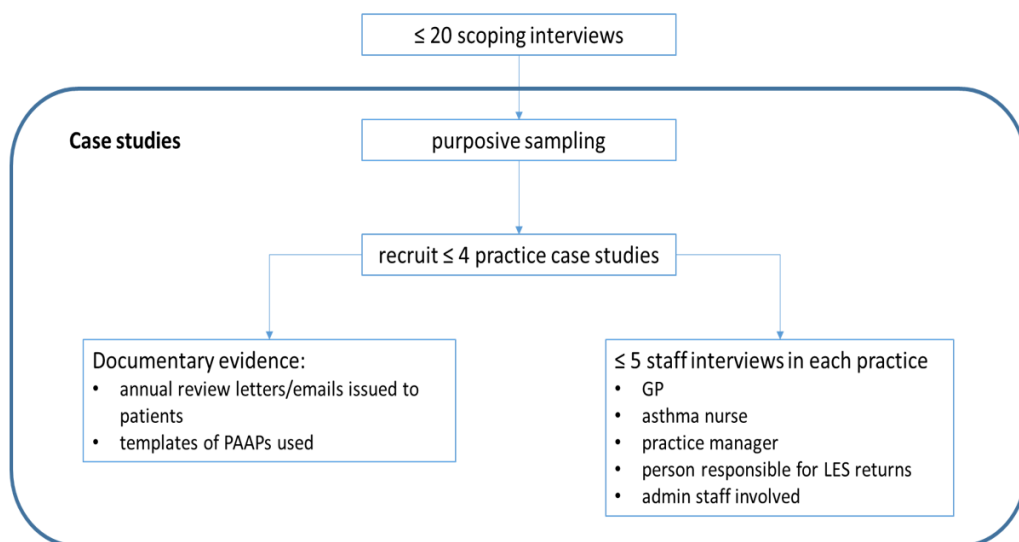


Figure 24: Flow chart of selection process

Initially I aimed to interview patients from each of the case study practices as well as professionals. However, when recruiting practices there was noticeable resistance from practices regarding contacting patients for research; practices cited this as a reason not to be involved in the case study stage. Potentially, this may have been due to a number of factors including: practices' perception that research would have a negative impact on the patient and may affect their relationship with patients (Williamson et al., 2007); insufficient time in busy clinical practice: lack of interest in research area (Jahan et al., 2015).

An additional disincentive was that my study was classified as a "service evaluation" by the University of Edinburgh research sponsor for NHS ethics. Had it been classified as "research" I would have been able to access support from the Northern Ireland Clinical Research Network who would have been able to supply nurses to go into case study practices, identify potential participants on the asthma register and issue study invitation letters to these patients. As a "service evaluation" without NHS ethical approval, the Northern Ireland Clinical Research Network were unable to assist. This meant primary care staff in each case study practice would have had to undertake this work, taking time from their own work commitments. Despite offering to pay for staff time, practices were unable to commit resources to perform these tasks and therefore did not want to participate as a case study practice. I therefore decided, in discussion with my supervisors, that removing the patient interview aspect would be necessary to enable case study practice recruitment. The removal of the patient interviews meant that the patient perspective of supported self-management for asthma was not included in this study. However, this did not detract from a multidisciplinary approach investigating the impact of the LES on practices, including an exploration of primary care staff perspectives on the LES and self-management and an evaluation of the implementation processes using a framework based on the NPT.

7.3.1.1 Description and justification of Grounded Theory Approach

This PhD was undertaken in order to explore the impact of financial incentives on the implementation of action plans, in particular exploring the introduction of the LES in NI, the impact on health outcomes and the process of how the LES was embedded into primary care routines. This qualitative phase explores the changing experiences from before, during and after the introduction of the LES and grounded theory is an appropriate method fit for this (Richards & Morse, 2007). Grounded theory is a general research approach which emerged from two sociologists, Glaser and Strauss, in the 1960s during their studies exploring dying in hospitals (Glaser & Strauss, 1966, 1967, 1968), and is an inductive systematic methodology using constant comparative methods. The systematic strategies they developed were suitable for adoption by social scientists researching a wide range of topic areas. Theories are developed from the researcher “grounding” themselves in the data, constructing themes from the data rather than producing testable hypothesis from a specific theory or framework (Charmaz, 2006).

This qualitative phase did not follow pure grounded theory methods, as I was not seeking to develop a new theory which is the result of pure grounded theory, but adopted a grounded theory approach utilising a number of its methods in conducting the interviews and analysing the data. Taking a grounded theory approach involved an iterative process with the data; whilst conducting the interviews, I was continually reviewing, reflecting and synthesising the data, developing emerging constructs which were reflected in later interviews. I was constantly comparing the difference between practices and reframing and updating questions as themes were constructed from earlier interviews. The utilisation of grounded theory approach moved the data from a description of what was happening in each practice to an understanding of what had changed since the introduction of LES and how this differed between practices. The combination of scoping interviews and case studies involving in-depth interviews and document analysis fits with Glaser’s dictum of “all is data” and demonstrates methodological congruence in this qualitative phase.

Methodological congruence is defined as the “fit between the research problem and the question, fit between research question and the method, and, of course, fit among the method, the data, and the way of handling data” (Richards & Morse, 2007) and is linked with the evaluation of scientific rigour in qualitative research (Thurston et al., 2008).

Glaser and Strauss (1967) described the point at which to discontinue data generation or analysis in relation to a specific category as when theoretical saturation has been achieved. Data saturation is when interviews do not produce any new information. It has been referred to as the “gold standard” in qualitative health science research for determining purposive sample sizes (Guest et al., 2006) and is widely considered an essential methodological element within qualitative work, however there has been uncertainty regarding its conceptualisation and application (Saunders et al., 2017). I aimed to conduct up to 20 scoping interviews and four case studies with up to five staff members in each practice, or when data saturation was reached prior to these targets (see section 7.3.1 for further information).

I am interested in participants’ interpretations of their worlds and their perspectives of the LES and supported self-management for asthma. I adopted a relativist ontological stance in this qualitative phase as relationships are integral to constructing reality and interviewing various members of practice staff in the case studies allowed me to gain a holistic perspective of the impact of the LES on primary care. In gathering and analysing the accounts of different primary care staff members, I explored the social interactions that have determined the meaning participants assigned to their world within the realm of primary care practice. An interpretive approach enabled me to improve my understanding of primary care staff behaviour in routine practice and produce results which, to a certain extent, could be applicable to individuals in similar situations. As a researcher I am aware of my impact on the research process and acknowledge that the results for this qualitative phase are subjective as they are my interpretation of findings,

another researcher may have produced different research and constructed alternative conclusions.

7.3.2 Scoping interviews

7.3.2.1 Practice recruitment

I used a range of sampling techniques to recruit participants for the scoping interviews: purposive, snowballing and convenience. Convenience sampling was included in the sampling techniques due to the difficulty of recruiting primary care staff (Wetzel et al., 2005; Askew et al., 2002). In discussion with my two supervisors based at Queen's University Belfast (MS & LH), who have working knowledge of Northern Ireland's healthcare system, we compiled a list of 26 practices to approach in Northern Ireland and request a telephone interview with the individual best placed to explain how the practice addressed the challenges of the LES. This key informant could be either a healthcare professional or a member of the administrative staff. We selected practices from the five Local Commissioning Groups across Northern Ireland which represented a range of demography (e.g. deprived/affluent, city/urban/rural, young/older populations), diverse practice sizes and organisation of asthma care.

I wrote to each of these 26 practices enclosing an information leaflet regarding the study (Appendix 8) and followed up with a telephone call within two weeks. The Public Health Agency introduced me to two participants (1 GP; 1 administrative staff). I contacted Education for Health, who connected me with a registered nurse who conducts respiratory training courses in Northern Ireland and she introduced me to three nurses. Following this, I downloaded the list of registered GPs from the Public Health Agency website and called each practice on the list until data saturation was reached. These calls were not prearranged and the practices were not aware of me or my PhD prior to the phone call. Unlike the other participants, these practices had not received an information leaflet or consent form prior to the call. Many wished to proceed with the interview immediately rather than wait for forms to be exchanged and arrange a time for me to call back. To accommodate this, I

explained carefully about the study, read out the consent form and took verbal consent.

7.3.2.2 Payment

Primary care is busy and I reimbursed the practice for the staff members' time away from routine practice. I contacted various departments within the Public Health Agency, Northern Ireland's Research and Development office and the Northern Ireland Clinical Research Network, none of whom were aware of or could confirm a standard rate paid to practices in Northern Ireland for participating in research. The Northern Ireland Clinical Research Network advised against asking practices individually for a cost and recommended paying a flat rate. I contacted the Scottish Primary Care Research Network who were able to provide hourly rates for primary care staff: GP - £80; Practice Manager - £30.10, Nurse - £30.10, which were worked out pro-rata in half hour increments and I used these in lieu of official rates from Northern Ireland.

7.3.2.3 Aims of the scoping telephone interviews

The aims of the scoping telephone interviews were:

- to gain an overview of attitudes to incentives, strategies used to meet the challenge of the LES, and the barriers and facilitators that were encountered.
- to enable theoretical sampling of four diverse practices for the case studies.

7.3.2.4 Topics for the structured scoping interviews

The financial incentives framework was used to create some of the questions in the topic guide. Appendix 10 shows the topic guide for the scoping interviews.

- Perceptions of the LES (e.g. working in a target driven environment).
- Strategies used to achieve change as a result of the LES.
- Key barriers and facilitators encountered.

7.3.2.5 Data generation

All scoping interviews were conducted by telephone, with consent, at a time convenient for key informants. Initially, I recorded scoping interviews to aid note-taking; their primary function being to provide contextual data about the range of strategies that practices used for fulfilling the LES, in addition to providing demographic and performance data to assist with case study practice selection. I anticipated interviews to be approximately 10-15 minutes in duration. However, after completing four interviews, I realised the information being provided was a rich data source and required inclusion in the analysis alongside the case studies. Initially these interviews had been labelled as “screening” interviews due to their primary function of identifying practices for case studies and they were due to complete when the case study quota (up to four or data saturation) was reached. As screening was no longer their sole function, the interviews were relabelled as “scoping” interviews and two of the interviews were undertaken after the case studies had completed.

7.3.2.6 Pilot interviews

Before conducting interviews in any qualitative research, it is advisable to pilot the interviews (Gill et al, 2008). I undertook two pilot individual telephone interviews, one GP within the University of Edinburgh and one primary care practice manager from an Edinburgh practice, and asked for feedback on my interview style and interview questions. This allowed me to establish the clarity of my topic guide, effectiveness of questions in eliciting responses and feasibility of participants answering the questions in time allocated. In addition it enabled me to practice my interview style, learn how to initiate the conversation to explain my research, become familiar with vocalising my questions, and how to engage the participant in the interview.

7.3.3 Case studies

Case studies are the preferred study design when “how” or “why” questions are being asked and the focus is based in a real-life context where the researcher has minimal control over the events (Yin, 2003). Case studies were selected for this phase as they aim to look at relationships and processes

(Thomas, 2016). Case studies can be either single or multicas e and explore multiple facets of a phenomenon using a range of different data sources. The inclusion of different data sources is both a requirement and a strength of case studies (Yin, 2003). While single case studies are looking to understand the case, multicas e research is looking to understand the ‘quintain’ with each case being a manifestation of the quintain (Casey & Houghton, 2010). Derived from the name of the target in mediaeval jousting, the ‘quintain’ is identified by Stake as “an object of the condition to be studied – a target, not a bull’s eye” and argues that multicas e studies are primarily instrumental rather than intrinsic due to their strong interest in the quintain (Stake, 2006). The selection of four different practices makes the case study element of this phase a multicas e study and the quintain is the perceived impact of the LES in primary care in Northern Ireland.

I followed Stake’s (2006) approach to case studies which is based on a constructivist paradigm and acknowledges the inclusion of data other than the case data (such as the scoping interviews in this study), although it highlights the need to keep the case studies integral rather than incidental to the study. This supports the inclusion of the scoping interviews in this chapter as they provide further data allowing me to explore the multicas e study quintain. Constructivism is based on the principle that truth is subjective and based on one’s own perspective, with people making meaning through their interactions with others (Baxter & Jack, 2008).

7.3.3.1 Practice selection

I wanted to include four practices with diverse approaches and different performance in the LES. Participants were therefore approached at the end of their scoping interviews about participating in the case study stage to provide an in-depth understanding of their practice’s strategies for achieving LES targets. At the end of every scoping interview, if deemed appropriate, I explained the case study aspect of my PhD to the participant and asked if they would be interested in having their practice participate. For every individual who stated they were interested, I emailed over an information sheet for the

practice (Appendix 11) and the participant (Appendix 12). If I had not received a response from the practice after one week, I followed up by phone call and/or email. The case study involved semi-structured interviews with up to five practice staff members and documentary evidence collection including: templates of the action plans used in each practice and copies of letters/emails issued to patients regarding their annual asthma review. I aimed to construct an understanding of how the practice addressed, and were continuing to address, the provision of supported self-management, including an action plan, required by the LES guidelines.

7.3.3.2 Participant recruitment – practice staff

In each case study practice, I invited GPs, nurses (respiratory and practice) and administrative staff to participate in in-depth interviews about: their experiences of supported self-management for asthma; their perception of the LES implementation in their practice; any new resources introduced; any training they have undertaken; any organisational changes adopted to meet the demands of the LES standards. Case studies involved individual or group interviews with up to five members of staff and provision of documentation which would require work outside of the interview time. Practices were paid £300 to reimburse their time and were informed of this prior to taking part.

7.3.3.3 Topics for in-depth interviews with key clinical and administrative staff

The financial incentives framework was used to create some of the questions in the topic guide. Appendix 13 shows the topic guide for the in-depth individual and group interviews undertaken in the case studies. In summary I aimed to:

- Explore clinical and administrative staffs' perceptions of supported self-management for asthma and the LES (e.g. target driven working environment, monitoring undertaken and any sense of achievement, impression of whether self-management education is worthwhile/effective)

- Identify changes that have taken place since the introduction of LES (e.g. new systems that have been implemented, upskilling of staff, new staff members employed, new resources introduced, internal restructure or change of job descriptions)
- Understand how changes were decided upon (e.g. journal-based research, discussion with other practices, advice from the Health Board, internal expertise)
- Understand the current routines for supporting self-management (e.g. how action plans are delivered to asthma patients, where the responsibility for provision of supported self-management lies, monitoring of out of hours/emergency department visits, measuring rescue medication requests), and how they were developed.
- Identify issues that currently affect the provision of self-management education (e.g. missed appointments, non-adherence to preventer medication, understanding of action plans, time given per appointment)

7.3.3.4 Data generation

Interviews and document review were selected as data generation tools as recommended by Stake (2006). Interviews were conducted face to face, in each of the four practices at a time that was convenient for the key informants; participants were advised that the interview could take up to an hour. Participants were provided with an information sheet and consent form prior to the interview, with the consent form being signed and collected at the interview. As part of the Northern Ireland Research & Development guidelines, written consent was required from a senior practice staff member on behalf of the whole practice in addition to the individual consent forms: in each practice it was the GP participant who signed this form. In addition to the consent form, the participants were also informed verbally, at the start of the interview, that the interview would be recorded and that they were entitled to withdraw at any point. I chose not to take any notes during the interviews, rather I wanted to focus on the participants and give them my full attention, with field notes being written immediately after the interviews, once I had left the practice.

Semi-structured interviews

I interviewed participants only once which allowed me to hear from more individuals about their experiences and utilised a carefully prepared interview schedule, developed in discussion with a multidisciplinary team and feedback from Patient and Public Involvement (PPI) representatives (see section 7.3.5 for further information), ensured the questions asked generated as much detailed information as possible from each interview. In addition, as I was interviewing multiple members of staff from each practice, it was possible to confirm and check details in other interviews. The use of semi-structured interviews provided flexibility within each interview and as I progressed through the interviews, additional questions were added as potentially interesting themes were constructed through ongoing comparative analysis of earlier interviews. For example, a number of participants mentioned the importance of providing supported self-management for asthma from initial diagnosis and I incorporated questions asking about the process of diagnosing asthma into later interviews. This was insightful as it provided information on defined roles, communication between staff members and teamwork. The interviews were audio-recorded, transcribed verbatim and analysed thematically using data analysis software (NVivo).

The interview topic for participants was unlikely to cause distress, however participants were reminded at the start of the interview that they had the freedom to pause or stop the interview and have their data removed without providing an explanation. I followed University of Edinburgh and Social Research Association guidelines on personal safety when conducting lone interviews (Craig et al, 2016) and nothing materialised in the interviews which required me to seek support from the University of Edinburgh Student Counselling service. In addition to my regular monthly supervisory meetings, I had the opportunity to reflect on my experiences of interviewing as I met with my main supervisor (HP) and my supervisor with extensive qualitative research experience (MK) separately throughout data generation.

Individual and group interviews

Initially I had planned to undertake individual interviews in each of the practices and this was the method used in case study 1 and case study 2. Prior to arriving at case study 3 practice, the practice contacted me and stated that, due to time constraints, their preference was to be interviewed together in a group interview. I discussed this with two of my supervisors (HP and MK) and agreed with the practice that we could proceed with a group interview. On arriving at case study 4 practice, they had set themselves up for a group interview and as this had already been agreed with case study 3, I was able to proceed. This proved beneficial as it provided me with two group interviews to compare.

Individual interviews provide a safe space for individuals to express their opinions without judgement or interference from other participants and the researcher receives the view of one person. However, in a group interview the researcher can receive multiple responses and learn about different experiences and opinions. In addition to what is said, group interviews provide the opportunity for the researcher to observe group dynamics, seeing how individuals support certain views and challenge others (Denscombe, 2014).

Group interviews are distinct from focus groups. The researcher takes a more prominent role in group interviews than focus groups, asking questions and leading the discussion, whereas, focus groups are more participant led as they discuss a particular topic and the researcher assumes a less prominent role; observing rather than actively controlling the discussion (Barbour & Kitzinger, 1998).

Documentary evidence

To construct an understanding of how practices communicated with patients through written correspondence, I collected a selection of documentary evidence from each practice. This included copies of the letter and/or email templates sent to patients with asthma inviting them for their annual asthma review and copies of the action plans each practice provided for their patients.

Collecting documentary evidence was mentioned on the participant information sheet and discussed during the scoping interview telephone call with the initial participant from each case study practice. During (if the topic arose organically), or at the end of interviews, I asked the administrative staff member to provide a copy of communication issued to patients inviting them for their annual asthma review, and the nurse provided copies of action plans used in the practice. All documents collected from practices were kept in a locked room with in the University of Edinburgh and then scanned by a university printer and saved on a university password protected computer.

7.3.4 Analysing the data

A grounded theory approach (Charmaz, 2006) was used for data analysis to construct an understanding of practice processes, particularly any processes changed since the introduction of the LES. By using a grounded theory approach I moved from a description of what is happening to an in-depth understanding of the process taking place (Corbin, 2008). The data gathered from the scoping interviews was used to provide an oversight of what was happening in practices and allowed me to select practices for the case studies. I used an iterative process with the data, continually reviewing, reflecting and developing our interview questions as I proceeded through the interviews. Information that I gathered was coded to identify theoretical concepts. The analysis was iterative and on-going alongside data generation so that findings from early interviews influenced the conduct and content of later ones, for example early participants discussed the Public Health Agency and the role of pharmaceutical companies in relation to the LES and supported self-management for asthma so I then included questions exploring these relationships and interactions further. Analysing and collecting data simultaneously is also recommended in multicase studies (Stake, 2006). During the analysis process I met with my supervisors (HP, MK, MS) and a PPI representative (EE) to discuss the qualitative analysis of the interview transcripts. In addition to their academic roles, two of my supervisors involved in this meeting hold clinical positions within primary care (HP) and secondary care (MS) which provided a range of perspectives to the discussion. Everyone

was provided three anonymised interview transcripts (1 scoping interview; 1 individual in-depth interview and 1 group interview) and a list of the preliminary themes and we all contributed to a discussion regarding the themes being constructed from the data.

7.3.4.1 Transcription

I employed an external company to provide transcription services for the recorded interviews. They signed a confidentiality agreement which was reviewed and approved by the University of Edinburgh Usher ethics committee. It was reasoned that, due to all interviews being conducted with participants in Northern Ireland, and being Northern Irish myself, employing a transcription company from Northern Ireland would ensure that the accent, dialect and colloquialisms were picked up accurately.

Audio recordings were sent via the “WeTransfer” website which encrypts files while they are being transferred. The transcription company received an email and had to log into an account, where they downloaded the files. WeTransfer is a Dutch domiciled company and their security standards abide by the Dutch Personal Data Protection Act (Wet bescherming persoonsgegevens), based on the E.U. Privacy Directive (95/46/EC). Transcripts of recordings were sent by email from the named point of contact at the transcription company and were password protected with the password issued in a separate email.

My analysis involved listening to every audio recording at least three times in order to immerse myself fully in the data. This also meant I could compare the recordings with the transcript ensuring accuracy in the transcribing.

On receipt of the transcripts, I removed all identifying information such as people and place names. Participants in the telephone interviews were attributed a pseudonym in the format of “T#”, the number corresponding to the order in which the interviews were conducted. Case study interview labels begin with “CS”, then the case study practice number (1-4) and a number identifying job role (1 = administration staff; 2=GP; 3=nurse). When a

colleague's name was mentioned in the transcripts, I removed it and inserted the named individual's job title to ensure context was kept in interviews.

7.3.4.2 Grounded theory approach coding

Coding is the first analytic step and I used both line by line and focussed coding to analyse the data. Line by line coding involved immersing myself in the interview transcripts and labelling each line of the transcript with a code stating what has happened in that line of written data. Due to the iterative nature of a grounded theory approach, I commenced coding and analysing earlier interviews while undertaking the later interviews. Line by line coding allowed me to remain open to the data and helped reduce the influence of previous interviews as I was not focussing on a large theme, rather interpreting each line as an individual section. This approach separated me from the overall story participants were telling, freeing me from accepting their views without question and enabling me to proceed with a more critical analysis of the data unbiased by participants' opinions.

Initially I printed out the transcripts and highlighted codes by hand as I found this easier than reading and coding on screen. I annotated the transcripts providing more contextual data regarding the interview experience such as environment, body language, pauses and interruptions. This allowed me to produce a more holistic picture of the interview and enabled me to compare transcripts more efficiently. Line by line coding provided large lists of categories which were building blocks from which to begin constructing codes and themes to be further investigated in focussed coding.

Focussed coding was the second major coding stage and it builds from the directions identified in the initial line by line coding. Where line by line coding identifies all possible codes, focussed coding is a decision-making process, identifying codes most appropriate to categorise the data. I continued this phase of coding on printed copies of the interview transcripts, continually comparing and moving back and forth through the transcripts comparing earlier coded transcripts with later coded ones. This iterative process is one of the strengths of a grounded theory approach to analysis as it allows the

researcher to become actively involved in the data rather than just passively reading in it (Charmaz, 2006).

Once I had determined the main themes and sub themes from the data, I uploaded all transcripts to a computer-aided qualitative data analysis software (NVivo). This provided an organised record of all main codes and sub themes and I could count the areas that were discussed most often. There is a quantitative element to focussed coding as it involves using the most frequently mentioned codes as a guide through large amounts of data. By containing all the data on NVivo it provides a clearer view of when and where themes are mentioned and allows for quicker location of texts than searching through multiple pages of print outs.

7.3.4.3 Document analysis

I collected letters issued to patients with asthma by their practice informing them of their need to attend an asthma review, and action plans issued by nurses and tailored for patients to assist with the self-management of their asthma. These provide an insight into the writers' perception and view of events which is extremely valuable for research based on a constructivist paradigm. The letters and action plans that I collected were analysed using the constructionist approach to document analysis. This approach moves beyond the structure of the document's narrative and instead is concerned with understanding the processes by which the narrative constructs reality, with consideration for who the intended recipient is, the position of the writer and what the writer is trying to achieve. Table 19 depicts the questions outlined by Hammersley and Atkinson (1995) that I utilised to explore the letters and action plans.

Table 19: Questions to ask about documents (source: Hammersley and Atkinson, 1995)

1. How are documents written?
2. How are they read?
3. Who writes them?
4. Who reads them?

5. For what purposes?
6. On what occasions?
7. With what outcomes?
8. What is recorded?
9. What is omitted?
10. What is taken for granted?
11. What does the writer seem to take for granted about the reader(s)?
12. What do the readers need to know in order to makes sense of them?

7.3.4.4 Case description, within-case and cross-case analysis

The case studies were analysed by a three-stage process: case study description; within-case analysis and cross-case analysis (Stake, 2006) and the analytic strategies used are identified in Table 20. Case description allowed me to paint a picture of the practice and the relationships of the participants within it, providing context for the interviews, which is crucial to case study research (Yin, 2003). I describe the size and setting of the practice, the built environment, interaction between participants and between participants and me. I provide an overview of their initial interaction(s) when diagnosing asthma and the routine interactions for established patients with asthma including the duration and experience of an annual asthma review. Within-case analysis allowed me to gain familiarity with the data and develop initial themes which were then expanded to develop the key concepts and a deeper understanding of the processes in place. A grounded theory approach of line by line coding and focussed coding was utilised (see section 7.3.4.2 for further information) immersing myself in each interview transcript and then constantly comparing and analysing with the other interview transcripts in a cross-case analysis to identify and develop themes. In addition to performing cross-case analysis with other case study interviews, I also included the scoping interviews' transcripts in this stage of analysis. The practice of including data external to case studies is acknowledged by Stake (2006) and can be useful in understanding the quintain (see section 7.3.3 for further information).

Table 20: Within- and cross-case analytic strategies

Strategy	Analytic focus	Product
Immersion in each interview through reading and line by line coding	Within-case	Identification of initial codes
Rereading and comparing	Within- and cross-case	Focussed codes
Close reading and comparison with other interviews	Cross- case	Development of themes
Categorisation of themes and identification of significant statements	Within- and cross-case	Structure and content of evidence

7.3.4.5 Framework analysis

The Normalization Process Theory (NPT) (May et al., 2016) is a dynamic and flexible middle theory, now in its fourth iteration, which seeks to address the factors needed to bridge the gap between research and implementation within health research (Murray et al., 2010). Introduced as the Normalization Process Model (May, 2006; May et al., 2007) it has been extended and developed and is now used in a wide range of health research studies including: E-health (Mair et al., (2012); maternity care (Forster et al., 2011); diabetes (Burrige et al., 2016); substance misuse programme (Dugdale et al., 2016). In addition, the NPT has also been used at different phases of the complex intervention cycle including: systematic reviews (McEvoy et al., 2014) pilot studies (Buckingham et al., 2015); trials; surveys and qualitative research (May et al., 2015).

The NPT consists of four constructs: Coherence (making sense of change), Cognitive Participation (engaging together for change); Collective Action (contributing to change); Reflexive Monitoring (appraising the impact of change) each with four underlying components (Table 21) and focuses on identifying factors that support or impede the implementation and normalizing of practices and how they impact on implementation strategies and outcomes (May et al., 2009). These four constructs are not linear but work together dynamically, and in conjunction with other factors including: the intervention; organisational context; social norms; group processes (Murray et al., 2010).

In addition, the NPT highlights the significance of “context” in implementation science and proposes that it be considered a process rather than a place, therefore acknowledging the importance of the roles, interactions and relationships involved in implementation strategies (May et al., 2016).

Table 21: Constructs and components of the Normalization Process Theory

NPT Core constructs			
1. Coherence	2. Cognitive participation	3. Collective Action	4. Reflexive monitoring
Underlying components			
Differentiation	Initiation	Interactional workability	Systemization
Communal Specification	Enrolment	Relational integration	Communal appraisal
Individual specification	Legitimation	Skill set workability	Individual appraisal
Internalisation	Activation	Contextual integration	Reconfiguration

1. Coherence refers to work undertaken both individually and collectively by people prior to the implementation of new practices to understand the purpose of the new practice, what will it entail and how it is different from existing practices. This construct is about making sense of the changes that will occur with the implementation of the new practice and defining what the work is.
2. Cognitive Participation is about participants engaging with the implementation, determining individual's roles in the new practice and

understanding what motivates individuals to continue to contribute to the new practices.

3. Collective Action refers to the operational work undertaken by individuals to enact a set of practices so determining how the work will be completed. This is about identifying if there is sufficient support from management, are individuals confident about their co-workers contributions and are tasks correctly allocated according to individuals' skill sets.
4. Reflexive Monitoring focuses on the appraisal work undertaken to evaluate and understand the impact of the implemented practice: how it has affected participants individually and collectively. These evaluations can then be used to modify the new practice to increase its effectiveness and workability within the context it has been implemented in.

However, when implementing new interventions, normalization is not a certain outcome nor, if achieved, is it a permanent end point of the implementation process. For example, de-normalization may occur during when a previously normalized intervention is replaced, disturbed, disrupted, or ceases to be accepted by participants involved (May et al., 2007). The four constructs of the NPT are dynamic and have different relevance at different stages in the normalization process. In work at the earlier stages of implementation, there would be less difficulty in determining the differences between old and new practices. In contrast, later in the normalization process people will have reflected on the intervention but may have forgotten how different it was to the previous approach

I chose the NPT for the framework analysis section of this thesis as it provided a set of sociological tools that enabled me to explore the relationships between primary care staff and if/how the LES had been normalized into routine practice in Northern Ireland. As a middle range theory, the NPT integrates theory and empirical research and complements the grounded theory approach I utilised for the scoping interview and case study data generation and analysis. Its

consideration of the importance of context supports findings from my systematic review and the inclusion of the context of health care in Northern Ireland containing quantitative data on health and implementation outcomes.

7.3.4.6 Framework analysis coding

Interview transcripts were uploaded to NVivo for analysis and analysed using a framework informed by the NPT (Table 22).

Table 22: Coding framework for the implementation of the LES

	NPT Toolkit definition (May et al., 2015)	Application to LES
1. Coherence		
<i>Differentiation</i>	Whether the intervention is easy to describe to participants and whether they can appreciate how it differs or is clearly distinct from current ways of working	LES distinguished as different from previous ways of working
<i>Communal specification</i>	Whether participants have or are able to build a shared understanding of the aims, objectives, and expected outcomes of the proposed intervention	Participants collectively build a shared understanding of what the LES expects from the practice
<i>Individual specification</i>	Whether individuals participants have or are able to make sense of the work - specific tasks and responsibilities – the proposed intervention would create for them	Participants understand what the introduction of the LES entails for their specific role
<i>Internalization</i>	Whether participants have or are able to easily grasp the potential	Participants understand the reason for the LES and the positive

	value, benefits and importance of the intervention	implications of its introduction.
2. Cognitive participation		
<i>Initiation</i>	Whether or not the key individuals are able and willing to get others involved in the new practice	Key individual(s) take ownership of the LES processes and drive its implementation
<i>Legitimation</i>	Whether or not participants believe it is right for them to be involved, and that they can make a contribution to the implementation work	Participants agree that the LES tasks belong in primary care
<i>Enrolment</i>	The capacity and willingness of participants to organise themselves in order to collectively contribute to the work involved in the new practice	Participants have organised themselves to collectively contribute to the LES
<i>Activation</i>	The capacity and willingness of participants to collectively define the actions and procedures needed to keep the new practice going	Participants collectively define and participate in the organisational processes needed to achieve LES targets
3. Collective action		
<i>Interactional workability</i>	Whether people are able to enact the intervention and operationalise its components in practice	LES processes can be integrated into existing work

<i>Relational integration</i>	Whether people maintain trust in the intervention and each other	Participants' confidence in team members abilities to complete LES processes
<i>Skill-set workability</i>	Whether the work required by the intervention is seen to be parcelled out to participants with the right mix of skills and training to do it	New LES organisational processes are assigned to the most appropriate staff member dependent on skills
<i>Contextual integration</i>	The intervention is supported by management and other stakeholders, policy, money and material resources	Sufficient support for participants from the practice and the Public Health Agency
4. Reflexive monitoring		
<i>Systemization</i>	Whether participants can determine how effective and useful the intervention is from the use of formal and/or informal evaluation methods	Measurement of LES and organisational processes effectiveness
<i>Communal appraisal</i>	Whether, as a result of formal monitoring, participants collectively agree about the worth of the effects of the intervention	Collective assessment of the impact of the LES on care received by patients
<i>Individual appraisal</i>	Whether individuals involved with, or affected by, the intervention, think it is worthwhile	Individual assessment of the impact of the LES on staff
<i>Reconfiguration</i>	Whether individuals or groups using the intervention can make changes as a result of individual and communal appraisal	Feedback on the LES and how it has modified initial implementation strategies

7.3.4.7 Assigning strength to NPT variables

The web-enabled NPT Toolkit is an online questionnaire which contains 16 statements to think through an implementation problem (May et al., 2015), each of which relate to a respective component of the NPT. The NPT Toolkit does not provide definitive scores but is a heuristic tool to encourage thought about an intervention process and highlight areas which potentially require further investigation. Agreement with statements can be measured by selecting “not at all” to “completely” on a sliding scale and a radar plot is produced depicting the strength that has been attributed to each of the 16 NPT components. I used the NPT toolkit to produce radar plots to provide a graphical representation of the summary of the strength assigned to the NPT variables based on my framework analysis of the scoping and case study interviews, interpreted in discussion with a multidisciplinary team representing primary care (HP) and secondary care practice in Northern Ireland (MS).

7.3.5 Patient and public involvement contribution

The Asthma UK Centre for Applied Research has a Patient and Public Involvement (PPI) platform which I have accessed throughout the qualitative phase of this study. I spoke with six lay representatives from the patient advisory group to learn more about how patients with asthma interact with general practice about their asthma care, including who they were most likely to interact with regarding their asthma care (nurse). This gave me practical advice which informed my topic guides, and also assisted in identifying which staff members it would be necessary to interview to find out more about asthma care in general practice. For example, lay representatives told me that they predominantly saw the nurse for asthma care which identified nurses as key individuals in supported self-management for asthma.

A lay representative (EE) was provided with copies of three anonymised transcripts (a telephone interview; an in-depth individual interview with a GP from the case studies; a group interview) and asked to read through and deliver her perspective on the data. She was also provided with a list of the themes that had been constructed from my coding and asked to consider their

appropriateness to the data. This information was combined with my codes and discussed by a multi-disciplinary team (TJ, HP, MK, MS) to include multiple perspectives.

7.4 Summary and next steps

In this chapter I have outlined the methods utilised in the qualitative phase of my PhD. Scoping interviews were conducted by telephone and although initially their primary focus was to provide contextual data regarding the practice's methods for fulfilling the LES requirements and demographic information for case study practice selection, they were ultimately included in analysis alongside the case studies. The case studies consisted of individual interviews, group interviews and document analysis and were analysed by a three-stage process: case description; within-case and cross-case analysis. I adopted a grounded theory approach to data generation and to the analysis of interview transcripts to explore primary care staff perceptions of the implementation of the LES and supported self-management for asthma. The NPT influenced the framework analysis of data collected in the scoping interviews and case studies to provide an understanding of how the LES became embedded into routine practice in primary care.

The next chapter presents the results of the semi-structured scoping interviews, describing recruitment and practice and participant characteristics. The themes discussed in the next chapter were constructed by analysing the scoping interviews and the case study interviews together, but the results will be presented separately and then combined again for a discussion in the case study results chapter (Chapter 9). The next chapter outlines the themes and presents quotations only from the scoping interviews as evidence in support of each theme.

Chapter 8 Constructing themes using a grounded theory approach

8.1 Introduction

The previous chapter outlined the methods I utilised in the qualitative phase of my PhD. A grounded theory approach to data generation and analysis was used to explore the perceptions among primary care staff members. This chapter reports the results of the 15 semi-structured scoping interviews: describing recruitment and practice and participant characteristics, and providing quotations in support of the constructed themes. Themes were constructed by analysing the scoping interviews and case study interviews together, and clustered around: communicating with patients; financial incentive schemes; strategies for achieving targets and targeting poor asthma control. The case studies were recruited from the scoping interviews and transcripts analysed together, however, this chapter presents the results from the scoping interviews only.

8.2 Results

I aimed to speak to up to 20 primary care staff members but data saturation was achieved at 15 scoping interviews (two GPs; three nurses; 10 managers). Table 23 outlines how many practices were contacted, means of contact, and which resulted in interviews and participation in case studies.

Table 23: Recruitment methods and participation numbers

	Practices contacted	Scoping interviews	Case studies
<i>Targeted letter</i>	26	3	1
<i>Telephone</i>	125	7	1
<i>Public Health Agency</i>	3	2	1
<i>Education for Health</i>	3	3	1
<i>Total</i>	157	15	4

There are five Local Commissioning Groups in Northern Ireland (Belfast, Northern, Southern, North Eastern and Western) (see section 6.2 for further information) and participants were from across all of the Local Commissioning Groups. Ideally, I would have preferred to have a similar number of participants from each of the Local Commissioning Groups and initially this is what was aimed for in our selection process involving the recruitment letters. Unfortunately, this was not possible as I experienced difficulty engaging practices in taking part. Primary care staff are frequently approached for participation in research studies, and recruitment is often low (Signorelli et al., 2017). Reasons for this include: workload demands; lack of time; perceived unimportance of project; perceived lack of relevance to their work; contact being lost among other emails, letters or paperwork (VanGeest et al., 2007; Senf, 1987; Kaner, 1998). Recruiting to qualitative studies is more difficult than recruiting for quantitative work and this may be due to time constraints or the need for face to face contact with researcher (Thompson et al., 2001). I noted while calling practices that receptionist staff quizzed me thoroughly on my intent and were quite often guarded about providing any information or transferring me to other members of staff. Of the 157 unscheduled calls that I made, I was connected to 10 staff members who were involved with the LES. Six of these resulted in interviews and the other four declined due to either staff not wanting to participate or asking me to call back at a more convenient time. On calling back I was unable to be transferred through due to a variety of reasons provided by reception staff including: not in the practice that day; in a meeting; not answering their desk phone.

Table 24 shows the characteristics of the practices in the scoping interviews. The Northern Ireland Multiple Deprivation scores were allocated by using the practice's post code to determine their Super Output Area (SOA), this was then cross referenced with Northern Ireland Multiple Deprivation 2017. SOAs are geographical areas created following the 2001 Census and are divided into Lower Layer SOA with an average population of 1500 residents and Middle Layer SOA with a population of approximately 7200 residents. The 890 SOAs in Northern Ireland are ranked from 1 (most deprived) to 890 (least deprived)

and these are presented in graphical form with the 890 SOAs divided into 10 equal categories, each containing 89 SOAs. This means that the deprivation measure provided is based on the practice's postcode which may not be the same for all of the practice's population.

Table 24: Characteristics of scoping interview practices

Identifier	Geographical area	Northern Ireland Multiple deprivation measure 2017*	Local Commissioning Group	Practice size (number of registered patients)	Participant occupation
T1	Urban	2	Belfast	3,000-4,000	Manager
T2	Urban	5	Belfast	10,000-11,000	Manager
T3	Urban/rural	6	Southern	7,000-8,000	GP
T4	Urban/rural	7	Southern	13,000-14,000	Manager
T5	Urban	10	Belfast	5,000-6,000	Manager
T6	Urban	3	Belfast	9,000-10,000	Manager
T7	Urban	5	Belfast	6,000-7,000	Manager
T8	Urban	2	Belfast	13,000-14,000	Manager
T9	Urban	1	Belfast	9,000-10,000	Manager
T10	Urban	9	South Eastern	5,000-6,000	Manager

T11	Urban	8	Belfast	5,000-6,000	Nurse
T12	Urban/rural	9	South Eastern	5,000-6,000	Nurse
T13	Urban	1	Belfast	3,000-4,000	Nurse
T14	Urban	5	Western	11,000-12,000	GP
T15	Rural	7	Northern	7,000-8,000	Manager
*Northern Ireland Multiple deprivation measure 2017 (1 = most deprived, 10 = least deprived)					

8.2.1 Themes

Themes were constructed, using a grounded theory approach (Charmaz, 2006), from the scoping interviews and the case studies. Themes identified clustered around the following categories: communicating with patients; financial incentives; strategies for achieving targets and targeting poor asthma control (Table 25). Additional supporting quotations are contained in Appendix 14.

Table 25: Themes and sub-themes of scoping interviews

Themes	Sub-themes
Communicating with patients	<p>Communication and barriers to engagement</p> <p>Understanding patients and personalisation</p> <p>Empowering patients to self-manage</p> <p>Awareness and education</p>

Financial incentive schemes	Record keeping Funding and receiving financial incentives QOF vs LES Complementary roles
Strategies for achieving targets	Updated processes and legacy work Annual cycle Team members, roles and interaction Time management Infrastructure
Targeting poor asthma control	Identifying risk Seeing the value in work and prioritisation Non/low attendees

8.2.1.1 Communicating with Patients

Communication and barriers to engagement

Communication with patients was discussed by all the participants. There was an understanding that building relationships with patients was key to encouraging them to attend their asthma review appointments. By building a relationship, practices were providing patients with a nominated person in the practice they could rely on and learn to trust with their asthma care. Participants wanted patients to be aware they invested in each patient, provided asthma care tailored to the individual patient and started engagement from an early age, potentially five or six years old, encouraging children to be involved in their own asthma care.

“It’s really about building the relationship, trying to encourage the patients that this is on-going patient care.” (Nurse, T12)

“I think it’s very, very important and that engagement increases as they get [grow] up. And by the time they’re 16, if they’re coming with the parent, the parent is offside. They just sit there. It’s very much, well at least that’s the way I work it.” (GP, T14)

All participants highlighted the difficulty of getting patients with asthma to attend appointments, patients were described as “*notoriously hard*” (Manager, T05) to get to attend the practice for their asthma as they “*only come in if there’s a crisis*” (Manager, T09). Participants expressed frustration at the time and effort they were investing in patient engagement feeling it was not acknowledged by the patient.

“It is difficult when you’ve tried to bring patients in and you’ve put a lot of effort in and they won’t come so then you’re penalised for it.” (Manager, T01)

“You get them on the phone and they make an appointment and then maybe a day before they cancel, even though they were ‘Oh yes, yes I’ll certainly come in for that’. And you stress how important and then the last minute they cancel.” (Manager, T02)

The main reason identified for patients not attending annual reviews was a lack of understanding about their condition and how serious it can be if not well managed. Due to the variable nature of asthma, participants believed that patients thought their symptoms were under control and therefore did not need to attend for an annual review.

“...with asthmatics it’s very difficult to get them, they come when their asthma is bad but if it’s not giving them any trouble, it’s really hard to get them in.” (Manager, T01)

“You know, unless they’re regular attenders you just can’t get them in. When they’re well they feel they’re well and they just won’t come in.”

(Manager, T06)

The word “steroid” was identified as a barrier to adherence in children as parents did not want to give their child steroids due to negative connotations and lack of understanding. One participant noted that parental reaction to the word “steroid” was so strong that it had endangered the life of one their patients.

“...they’ll [parents] think you’re talking a lot of rubbish to them. And I’ve seen the one child who was hospitalised, a wee girl, and the parents would not give her the steroid. They just wouldn’t...And I got the doctor involved, and I said to him, ‘You need to speak to these parents because this child’s going to die’.”

(Nurse, T11)

Practices have developed different techniques for patients that do not attend for their annual review including: adding notes on the prescription script advising “*must come and see GP or nurse before ordering further inhalers*” (Nurse, T11); stopping repeat prescriptions of reliever medication; advising reliever will not be provided; advising patient will be removed from the register. However, all but one practice admitted that they would not feel comfortable withholding reliever medication in case the patient experienced an exacerbation or worse.

“...before they order their next inhaler we’d put that in but you can’t really withhold inhalers from someone with asthma and if they don’t come to their asthma appointment, it’s very difficult to do that.”

(Manager, T01)

“If they don’t turn up for their review, they get a reminder with the prescription. They might get a second reminder with the prescription and if it goes to the third time, they get a nice letter from me, saying, ‘Look, please come in, we haven’t seen you’. If they don’t come in then,

they get a slightly more – how would I put it? – urgent letter: ‘Come in or else’. And usually, they come in. Or else - ‘You may be off our list’ gets them in.” (GP, T14)

Understanding patients and personalisation

Practice staff reported empathy and understanding for individuals with asthma and worked towards personalising a service to increase attendance for annual reviews and provide better care for individuals. Practices scheduled appointments for school children in the summer months so parents did not have to take time off work and remove their child from a school day to attend the practice. Appointments were also created in the evening, with practices remaining open to provide a more accessible service to patients who were employed and unable to take time off work during regular practice opening hours. In addition, practices showed an understanding of individual patients, identifying individuals whose conditions were affected by seasonal changes and arranging appointments in months prior to them experiencing adverse reactions to changes in the weather.

“I’ve tried in a previous practice to default all the children and the teenagers to the summer holidays. Sometimes it works, sometimes it doesn’t.” (Nurse, T12)

“Because those patients will come and we tried to get them over the summer before the winter sets in, when they’re maybe not feeling as chesty, we try to get a lot of them in then.” (Manager, T01)

Empowering patients to self-manage

Administrative staff, nurses and GPs all stressed the importance of supporting self-management in patients with asthma. Asthma action plans were viewed as key to self-management and a sign of providing higher quality care to patients. Nurses preferred completing these plans in conjunction with patients to increase engagement in self-management, ensuring knowledge had been provided and that it was understood.

“The asthma one is more like a traffic light thing, and it would say, ‘this is what you should be doing when you’re good’, ‘this is what you should start doing when you go into, like, an amber stage’, and ‘this is your red alert’.”
(Nurse, T11)

“The patient seems to get better care with all the plans and what to do in an emergency and how to manage their asthma symptoms and then the leaflets, you know, what to do, what inhalers to take.”
(Manager, T02)

There was frustration surrounding how patients responded to self-management plans and advice provided by the nurse or GP. There was consensus that patients who did not understand their condition were happy to adopt a passive role, allowing the onus for the management of their asthma to remain with the practice. Practices were struggling with how to transfer responsibility for asthma management from solely the practice, to sharing it with the patient through supported self-management.

“It tends to be a little bit paternalistic, still. And I’m not sure how we deal with, that is, to get the patient to take responsibility for their own condition... And that’s where the asthma action plans were to come in.”
(GP, T14)

Awareness and education

Lack of awareness and education about asthma were identified as barriers in facilitating patients to learn more about asthma and engage in supported self-management. Practices utilised a variety of resources to provide asthma education tailored to the individual patient. Different modes of education were seen as important as there was a concern that with action plans, leaflets or booklets, patients were *“just gonna chuck them in the drawer”* (Nurse, T11). Providing further education was seen as beneficial, in particular from external organisations such as the Health and Social Care Board and Asthma UK but this education needed to be developed in a multi-disciplinary group with nurses and GPs involved.

“I think to publicise it more on TV or in general about how important it is for the asthma review to try and, you know, make patients more aware of what they need to do in regards to their asthma.” (Manager, T02)

“...more advertising with regards to the fact that asthma is...it’s not to be taken lightly...there’s been a couple of asthma attack deaths, although that comes out when it happens. It shouldn’t happen for it to come out, Public Health could maybe do advertisements with Asthma UK.”

(Nurse, T12)

8.2.1.2 Financial incentive schemes

Funding and receiving financial incentives

Financial incentives were generally viewed positively by primary care staff. However, they were not an added extra or a bonus, financial incentives were seen as payment for additional work that was being completed in primary care, work previously undertaken in secondary care.

“We are prepared to do work but we’re not prepared to do it for free. So yeah, I think it’s a must, we need to have financial incentive, absolutely.”

(Manager, T05)

“...it was work that was taken from secondary care, so you know, there needs to be some financial remuneration for the amount of work that’s being done.”

(Manager, T03)

Participants voiced concern regarding the Health and Social Care Board amending LES targets and reducing the amount of money available for the financial incentives, with the belief it would have a detrimental impact on care provided. The financial incentives received through LES are essential to providing this higher level of care to patients and if removed, action plan provision rates would drop due to the amount of work involved.

“It depends on how they increase targets and making them realistic. They’re talking about increasing them more, which wouldn’t be realistic.”

(Manager, T06)

“...if you were to withdraw the financial incentive now, it sort of would be the last straw for GPs because, I mean, money is already very tight in a lot of areas.”

(Manager, T04)

Budgets and funding are imperative for training staff and providing high quality care to patients. Annual asthma reviews were predominantly a nurse-led process, however due to a reduction in funding from the Health and Social Care Board and pharmaceutical companies, respiratory training is inaccessible to many, resulting in a lack of skilled respiratory nurses to undertake asthma reviews. Inconsistency in funding has impacted on the service provided to patients, with practices describing a lack of support from the Public Health Agency and Health and Social Care Board.

“...staff training at the onset of QOF way back in 2004 was very good because a lot of pharmaceutical companies had money and they were rolling out...the asthma diplomas for practice nurses. That very much has dried up...that’s something that maybe would need to be looked at again probably by the local area board.”

(Manager, T04)

“...the pharma companies, of course, their money is dwindling now too...in Northern Ireland the practice nurses, we are an ageing population...so the younger ones [nurses] coming through need the training but it’s slightly harder than maybe what it was maybe for us starting out.” (Nurse, T12)

Reporting and targets

Practices were required to contact all patients with asthma prescribed regular preventer medication, (clinical staff often referred to this as ‘between Steps 2 to Step 5 of the BTS/SIGN guideline’ (2014)), and invite them for an annual asthma review where an action plan is provided (or reviewed if provided previously). To achieve payment, practices were required to achieve a

minimum of 30% attendance from patients, the maximum payment is received at 80%, although there was confusion between QOF and LES targets and between asthma and Chronic Obstructive Pulmonary Disease targets in the LES.

“I know that it’s a sort of tapered payment as well, so I think it’s 80% is the sort of target for the reviews, for the Step 2 to Step 5 but if we were to get 78% we’d still get a payment, it’s just that there’s a calculation and that’s a sort of tapered payment.” (GP, T03)

“...thought it was 80% that we had to meet to sort of get payment and I’m not sure the figure in my head was roughly we get paid about £15.00 per person for asthma care.” (Nurse, T13)

The LES does not allow exception reporting for the annual asthma review, this means attendance is required for all registered patients on regular preventer medication. In contrast, QOF allows practices to exclude patients who do not respond to three invitations from the reporting figures. The removal of exception reporting increases the impetus of engaging patients with asthma to encourage them to attend appointments but it is felt by some of the participants to be inflexible and unrealistic.

“It doesn’t allow for exception reporting, so if we say, for instance, we try our best to get maybe 100 asthmatics in and we sent three letters and rang them, text them or whatever, it doesn’t allow for those. If you basically get this based on people walking through your door and have a face to face review.” (Manager, T02)

Participants were generally positive regarding the LES but there was a concern that even when targets were reached, there is still a population of people with asthma who the practice has not seen to evaluate their asthma control or provide self-management support.

“I am pleased but my concern is that 15 to 20% that I am not seeing, they are probably the ones that I really need to see.” (Nurse, T12)

QOF versus LES

The LES was designed to be complementary to the QOF, providing a financial incentive for offering an enhanced service of asthma education and an action plan in the annual review (which is a QOF target).

“...essentially really whenever we’re doing our, doing an asthma review or a COPD review that would be sort of giving an enhanced level of service and that we’re sort of going over and above what we’d need to do for QOF.”

(GP, T03)

Despite the link between the two schemes, there are multiple differences which caused confusion and frustration for primary care staff.

“It’s slightly annoying because the QOF looks back 15 months from say, the end of March 2017, it would look back to January 2016, where the Northern Ireland LES, it’s counted only from the financial year.”

(Manager, T01)

Complementary roles

Primary care practices are comprised of multi-disciplinary teams including GPs, nurses and managers each of which have a different focus. Nurses focus on health care provision, managers focus on business and GPs split between providing care and managing a business. There was an awareness from nurses that although they do not directly benefit monetarily from reaching targets, the incentives are required to run the practice and pay salaries. Providing high quality care was the main motivator for all primary care staff but with the acknowledgement that the financial incentives were required for running the practice.

“It doesn’t affect me personally but obviously in a way it does...because the practice has to get paid to pay me.”

(Nurse, T13)

“If I’m speaking about the practice we’re doing it because of patient care. So you’re not doing it because there’s a monetary benefit but... you’re

taking clinicians out of other work, there's a lot of admin team workload, so ultimately, the recompense of the money does help you but you're not doing it because you're making money, you're doing it because it is best care."

(Manager, T07)

8.2.1.3 Strategies for achieving targets

Updated processes and legacy work

The LES was introduced in 2008 and many of the participants were not aware of any changes to asthma care processes after the introduction of the LES as they had not been working in the practice at that time. Participants who had been present before the introduction of the LES had difficulty in recalling processes prior to the LES which implied that it has been successfully embedded into routine practice in primary care.

"...we didn't really change anything, we changed the recording of things but not how we ran them (annual asthma reviews) or anything like that."

(Manager, T06)

"...I haven't been here all that long so I wasn't here when the LES would have first started but there hasn't been any change really that I've been aware of in the last wee while."

(Manager, T10)

The perception was that LES requirements were provided care wise prior to its introduction, the only changes implemented were standardising coding on patient records and reporting attendance figures to the Health and Social Care Board in consideration for LES targets and payments. Current processes involve: identifying all patients requiring an annual review on the practice register; initially contacting patients by letter (up to three times); opportunistically engaging patients when they are in the practice; producing reports to identify target status; working collaboratively to reach optimal patient attendance and submitting percentages to the Health and Social Care Board at the end of the year for payment.

“I created like a wee template for the nurse and clinicians to use... kind of way included the QOF guidance...and the NI [Northern Ireland] LES requirements as well...a step by step wee guide for the nurse, so she just clicked and worked her way through the wee template which covered both aspects of the QOF and the NI LES.” (Manager, T02)

“I’m the one that does the searches on the patients and makes sure the READ codes are in correctly and claims the money and keeps the record of the patient.” (Manager, T05)

Annual cycle

The majority of practices described an “annual cycle” undertaken to engage patients to attend practice for their annual review. The LES year starts at the beginning of April and runs to the following March. Practices followed the same cycle each year starting with issuing written correspondence to patients in April or May inviting them to attend an annual review. There was no personalisation to the letters and everyone was targeted in this bulk mailing. After Christmas, targets become more focussed with practices starting to target patients individually by telephone calls.

“We started targeting them the minute the new year in April starts. In fact, I sent out 100 invites yesterday.” (Manager, T05)

Encouraging patients to attend asthma reviews was extremely difficult with practices adopting different techniques to increase attendance, in particular engaging patients when they are at the practice for another reason. Staff members work together in these situations: GPs advising nurses if patients are in the practice; reception staff identifying patients who require an annual review and scheduling appointments.

“...we normally do it opportunistically if they’re in seeing the GP or whatever and then the nurses would see them and they would do them like that.” (Manager, T06)

“...the doctors are quite good that if they see somebody that hasn't got their asthma stuff done and defaults from asthma appointments regularly, they're quite good at alerting the nurse and she sometimes can grab them in reception.” (Manager, T05)

Team members, roles and interaction

There were clearly defined roles within each of the practices with provision of asthma self-management identified as a predominantly nurse-led process. Identification of eligible patients with asthma on the register was mostly an administration task, with the exception of a small number of practices. GPs tended to undertake supervisory roles in respiratory clinics and were more involved in asthma diagnosis, complex cases, signing off of the LES annual returns and flagging up patients who required an annual review with the nurse.

“I would be the sort of lead GP for asthma and COPD within the practice...the practice nurse who really tends to do more of the work but I am here just for her if she's got any issues or problems.” (GP, T03)

In Northern Ireland, pharmacists provided by the local federation are linked to each practice, undertaking medicine usage reviews for patients with asthma and diabetes. Their involvement with asthma care provoked mixed reactions, some practices saw their input as beneficial in providing better care whereas others voiced concerns. The questions asked by the pharmacist potentially led patients to incorrectly believe they had attended an annual asthma review, therefore they do not attend their practice for the review believing it is a duplicate. Despite reservations, participants wanted to work with pharmacists to improve processes and care provided.

“...the input that federation pharmacists would have now in Northern Ireland, I'm not sure if that's something that's across the water too but they sort of are another incentive.” (Manager, T04)

“MURs [medicine usage reviews] are done by pharmacists now, we're not really sure what all goes on... though I am concerned about MURs, very

concerned about them as a lot of my colleagues are but again we have to move forward with that and get that tweaked a bit.” (Nurse, T12)

Despite the demarcation of roles within the practice, the synergism between staff enabled the practice to provide high quality care. Staff had effective communication strategies and were respectful and complimentary of fellow colleagues' contributions to teamwork, providing support when required.

“Most of them go into the nurse first, they're booked up and the overflow goes to the GPs. They would help out then because the nurse is here on a Thursday...but sometimes they'll mix and match.” (Manager, T02)

“...our practice manager puts a yellow flag up that says “Inhaler technique, three RCP questions, self-management plan” and once I have done that I just tick that off.” (Nurse, T13)

Time management

The duration of annual asthma review appointments varied with some practices allocating 15 minutes and others advising that it takes up to an hour, depending on the individual patient and whether spirometry was involved. Nurses advised that they often exceed the time allocated for an asthma review due to the content involved in providing a complete review, and expressed a need for longer appointments.

“A review for newly diagnosed would be 45 minutes but a normal asthmatic who has been on the register for years would be just I think the usual 15.” (Manager, T02)

“We are allocated 15 minutes, you can't say all of that and give a patient a quality interview in 15 minutes, and you have to run over... it takes more because my view is I want the patient to think that they are giving up their valuable time to come in to get something out of it.” (Nurse, T12)

GP behaviour and actions sometimes contributed to increased workload for

nurses and administrative staff, although there was an absence of blame culture as nurse and managers were aware of pressures on GPs and displayed empathy for their situation.

“They’ve got so much house calls. There’s so many pressures. They’ve got nursing homes. They don’t get lunch...I’ve seen GPs at my work actually so stressed they’re lying up on their own bed with migraines, with the amount of workload that they’ve got.” (Nurse, T11)

With limited time and appointments available, clinical staff constantly made decisions on who to see for an annual review and how to tailor care to the individual needs and abilities of each patient.

“Kinda re-adapt, target those that really need to be seen, whereas, against those who may not need to be seen as often.” (GP, T14)

Infrastructure and resources

Computer systems used in practices produced templates for the annual asthma reviews. Staff were evaluating their current resources, adapting existing processes or developing new ideas to increase efficiency and improve their performance on asthma targets.

“We’re going to name it Asthma Quick but obviously, everything will be done but it will just not be so off-putting with all the stuff that’s on the one that’s in the computer.” (Manager, T01)

“...with the asthma reviews we have, Apollo [data extraction software] does a wee search, it works with, it’s set aside from our Vision [practice electronic health record] but they do a good report for this end of the year data return.” (Manager, T02)

Action plans were used from a variety of providers including pharmaceutical companies, the Public Health Agency, Asthma UK or plans that the practice has designed and produced themselves. The plans often used a traffic light system to advise the patient on what action to take depending on their

symptoms (green = under control, amber = symptoms worsening and requiring monitoring, red = emergency).

8.2.1.4 Targeting poor asthma control

Identifying risk

Concern for individuals ordering excessive numbers of reliever inhalers was identified as a high priority task for practices. Practices had undertaken searches to identify these individuals and attempted to engage them in attending the practice for a medication review and provision of self-management education. Different techniques were employed to reach patients including: sending letters; telephone calls; reducing inhaler amounts available on repeat prescriptions; notes on prescriptions scripts. Identifying individuals using large numbers of reliever inhalers is not financially incentivised on the LES (or the QOF) but the majority of practices advised that they were doing this.

“We would run searches to keep an eye on that...if someone is getting a lot of salbutamol or whatever, we would ring them and ask them to come in or send a stronger letter.” (Manager, T01)

“...if they're getting two at a time we would reduce to one...if it gets delivered to the chemist we would score out so that they don't get delivered to that chemist, they've actually to come in, and physically pick up the script.” (Nurse, T11)

Seeing the value in work and prioritisation

Participants identified that the work undertaken to achieve LES targets had a positive impact on the level of care provided to patients with asthma, resulting in patients with better controlled asthma. However, time was a barrier which impeded practices from providing an annual review to all patients with asthma who had been prescribed a preventer inhaler. In these situations, practices had to prioritise seeing the patients they identified as being at a higher risk of

exacerbations due to poorly controlled asthma over patients they believed were well controlled and effectively self-managing.

“...it’s the best care for the patient. I mean, if a patient has got asthma well, the less exacerbation of asthma you have the better it is for them.” (Manager, T07)

Non/low attenders

General consensus identified older adolescents as the least likely to attend the practice for their asthma. A variety of reasons were responsible for this including: less parental involvement in healthcare; lack of understanding regarding the seriousness of asthma; chaotic lifestyle; moved to university but not registered at a new practice. Other low attenders included working age patients and patients who believed their asthma was well controlled, typically both of these groups were predominantly male.

“...teens, or late teens, early twenties, working age...patients come to their doctor if they’re unwell and they only come to their doctor when their asthma is causing them a problem.” (Manager, T07)

“...some of the teenagers, you know, they’ve maybe, they’re still registered with the practice, but they might be at Uni in Scotland, or in England.” (Nurse, T11)

“There is that group of older adolescents, once you get to 16 or 17, and young adults, which are quite difficult. Those who have – how would I put it? – chaotic lifestyle.” (GP, T14)

8.3 Summary and next steps

In this chapter I have presented results from the 15 scoping interviews undertaken in primary care practices across Northern Ireland, exploring clinical and management staff perceptions of financial incentives promoting implementation of asthma self-management in primary care in NI. Findings from the scoping interviews informed the case study analysis, which is

discussed in the next chapter. The results from the scoping interviews were combined with the results from the case study analysis and are discussed in detail in the next chapter.

Chapter 9 Case study analysis

9.1 Introduction

The previous chapter presented the results of the 15 scoping interviews exploring the perceptions of clinical and managerial staff involved with the LES in primary care practices in Northern Ireland. A grounded theory approach to data generation and analysis was used to explore the perceptions among primary care staff members. In this chapter I will discuss the results of the four case studies starting with a brief quote which distinguishes this practice among the other case studies, then a case description to set the scene of the practice, followed by documentary evidence presented to provide an indication of each practice's written interaction with patients and finally the major themes outlined in the cross case analysis will be discussed with quotes to support findings reported. Finally I will combine the scoping interviews and case studies for a discussion on primary care staff perception of the introduction of the LES and supported self-management for asthma.

9.2 Results

Four of the practices from the scoping interviews agreed to take part in the case study stage of my qualitative phase. I interviewed 12 primary care staff members (six individual interviews and two group interviews), and collected the annual asthma review invitation letters and asthma action plans used in each of the practices. Characteristics of the case study practices are presented in Table 26. The average size of a primary care practice in Northern Ireland in 2017 was approximately 5,200 patients. One of the case study practices was small, one was average, one was slightly above average and the other was a very large practice. Two of the practices were in urban areas and two in a mixed urban/rural area. One practice was located an area of high deprivation, two practices were in areas of mid-deprivation and one practice was situated in an affluent area.

Table 26: Characteristics of case study practices

	Geographical area	NI Multiple deprivation measure 2017*	Practice size	Participation occupation and identifier
Case study 1	Urban	5	10, 000-11,000	<i>Manager (CS1.1)</i>
				<i>GP (CS1.2)</i>
				<i>Nurse (CS1.3)</i>
Case Study 2	Urban/rural	6	7,000-8,000	<i>Admin (CS2.1)</i>
				<i>GP (CS2.2)</i>
				<i>Nurse (CS2.3)</i>
Case Study 3	Urban/rural	9	5,000-6,000	<i>Manager (CS3.1)</i>
				<i>GP (CS3.2)</i>
				<i>Nurse (CS3.3)</i>
Case Study 4	Urban	1	3,000-4,000	<i>Manager(CS4.1)</i>
				<i>GP (CS4.2)</i>
				<i>Nurse (CS4.3)</i>
*Northern Ireland Multiple deprivation measure 2017: 1 = most deprived, 10 = least deprived				

9.2.1 Themes within case studies

Themes clustered around targeting poor asthma control; communicating with patients; strategies for achieving targets; financial incentives. In each case study the sub themes of: communication and barriers to engagement; updated processes and legacy work; and team members, roles and interaction were prominently featured: awareness and education, and identifying risk were moderately featured in each case study. The prominence of the remaining

themes was spread among the case studies. Table 27 provides a summary of the themes discuss in each case study site.

Table 27: Summary table of themes by case study site

Theme and Subtheme	CS1	CS2	CS3	CS4
Communicating with patients				
<i>Understanding patients and personalisation</i>	△	▲	△	△
<i>Communication and barriers to engagement</i>	▲	▲	▲	▲
<i>Empowering patients to self-manage</i>	△	△	△	△
<i>Awareness and education</i>	△	△	△	△
Financial incentive schemes				
<i>Funding and receiving financial incentives</i>	△	△	△	△
<i>Reporting and targets</i>	△	▲	△	△
<i>QOF vs LES</i>	△	△	△	△
<i>Complementary Roles</i>	△	△	△	△

Strategies for achieving targets				
<i>Updated processes and legacy work</i>	▲	▲	▲	▲
<i>Annual cycle</i>	△	△	△	△
<i>Team members, roles and interaction</i>	▲	▲	▲	▲
<i>Time management</i>	▲	△	△	△
<i>Infrastructure and resources</i>	△	▲	△	△
Targeting poor asthma control				
<i>Identifying risk</i>	△	△	△	△
<i>Non/low attendees</i>	△	△	△	△
Key: ▲ prominently featured; △ moderately featured; △ minimally or not featured				

9.2.2 Case study 1

“We had an issue a few years ago about our figures for the Quality and Outcomes Framework and getting figures out. I accept that’s different from the LES but, in some ways, if you’re not getting one you’re unlikely to get the other. We had, initially the Board had an issue about our figures because when you compared to others, the contract, we weren’t scoring as well.”

GP, case study 1

9.2.2.1 Case study description

Case study practice 1 was a large urban practice delivering care to a mixed population of mid-range deprived and least deprived areas (Table 26). The practice was in a converted house set back from a busy main road into a leafy area with a one-way carpark for staff and patients. Although traditional from the outside, the inside of the building was light and modern. The main reception was spacious and the front desk was manned by a number of receptionists, who were unaware of my appointments with the GP and managerial staff. The confusion only lasted a few minutes with the practice manager arriving to greet me. The interviews took place upstairs in the training room which was airy and bright with training information pinned to noticeboards on the walls. A table dominated the room and it was around this the interviews took place which contributed to a more formal setting and feel to the interviews. I stayed in this room for the duration of the interviews and the participants came to me to be interviewed, I did not see any of the consulting rooms in the practice. I interviewed the practice manager and GP separately; however the nurse was absent due to sickness so their interview was conducted at a later date by telephone. This absence resulted in the cancellation of annual asthma reviews as there were no available appointments with any other nurses or GPs, something the GP mentioned a number of times in his interview.

The nurse was employed by a different practice and only worked one day at week at this practice. This was something that she found difficult as she had

no control over her appointment schedule, who is being invited for asthma reviews or the follow up procedure for newly diagnosed patients. Although her role in the practice was well-defined, it was considerably different to the autonomy she had in the other practice and she was concerned the processes were not as efficient as they could be. While there was a multi-disciplinary team involved in asthma care and engaging patients to come in for their annual reviews, the nurse experienced challenges working collaboratively due to only being in the practice one day a week. The GP identified the possibility of deskilling due to the asthma reviews being a predominantly nurse-led process and believed GPs should be proactive in training themselves to keep updated. With the nurse only being in the practice one day a week, the appointments were scheduled by the administrative staff who booked appointments based on achieving LES targets rather than the clinical reasoning provided by the nurse.

Patients who presented with possible asthma symptoms were seen initially by the GP who referred them to the nurse for spirometry, then back to the GP for formal diagnosis. Spirometry is a pulmonary function test measuring the volume of inhaled and exhaled airflow and is recommended by the National Institute for Health and Care Excellence (NICE) and the British Thoracic Society/Scottish Intercollegiate Guidelines Network (BTS/SIGN) as contributing to the diagnosis of asthma (NICE, 2017; BTS/SIGN, 2016). Occasionally the GP provided preventer medication before a peak flow diary or spirometry had been completed which the nurse preferred they wouldn't because she considered spirometry to be the "*gold standard*" (Nurse, CS1) in diagnosis of asthma. Newly diagnosed patients received a 30 minute appointment, and all patients with asthma were allocated a 15 minute appointment each year for an asthma review with the nurse. Patients were advised about their asthma review by letter, telephone call and opportunistically when they attended the practice for another reason. During the review, the nurse asked the Royal College of Physicians three questions (RCP-3Qs) (Table 28) to ascertain asthma control. Designed by a multidisciplinary team including health care professionals and patient

organisations, the RCP-3Qs is an asthma measurement instrument, comprised of three questions which are understandable by both patient and clinicians, used by healthcare professionals to monitor patients with asthma (Thomas et al., 2009; Georgiou & Pearson, 2002; Pinnock 2012). She also reviewed inhaler technique, adherence to preventer medication, action plan and patient's understanding of good asthma control (Thomas et al., 2009). A respiratory clinic ran weekly, when the respiratory nurse was in practice, an arrangement introduced in response to the LES. The annual reviews and provision of asthma care were nurse-led and the GP had a supervisory role monitoring the respiratory clinic.

Table 28: UK Royal College of Physicians “3 Questions” screening tool

In the last month...	
1. Have you had difficulty sleeping because of asthma symptoms (including cough)?	Yes/No
2. Have you had your usual asthma symptoms during the day (cough, wheeze, chest tightness or breathlessness)?	Yes/No
3. Has your asthma interfered with your usual activities (e.g. housework, work, school, etc.)?	Yes/No
The “yes/no” responses are scored within 1 for each positive answer giving a total score between 0 and 3.	
<p>Interpretation:</p> <ul style="list-style-type: none"> • No to all three questions indicates good control • Yes to 1 question requires more detailed questioning to assess asthma control • Yes to 2 or more questions indicates poor control 	

9.2.2.2 Document analysis

The annual asthma review letter issued by the practice advised patients of the need to attend for their asthma review but did not provide an appointment date for the patient. Instead a named contact (the practice manager) and a phone number was provided for the patient to contact the practice and make an appointment (Appendix 15). The letter was issued with a copy of Asthma UK's Asthma Control Test (Asthma UK, 2002) which patients were advised to complete before attending their review. Although signed by the GP, the letter was composed and issued by administrative staff. The letter advised that although the patient may feel well, due to the nature of asthma they needed to be reviewed regularly and an attack could occur at any time. The letter did not discuss specific medication, but asked that all inhalers were brought to the appointment. The final statement of the letter was in bold font, block capitals and underlined stating asthma medication may be refused if the patient did not attend their review. The letter was written in a formal style and used a number of technical words and phrases such as "exacerbation" and "specialist respiratory nurse" which presumed the patient understood these terms.

The action plan was designed by the practice manager to work within their computer system (Vision) (Appendix 16). The nurses completed the information on Vision for the patients' records and the information filtered through and populated the action plan, the nurse then printed this to discuss with the patient. The plan itself was split into five sections (How do I know if my asthma is under control?; My usual medications include; How do I know if my asthma is getting worse?; How do I know if it is an asthma emergency?; My asthma plan). It was intricate and contained information on all prescriptions, not just asthma medications, including: date prescribed; brand name of medication; dosage instructions; amount prescribed and name of prescribing GP. The three sections about asthma control, asthma getting worse and asthma emergency contained information that directed patients to identifying their symptoms, however, there was no guidance on what to do if the individual answered yes to any of these questions. A number of the indicators were ambiguous, for example in the section determining an asthma

emergency, patients were advised it was an asthma emergency if “your symptoms get worse” or “you are feeling frightened” which are abstract terms and not measurable. The final section of the self-management plan was “My action plan” which contained all the information that the nurse had discussed with the patient during their annual review. There was a lot of information contained in this section, each line has the date and the name of the nurse in addition to indicators such as: inhaler technique, asthma management plan status; smoking status; weight and body mass index. However, there was a lot of information contained on this page that appeared to be composed for a healthcare professional rather than a patient, for example “Peak exp. Flow rate: PEF/PFR:=360 L/min EN13826” and “Repeat Volumatic (GlaxoSmithKline UK Ltd) Last issued 15/06/2017 Issued: 1 maximum 1 allowed Supply (1) device”. Containing information more applicable to a healthcare professional than a patient, the document was difficult to interpret and a potential barrier for patients self-managing their asthma. The action plan was produced on an A4 sheet of paper in black ink which is different from the colourful traffic light symbols used in other action plans.

The letter and the action plan were both formal and contained information potentially confusing to patients, including medical language and technical abbreviations. Both were created by the practice manager to work with their computer system where the information is pulled through from the electronic health record to streamline and automate the creation of an action plan. However, the systems are limited in how they displayed information in merged documents creating a plan that was not user friendly for patients. This supports the nurse’s viewpoint regarding her lack of input regarding appointments and patient written communication as these were controlled by administrative staff.

9.2.2.3 Communicating with patients

Communication and barriers to engagement

The patient population in this practice had high levels of employment, which was identified as a barrier to patients attending asthma reviews. Practice staff

struggled with engaging patients who thought their asthma was well controlled. These patients believed a review was unnecessary and not something they were willing to take time off work to attend.

“...working class adults are hard to get in because they don't seem to want to take time out of their working day to come here. Cause they usually ring me up and say, 'Look, [manager], I've had no problems with my asthma, I'm well controlled, I can't get time off work or I've no holidays to take, I can't afford to take'.” (Manager, CS1)

To overcome this barrier, the practice implemented various strategies to increase appointment attendance such as text invites and reminders which were successful as patients often ring immediately after receiving the text. Children's appointments were scheduled in the summer time to reduce absenteeism from school, and during winter months, the practice opens late to telephone patients and hold clinics around patients' working hours. The practice manager reported that when they speak directly with patients and explain the need for a review, patients were receptive and booked an appointment. However, they found patients often called later to cancel the appointment or did not attend.

Respiratory clinics were only held on a Thursday due to the nurse's working hours and this was potentially a barrier for patients who were unable to attend on Thursdays. Only being available one day a week, patients often had to wait a substantial time for an appointment with the respiratory nurse which also reduced attendance rates.

Awareness and education

Older patients were identified as being “*set in their ways*” (Nurse, CS1) and harder to educate on asthma self-management. Patients who had been using “*a blue inhaler a month for the past 10 years*” (GP, CS1) have behaviour so engrained that a fifteen minute appointment was not sufficient to change their mind as they believed their asthma was well managed, although clinical staff believed it could be better optimised. In addition, these individuals were

identified as believing that reviews and advice do not apply to them and were less likely to engage with the practice regarding their asthma care. This is a source of concern for the nurse who identified the patients not attending their reviews as the patients she most wants to see. Self-management education provided from initial diagnosis produced better results as newly diagnosed patients were more engaged and receptive.

“...if you’ve got a new patient and you’ve taught them well and you’ve got on the sort of straight and narrow to begin with. They’re wonderful.”

(Nurse, CS1)

9.2.2.4 Financial incentive schemes

For the case study results, I have chosen to report on themes that were “prominently” or “moderately” featured in the interview which I calculated by counting coverage percentage in NVivo of each theme and sub theme. In this practice, the amount of coverage of the other themes greatly outweighed the topic of financial incentives as participants talked more about relationship building with patients, importance of self-management for asthma and strategies for achieving targets. The topic of financial incentive schemes was only minimally mentioned in the interviews for this practice (Table 27) and is therefore not discussed in detail.

9.2.2.5 Strategies for achieving targets

Updated processes and legacy work

The provision of management plans was implemented in this practice after the introduction of the LES. Prior to this the patient was provided with verbal information by the nurse but nothing was written down for the patient to take away for reference. The templates for the asthma review were located on the computer system and modified due to the more stringent demands of the LES. Appointments and appointment times increased as a result of the LES demands requiring a more thorough consultation with extra time being needed for provision of self-management education. The increase in appointments for annual reviews resulted in the employment of a respiratory nurse and a

dedicated day for respiratory appointments, although it was acknowledged *“it probably needs more than that”* (GP, CS1).

Team members, roles and interaction

Asthma clinics were previously run by GPs, but the increase of qualified respiratory nurses enabled GPs to take a more supervisory role. This was viewed positively by the GP as it enabled their time to be allocated to other areas and provided the patient with an identifiable contact for their asthma. The GP identified that respiratory nurses had a better understanding of patients with asthma and their needs as they were seeing them on a regular basis, whereas GPs were seeing patients with asthma on a less regular basis. The diminishing role of GPs in providing asthma care is of concern as it was resulting in a deskilling of GPs.

“...whenever they [patients] know that there’s a dedicated nurse they tend to identify her with managing that condition, which is good. They would have a lot of faith in a nurse and say, I’ll go to [nurse] for my asthma, and wouldn’t possibly ask the GP about asthma matters. The problem with that is then you become a bit deskilled.” (GP, CS1)

Interaction between staff members in this practice was limited due to the nurse only being present one day a week. Reviewing registers to identify patients and schedule appointments were administrative staff responsibilities with minimal nurse interaction. Limited coproduction in asthma care provision was a source of frustration for the nurse who expressed concern regarding the impact of a strong administrative focus on patient care.

“...[practice manager] would say right, that’s that done, but all she wants is all the information on the computer there and then. She wants the diagnosis there and then, “get that up to date, get the QOF up to date”. I can’t put that on because I’m not sure yet. You can’t just make a diagnosis on a first initial assessment.” (Nurse, CS1)

Time management

Within the 15 minutes allocated for an asthma review, the nurse felt limited in the information and support she could provide to patients with administrative and GP processes contributing to her workload. The use of text messaging and phone calls produced a higher response rate from patients than letters, but created a larger workload for the nurse as patients arrived unprepared for an asthma review with no action plan, peak flow measurements or health questionnaire (information requested in a letter). The GP emphasised asthma reviews could not be incorporated into an existing ten minute appointment, which was the Public Health Agency GP advisor's recommendation to improve LES results.

"You know where you're doing it, you could do it but it's not going to be of as good a quality, in my view, as a proper asthma review."

(GP, CS1)

The nurse in this practice drew comparisons to her other practice, where she was employed four days a week. There, newly diagnosed patients were allocated a 30 minute appointment and she believed this was the optimum amount of time, allowing her to *"get them on the straight and narrow"* (Nurse, CS1). Being in the other clinic four days a week also provided the nurse with the time to work with the administrative staff booking her appointments, set up her room and perform email communication. The nurse expressed a sense of isolation in this practice where she *"can't even communicate with anybody else"* (Nurse, CS1) because she was the only person delivering respiratory care.

"...my clinics are completely booked and then trying to get the emails sent. Maybe I don't take all of my lunch break, I'm here usually an hour before I even start just to get set up because you don't get that set-up time or something like that. So, it's difficult, it's just time, I can't do it."

(Nurse, CS1)

Infrastructure and resources

Vision was the GP software utilised in this practice and the asthma management plan was produced by the practice manager and designed in Vision to work within their system. They used this system to “flag” when patients were due an annual asthma review so the GP was notified of this alert and could perform a review opportunistically, if time allowed, in an appointment. The nurse showed patients how to access the Asthma UK website and the information that was contained in it. There used to be leaflets available for provision to patients, but this has stopped.

“I direct them to the [Asthma UK] website to download them [information booklets]. But, it’s not always the same, you know. It’s nice to have the booklet, patients prefer the booklets. I will print them out when I’m in surgeries as best as I can for education.” (Nurse, CS1)

9.2.2.6 Targeting poor asthma control

Identifying risk

Administrative staff recorded asthma related hospital admissions and the federation pharmacist carried out audits, identifying individuals receiving large numbers of reliever inhalers. The pharmacist then attempted to phone the patient for a review and/or notify the GP of patients at risk. Consensus was that frequent ordering of reliever inhaler intimated poorly controlled asthma and these were the most difficult patients to engage.

“...patients ordering 12 or more salbutamol inhalers or SABA in the year. I mean you cannot get those people in.” (Nurse, CS1)

9.2.3 Case study 2

“I think from the patients’ point of view it is actually really good for them to have the knowledge about their health condition and to be empowered to be able to manage it. I think that that is going to be the way going forward.”

GP, case study 2

9.2.3.1 Case description

Case study practice 2 was a large practice in an urban setting delivering care to an urban and rural population in an area of low deprivation situated in an affluent area (Table 26). The practice was a purpose built centre in a small town, a 10 minute walk from the town square. The reception area was small with leaflets and fliers on the noticeboards on the wall. The receptionist was expecting me and took me through reception to a secondary waiting area outside the nurse’s room. This area had a TV screen and a number of chairs sitting around against the wall. The interview took place in the nurse’s consultation room with other nurses entering and exiting throughout the duration of the interview. The nurse mentioned she used to have a large poster on the back of her door of Paula Radcliffe (famous UK marathon runner) which she used to reassure parents of children with asthma who were reluctant to accept the asthma diagnosis that it was not necessarily a debilitating condition. Afterwards she took me to the break room to wait for the next interview. This room contained a kitchen and she offered me refreshments including toast or cereal, which I found a little unusual but incredibly hospitable, and left me on my own with a drink and some magazines as she returned to work. There was a friendly almost homely atmosphere within this practice and the nurse’s behaviour made me feel welcomed in the practice. The interview with the GP was conducted in her room and afterwards she left the room to retrieve the final interview participant and the interview took place with the administration staff member in the GP’s room. The interviews were all conducted in either the nurse or GP’s room, where there were no desks or other barriers between

myself and the participants. This is the only practice I spoke to where it was not managerial staff who conducted the administration aspect of the LES, instead it was an administration staff member.

In each of the individual interviews, participants discussed working together to provide high quality asthma care and achieving targets for the LES. There was a strong sense of collaborative working in this practice with the nurse and GP discussing complex cases or new medicine and the nurse and administrative staff member identifying high risk patients who required invitations and coordinating around requirements for LES target achievement. The nurse focussed predominantly on care giving and was unaware of target figures other than occasionally checking their score online to “*give yourself a bit of a pat on the back*” (Nurse, CS2). The administrative staff member had management background within the engineering sector and considered himself “*medically a lay person*” (Admin, CS2). His focus was to work as efficiently as possible, getting the biggest return for the practice and providing a good quality service to the community. He worked collaboratively with health professionals within the practice to increase attendance for annual asthma reviews. Alongside being a GP in this practice, the GP also had a particular interest in respiratory care and the LES as a result of external management roles.

Patients with suspected asthma symptoms initially attended the GP who referred them to the nurse for spirometry and a trial of treatment after which they returned to the GP for review and formal diagnosis which was coded on the computer system. After formal diagnosis, the nurse performed all annual reviews and was the primary point of contact for the patients. Patients were advised about their annual review by letter or text. The annual review was a 30 minute appointment in which the nurse discussed adherence, inhaler technique and any other queries that the patients (or their parents or carers) had regarding asthma.

9.2.3.2 Document analysis

The asthma review letter was produced and signed by the administrative staff member and issued annually to patients (Appendix 17). The onus for

arranging an appointment was with the patient and the letter advised that the practice had annual asthma review clinics and “the Doctors strongly advise” patients to attend an asthma review. The letter advised patients to call the practice and make an appointment with the named nurse, provided the phone number and asked patients to refer to the letter when booking their appointment. Patients were also asked to bring the letter and inhalers to the review. There was a sentence informing patients that the nurse would be checking inhaler technique as this could improve asthma control and that a written management plan would be provided. The letter was clear and concise using no technical or medical language that might be confusing to a patient.

The nurse at this practice identified five different action plans they provided to patients with asthma or parents of children with asthma. The nurse had a good relationship with pharmaceutical companies and would contact them when she required more action plans. Her justification for using multiple plans was that not all inhalers were the same and plans are produced specifically for each of the medications. In addition, the nurse would often make a judgement in the asthma review about what type of action plan was best for the patient based on: age; understanding of asthma; prescribed medication and if they had asthma or were the parent of a child with asthma.

The first leaflet provided (Appendix 18) had been produced by the Public Health Agency as asthma information for parents who have a child with asthma. The leaflet card was colourful, with pictures depicting a boy using an inhaler with a spacer and a variety of spacers. A spacer is a large plastic device with a mouthpiece at one end and a hole at the other to attach an aerosol inhaler, they are used to increase the ease of administering medication. It provided comprehensive information on what asthma is, what the symptoms are and what causes asthma attacks, without using overly technical language. This leaflet was to accompany the Public Health Agency action plan (Appendix 19) and referred to its traffic light system: green “How can I help my child’s asthma”; amber “What if my child’s symptoms get worse?”; red “What if my child has a dangerous attack?”. In each of the

sections it provided advice on identifiers for that stage and what action needed to be taken. There was further information on types of asthma inhaled treatment and other types of airways treatments. There was a section to be completed by the parents stating which device had been recommended by the healthcare professional, if a holding chamber had been provided and colour of the holding chamber. This leaflet had to be signed and dated by the parent confirming they had received it, acknowledging the engagement with the healthcare professional. The front cover of the leaflet contained sections to be completed with the child's personal details, GP details, nurse details and hospital consultant details.

The second leaflet was the Public Health Agency action plan (Appendix 20) was a colourful card with the traffic light system colours used, that folded into an A8 size so it can be kept in a bag or wallet. The traffic light system identified when symptoms were: under control (green); getting worse (amber); a dangerous asthma attack (red). Advice was given on identifying symptoms belonging to each section and what action was required if the patient was in amber or red. The action plan had sections for the healthcare professional or patient to complete detailing prescribed medication and dosage required depending on symptoms. The front section had a space for details of the patient, GP, nurse and hospital consultant and a section for any other information.

Appendix 21 is the third leaflet and was a colourful, A8 size folded card produced by Asthma UK. It was titled "What to do in an asthma attack" and is written for patients to provide to whoever they are with in the event of an asthma attack. There was a section to be completed with the patient's name and next of kin details. The plan could be personalised to the patient's individual symptoms and provided advice on how someone else should behave in order to assist them. It did not use the traditional traffic light system but the emergency section was red, similar to plans which use the traffic light system.

The final two action plans provided were both produced by Chiesi, a pharmaceutical company which produces medicines for respiratory conditions (Appendices 22 and 23). One was a black and red A8 size folded card which provided information on what an asthma attack is and what the patient should do in the event of an asthma attack. There were sections for completing the patient's name, next of kin details, medical contact numbers in addition to preventer and reliever medication and dosage. The card was concise and created to fit in a bag or wallet, similar to the Asthma UK action plan described above. The second Chiesi action plan was a folded A4 size and used the traffic light system: good control (green); worsening asthma (yellow); severe asthma (amber); emergency (red). Explaining how to determine which stage the patient was in, peak flow reading in that stage (to be completed by patient); and actions to be taken in each stage.

The letter produced by the administration team was clear and concise, using no technical language. It advised the patient of what was involved in the annual review, why they should attend and what to bring. The range of action plans provided by the nurse supported information data generated in the interviews about tailoring the supported self-management provided to the patient through engaging patients and understanding their individual needs. This practice was actively engaged with a wide range of providers including: the Public Health Agency, Asthma UK and pharmaceutical companies and using external resources to provide tailored self-management education to patients with asthma.

9.2.3.3 Communicating with patients

Communication and barriers to engagement

Letters were the initial form of communication in engaging patients for annual asthma reviews, although the response rate had been decreasing over the years and now "*maybe 10 or 20% of people will...respond to a letter*" (Admin, CS2). Text messaging was used and proved more successful than letters but people started to ignore the messages and due to cost reasons and transferring to a new computer system this had ceased. After the initial letter

was sent, the practice issued one more letter, then followed up with phone calls as this was the most successful form of communication in engaging patients.

Relationship building was emphasised as being central to patient engagement, with the nurse an accessible contact for patients. When patients call the practice to speak with the asthma nurse they are transferred through without question rather than having to provide an explanation to the reception staff, which was identified as contributing to the improved relationships between staff and patients.

“...I definitely do think it’s built up a good rapport. That you have said ‘You can call me anytime and I am going to see you every year and if there are any problems just lift the phone’, I think its accessibility now.”

(Nurse, CS2)

Understanding patients and personalisation

Multiple types of action plans were provided at this practice dependent on medication prescribed, patient age, understanding of asthma and other individual factors. The nurse spent a lot of time getting to know patients and their lifestyles, producing personalised treatment plans which increase adherence. To increase understanding of inhaler adherence the nurse attempted to follow an asthma treatment plan resulting in awareness of patient perspective of adherence.

“...you have to put yourself into the patient shoes and think sometimes you do forget and sometimes you think ‘I’m okay, I’m okay I’ll just forget it today’. After doing that myself I realised compliance is a big thing and you have to tailor to the patient and their lifestyle.”

(Nurse, CS2)

Empowering patients to self-manage

Staff identified the increase in self-management education provision in primary care as directly impacting on secondary care through reduced numbers of asthma-related hospital attendances. Self-management support provided by

primary care was proactive; monitoring patients' symptoms and improving asthma control. In addition to the positive impact on secondary care, self-management was seen as benefiting patients by improving asthma control and understanding of symptoms resulting in improved health and quality of life.

"...the more knowledge and understanding somebody has, then the more confidence they have themselves...the more motivated they become as well because they see that they, you know, have gained confidence."

(GP, CS2)

Awareness and education

Younger people were perceived as being motivated to be involved in their healthcare due to their access to the internet: they were more aware of the seriousness of asthma because of online coverages about individual asthma deaths on social media and online news outlets. Clinical staff noticed a shift in patient behaviour from being embarrassed to administer inhalers in front of peers to nowadays where *"young children aren't afraid to use them"* (Nurse, CS2). Increasing asthma awareness campaigns were suggested, specifically working collaboratively with the Public Health Agency so advertisements were timed alongside practices issuing asthma annual review letters. Advertisements needed to deliver a specific message and target individuals already diagnosed with asthma.

"...an awareness campaign... 'you may have been diagnosed with asthma 10 years ago and you may think you are doing well but it's very important that you still come in and get yourself checked out every year'."

(Admin, CS2)

9.2.3.4 Financial incentive schemes

Reporting and targets

The introduction of the LES resulted in an increase of reporting tasks, which was the responsibility of administrative staff. They had created spreadsheets which were updated monthly then, as the year end approached, increased in frequency to monthly then fortnightly updates. These reports were shared with

the nurse, GP and management, working together to increase annual review attendance rates. The increase in reporting was not viewed negatively as staff understood why it was necessary.

“If you want to know why, you need the information. You need the information, you’ve got to collect that information.” (Admin, CS2)

Working to targets provided staff with something to aim towards, increased motivation and developed a sense of competitiveness. While the requirements of the LES had initially been viewed as increasing workload, staff were aware it resulted in better care for patients.

“At the start, we thought it would take us far longer to do an asthma patient but once you got into it you realised you were actually giving better care, so you were. Because you were covering all aspects, you know, of a care plan with them. Definitely.” (Nurse, CS2)

9.2.3.5 Strategies for achieving targets

Updated processes and legacy work

LES processes were thoroughly embedded in this practice with staff struggling to recall how they did things prior to LES introduction. One difference was time provided for asthma appointments, previously it was 10 minutes but had been updated to 30 minutes which was required to conduct a thorough review and provide self-management education.

“Now we’ve got a day, a whole day blocked. And we’ve got half an hour appointments. That’s great because you can go through everything with them.” (Nurse, CS2)

Annual cycle

The administrative staff member produced reports of all eligible patients on the register and issued letters at the start of the LES year in April. He worked with the nurse who also contacted patients and invited them to the asthma clinics. Quarterly reports were run to update the practice on numbers and ensure they were on target, towards the end of the year these reports increased in

frequency. If the administrative staff noticed numbers were falling behind, they issued another letter to patients advising a review was due and to make an appointment. Patients who were unresponsive to the second letter were contacted by telephone and an appointment booked. At the end of the year, the administrative staff compiled a separate report based on the previous year's figures and produced a LES report for submission.

“...more emphasis certainly towards the end of the year, we're on the phone trying to get people in and there's no point in sending letters out, we probably send two letters to these people already.” (Admin, CS2)

Team members, roles and interaction

Staff worked collaboratively in this practice to provide asthma care. There were defined roles with regards to GP diagnosing asthma, nurse delivering routine asthma care and administration focusing on reporting, but there was substantial interaction between staff members: nurse and GP discussing complex cases; administration updating GP and nurse on targets; nurse and administrative staff working together to engage asthma patients and book appointments. Staff were aware of colleagues' skills and tasks were allocated due to skillset.

“...I put my hands up, she [nurse] is much more skilled...just in terms of all the different devices and the counselling patients on how to use them so it is better coming from her.” (GP, CS2)

Infrastructure and resources

The nurse engaged with pharmaceutical companies to request action plans and literature resources to provide to patients. Providing different action plans dependent on patient requirements was part of delivering a personalised service to patients. The computer database (EMIS) was in the process of being updated which resulted in the removal of text messaging capabilities. Although text messages had been initially successful in engaging patients, reduction in their effectiveness and difficulties operating the system deemed them an inefficient resource.

“...to actually generate texts, it’s quite an awkward system to go through this screen, that screen, the other screen, check this, check that, check the other. I am the only person who does it, so it doesn’t come handy to people. That is given the system that we have. I wouldn’t say for one minute it’s the easiest system, it’s not.”

(Admin, CS2)

9.2.3.6 Targeting poor asthma control

Identifying risk

There was a low level of non-attenders at this practice, with the nurse stating the majority of individuals who had been diagnosed with asthma and received inhalers were likely to come in for an annual review as they understood the review was for their benefit. The nurse’s knowledge of her patients meant she knew specifically which patients would be most difficult to engage. The populations causing the most concern were teenagers, whose appointments were all defaulted to summer school holidays to avoid them taking time off school, and individuals who used their inhaler for exercise and were reluctant to admit they had asthma.

“[Nurse] would know her patients pretty well, and she would say, right these patients are difficult to get in here, probably talking about a block of maybe 20 patients. Very difficult to get in”

(Admin, CS2)

9.2.4 Case study 3

“[Nurse] would definitely be the linchpin of the whole thing really, she takes over and she sort of organises whenever people are seen. And if they come in with problems, she will be there and be an open door really for them, aren’t you, for any respiratory issues.”

GP, case study 3

9.2.4.1 Case description

Case study practice 3 was a medium sized practice delivering care to an area of very low deprivation, with patients from a mix of urban and rural population (Table 26). The building was a converted house, which had maintained traditional features and on entry into the waiting room there was a touch screen computer for patients to register their arrival at the practice. The group interview took place upstairs in the nurse’s room on the first floor and we sat in a circle with the audio recorder on a chair in the middle. There was a sense of camaraderie among the interview participants and particularly between the practice manager and nurse who shared a number of jokes and friendly banter before, during and after the interview.

Patients who presented to the GP with suspected asthma symptoms were referred to the nurse for spirometry or peak flow diaries; the patient was either diagnosed with the nurse or sent back to the GP. If the GP decided it was not asthma and the diagnosis was still not clear, the GP would consider referring the patient to the hospital. All annual asthma reviews were conducted by the nurse who covered: self-management; asthma management plan; medication reviews and the RCP-3Qs (Table 28) (Thomas et al., 2009). There were defined roles within this practice with asthma reviews being a nurse-led process and the nurse was in control of all of her appointments and seen as an “open door” for any respiratory issues. A pharmacist was based at this practice, with part of their role being to review all letters from the hospital identifying patients who have presented with an asthma exacerbation. Letters were passed to the nurse who contacts the patient to arrange an appointment within two to four weeks. In this appointment the patient’s management plan

will be updated, medication checked and a review of asthma control performed.

9.2.4.2 Document analysis

The letter sent to the patient informing them that they are due an annual asthma review, stresses the importance of attending once a year for an asthma review and was composed, signed and sent by the practice nurse (Appendix 24). This confirms information provided in the interviews that annual reviews were a nurse organised and led process with the nurse identifying who required a review and organising the issuing of letters. The letter provided a number to call to arrange an appointment and advised that the appointment duration would be 20 minutes. This established realistic expectations with the patient regarding time taken to complete a review and placed the onus on the patient to arrange the appointment. The letter was short and concise, with only one example of medical terminology that might be confusing to some patients, “optimal therapy”.

The practice used two action plans, both provided by the Public Health Agency, (Appendix 19 and Appendix 20). Appendix 20 is described in section 9.2.3.2 as it was also used by case study 2. The second action plan (Appendix 19) was a folded A4 card in colour that used the traffic light system: “How do I know if my asthma is under control?” (green); “How do I know if my asthma is getting worse?” (amber); “How do I know if it is an asthma emergency?” (red). The plan outlined symptoms for each section and also what actions should be taken if symptoms get worse. The plan required to be completed with personal details tailored to the patients and had an area to complete with details of the GP practice; community respiratory team; pharmacy; out of hours service and hospital respiratory team. It stated it had been produced by the Public Health Agency on behalf of the Northern Ireland Regional Respiratory Forum, which is a multidisciplinary group (including patient representatives) within the Public Health Agency focussed on improving respiratory health in Northern Ireland.

9.2.4.3 Communicating with patients

Communication and barriers to engagement

Attendance at annual asthma reviews was high in this practice and staff did not express many difficulties in engaging individuals to be involved in self-management of their asthma. For individuals that did not attend, staff employed a process of “*just sending and sending and sending for them*” (Nurse, CS3). A stricter approach was adopted with individuals who ordered reliever inhalers and did not attend for their annual review, with staff attempting to reduce the accessibility of receiving reliever inhalers without attending the practice.

Admin: *But you can make it as difficult as possible.*

GP: *Yeah, to try and encourage them to come in.*

Nurse: *But most people, well, I would say 70% of folk, are obliging and would come out for their reviews.*

GP: *Yes, I think so.*

Understanding patients and personalisation

Working with patients to provide supported self-management was evident in this practice. The nurse had created good relationships with patients with asthma and if they phoned the practice they would either be connected to her directly or she would call them back as soon as possible. By providing patients with a named contact in the practice and someone they could rely on with their asthma, staff believed that patients were more likely to be engaged with their asthma management and attend reviews. There was an awareness of targets, but providing patient care based on the individual’s needs and requirements took higher priority.

“...you can’t make people come if they never come. There’s one woman who, mind, just doesn’t come out of her house and she’s wrote us loads of letters as I’ve sent for her.” (Nurse, CS3)

9.2.4.4 Financial incentive schemes

Reporting and targets

The LES requirements are that all patients with asthma on regular preventer medication attend an annual asthma review and be provided with self-management education. This required patients to be accurately diagnosed and the correct diagnosis recorded on the computer system. This process resulted in staff developing a greater understanding of individual patients and their asthma as they are regularly reviewing their symptoms and medication. Patients can be “stepped up” or “stepped down” according to the current status of their asthma. .

“...while you’re stepping them, it does make you look at their therapy as well. Because you maybe put them on a Step 3 and then you realise when you go and look that they’ve maybe only ordered two Ventolins in a year...And you maybe wouldn’t have been doing that if you weren’t stepping them.”

(Nurse, CS3)

QOF vs LES

Increased reporting was regarded as a positive change, improving the care provided by increasing awareness of patients being reviewed and their medication usage. However, the differences between the QOF and LES were discussed with the 12 month and 15 month reporting timescales causing issues. Participants would prefer the QOF and LES be the same timescale with no preference on duration, just that the timescales matched.

“I think you get into a habit of just looking through the QOF details, the percentages only for the year, not for 15 months and then you think well, that’s fine and you can get that slightly panicky feeling then when you realise it’s not right.”

(Manager, CS3)

9.2.4.5 Strategies for achieving targets

Updated processes and legacy work

There have been updates to reporting processes to ensure the practice reached the LES targets. These updates were viewed positively due to the

beneficial impact on health care provided in terms of reviewing patients' medication and stepping them up and down as required. However, the action plan had always been provided by this nurse due to it being part of her nurse training and asthma guidelines.

"I have always gave management plans, so it's not just because it's a box ticking exercise. I give a new one every year. If they have got one and there are no changes, they just keep the same one but they all should have one."

(Nurse, CS3)

Team members, roles and interaction

Staff members had defined roles in this practice with the GP responsible for asthma diagnosis and exacerbations, administrative staff performing all reporting for the LES and the nurse controlling the asthma register, identifying patients requiring a letter to be issued by the administration team, arranging her own appointments and conducting asthma reviews. The pharmacist reviewed letters from the hospital regarding patients who had attended with asthma related symptoms and passed this information to the nurse who contacted the patient. Staff were happy with their roles, practice processes and how colleagues communicated and supported each other in providing high quality healthcare.

"Well I mean it's perfect. We are looking at skill mix and everything and it is a very good example of it and it works very well here... So it's a good division of labour really."

(GP, CS3)

Infrastructure and resources

The nurse provided the Public Health Agency action plans to patients and believed that all practices should provide the same plan to provide continuity. This would help communication between primary and secondary care as there would be no confusion for staff or patients due to different plans. Staff experienced alert fatigue with computer systems due to the number of pop up boxes which were distracting, not adding any value and were just a *"tick box exercise"*

(Nurse, CS3).

Nurse: *You know, especially when you have Vision plus now, there is the pop up boxes.*

Admin: *So many options.*

9.2.4.6 Targeting poor asthma control

Identifying risk

Individuals ordering large numbers of reliever inhalers were highlighted and staff attempted to engage them to attend the practice for a review. This was the nurse's responsibility, unlike the majority of other practices where it was the responsibility of the federation pharmacist. The patients would be contacted by telephone to discuss their medication and attempts made to arrange an appointment. The nurse experienced difficulties with parents who had children newly diagnosed with asthma. There was resistance from these parents when steroid inhalers were prescribed if parents were reluctant to administer steroids to their child. Adherence was also difficult in this group with parents not completing steroid inhaler treatments, stopping after a few days due to not seeing any difference in their child's symptoms. The nurse expressed frustration over this, specifically parents preferring to administer repeat prescriptions of antibiotics to their child than use regular inhaled steroids.

"There's been a few that's been flagged up, maybe you have ordered 16 salbutamol in a year or something, and haven't been taking their preventer and obviously you would try your best to phone them up."

(Nurse, CS3)

Non/low attendees

For non-attendees ordering prescriptions, the practice used multiple techniques to attempt to engage the patient. If a prescription was regularly ordered to collect at the pharmacist, this would be modified so that patients had to visit the practice and pick the prescription up from the reception. At this point the receptionist would attempt to book an appointment. After this the practice would write on the prescription that no more reliever inhalers would

be provided unless the patient attended the practice for a review. Despite this warning, staff admitted that refusing reliever inhalers was not an option and they would always provide them.

“...what we would normally do is, emm, on the right-hand side of the script, just always set the repeat up, so they’re only allowed one inhaler and we put on a wee note ‘Must come and see GP or nurse before ordering further inhalers’.”

(Nurse, CS3)

9.2.5 Case study 4

“The income of GPs in this country is 25% to 30% lower than the rest of the UK. Practices are closing everywhere around Northern Ireland. People are going broke and they are not making enough money. Every penny counts. We literally are, we are not multimillionaires. We are looking for every penny. So yes, it is not icing on the cake, this is cake!”

GP, case study 4

9.2.5.1 Case description

Case study practice 4 was a small urban practice providing care to patients in an area of extremely high deprivation (Table 26). The purpose built practice was located in a terrace building on a main road and entry was through a buzzer system. A sign on the door stated that entry will not be approved to people wearing motorcycle helmets or anything obscuring their face. Reinforced glass separated the receptionists from the waiting area and numerous posters were dotted around stating that violence towards practice staff members would not be tolerated and the law did not stop at the practice entrance. In front of the reinforced glass there was a machine to measure blood pressure; the GP informed me this was to ensure that patients who were overdue a blood pressure test provided a reading before being issued their prescription. Seats in the waiting room were church pews, meaning patients had to sit side by side bench style as there were no separate individual seats.

I was taken to the break room which was accessed through a different door than the main practice, we had to go back outside the practice and through a locked door adjacent. The respiratory nurse and practice manager were already present in the break room and both stood to greet me as I entered and immediately offered me a drink. A plate of biscuits and cakes was present in the centre of the table. They arranged themselves on one side of the table and I was on the other. The GP had been called away to an emergency at a nearby hospital but was en route back to the practice and had advised to start without him. This practice has a strong sense of identity and knowledge of

their patient population, something which is discussed later in this chapter. The practice offered open access surgeries so that patients did not have to book an appointment but could turn up as and when they required medical attention. The practice had operated like this since “the inception of the NHS” and believed that patients were used to this process.

There was collaborative working between all staff members: GP and nurse working together with patients; nurse and administrative staff working together to identify risk, communicating with patients and aiming for LES targets. The nurse had a background in secondary care but moved to primary care and had developed an interest in respiratory conditions. An internal audit of asthma medication had taken place two years previously with all asthma reliever medication being removed from repeat prescription. The nurse had worked closely with the pharmacist to achieve this and although she acknowledged it was incredibly difficult at the time, they were seeing the benefits of it now in improved asthma control among their patients. When patients with asthma called for a repeat prescription of a reliever inhaler, this was immediately flagged to the nurse who called them back and advised they needed to attend the practice for a medication review. Patients turning up at the practice on the day they received their annual review letter, rather than attending on the date stipulated on the letter, would be seen by the nurse. Only when spirometry was involved would an appointment have to be made as it required 40 minutes which was difficult to complete during an ‘open access’ consultation.

9.2.5.2 Document analysis

The review invitation letter was used for contacting both patients with asthma and patients with COPD (Appendix 25). It was written and issued by the practice manager on behalf of the practice nurse. As the letter was used for both respiratory conditions, it did not state it was for an asthma review, rather it was for “respiratory review and inhaler assessment”. The letter highlighted in large bold font, the date and time of the “special clinic” advising the patient to attend any time within the duration of the clinic and if they were unable to attend, then they should phone the practice. The letter also advised it was an

opportunity for the patient to discuss any health queries, so it was not solely an asthma review. An asthma questionnaire was enclosed with the letter for patients to complete and bring to the review, although this was not stated anywhere on the letter or questionnaire. The questionnaire asked about current medication, the RCP-3Qs (Thomas et al., 2009), whether the patient was happy with their asthma control and current medication, smoking status (giving details of a stop smoking service provided by the practice) and how often they use their blue inhaler.

The top of the questionnaire stated that a working telephone number must be provided as the practice nurse (name provided) may contact the patient to discuss information further. During the interviews, the nurse explained that she called every patient who ordered a repeat prescription of a reliever inhaler without attending for an asthma review. Through their own admission, the practice has taken a hard stance on how many reliever inhalers are being used and this was confirmed by the asthma questionnaire where it explicitly asked “How often do you use your blue inhaler?”.

This practice used the folded A4 Public Health Agency asthma actions plans described in detail in section 9.2.3.2. However, they had run out of original actions plans, and were unable to obtain anymore so produced colour photocopies to provide patients with an action plan. The practice manager identified the fact the action plan was in colour as being “*the main thing*” (Manager, CS4) however, instead of the more durable card, the action plan was on paper which could easily be folded or ripped.

9.2.5.3 Communicating with patients

Communication and barriers to engagement

Unavailable appointments were not a barrier to engagement in this practice due to their “open surgery” policy. If patients called in the morning regarding an asthma review, they could be seen the same day by the nurse. If patients ordered a repeat prescription of a reliever inhaler, this was flagged to the nurse who promptly called them and informed them they needed to attend

practice for a review before a prescription would be provided. All prescriptions were available for collection at the reception, so patients were required to attend the practice to pick up the prescription and the nurse could be available to see them then.

Nurse: *I think because we're open as well.*

Admin: *Any problems and they just turn up.*

Nurse: *I think we are very easily accessed.*

Understanding patients and personalisation

The good accessibility provided staff with the opportunity to interact with patients more frequently, develop a relationship and understanding of patients' individual needs. The GP had been in this practice for many years which provided valuable knowledge on patients' medical histories and their family medical histories. In addition, staff identified this consistency as beneficial for patients, who were more engaged due to established long-term relationships with their GP.

“Not to mention the fact that I have known them [patients] for [many] years, so I have got a longer-term view on it.” (GP, CS4)

Awareness and education

Staff prioritised providing asthma education to patients, viewing it as their role but required more support from the Public Health Agency and charities such as Asthma UK, in terms of funding for respiratory training courses for the nurse and increasing public awareness of asthma and self-management education for asthma. Patients in this practice had their asthma reviewed each time they attended the practice, which could be multiple times a year if they frequently requested reliever medication, rather than just once annually. The continual focus on asthma at each appointment increased patient awareness of self-management including identifying triggers, understanding symptoms and checking inhaler technique. Checking once a year was deemed not enough as often patients would forget or return to previous behaviour.

Admin: *Oh, she has got some stories about what people do with their asthma in here.*

Nurse: *Oh it's terrible.*

Admin: *On their dinner was one of them.*

GP: *What?*

Admin: *Someone sprayed it on their dinner. Oh we'd a laugh.*

Nurse: *On their cat. They got asthma because they were allergic to the cat, so they had to spray it on their cats so they didn't have their asthma.*

9.2.5.4 Financial incentive schemes

Funding and receiving financial incentives

Financial incentives provided an essential monetary contribution to the practice and were required for staff wages. The LES incentives were core funding and not seen as a bonus or an added extra, but as necessary to remain open. The nurse and administrative staff member did not receive a bonus for reaching targets but were aware of the necessity of reaching targets and receiving LES payments for their job security. The GP was aware of similar situations in practices across the whole of Northern Ireland.

Nurse: *That is the side of that I don't really see, but indirectly, yes, because if we don't get paid for the work we do, then I won't get paid my wages.*

Admin: *Won't get my wages, same here, yip.*

GP: *There are practices closing all around the Western Board in particular. There are people talking about closing within 300m of here.*

9.2.5.5 Strategies for achieving targets

Updated processes and legacy work

The nurse joined the practice after the inception of the LES, prior to which she was a nurse in secondary care. She had no knowledge of processes before the introduction of LES and accepted the current processes as they were all she had known. The care provided in consultations had remained the same as action plans were always provided, however the RCP-3Qs were added into the reviews. The only noticeable change in process was in reporting as the LES involved “*more key strokes*” (GP, CS4).

“I suppose they did introduce the three RCP questions, yes, they did, and they did it with QOF as well. But that would be the only real change, the rest was roughly the same that they had.” (Nurse, CS4)

Team members, roles and interaction

Staff members had defined roles in this practice, the administrative staff identified patients for reviews, issued correspondence, regularly viewed status of attendance rates for reviews, and submitted final reports to the Public Health Agency at year end. The nurse was heavily involved in asthma care, responsible for reviews, monitoring prescription requests and contacting patients to discuss their asthma. The GP primarily diagnosed asthma and was involved with patients with comorbidities and complex cases. His medical knowledge and awareness of patients’ medical histories and family histories was considered valuable in providing high quality care and the nurse and GP also worked together delivering joint consultations to patients. Staff worked well together, praising each other’s skillsets and acknowledging the contribution each individual made to the practice, understanding that it was reflected in the improvement of patients’ health.

“I think there is a mutual respect over this whole thing and the fact is we have got people much, much better controlled.” (GP, CS4)

9.2.5.6 Targeting poor asthma control

Identifying risk

High salbutamol use was a concern in this practice so two years ago all reliever inhalers were removed from repeat prescription. These orders were registered as an acute prescription and the nurse reviewed notes on the patient's record, taking into consideration annual review status and date of last reliever and preventer prescriptions and contacted the patient advising them to attend the practice before the prescription would be authorised. This process identified individuals who were using a substantial amount of reliever inhaler medication due to poor asthma control, and allowed the practice to engage with them regarding self-management. The practice had found patients who needed reliever medication would come to the practice, and it stopped unnecessary prescribing, "You've got some places like nursing homes ordering one [reliever inhaler] a week" (Manager, CS3). The audit resulted in a "34.7% decrease in short-acting bronchodilator prescriptions" and patients with better controlled asthma.

GP: *We basically stopped giving them all salbutamol.*

Nurse: *Every asthma patient does not have salbutamol on their repeat in this practice. It has to be requested as an acute and then the acutes go on my screen so as we, as a tiny audit, can look at their notes, and you can see how many they have had and since their last review and we would ring them up.*

9.3 Cross-case analysis and discussion

The evidence provided in this chapter and the previous chapter showed the importance of effective communication, relationship building with patients and increased awareness in engaging patients in self-management education. In this section I will present cross-case analysis and an overall discussion of the scoping interviews and case study results.

The lack of exception reporting contributed to practices' continual efforts to contact patients by methods such as letters, text messages, phone calls and

opportunistically when they were in the practice. The size of the financial incentive is important as practices expected to be compensated for this work that was previously considered as the remit of secondary care, and it was considered that removal of the financial incentive would have a negative impact on the provision of asthma care. Understanding the intervention context is important, particularly the emphasis on defined roles that match individual's skillsets, multidisciplinary teams working collaboratively and the presence of a key leader to drive forward the intervention.

9.3.1 Communicating with patients

Participants from all practices discussed the difficulties connected with encouraging patients to attend reviews and engage in supported self-management. Effective communication between clinical staff and patients is known to be essential for successful asthma self-management with poor communication impairing asthma care (Miles et al., 2017; Moffat et al, 2006). Understanding patients is important for primary care staff to create relationships with patients and empower them to self-manage their condition. Lack of communication affects care provided for example, switching asthma medication without consulting patients resulted in discontented patients, negatively impacted on patient/GP relationships, reduced confidence in asthma medication and decreased patient's perceived asthma control (Doyle et al, 2010). The nurse-led process of asthma care provision described by participants strengthened the relationship with patients due to a named contact in the practice for asthma care providing continuity in asthma care. This is in contrast to previous research which suggested that the introduction of QOF had reduced continuity of care provided in patients with chronic disease (Campbell et al., 2010).

The GP role had moved from the paternalistic relationship with patients described by Coulter (2002) where GPs prefer a paternalistic relationship with a docile patient to a new alliance between patient and GP where care is patient centred (Kaba & Sooriakumaran, 2007). Understanding the patients and sharing the decision making processes are essential in providing good quality

care and is a process adopted by primary care staff in Northern Ireland. Participants aimed to provide self-management education to empower patients resulting in improved asthma control, lower numbers of exacerbation events and reduction in the use of healthcare resources.

Areas of high deprivation have increased unscheduled primary care attendance for individuals with asthma which is often considered an indicator of poor asthma control (Abdelhamid et al., 2010; Al Sallakh et al., 2017; Cope et al., 2008) and demographic tailoring is required for successful implementation of self-management programmes (Pinnock, 2015). Case study 4 practice was located in an area of extremely high deprivation with low employment rates and adopted a more paternalistic approach to asthma care, contacting patients after a reliever prescription was ordered and refusing to supply medication until a review has been completed. They offered open surgeries allowing same day access to a nurse for asthma care, so there was no barrier of unavailable appointments. Refusing reliever medication is controversial and other practices were reluctant to adopt this approach. However, this practice achieved over 90% of eligible patients attending an annual review where self-management education was provided. The practice staff believed that high annual review attendance rate, reliever prescription audit and open surgery practice resulted in increased levels of patients with well controlled asthma as evidenced by the 34.7% drop in reliever inhalers prescriptions.

The provision of action plans was evident in all of the practices with nurses advising they provided one in every annual review. Case study 1 had developed their own action plan and provided it in black and white ink, whereas case study 4 provided patients a colour photocopy of the Public Health Agency action plan as they were unable to obtain further supplies from the Public Health Agency. Case study 2 used a range of action plans provided by pharmaceutical companies and the Public Health Agency. The action plan they provided to the patient was tailored to the patient's age, prescribed medication and understanding of their condition. However, case study 3

believed that all action plans provided in primary and secondary care in Northern Ireland should be the same in order to provide consistent advice and reduce confusion. The absence of colour printers in primary care can be a practical challenge in providing supported self-management as action plans do not print well in black and white (Morrow et al, 2017). It was notable that case study 4, despite being in an area of high deprivation, was printing out colour copies of action plans and the use of colour printing for action plans was identified by the practice manager as “the main thing”.

9.3.2 Financial incentives

Financial incentives were viewed positively by staff, although they were emphatic they were payment for work undertaken and not an added extra. Staff argued that the provision of asthma care previously belonged in secondary care and while they accepted it was now within primary care remit and saw the benefit for patients, participants expected to be compensated for the additional workload. Practices used a wide range of strategies to increase attendance at asthma reviews including: issuing multiple letters; phoning patients; extending practice hours and removing reliever inhalers from repeat prescriptions. Time is a limited resource within primary care and engaging patients with asthma required considerable input from practice staff who believed the practice should be compensated for their effort. The size of the financial incentive is important and should correspond directly to the work expected to be undertaken to reach targets (Conrad et al., 2013; Fagan et al., 2010; Kontopantelis et al., 2012; Rosenthal et al., 2005). Reduction or removal of financial incentives caused concern among participants, who believed it would have a direct impact on the provision of asthma care due to the work required to engage patients with asthma. Time and funding were limited in practices and if they were to no longer be paid for the LES, resources would be allocated to other areas of practice work.

Complementary roles were evident in some practices: nurses' priority was providing high quality care; administration staff had a business focus and GPs were involved in both health care and business. Providing high quality care

was the main priority claimed by all practice staff however, participants highlighted the importance of financial incentives for paying wages. Although nurses and administration staff did not receive bonuses for achieving targets, as LES payments are made to the practice, participants acknowledged that their contribution to achieving LES targets was necessary for the practice to remain open. The awareness of practice closures highlighted to participants the instability of job security in primary care across Northern Ireland, and practices highlighted that the financial incentives were not making GPs rich, but provided required resources to enable the provision of supported self-management for asthma.

The requirements for the LES were developed to be complementary to QOF requirements, in terms of asthma care. Annual reviews for all patients with asthma is a QOF requirement and the LES requirement is the provision of an action plan in these annual reviews. However, participants expressed frustration at the differences in reporting timelines between QOF and LES. The QOF pays a financial incentive to practices for providing an annual review to patients with asthma. However, there is a three month extension for “slippage”, which practices have interpreted as the QOF being every 15 months rather than annually. Therefore, the QOF’s 15 month reporting period is different to the LES, which is calculated on a 12 month basis. This means the two financial incentive schemes, which are meant to be complementary, are not aligned. Participants had no preference between a 12 month or 15 month reporting period.

9.3.3 Improved care vs improved reporting

Previous research has suggested that the focus on care recorded in financial incentive schemes could improve coding and reporting in primary care practice rather than improve the quality of care provided (Campbell et al., 2007). However, improved reporting and improved care do not need to be mutually exclusive. Some practices had adopted a process where patients frequently ordering reliever inhalers were identified, allowing practices to identify risk and proactively contact patients to arrange an appointment to review medication,

asthma control and inhaler technique. In addition, the annual review and provision of self-management education provided clinical staff an opportunity to review the current status of patient's asthma, "stepping up" or stepping down" where appropriate.

Negative connotations of increased reporting processes existed and tasks defined as box ticking exercises held no value for the clinical staff and the pop up boxes in healthcare software created alert fatigue. An abundance of online reporting tasks when delivering care were an organisational barrier for clinical staff in providing supported self-management for asthma (Morrow et al., 2017) and viewed negatively by patients (Daines et al., 2017). However, there was an understanding among administrative staff that these reporting figures were essential for the Public Health Agency to evaluate asthma care provision and award financial incentives.

Exception reporting has been identified as increasing target results but not increasing care provided (Pape et al., 2015). The absence of exception reporting in the LES was viewed negatively by participants; although participants acknowledged that it meant they continually strived to engage patients for reviews, even after multiple attempts, because they were unable to submit an exception report. However, previous research reported GPs as viewing exception reporting as a necessary element of QOF safeguarding against inappropriate treatment or over treatment of patients (Campbell et al., 2011). Practices in deprived areas are more likely to submit an exception report (Dalton et al., 2011) and there is increased mortality in exception reported patients (Kontopantelis et al., 2015). There is a need to support practices in deprived areas who potentially may struggle in achieving LES targets due to inequalities in practice resources; potential solutions to this area might be measuring targets from baseline or specific rewards for practices providing care to difficult to reach populations (Dixon et al., 2011).

9.3.4 Impact of context

In my systematic review (see section 5.4 for further information) I concluded that understanding the context in which an intervention is being implemented is key to determining its effectiveness (Jackson et al., 2017). Understanding the patient population; collaborative working within a multi-disciplinary team and support from internal and external colleagues are critical elements in the success of an intervention. What works for one population does not work for all populations. Practice organisational processes highlighted the emphasis on multi-disciplinary teamwork and collaboration in providing asthma care to patients and previous research has identified improved teamwork as a result of the QOF (Gillam et al, 2012). Practices with effective communication strategies worked efficiently and appeared to have high levels of job satisfaction. Time was a barrier for practices and the introduction of longer appointments for newly diagnosed patients and for asthma reviews succeeded in enabling nurses to conduct a thorough review.

Normalization process theory (NPT) (May et al., 2009) highlights the importance of defined roles in its individual specification component and this was evident in many of the interviews. Provision of asthma care was predominantly a nurse-led process with GPs diagnosing patients and performing a supervisory role in clinics, and administrative staff focussing on reporting tasks, including monitoring performance in relation to LES targets. Three of the case studies had a key individual in the practice, who was interested in asthma, driving the provision of asthma care and supported self-management education, which corresponds to the initiation component of the NPT. The next chapter will consider the process of normalization in more detail and provide results of the framework analysis I conducted using NPT.

Despite the numerous changes that practices described including: increase in reporting; change of appointment duration and introduction of dedicated days for asthma clinics; targeting of individuals prescribing high amounts of reliever inhalers, participants continually stated that there had been no changes. Checkland and Harrison (2010) identified a similar narrative of no change,

despite significant changes to practice organisational structure, roles and increase of information technology, in four case study practices while investigating the impact of QOF. Their recommendation was to consider the patient's perspective of the financial incentive scheme, something they were unable to complete for QOF and I was unable to complete with this study for LES.

9.3.5 Strengths and limitations

The inclusion of both individual and group interviews in the case studies was a strength of this research. Group interviews provided a more relaxed group setting for participants and allowed me to observe team dynamics which I compared with interview transcripts discussing teamwork and communication. Occasionally it was challenging to keep conversations to the topic guide in group interviews but this allowed for unexpected information to emerge with participants generating ideas and responses with each other. Peer pressure is a disadvantage of group interviews and the inclusion of individual interviews in the first case study was beneficial as the nurse expressed frustrations that may not have been discussed in a group interview. Telephone interviews were time efficient in allowing me to contact a large number of practices across Northern Ireland for the scoping interviews but lacked non-verbal cues such as body language making it harder to develop a connection with participants.

I conducted all the interviews which could lead to interviewer bias, however I discussed my interviews on a regular basis with my supervisors and produced a balanced interpretation of results by working with a multidisciplinary team including lay representatives to produce the topic guide. Analysis of data was discussed with a multi-disciplinary team and included input from a patient representative which reduced subjectivity of findings.

The majority of the interviews were conducted with practices in an urban or urban/rural mixed population with only one practice from a rural population. While there were participants from each of the five Local Commissioning Groups in Northern Ireland, the majority of the participants (57%) were from

Belfast. There was a wide range of practice sizes ranging from approximately 3,000 to approximately 14,000 and practices from across the spectrum of deprivations. The method of unsolicited calling of practices for the scoping interviews resulted in a high proportion of the participants being administrative staff as GPs and nurses were typically unavailable because of clinical responsibilities. However, there were GPs and nurses interviewed in each of the four case studies so their perspective was explored too.

Three of the cases study practices participated because the nurse or GP had a specific interest in respiratory conditions. This provided a valuable insight into the processes developed in their practice, but does not represent practices who do not have a clinical staff member with an interest in asthma. Recruitment difficulties experienced in Northern Ireland resulted in only practices with an interest in asthma (5/15 of the scoping interview participants) or with available time were included and practices who were struggling with time, LES targets and/or other factors were less likely to participate. There needs to be engagement with practices struggling with the LES to understand their perspective to facilitate development of strategies to support practices struggling with asthma self-management education provision.

Interviewing primary care practice staff provided an exploration of their perceptions of the LES and the impact on primary care processes. However, this is just one side of the story as patient perspectives were not represented. Participants provided reasons why they believed patients did not attend but without interviewing patients we cannot be sure that these reasons were correct. Further research is required on the patient perspective of self-management to understand its impact on patients and produce strategies to increase patient engagement.

9.3.6 Patient and public involvement contribution

A PPI representative (EE) was provided with three anonymised transcripts (1 scoping interview; 1 case study individual interview; 1 case study group interview) and asked for their perception of topics that regularly occurred in the

interview transcripts. I provided initial overarching themes, but not the multiple sub-themes. They identified five main points:

1. The nurse plays a vital role in practices delivering asthma care
2. Empowering patients to manage their asthma is important
3. Patients with asthma were viewed as hard to reach and practices needed to be proactive in engaging them
4. Effectiveness of clear processes and defined roles in practices for delivering asthma care
5. Importance of multidisciplinary team work

Responses from the PPI representative were included in the multidisciplinary discussion with my supervisors (HP, MS, MK) regarding the qualitative themes. The PPI representative analysis complemented my findings of the importance defined roles, multidisciplinary teamwork and clear processes in implementing the LES. I explore these further by using the NPT in framework analysis of the interview transcripts, which is discussed in Chapter 10.

9.4 Conclusion

The evidence provided in this chapter showed the importance of effective communication and increased awareness of engaging patients in self-management education. The lack of exception reporting encouraged practices to continually contact patients by methods such as letters, text messages, phone calls and opportunistically when they were in the practice. The size of the financial incentive is important as practices expected to be compensated for work that was previously the remit of secondary care, and considered that removal of the financial incentive would have a negative impact on the provision of asthma care. Understanding the intervention context is important, particularly the emphasis on defined roles that match individual skillsets, multidisciplinary teams working collaboratively and the inclusion of a key leader to drive forward the intervention. Further research is required to understand the patient perspective on annual reviews and supported self-management.

9.5 Summary and next steps

In this chapter I have discussed the 15 scoping interviews and four case studies undertaken in primary care practices across Northern Ireland, exploring clinical and administrative staff perceptions of financial incentives promoting implementation of asthma self-management in primary care in Northern Ireland. A grounded theory approach to data generation and coding constructed four main themes: communicating with patients; financial incentive schemes; strategies for achieving targets and targeting poor asthma control. Effective communication was required for building relationships with patients resulting in increased engagement in self-management education. With asthma action plan ownership rates higher in Northern Ireland than the rest of the UK, exploring the patient perspective could provide insight into high self-management reported in Northern Ireland.

What has emerged from this exploration of primary care staff perceptions of the LES and delivering asthma self-management was the extent to which the LES had been embedded into routine practice, with some participants unaware of pre-LES processes. To explore how the LES became embedded in primary care routines, I evaluated the LES with the framework of the Normalization Process Theory (May et al., 2009). The next chapter discusses the framework analysis conducted on the scoping interviews and case study interview transcripts, using Normalization Process Theory.

Chapter 10 Framework analysis

10.1 Introduction

The previous chapter discussed the findings of 15 scoping interviews and four case studies in primary care practices across NI, exploring clinical and administration staff perceptions of the LES and delivering asthma self-management. Results from the interviews showed that the LES had been successfully embedded in the majority of primary care practices, with many staff being unaware of processes prior to its introduction. To gain a deeper understanding of how these processes were normalized into routine care, I explored the implementation of the LES in primary care using the Normalization Process Theory (NPT) (May et al., 2009). NPT is explained in section 7.3.4.5. This chapter reports the findings of a framework analysis of interviews with clinical and administrative staff involved with the LES in primary care practices in Northern Ireland.

10.2 Methods related to the NPT analysis

Initially I intended to map the themes constructed from the grounded theory approach analysis into the NPT constructs and components, but this was not successful so I undertook separate framework analysis without the grounded theory approach themes. This does not mean that the grounded theory approach themes were incorrect, instead they covered topics such as communication with patients which fell outside the NPT framework. Prior to the framework analysis, the grounded theory analysis highlighted that organisational processes created since the introduction of the scheme appeared to be successfully embedded into primary care practice routines with many staff stating that they could not remember or did not know what the processes were prior to the scheme.

10.2.1 Framework analysis

I chose the NPT for the framework analysis section as the constructs provided tools for me to explore if/how the LES had been normalized into routine practice in primary care.

The transcripts from the scoping interviews and in-depth interviews in the case studies were uploaded to a computer-aided qualitative data analysis software (NVivo). I created separate codes for each of the 16 NPT variables and one for “outside the framework” within NVivo. I read each of the transcripts and coded each statement within the interviews into either one of the NPT constructs or “outside the framework”. This coding involves allocating statements to pre-set constructs, which is the opposite of the coding in grounded theory approach where the themes are generated from the data.

10.2.2 Using the NPT toolkit

The NPT toolkit was used to assign strengths to each of the NPT variables, based on the framework analysis of the scoping interviews and case study interviews (Figure 25). The strengths were agreed in discussion with a multidisciplinary team (TJ, HP, MS) including contribution from a patient and public involvement representative (EE). In addition to their academic roles, two of my supervisors involved in this meeting hold clinical positions within primary care (HP) and secondary care (MS) which provided a range of perspectives to the discussion. All team members were provided a document outlining the 16 NPT variables with up to five supporting quotations for each variable. The ratings of the NPT variables were discussed in relation to the provided quotes and, once agreed with all team members, the strengths were then input into the online NPT toolkit and a radar plot produced.

10.3 Results

Overall, 23 interviews (15 scoping; six individuals; two group) with primary care staff (13 administration staff; five GPs; five nurses) involved with delivering the scheme were analysed. Four of the participants in the scoping semi-structured

interviews also took part in either an individual in-depth interview or a group interview. Information regarding interviewee characteristics and practice demographics have been outlined in section 8.2 (scoping interviews) and section 9.2 (case studies).

10.3.1 Themes

Themes were the four NPT constructs: Coherence, Cognitive Participation, Collective Action and Reflexive Monitoring, and their underlying components (Table 29).

Table 29: Constructs and components of the Normalization Process Theory

Construct	Component
Coherence (sense-making work)	<ol style="list-style-type: none"> 1. Differentiation 2. Communal Specification 3. Individual specification 4. Internalisation
Cognitive participation (participation work)	<ol style="list-style-type: none"> 5. Initiation 6. Legitimation 7. Enrolment 8. Activation
Collective Action (action work)	<ol style="list-style-type: none"> 9. Interactional workability 10. Relational integration 11. Skill set workability 12. Contextual integration
Reflexive monitoring (appraisal work)	<ol style="list-style-type: none"> 13. Systemization 14. Communal appraisal 15. Individual appraisal 16. Reconfiguration

10.3.1.1 Coherence

1. *Differentiation: LES distinguished as different from previous ways of working*

Some participants were not working in the practice prior to the introduction of the LES, so for them there was no way of differentiating between pre-LES and post-LES processes. Other participants stated the time between the LES and these interviews (nine years) created difficulty in remembering the pre-LES processes within primary care. A number of participants advised that the introduction of the LES had involved the provision of an action plan, while others advised that providing actions plans had always been part of their processes in providing health care. The main difference that was discussed was the increase in reporting due to having to provide this information to the Health and Social Care Board to receive their financial incentive.

“...we didn't really change anything. We changed the recording of things, but not how we ran them or anything like that. You know, we still had our asthma clinics and stuff.” (Admin, T06)

“To be honest, I haven't been here all that long so I wasn't here when the LES would have first started. But there hasn't been any change really that I've been aware of in the last wee while.” (Admin, T10)

“We've been doing this enhanced service a long time now. So probably longer than I've been here. I think the only thing we brought on was sending out the actual appointments when they [patients] didn't come in, to put a bit of pressure on people to come in.” (Admin, T15)

There was some confusion in interviews regarding what were LES requirements and what were QOF requirements, particularly discussed in terms of exception reporting and the reporting period with LES being 12 months and QOF being 15 months. There was frustration expressed regarding the fact the LES and QOF were supposed to work in parallel but this difference in reporting period created an increase in workload for primary care staff.

“It’s slightly annoying because the QOF looks back 15 months from say, the end of March 2017 it would look back to January 2016. Where the Northern Ireland LES, it’s counted only from the financial year. So, even though someone has had an asthma review, say, in February for QOF and the LES, we need to bring them back in again and then it counts for both.”

(Nurse, T1)

2. Communal specification: Participants collectively build a shared understanding of what the LES expects from the practice

Participants worked together to determine tasks that required completion to provide an enhanced level of asthma care and achieve LES targets. There was a collective understanding of how the LES fitted into the practice and that the processes undertaken were suitable for the specific tasks required. Staff were working together to provide high quality asthma care and, although administration staff had a business focus, ultimately the main priority for all staff was providing high quality care for patients.

“...each year we would have read the service specification that came out from the board. Checked to see what the percentage achievement, whether it had changed year on year. It was 80% I know last year, for maximum achievement was 80%.”

(Admin, T04)

“To get the doctors involved...if they’re in the middle of surgery and someone is coming in, they don’t want to be bothered with all that [completing online asthma review forms], so you know, if we could maybe devise something that would be quick...and it wouldn’t be off-putting to the doctors”

(Admin, T01)

3. Individual specification: Participants understand what the introduction of the LES entails for their specific role

There were defined roles within the practices regarding organisational processes and participants were aware of how their individual role contributed to LES targets. GPs were involved in diagnosing patients with asthma and

assumed a supervisory role in asthma clinics; annual reviews and provision of asthma care were predominantly nurse-led processes; and administration staff were involved in reporting tasks and communicating with the Health and Social Care Board regarding the LES.

“My job to set up the clinics, we call the patients through the admin team, establish the clinics for the nursing team, make sure the kits up and running and basically chase patients up to make sure they attend.”

(Admin, T07)

“I’m actually an independent nurse prescriber, so, I would run all the clinics for asthma, you know, to diabetes, heart disease, everything”

(Nurse, T11)

“The annual returns...I sign them off, you know that way. I would check them. I do the checking. They’re usually put together by our IT officer and then he presents them to me and I go through them.”

(GP, T14)

4. Internalization: Participants understand the reason for the LES and the positive implications of its introduction

Participants portrayed an understanding of the LES aims and that the provision of asthma action plans was in order to provide high quality asthma care to individuals to increase asthma control and decrease exacerbations and use of secondary care. Providing high quality care to patients was the main priority for all staff and the financial incentives from the LES were identified as enabling practices to deliver this care. However, there was an indication that primary care staff believed aspects of the LES standards to be unrealistic when implemented in the real world context of primary care practice.

“At the start, we thought it would take us far longer to do an asthma patient [review] but once you got into it you realised you were actually giving better care, so you were. Because you were covering all aspects, you know, of a care plan with them.”

(Nurse, CS2)

“I don’t know, someone up there [Health and Social Care Board] has devised it, a man in a grey suit.” (Admin, T01)

10.3.1.2 Cognitive Participation

5. Initiation: Key individual(s) take ownership of the LES processes and drive its implementation

All participants identified the provision of asthma care as being a nurse-led process. Nurses were involved in identifying patients on the asthma register, undertaking the annual reviews and providing supported self-management, including action plans, to patients. Administration staff took ownership of all reporting tasks and communication with the Health and Social Care Board in regards to the LES and financial incentives. One participant discussed a training role taken on by the nurse in their practice: when the nurse completed training she came back to their practice and updated her colleagues on what she had learnt in relation to asthma care. The participant deemed this exchange of knowledge as positive and beneficial for all staff involved with LES in the practice. However, there was concern regarding the dependency on the nurse for the provision of asthma care and the potential for other clinical staff to become deskilled.

“Our nurse is very good...she has a lot of updates of training with regards to asthma and COPD. And then she comes back to the practice and feeds us back, like collaboration and all, about all the equipment and things, so she feeds it back to us from the training.” (Admin, CS1)

6. Legitimation: Participants agree that the LES tasks belong in primary care

There was agreement among participants that, through the LES, the Health and Social Care Board were paying primary care practices for work that was previously the remit of secondary care. Participants accepted that these tasks now belonged in primary care and the financial incentives provided by the LES

were the payment for taking on this work. In addition to understanding that asthma care was now a primary care responsibility, participants highlighted the benefit of providing self-management education to patients from diagnosis (typically made in primary care) rather than retraining patients with existing habits.

“It was work that was taken from secondary care, so you know, there needs to be some financial remuneration for the amount of work that’s being done”

(GP, T03)

“...you’re not doing it because there’s a monetary benefit but ultimately...you’re taking clinicians out of other work, there’s a lot of admin team workload, so ultimately, the recompense of the money does help...but you’re not doing it because you’re making money, you’re doing it because it’s best care.”

(Admin, T07)

7. Enrolment: Participants have organized themselves to collectively contribute to the LES

Practice staff were working collaboratively, combining the defined roles of administration processes and health care provision to provide high quality care for patients with asthma. The provision of asthma care was predominantly nurse-led, however other staff members were aware of the team work required to reach LES targets and provide high quality asthma care. Staff worked together to increase engagement with patients for asthma care including reception staff and GPs alerting the nurse when a patient who required an asthma review was in the practice.

GP: *I would suspect it [asthma diagnosis] and then I would bounce them [patient] down [to see the nurse].*

Nurse: *They would have their reversibility or serial peak flow, that kind of stuff done and then we would look at the picture together.*

TJ: *Okay. So is it a joint diagnosis?*

GP: *We do a lot of joint consultations. Where we're both talking to the patient together, we do a lot jointly.* (Nurse & GP, CS4)

"The doctors are quite good, that if they see somebody that hasn't got their asthma stuff done and defaults from asthma appointments regularly, they're quite good at alerting the nurse and she sometimes can grab them in reception." (Admin, T05)

8. Activation: Participants collectively define and participate in the organisational processes needed to achieve LES targets

The majority of participants continued to work together to define and participate in the LES, organising and delivering annual asthma reviews, providing action plans, undertaking inhaler technique checks and reporting figures to the Health and Social Care Board. One practice in a particularly deprived area, had undertaken an audit as a result of which they removed reliever inhalers from all repeat prescriptions and patients were now required to attend the nurse for a review before another would be prescribed. This resulted in patients having asthma reviews multiple times a year in this practice.

Lack of time was a barrier to providing supported self-management and most participants advised they were unable to see all asthma patients so prioritisation and making an informed judgement was necessary. In addition, a number of participants voiced concern about the potential removal of the financial incentives or modification of the targets and the negative impact this would have on the provision of supported self-management for asthma in primary care practices.

"...I think it [the LES] works well in our practice and we're happy to continue to do it. We've got a lot of asthmatics, we've probably got over 300. It's never been a major problem for us and I assume it'll keep going and we'll keep doing it." (Admin, T05)

Would the same impetus be there if the funding wasn't allocated, you would hope it was but I couldn't guarantee it. (Manager, T07)

10.3.1.3 Collective Action

9. Interactional workability: LES processes can be integrated into existing work

The inclusion of action plan provision was integrated into the existing annual reviews, which were already a requirement of the QOF. For some practices this involved developing their own asthma action plans to work within their computer systems, while others provided action plans produced by the Public Health Agency or pharmaceutical companies. Clinical staff suggested they were already providing supported self-management education to patients including asthma action plans and the introduction of the LES just involved recording this on the practice computer system. Reporting staff were producing reports for QOF and the introduction of the LES required new reports to be developed, but once these were created in the system they could be easily accessed and completed each year. When the LES was introduced, there was a considerable amount of work undertaken ensuring that the diagnostic codes used on the computer system were correct. Similar to the building of the reports, however, these were considered one-off tasks that were carried out at the inception of the LES and were not rebuilt each year.

"...there was some [asthma action plan templates] floating about but we just adjusted it to make it easier for the patient and to print it out and then it's just scanned straight into the patients' notes." (Admin, T02)

"...it was already set up... But essentially, there was a template that was already on the system...and the way that it worked was just when [nurse] was doing her asthma and COPD reviews of patients, she would have been completing extra bits really on this template so that she was making sure that she was doing a sort of fuller review" (GP, T03)

10. Relational integration: Participants' confidence in team members abilities to complete LES processes

There was evidence for multi-disciplinary teamwork in all of the practices, and staff respected and valued the contribution made by their colleagues. Due to the defined roles in each of the practices, participants were aware of their role requirements and had expectations of their colleagues' contributions. Staff were mostly positive about their colleagues' work practices though one nurse identified GP and administration staff behaviour which had a negative impact on her work. In particular, prescribing inhalers without a formal diagnosis, or a consultation to check inhaler technique or provide self-management education; she was concerned that once patients had received an inhaler, they did not attend for supported self-management.

"...[nurse] has been doing them for years and has been validated umpteen times, so I do trust her implicitly."

(GP, T14)

"...sometimes, the GP has done it [the diagnosis] and unfortunately, I've tried to get them not to commence the preventer inhaler prior to really making a formal diagnosis...sometimes, they just start them on the brown inhaler. Then the patient, they come in for their spirometry, if they do"

(Nurse, CS1)

11. Skill set workability: New LES organisational processes are assigned to the most appropriate staff member dependent on skills

The allocation of work tasks was based on the skill-set of each of the team members. GPs were involved in the diagnosis of patients, complex cases and providing a supervisory role for nurses in asthma clinics; trained respiratory nurses were predominantly delivering the asthma care and updating GP and administration staff on developments within asthma guidelines; administration staff focused on reporting tasks, issuing communications to patients and scheduling appointments.

“The nurses are very good at, I think, working to protocols and also time, and they probably don’t make as many assumptions about patients’ knowledge of matters as the GPs might do. I think they’re good at explaining things.” (GP, CS1)

“Usually they [patients] would probably tend to see the GPs if they are having exacerbations or if there’s other sort of other issues going on. So, we would tend to see them when they have been having problems and [nurse] sees them more for that sort of annual review.” (GP, CS2)

12. Contextual integration: Sufficient support for participants from the practice and the Health and Social Care Board

Significant support from the Health and Social Care Board in providing funding and training for nurses was acknowledged as a key to the successful embedding of new processes for asthma self-management. Initially, the Public Health Agency had produced and provided action plans to all practices in Northern Ireland however, this had stopped and practices were having to develop different strategies to secure action plans such as communicating with pharmaceutical companies and photocopying existing plans. Participants identified a number of barriers in obtaining training for nurses including: the cost and who pays (the nurse, the practice or the Health and Social Care Board), and asthma diploma courses previously provided in Northern Ireland were no longer available and nurses were expected to travel to England to complete respiratory courses. In addition, participants raised concerns regarding a reduction in funding from the Health and Social Care Board and the impact this would have on the provision of asthma self-management education in primary care.

“...there are a number of new practice nurses here in this building and they haven’t got their asthma diploma. It either means that they have to fund them themselves or the practice has to fund them, and practices are reluctant to do that because sometimes when you fund something like that then they [nurses] move on and go elsewhere.” (Admin, T04)

“...now you do have to go to mainland UK for those [asthma diplomas], which is very hard if you are a young nurse coming through with family.”

(Nurse, T12)

Pharmaceutical companies had played a role in supporting primary care in providing supported self-management for asthma by funding nurses to undertake training on respiratory courses and providing company branded action plans which accompanied their inhalers. There was some concern about the involvement of pharma companies in sponsoring nurses for training courses but due to lack of support or options, it was deemed the only way to proceed.

“...[in] a lot of practices, they [nurses] are the ones who are delivering care, and they’re relying on courses that are sponsored by the big drug companies. And I don’t think that’s the ideal way to go. But sometimes, that’s what you had to do... because we couldn’t do it any other way.”

(GP, T14)

Practices provided support to staff delivering asthma care by introducing asthma clinics and increasing the duration of asthma review appointments to enable nurses to complete all aspects of the review required to reach LES targets and provide high quality asthma care. This did not exist in all participants’ practices which was an area of frustration for nurses. Inadequate allocation of time for appointments resulted in: appointments running late which upset patients; missed lunch breaks, staff staying after scheduled working hours to complete admin work.

“We are allocated 15 minutes, you can’t say all of that [asthma review questions] and give a patient a quality interview in 15 minutes, and you have to run over. My philosophy in this would be I am inviting this patient in once a year, possibly twice a year if they are going to be taking time off work or get baby sitters for their children they have to get something out of it.”

(Nurse, T12)

10.3.1.4 Reflexive Monitoring

13. Systemization: Measurement of LES and organisational processes effectiveness

The financial incentives received from the Health and Social Care Board were viewed as a measure of the effectiveness of the organisational processes that the practice had implemented in order to reach targets. Staff would often access the online reporting systems to compare their progress to the previous year's and also located where they were in regards to the current year's targets. However, due to the absence of exception reporting in the LES, some participants did not believe the financial incentives recognised the amount of work undertaken, particularly as asthma patients were identified as "notoriously" difficult to engage.

"...to take pride in that you have hit your targets as well...But, it is good, quite often you do take pride, you look up [the practice LES reports] every now and again to see how you are doing." (Nurse, CS2)

"Well, not as soon as that financial came in, it's not really financial bit, it's just more hitting actual targets. You know because we were just hitting it about now, well we're not brilliant but we're certainly well above target year on year." (Admin, T15)

14. Communal appraisal: Collective assessment of the impact of the LES for patients

Staff agreed collectively that the LES was worthwhile and felt its introduction had positively impacted on their relationship with patients and improved the care they provided for patients resulting in improved asthma control in patients.

"I'll be honest with you, it's working well. I mean, it's going through the templates, it's going through giving them management plans, bringing them back in, it's an opportunity to check inhaler use and to also make sure they're using them correctly. So, I think it's working well." (Admin, T07)

“I don’t think there’s anything negative about it [the LES]. The more education and the more people we can see and the more things we can do for them, the better.” (Nurse, CS1)

GP: *The fact is we have got people much, much better controlled. That is probably the most dramatic thing that has improved asthma care in this practice over the last...*

Nurse: *I don’t know what our figures are like with [hospital] admissions of asthma, but I really don’t think there is very many people who are admitted with any asthma complaints.*

(GP & Nurse, CS4)

15. Individual appraisal: Individual assessment of the impact of the LES for staff

There was a perception from some participants that the increase in reporting tasks for the LES were not necessary and some of the required reporting resulted in tick box activities to which clinical staff did not attribute any value, particularly if it could be incorporated into the QOF. However, there was an acknowledgement from administration staff that, in order to measure the asthma care provided by primary care in Northern Ireland, the recording and detailing of this information was needed by the Health and Social Care Board. In addition, reporting tasks were essential to provide evidence of the work completed to the Health and Social Care Board to receive financial incentives. Delivery of asthma care was identified as a nurse-led process and as a result, nurse workload had increased. However, the majority of nurses were happy with the LES requirements as they could see the benefit for their patients, and their main priority was providing high quality care for patients.

“...there’s a box ticking exercise that creates a point system. So, if it was put into the QOF it would probably be better, I think, because then, you know...well, it should be in the QOF.” (Nurse, T11)

“It is difficult when you’ve tried to bring patients in and you’ve put a lot of effort in and they won’t come so then you’re penalised for it.

(Admin, T01)

“I do think there could be more money put into it because £10 is not a lot for the amount of time that we spend with our patients.” (Nurse, CS4)

16. Reconfiguration: Feedback on the LES and how it has modified initial implementation strategies

Practices were continually developing strategies to increase the effectiveness of organisational processes in routine practice. Strategies included: producing new systems that would increase GP involvement in asthma care; adapting action plans to work with computer systems; removing reliever medication from repeat prescription to increase patient engagement and empower them to self-manage their asthma.

“...there was someone in, a trainer in today to try and get a template on the computer for an asthma quick that maybe the doctors would opportunistically do very quickly. And then the practice nurse could sort of maybe have a wee look at that...So, I’m trying to encourage the doctors to do a very quick asthma and then the nurse can follow it up.”

(Admin, T01)

These strategies were dependent on individual practices and context, for example, text messaging to contact patients identified differences among practices.

“We did have a texting system which really wasn’t beneficial unless we were sending bulk texts out, like...50 texts, something like that.”

(Admin, CS2)

“...we don’t do any of the texting. Our patients change their mobile numbers like people change dinners. Because there’s no appointments, there’s no need to have a text system, you see.” (Admin, CS4)

In addition, one participant stated they were unable to see every patient with asthma on an annual basis. This was due to both time barriers and their belief that not all patients with asthma required a review every year as some patients had well controlled asthma and were identified as low risk. Instead of inviting all patients with asthma, this practice identified patients they believed required a review and prioritised them above patients whose asthma was well managed. By evaluating tasks and adapting for the individual context, this practice was moving beyond simply accepting the LES, and creating processes that worked effectively for their practice and patients.

“The asthma action plans, the most of them [patients] will at least have had one...It might have been two, three, some may be four years ago. But we try and update them at least every one to two years. Or, if there is an admission or a significant event.” (GP, T14)

10.3.1.5 Themes outside of the framework

Communication with patients was highlighted as integral to the success of providing supported self-management and achieving LES targets, and this fell outside of the NPT framework. Participants highlighted difficulty in persuading patients with asthma to attend annual reviews and engage in their asthma care. Participants identified a number of reasons for lack of engagement from patients including: an inability or unwillingness to take time off work/school, unawareness of the severity of asthma; misunderstanding of asthma symptoms. Practices were actively developing and initiating strategies to identify, engage and understand patients in order to increase patient involvement, provide patient-centered care and empower patients to self-manage their asthma.

“Patients come to their doctor if they’re unwell and they only come to their doctor when their asthma is causing them a problem...people sometimes view their asthma as being reactive. Also when it goes wrong or when there’s a problem we need a doctor, as opposed to us taking proactive

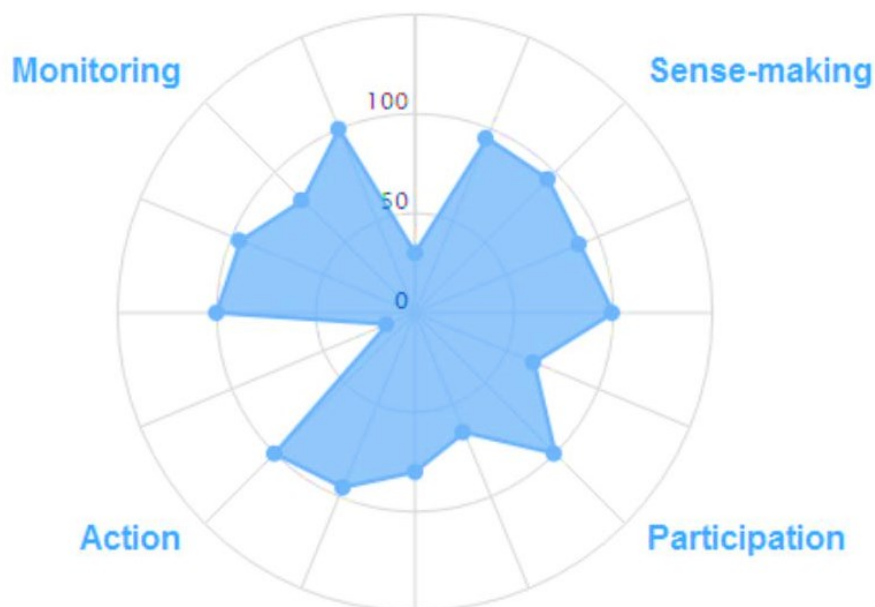
steps...in managing their asthma so it doesn't become a problem.”
(Admin, T07)

“People don't really understand and that's why now whenever I do an asthma review I don't ever do an asthma review without telling people that asthma does kill.”
(Nurse, T13)

“GPs, whenever they were printing scripts, checking to see when patients had their asthma review or opportunistically sending patients up to the practice nurse whenever they were in with them to book an asthma review because except sometimes you get them actually in the building at the time, it's very difficult to get them back again.”
(Admin, T04)

10.3.2 NPT toolkit: assigning strengths to NPT components

The radar plot outlines the strength assigned to each of the NPT variables, based on the framework analysis of the scoping interviews and case study interviews (Figure 25). The more positive a response, the further it extends from the centre with more negative responses nearer to the centre ('0').



10.3.2.1 Coherence

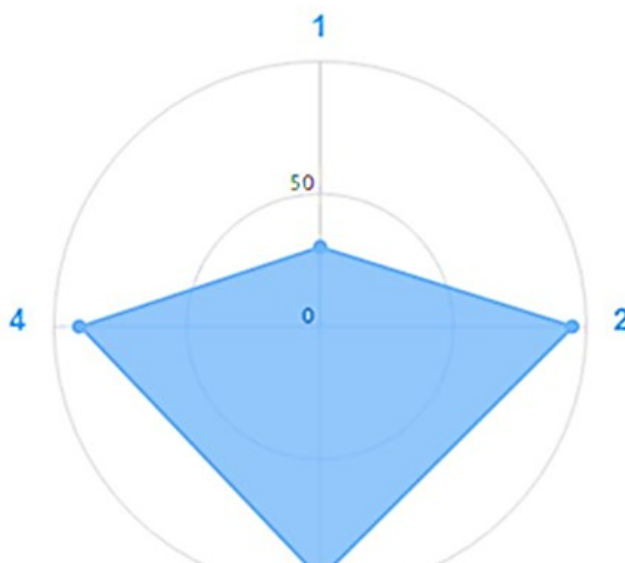


Figure 26: Radar plot identifying strengths allocated to components of the Coherence construct of the NPT

(Note: the scale on this radar plot is different to the scale on the others which all contain three rings. These plots are automatically produced by an online toolkit and I am unable to alter their scale)

1. Differentiation: *LES distinguished as different from previous ways of working*

It was agreed that staff had difficulty distinguishing the difference between the LES and previous ways of working and this was recorded a low on the NPT Toolkit. This was due to a number of reasons including: staff not working in the practice prior to the introduction of the LES; similarities between LES and QOF guidelines; time elapsed between the interviews and the introduction of the LES in Northern Ireland (nine years). However, the inability to distinguish the LES from previous ways of working is not necessarily negative, which is what is portrayed in Figure 26, as the timing between the interviews and the implementation of the intervention is important. For the LES, nine years had passed and an inability to distinguish between previous ways of working may indicate successful normalization. If the interviews had occurred shortly after

the introduction of the LES, then the results would probably have been different as the changes would still have been new.

2. Communal specification: *Participants collectively build a shared understanding of what the LES expects from the practice*

This was assigned a high strength as there was complete agreement in the multi-disciplinary team discussion that that all participants understood the LES targets and what teamwork was required to reach targets.

3. Individual specification: *Participants understand what the introduction of the LES entails for their specific role*

Similar to Communal Specification, Individual Specification was assigned a high strength due to participants' descriptions of defined roles within practices and awareness of how individual tasks were related to the LES and achieving targets.

4. Internalization: *Participants understand the reason for the LES and the positive implications of its introduction*

Internalization was also assigned a high strength, yet not as high as the specification components. This was due to participants' concern regarding the potential increase of target levels. These had been designed by policy makers not based in primary care who some participants believed were unaware of the effort required to provide an enhanced level of care to patients with asthma and the difficulties faced by staff in reaching targets.

10.3.2.2 Cognitive participation

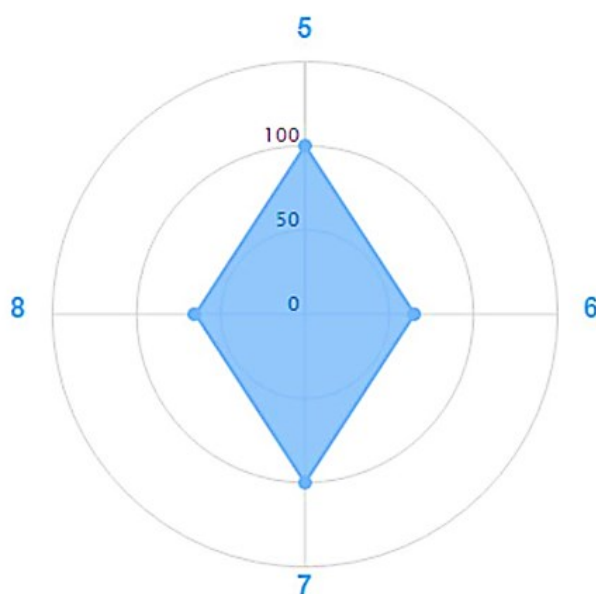


Figure 27: Radar plot identifying strengths assigned to components of the Cognitive Participation construct of the NPT

5. *Initiation*: Key individual(s) take ownership of the LES processes and drive its implementation

Provision of supported self-management in primary care was identified as a nurse led process in all of the practices with nurses responsible for annual reviews, provision of action plans and ongoing asthma care. There was complete agreement that this component should be assigned full strength.

6. *Legitimation*: *Participants agree that the LES tasks belong in primary care*

This component instigated a significant discussion amongst the team about what strength to assign, as although participants clearly believed that the provision of supported self-management for asthma belonged in primary care, it was identified as an additional service which required payment. The name of the LES (Local Enhanced Service) indicates what is being provided is an “enhanced service” which potentially reduces the normalization of the LES. Indeed, the paying financial incentive for ‘enhanced services’, reinforces the

notion that these tasks are in addition to routine work. We concluded that although there was a strong agreement from primary care staff that the work belonged in primary care, there was substantial belief among staff that it was in addition to routine work and therefore impeded the potential to be fully normalized.

7. Enrolment: Participants have organized themselves to collectively contribute to the LES

Participants discussed working collaboratively in multi-disciplinary teams, the defined roles described by participants provided evidence that they had effectively organized staff roles to work effectively in reaching LES targets. This component was assigned full strength on the NPT Toolkit as participants were aware of the roles of each of the staff members in their practice and how they contributed to the provision of supported self-management for asthma.

8. Activation: Participants collectively define and participate in the organisational processes needed to achieve LES targets

Participants reported working collaboratively to achieve LES targets, organising and delivering annual asthma reviews, providing action plans, undertaking inhaler technique checks and reporting figures to the Health and Social Care Board. However, there was concern regarding the removal of the financial incentives and the potential detrimental impact on provision of supported self-management for asthma and this contributed to the decision to assign a medium strength to this component.

10.3.2.3 Collective action

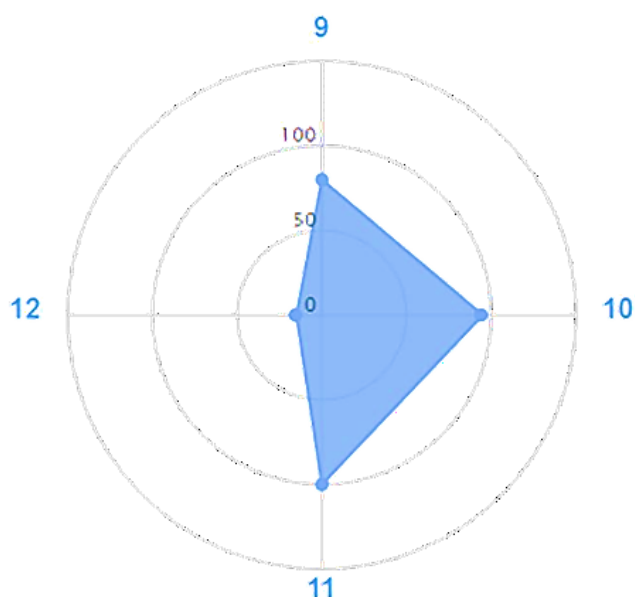


Figure 28: Radar plot identifying strengths assigned to the components of the Collective Action construct of the NPT

9. Interactional workability: *LES processes can be integrated into existing work*

The integration of the work to achieve LES targets appeared to have been easily integrated into routine practice in primary care. In particular, the provision of an action plan annually to patients with asthma was included in the annual asthma reviews which are a QOF target. However, despite the efforts of practices to engage patients with asthma, this population was identified as “notoriously” difficult to encourage to attend practice for a review. Practices invoked strategies of arranging appointments for patients, increasing correspondence to patients to advise of the annual reviews and working together to opportunistically engage patients when they were in practice. However, ultimately the onus was on the patient to attend the annual review and sometimes this did not happen creating a barrier for provisions of supported self-management. This lack of engagement from patients meant that practices, despite best efforts, were unable to deliver supported self-management to everyone within the targeted population. Due to this we

determined this component to be high strength, but not full strength due to the difficulties encountered with patient engagement.

10. Relational integration: *Participants' confidence in team members abilities to complete LES processes*

We allocated almost full strength to this component as the majority of participants were supportive and complimentary about their colleagues work, skill-sets and contributions to achieving LES targets. GPs advised they were confident about the competency of their respiratory nurses in undertaking the annual reviews and GPs provided a supervisory role for asthma clinics and were called upon regarding complex cases. However, with this trust came a negative aspect as one GP advised that the nurse provided so much of the asthma care there was a potential of GPs being deskilled as patients were more likely to visit the nurse, resulting in GPs being required to use their respiratory knowledge less often.

11. Skill set workability: *New LES organisational processes are assigned to the most appropriate staff member dependent on skills*

The defined roles in practices ensured that staff members were undertaking the tasks most appropriate for their expertise. The collaborative working within multi-disciplinary teams showed that when staff worked together, such as the admin staff member and nurse who worked together to identify which patients to target for annual reviews, they were contributing different skills to effectively complete tasks. Full strength was assigned in this component due to the defined roles of nurses providing asthma reviews; GPs undertaking supervisory roles and involvement with diagnosis and complex cases; administration staff focussed on reporting tasks and appointment arrangement with patients.

12. Contextual integration: *Sufficient support for participants from the practice and the Health and Social Care Board*

Support provided by the Health and Social Care Board at the inception of the LES included: funding; provision of asthma action plans and respiratory training for nurses. However, this support had decreased as the LES progressed and there was a lack of accessible respiratory training for nurses and practices reported difficulty in obtaining action plans so had resorted to creating their own or requesting them from pharmaceutical companies. Support at practice level differed between practices. Some participants discussed positive changes in terms of increased allocated time for asthma review appointments, however this was not the case across all practices and inadequate appointment duration was identified as a barrier to providing an enhanced level of care to patients with asthma. This lack of support from Health and Social Care Board level and at practice level resulted in a low strength being attributed to this NPT component.

10.3.2.4 Reflexive monitoring

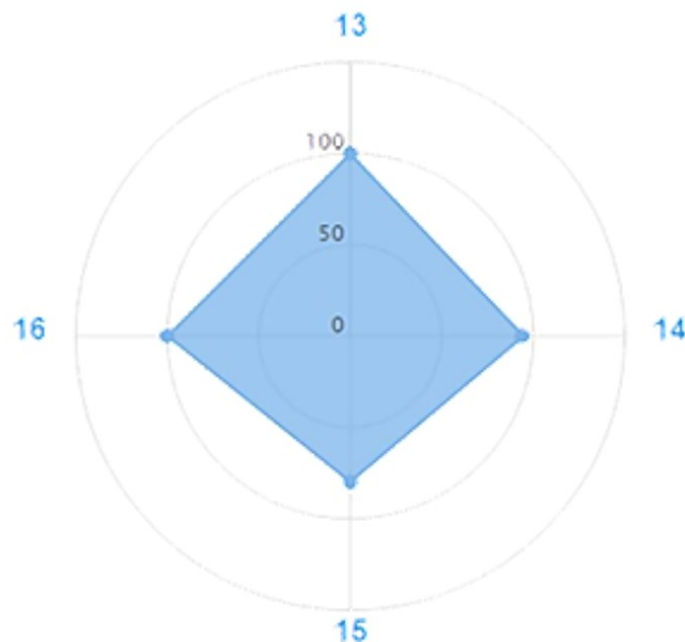


Figure 29: Radar plot identifying strengths assigned to components of the Reflexive Monitoring construct of the NPT

13. Systemization: *Measurement of LES and organisational processes effectiveness*

Systemization was marked as full strength as it is highly formalised in the context of LES due to the financial incentives paid for achieving targets. In addition to the formal measurement provided to the Health and Social Care Board, practices had undertaken their own internal reporting to monitor achievements throughout the year comparing current year results to previous years.

14. Communal appraisal: *Collective assessment of the impact of the LES for patients*

Participants were positive about how influential the LES had been in improving their relationship with patients with asthma and increasing the quality of care provided to patients. The LES was seen as beneficial and resulted in participants believing that their patients had better controlled asthma. One participant discussed how the LES provided a useful template to work towards and provided a guideline of what care should be provided to patients with asthma.

15. *Individual appraisal*: Individual assessment of the impact of the LES for staff

While communal assessment of the impact of the LES for patients was assigned a high strength, participants' individual assessment of the impact of the LES on staff was not as positive. While LES standards were identified as positive because they provided a framework to work within, structuring the support for self-management, some clinical staff advised that they had been providing this level of care before the LES but now they had to tick a box to confirm they had complied with LES requirements. In addition, staff discussed the frustration of issuing multiple letters to patients with little engagement in response. The lack of exception reporting was disheartening for some participants as it meant they were struggling to reach LES targets despite the high level of effort they had invested.

16. Reconfiguration: *Feedback on the LES and how it has modified initial implementation strategies*

Feedback on the LES was high as it is highly monitored with financial incentives paid to practices for reaching targets. More informal monitoring occurred within practices where they were continually developing strategies to increase patient attendance at annual reviews through understanding and engaging patients. The flexibility of the scheme allowed practices to modify the LES to individual practice context and participants provided evidence of this in terms of different methods of communication depending on different practices, using a range of action plans, and prioritising high risk patients for annual reviews.

10.4 Discussion

The evidence provided in this chapter explores the work undertaken by practices to embed the LES into routine organisational processes to provide supported self-management for asthma. The LES appears to be successfully normalized into routine practice with participants unable to recollect pre-LES organisational processes, either due to the passage of time or because they were not working at the practice at the time of implementation. Primary care staff had defined roles and understood what was required, individually and collectively, to reach LES targets. Asthma annual reviews were a nurse-led process with GPs adopting a role in diagnosis and supervision of respiratory clinics. Administration staff focussed on the reporting aspects of the LES, working with nurses to identify and engage patients with asthma requiring a review. When the LES was introduced, the Health and Social Board funded respiratory training for nurses, but this had stopped and clinical staff were concerned regarding the lack of accessible respiratory training for nurses in Northern Ireland. While staff regarded the financial incentives as a necessary payment for undertaking work transferred from secondary care, the main priority for all staff was the provision of high quality care for patients. Patients with asthma were identified as difficult to engage and practices were

continually developing and adapting strategies to improve the care they offered and meet LES targets.

10.4.1 Making sense of the LES (coherence)

Participants had made sense of the reasons for the LES, understood how it affected their individual work and teamwork within the practice. Staff were aware of the impact of the LES in terms of providing an enhanced level of care to patients to empower them to self-manage their asthma, resulting in improved asthma control and reduction in use of emergency healthcare resources.

The LES was developed to work in conjunction with QOF and some participants experienced difficulty differentiating between the two schemes when discussing the guidelines. The similarities between the schemes contributed to the ease with which LES guidelines were incorporated into routine practice as some organisational processes had already been adapted for the QOF. However, the disconnect between the reporting timescales created frustration for staff who would prefer the two be aligned to either a 12 month or 15 month duration. This is an important factor to consider as misalignment between established methods and newly implemented schemes could result in the rejection of the new scheme (Conrad et al., 2013).

The results from the radar plot identified the strength of the Differentiation component as being only moderately positive in relation to the coding framework statement "LES distinguished as different from previous ways of working". However, participants' inability to recall or establish differences between the LES and previous organisational processes could be interpreted positively, indicating the LES had been successfully normalized to the extent that primary care staff were now longer comparing with the previous routine practices. Due the length of time between the introduction of the LES and this study, the Differentiation component may have been redundant or required rewording to be effectively applied within this analysis.

Consideration is required in determining the impact of time on the significance of the NPT constructs. Evaluating immediately after implementation does not provide enough time for participants to react (Rosenthal et al., 2005) and an extensive period of time after implementation and participants have difficulty recalling previous processes or were not present for the implementation, which is what occurred in this research. Evaluation can provide different results at different stages of the implementation process as it evolves. At pre-implementation stage, reactions will be the immediate response to the anticipated change the intervention will bring, and potentially exaggerated by concerns about change (Roland et al., 2006). Early implementation stage perceptions will focus on the differences between the new processes and pre-intervention processes and may be a discussion point amongst participants with a variety of opinions on its successes or failures. Mid implementation stage will be when systems and processes are starting to embed and previous routine practices will be less of a topic of discussion (except if there are substantial issues), although they will be remembered by staff. In the late implementation stage, there will be a decrease in what staff can recall and the focus has moved on from comparing to the old processes. In contrast the opposite shifts may apply in the construct of Reflexive Monitoring (see section 10.4.4)

10.4.2 Constructing the value of the LES (cognitive participation)

Practice staff had defined roles and were aware of individual and team requirements to reach LES targets. Annual reviews were considered a nurse-led process with support from GPs in diagnosis and asthma clinics, and assistance from administration staff in engaging patients (Morrow et al., 2017). Nurses were the key individuals in driving forward the health care provision element of the LES and administration staff were custodians of the reporting aspect. Despite these defined roles, staff worked together effectively in multi-disciplinary teams, undertaking essential tasks required to achieve LES targets. However, with nurses taking on the majority of asthma care provision, there was a concern regarding the potential deskilling of GPs, as

they were less likely to be approached by a patient for asthma, unless there was an exacerbation. This can create a circle of behaviour where GPs feel deskilled in providing care for a particular condition or medication, refer the patient to another health practitioner or clinic, and therefore contribute to further deskilling (Sweeney et al, 2015).

Despite what appears to be successful normalization of the LES into routine care, a number of participants raised concern regarding the threatened removal of financial incentives and the potential negative impact on provision of supported self-management in primary care. This raises the question of whether financial incentives create a sustainable change as the payment of a financial incentive implies that the task is in addition to “normal” work and deserves a reward. The NPT identifies that normalization is not a permanent state and embedded practices can be de-normalized if the intervention is superseded, disturbed, disrupted, or atrophied (May et al., 2007). In terms of the LES, if the payment were to be removed would the work continue to be undertaken because it is normalized or is it only normalized in conjunction with the financial incentive and the removal of these payments would result in de-normalization. Research on the impact of removing financial incentives has shown mixed results with one study showing stable performance on clinical activities when a QOF indicator was withdrawn (Kontopantelis et al, 2014) and another demonstrating a decrease in performance to below pre-financial incentives levels (Lester et al., 2010).

10.4.3 Undertaking the work for the LES (collective action)

The support provided by the Health and Social Care Board was identified as extremely important and the reduction in patient resources, accessible training courses for nurses and the threat of LES targets increasing to unrealistic levels were a cause of concern for primary care staff. In conjunction with the introduction of the LES, the Health and Social Care Board funded a mass training of respiratory nurses. However, many of these nurses are retiring and taking with them specialist knowledge that is unable to be transferred within

practices due to the lack of newly trained respiratory nurses. This is an area where the NPT constructs of Collective Action and Cognitive Participation interact: the key individual in the delivery of asthma care in primary care was the nurse who was driving forward the LES (Collective Action) and the Health and Social Care Board supported this by providing specialist respiratory training for nurses (Cognitive Participation). The current lack of accessible training supported by the Health and Social Care Board has the potential to disrupt the successfully embedded LES processes, as there will be a deficit in respiratory nurse expertise to meet the demand for provision of supported self-management for asthma in primary care.

Lack of time was a barrier for nurses in providing asthma care and interviewees identified that adequate time needed to be allocated by practices to enable the provision of an enhanced level of care by nurses. Nurses were working before and after paid working hours, including through meal breaks to ensure they were providing a high quality of care to patients. Nurses are more likely to take a meal break if it is supported by their supervisors and lack of breaks for nurses can result in increased psychological stress (Hurtado et al., 2015). In addition, primary care physicians can experience occupational burnout due to lack of rest time resulting in a reduced quality of health care being provided to patients (Wallace et al, 2009), ultimately damaging the professional/patient relationship (Ratanawongsa et al., 2008).

10.4.4 Appraisal of the work for the LES (reflexive monitoring)

Financial incentives were considered essential for the additional work being carried out to achieve LES targets, particularly as there was a perception that the work had previously been the remit of secondary care. Interestingly, despite participants' difficulty in differentiating between pre-LES and LES processes, either through not working at the practice or inability to recall due to time lapsed, participants believed primary care were entitled to the LES financial incentives as they were providing an enhanced service and undertaking work transferred from secondary care.

Lack of exception reporting in the LES was an area of contention, as it did not allow for an adequate portrayal of the effort invested in contacting patients, particularly as patients with asthma were identified as notoriously difficult to persuade to attend annual reviews. Some participants did not feel the financial reward was sufficient for the effort input into reaching targets, whereas others believed it was sufficient as they were providing care anyway. Nurses were less focussed on receiving financial incentives than administration staff, although they were motivated to review LES scores online throughout the year as a personal performance measure, complimenting themselves when targets were reached.

Once introduced, the withdrawal of financial incentives could have negative consequences including de-normalization (Lester et al., 2010). There is the potential to withdraw financial incentives with limited negative consequences, however, the intervention may still need to receive incentives either directly, indirectly (Kontopantelis et al., 2014) or in another form. Nurses were not motivated by financial incentives (though they were aware that payments contributed to funding their salaries) and considered that they were providing action plans as advised in their respiratory training and national guidelines. However, they acknowledged that in conjunction with the introduction of the LES, the Health and Social Board provided funded respiratory training for nurses in Northern Ireland, and nurses were concerned about the consequences of recent lack of accessible respiratory training. Withdrawal or reduction of financial incentive amounts in Northern Ireland requires careful consideration as there is the potential to de-normalize the enhanced functions of the LES and negatively impact on implementation outcomes and health outcomes.

Participants believed the LES had contributed to an increase in the quality of supported self-management for asthma provided to patients and felt patients had better controlled asthma. The LES provided a framework and guidelines for clinical staff to provide high quality asthma care and had motivated staff to engage with all patients who required an annual review, including difficult to

reach patients. A barrier to achieving LES targets was the lack of response from patients to annual review invitations and practices developed various strategies to adapt existing organisational processes to increase annual review attendance to empower patients to self-manage their asthma. One GP discussed their reassessment of providing reviews to patients with asthma on annual basis, expressing concern that some patients did not require an annual review for the sake of what the participant deemed a box ticking activity. Instead, patients were prioritised by the practice according to their asthma control and if there had been an exacerbation.

10.4.5 Themes outside of the NPT framework

Communicating with patients and engaging with them to increase annual review attendance to receive self-management education for asthma fell outside the NPT framework though participants highlighted these as important factors in providing high quality asthma care. By engaging with patients and understanding their asthma and individual needs, administration staff can potentially provide suitable appointment times and clinical staff can provide supported self-management tailored to the individual including optimal medication and the most appropriate action plan. Continuity of care and providing a named contact, usually the nurse, in the practice enabled staff to build good relationships with patients, promoting their attendance at annual reviews and engagement in self-management. In addition, both a good relationship between clinical staff and patients, and a patient centred approach positively improve medication adherence in individuals with asthma (Peláez et al., 2015).

Context also fell outside the NPT framework though its importance is acknowledged by May et al. (2016), who advised to think of it less as a place but more as a process that is not linear, but dynamic and continually evolving. A positive component of the LES has been the flexibility granted to practices to develop organisational processes and strategies which complement their individual context. An example of this is the facility of contacting patients by text message to arrange annual reviews. One practice was positive about the

results and text messaging had become embedded into routine organisational processes; the practice continued to utilise it as a communication tool because their patients were more inclined to respond to a text message than answer a telephone call from the practice. A second practice had tried text messaging but found the system unintuitive, difficult to use and incompatible with their practice computer software so text messaging was not normalized into routine practice. A third practice had not attempted this method of contacting patients as they did not identify it as an effective tool for their practice population. This supports the notion that understanding the patient is essential to engaging them and increasing their attendance at annual reviews in order to provide the optimum care based on individual needs. In addition, it supports the implementation science principle that an evidence based intervention may be implemented in many ways and while there are core implementation strategies, how these are achieved should be adapted to context (Rapport et al., 2018).

10.4.6 Strengths and limitations

This NPT provided a useful framework for exploring the implementation of the LES in primary care in Northern Ireland, complementing the grounded theory approach analysis undertaken on the scoping interviews and case studies. This analysis contributes to a more holistic understanding of the impact of the LES on the implementation of supported self-management for asthma in primary care in Northern Ireland.

This framework analysis was undertaken on interviews which were conducted with a grounded theory approach, therefore the questions in the interviews weren't based on the NPT framework. Basing the interview topic guides on the NPT may have produced more specific results and reduced the initial difficulty encountered in interpreting the content of the interview transcripts to the framework. In addition to not developing questions based on the NPT, I did not ask participants to complete the NPT Toolkit or review the results I had produced which means the NPT radar plot is the core team's interpretation of participants' perspectives.

The LES was implemented in 2008, resulting in participants' recall of routine practice for asthma care provision pre-LES being impaired and making the allocation and interpretation of participant responses to the Differentiation component of the Coherence construct challenging. What I interpreted as successfully embedded processes, due to the inability to recall previously established organisational processes, were recorded as a negative on the NPT Toolkit, implying it was an area of concern in the success of implementing the intervention. I believe caution is required when answering this question in the NPT when applying to evaluations of interventions where significant time has passed since initial implementation and results can evolve over time.

10.4.7 Patient and public involvement contribution

A PPI representative (EE) was provided a description of the NPT and the quotes that I had selected to represent the 16 constructs of the NPT framework and asked for their perspective. The PPI representative believed that the quotes provided supported our findings and application of the NPT to the LES. In addition, they highlighted four main points:

1. The commitment of all staff to do their best for patients
2. How much good work was already going on prior to the LES
3. LES is building on existing work in the best GP practices
4. The importance of teamwork between administration and clinical staff

These comments were included in the multidisciplinary team discussion with my supervisors (HP, MS, MK).

10.5 Conclusion

The implementation of the LES into routine practice in primary care in Northern Ireland and financial incentives were received positively by both clinical and administrative staff members. The difficulty participants had in recollecting the processes involved in the introduction of the LES identified that the LES has become successfully normalized into routine practice in primary care in Northern Ireland. Primary care staff identified multi-disciplinary teamwork

throughout the lifespan of the scheme as key to its normalization, which was now so embedded that concerns were expressed regarding threats to funding and withdrawal of external support and the potential implications. The flexibility provided by the LES guidelines enabled practices to develop strategies which worked best for their individual context, adapting to practice population and individual patients. What this analysis raised was the question of whether financial incentives can ever truly normalize interventions? By paying GPs for providing an enhanced level of care, there is the implication that it is additional to what is “normally” expected and therefore requires payment to be carried out. The application of the NPT provided a greater understanding of the processes involved in implementing the LES in primary care, exploring how practice staff worked together in sense-making, participation, action and appraisal work. This understanding of how practices normalized the provision of supported self-management for asthma could inform further policy on similar initiatives.

10.6 Summary and next steps

In this chapter I have discussed the framework analysis conducted on 15 scoping interviews; six in-depth individual interviews and two group interviews undertaken in primary care practices across Northern Ireland with clinical and administrative staff exploring their perceptions of financial incentives promoting implementation of asthma self-management in primary care in Northern Ireland. What has emerged is that the LES appears to be successfully embedded into routine practice in primary care with the majority of staff unable to recall, or are unaware of, the organisational processes in place prior to its implementation. Nurses play an integral role in providing supported self-management, and working collaboratively with administration staff in identifying and engaging patients and appointment booking was essential. Practice staff worked together in multidisciplinary teams with defined roles and tasks allocated according to skill set. Developing relationships with patients increased attendance at annual reviews and the flexibility of the LES allowed practices to develop organisational processes

which were appropriate for their individual context. Support from the Health and Social Care Board in terms of financial incentives, funding nurse training courses and provision of patients resources were integral in the success of this scheme and gradual erosion of practical support and threatened loss of incentives may result in de-normalization. Due to the impermanent state of normalization, the withdrawal of support (practical or financial) requires careful management to avoid destabilisation. The next chapter combines the results from the systematic review, the quantitative phase and the qualitative phases in an overall discussion of the whole thesis.

Chapter 11 Thesis discussion

11.1 Introduction

In this chapter I will summarise the principal findings from the systematic review, quantitative phase and qualitative phases in relation to the PhD objectives, highlight the strengths and limitations of the thesis overall and discuss the key findings in relation to published literature.

11.2 Summary of findings

11.2.1 To determine the impact of financial incentives for implementation of supported self-management in asthma or diabetes on implementation outcomes, health outcomes and individual behaviour (Objective 1)

A total of 12 papers (three diabetes; one asthma; eight multiple condition schemes including diabetes but not asthma) reporting on financial incentives to promote supported self-management were included in the systematic review. The findings from this review were mixed with most studies showing no effect (Chien et al., 2012; Fagan et al., 2010; LeBlanc et al., 2017; Pape et al., 2015; Rosenthal et al., 2005; Vamos et al., 2011; Young et al., 2007) or a positive impact (Beck et al., 2004; Gulliford et al., 2007; Kontopantelis et al., 2013; LeBlanc et al., 2017; Mandel & Kotagal, 2007) on implementation or health outcomes. However, one study identified a negative impact of financial incentives on organisational processes, with a reduction in the proportion of people receiving HbA1c testing after the introduction of the financial incentive scheme.

11.2.2 To describe the features of financial incentive schemes as defined by the Financial Incentive Framework and determine any association with positive outcomes (Objective 2)

None of the nine domains of the financial incentives framework were identified as being consistently associated with positive or negative findings in the included studies, which highlights the complexity of these interventions. Understanding context was highlighted by all authors as being important to the

effectiveness of the scheme. Patient population, size of incentive, practice location and amenities and support from external partners were all identified as contributing to the schemes' success.

11.2.3 To observe trends in the provision of asthma action plans and asthma related hospital admissions in Northern Ireland from 2010 to 2011 and in asthma related deaths from 2001 to 2014 (Objective 3 [revised])

Northern Ireland is the smallest nation in the UK and, despite having the highest health needs of the four nations, has the lowest GP to patient ratio with only 65 GPs per 100,000. Official letters of resignation signed by hundreds of GPs December 2016 was halted after a “rescue package” was agreed with the Northern Ireland Health Minister. However, due to political instability the terms of this package have not been implemented. Action plan provision in Northern Ireland has remained high between 2011/12 and 2015/16 and ownership rates are much higher than the UK average. There were minimal differences observed between provision in children and adults and no differences between the five local commissioning groups in Northern Ireland.

Asthma related hospital admissions increased between 2011/12 and 2015/16 by over 300 admissions a year though caution should be applied when interpreting results from Northern Ireland due to the low numbers. There was a particularly large increase in the Belfast Health and Social Care Trust area. The two largest hospitals in Northern Ireland (Royal Victoria Hospital and Ulster Hospital) are located in the Belfast Health and Social Care Trust Area and almost two thirds of the population of Northern Ireland live within 40 minutes' drive of these hospitals. Asthma related deaths were observed to have plateaued in Northern Ireland, similar to the rest of the UK.

11.2.4 To describe the features of the LES as defined by the Financial Incentive Framework (objective 4)

Utilising the Financial Incentives Framework (Adams et al., 2014) to document LES features (Table 16) enabled me to compare the LES to similar financial incentive interventions and their domain configurations identified in the

systematic review. The LES is most closely aligned in terms of domain configurations with the only asthma study retrieved in the systematic review (Mandel & Kotagal, 2007) which documented a financial incentive scheme which was effective in increasing asthma action plan provision. Detailing LES features contributes to existing research on financial incentive schemes potentially informing the most effective domain configurations for assisting individuals in health related behaviour change.

11.2.5 To identify primary care practices with different approaches and success levels in achieving the LES targets (objective 5)

One hundred and fifty seven practices were approached using a mixture of convenience, purposive and snowball sampling. Primary care staff members from 15 different practices across the 5 Northern Ireland Health and Social Care Trust areas agreed to participate in telephone scoping interview. These 15 scoping interviews provided contextual data on the practices' methods for providing supported self-management for asthma to patients, achieving LES targets and success in engaging patients with asthma. Four practices with different approaches and demographic information were recruited from those interviewed to participate in the case study stage.

11.2.6 To explore different approaches and perceptions of primary care staff in reaction to the implementation of the LES (objective 6)

Summary combined with objective 7 below as the scoping interviews and case study interviews were analysed together using a grounded theory approach.

11.2.7 To undertake an in-depth exploration into primary care staff accounts of their understanding and experiences of the LES and self-management for asthma (objective 7)

In Northern Ireland, self-management education is predominantly delivered by nurses with support from GPs on complex cases, supported by administrative staff who identified patients requiring a review. Effective communication with patients was thought to increase engagement, improved patient understanding

of asthma and empower individuals to self-manage their asthma. However, annual asthma review attendance was low among patients. In particular, there were low levels of attendance in late adolescents and working age patients which staff members attributed to reluctance or inability to be absent from work/school and a lack of understanding regarding asthma, the variability of asthma symptoms and what constitutes “good” asthma control. Strategies to improve attendance included reduction or refusal of repeat reliever inhaler prescriptions, opportunistic interactions in practice and developing a relationship with patients through providing a contact for asthma care and tailoring self-management to individual needs. Increased awareness of asthma by patients is required and while primary care staff can deliver self-management education to individuals, support is needed from the Public Health Agency and charities such as Asthma UK and British Lung Foundation to target patients at a population level.

Receiving financial incentives for the extra work undertaken by nurses and administrative staff was viewed favourably, but the main motivator for primary care staff was delivering quality care to patients. Nurses and administrative staff did not receive bonuses for achieving targets and were aware that financial incentive payments contributed to their salary. Differences between LES and QOF targets and reporting dates led to confusion and staff would prefer the two financial incentive schemes brought closer into line. Administrative staff members produced annual, quarterly and monthly reports on asthma review attendance figures to monitor progress with the LES. Absence of exception reporting in LES was compared unfavourably to QOF (which allows exception reporting), with staff perceiving it as a lack of acknowledgment of the (often futile) effort invested in encouraging reluctant patients to attend.

A balance between defined roles and collaborative teamwork was successful in providing high quality care and engaging patients, resulting in achievement of LES targets. Lack of time created a stressor for staff with clinical staff advising that allocated appointment duration was often not adequate to provide

all requirements for the LES. Increase in appointments duration, introduction of evening appointments and dedicated respiratory clinic days contributed to a higher annual review attendance. Computer systems provided opportunities to highlight at risk patients, produce management plans and develop templates for reviews based on LES requirements. The Public Health Agency provided action plans at the introduction of LES but these have since ceased with practices developing their own or using pharmaceutical company action plans. There were opposing arguments regarding action plan templates with a proposal to use one action plan template to improve continuity of self-management education, however, a contrasting viewpoint was practices should utilise multiple templates dependent on the patient and medication prescribed.

Although not a LES requirement, practices were working with federation pharmacists to perform medication usage reviews, targeting patients ordering high levels of reliever inhalers, to identify poorly controlled asthma. Attempts were made to engage these individuals to attend practice for a review to assess asthma symptoms and control, review medication and provide self-management education. However, participants highlighted the difficulty in engaging these patients.

11.2.8 To explore if/how the LES was implemented and normalized in primary care in Northern Ireland using the Normalization Process Theory (objective 8)

The LES appears to have been successfully embedded into routine practice in primary care in Northern Ireland. Participants were unable to recall pre-LES processes however, many mentioned that this work was an “enhanced” level of service and in addition to “standard” asthma care. Participants identified the LES as helping staff empower patients to self-manage their asthma which resulted in improved asthma control and reduction in exacerbations though lack of engagement from patients was a source of frustration. Staff members had defined roles and worked in multi-disciplinary teams, collaborating with colleagues to provide an enhanced level of care and achieve LES targets.

With nurses identified as the key individuals driving forward the LES, GPs were concerned about the potential for deskilling as they were less involved with routine asthma care. Nurses felt that inadequate time was allocated to performing an effective asthma review and they were working beyond their salaried hours, including through meals, which could lead to increased psychological stress and potential reduction in quality of care provided to patients.

Financial incentives were viewed as necessary to provide an enhanced level of care to patients and there was concern regarding their removal or a change of LES targets. The Public Health Agency provided additional support at the introduction of the LES by producing asthma actions plans for all practices and funding specialist respiratory training for nurses. Erosion of this support meant that practices were turning to pharmaceutical companies for resources which they believed was less than ideal. Further reduction in funding was of concern to many participants, who advised they couldn't guarantee that action plan provision would remain high if financial incentives were removed. This raises questions about whether processes implemented as a result of financial incentive schemes can ever fully be normalized as they may always be deemed an "enhanced" level of care.

11.3 Strengths and limitations of this study

The strengths and limitations of the various phases in this programme of work are discussed in detail in the corresponding chapters in this thesis. This section will consider broader strengths and limitations of the programme of work.

11.3.1 Using a mixed methods approach

By utilising both qualitative and quantitative methods in this programme of work, some of the limitations of each individual approach could be off-set. The lack of quantitative data was a limitation as I had hoped it would substantiate qualitative perceptions of effectiveness of the LES, but triangulation proved impossible. However, one of the strengths of mixed methods is the

combination of both qualitative and quantitative research methods which allowed me to undertake two forms of qualitative analysis: a grounded theory approach and a framework analysis using the NPT to explore staff perspectives of the LES and how it was normalized into routine care. Using both a grounded theory approach and a framework analysis within the qualitative phase was a strength of this programme of work as it enabled me to undertake an in-depth exploration of broader staff perspectives as well as develop an understanding of how the LES was normalized into routine practice in primary care.

11.3.2 Methodological issues related to data collection of staff perceptions

This research was initiated seven years after the introduction of the LES which means the information regarding the initial implementation of processes in primary care may not be “fresh” in people’s memories or the individuals who implemented the new processes may no longer be working in the practices. However, it explores perceptions of the long-term impact this scheme has made in Northern Ireland health care and also how the processes have been embedded into primary care routines. Recruitment in Northern Ireland was difficult and participating practices were likely to have a particular interest in respiratory care (three of the four case study practices had a staff member with an interest in respiratory conditions) which limits applicability. Further research will be required to understand the perceptions of staff in practices who are not engaged with the LES, struggling with achieving targets and/or do not have a staff member with an interest in respiratory conditions. An exploration of their views may provide an understanding of barriers that hinder success on the LES, leading to ways to overcome this and increase the quality of asthma care provided across Northern Ireland.

11.3.3 Evaluating the impact of the LES on implementation and health outcomes

This programme of work was undertaken to explore the impact of the LES on the implementation asthma action plans in Northern Ireland. However, there

were limited quantitative data available and I was only able to observe trends in asthma plan provision, asthma related deaths and asthma related hospital admissions. This lack of available data highlights the importance of creating effective evaluation means prior to the implementation of an intervention as its absence creates difficulty in measuring an intervention's success retrospectively.

11.3.4 Understanding patient perspectives

This programme of work is limited by the absence of the patient perspective. Participants provided reasons why they believed patients did not attend but without interviewing patients it is impossible to state irrefutably that these perceptions were correct. Further research is required on the patient perspective of routine care and supported self-management to understand its impact on patients and produce strategies to increase patient engagement. To help mitigate this limitation, PPI representatives were involved throughout the programme of work, and especially in the qualitative analysis and thesis feedback sessions. They provided insight into patient views on financial incentives schemes for healthcare and supported self-management for asthma which informed the design of the study, the data collected and the interpretation of the findings.

11.3.5 Patient and public involvement

AUKCAR is committed to undertaking research that improves the lives of people impacted by asthma, therefore I deemed it essential to involve people with asthma throughout the lifespan of this programme of work. Lay representatives shared with me their experiences of living with asthma, in particular their interactions with primary care, which ensured I recruited the relevant staff members during my interviews. There was also feedback provided on participant information leaflets and consent forms and contribution to the analysis of the qualitative data. After completing all the data collection and analysis, I presented my entire thesis results to a group of PPI representatives who were positive about the study and its findings. Collaborating with PPI representatives throughout this programme of work has

ensured that I have produced research that matters, and is relevant, to patients impacted by asthma, which is the vision of AUKCAR and a strength of the programme of work.

11.3.6 Dissemination of findings

To ensure a balanced interpretation of findings throughout my PhD, I presented my work at various AUKCAR multi-disciplinary team meetings. There have been multiple research outputs from this programme of work, including: a paper published in a peer reviewed journal; seven oral presentations at national and international conferences and six poster presentations at national and international conferences. Findings from the grounded theory analysis are due to be presented at the European Research Society International Congress in September, 2018. Discussions generated as a result of these disseminations helped me to obtain a broader perspective of my findings.

11.4 Interpretation of findings in relation to previously published work

11.4.1 Financial incentives

The systematic review found mixed results on the impact of financial incentives on the implementation of asthma or diabetes self-management (Jackson et al., 2017). Previous research has identified that financial incentives may improve quality of care but there has been difficulty in producing consistent results (Flodgren et al., 2011; Mendelson et al., 2017) and careful design of incentive schemes is required prior to implementation (Scott et al., 2011). Observation of trends in Northern Ireland action plan provision show that rates have remained high after the introduction of LES, which is similar to previous evidence of quality of asthma care scores remaining high after the implementation of QOF (Campbell et al., 2009), although QOF indicators did not include action plan provision.

Staff members were positive about receiving financial incentives which is inconsistent with previous findings where staff members reported feeling

stressed, bombarded with initiatives (Allan et al., 2013) and a reduction in their internal motivation (Milstein & Schreyoegg, 2016). The incentive amount is important for effective implementation (Conrad & Perry, 2009) and most participants felt the amount received from the LES was sufficient for the effort required to reach targets. However, the payments received from the LES were not viewed as bonuses, but as necessary in order to provide an enhanced level of care. This raises questions regarding the sustainability of the LES as some participants suggested that they would not be prepared to do the work for free and there would be the potential for an erosion in action plan provision if the incentive was removed. Others have raised concerns regarding potential de-normalization of processes when financial incentives are removed (Lester et al., 2010), though withdrawal can be managed without loss of standards if alternative incentives are provided (Kontopantelis et al., 2014).

11.4.2 Impact of context

The role of context in implementation science is pivotal, and this study was consistent with previous findings that identify its importance (Dy et al., 2005). Northern Ireland healthcare is under considerable strain from overworked staff and an unstable political stalemate (National Audit Office, 2012; Bowers, 2017). The LES has evolved from work initiated in the early 1990s when respiratory conditions were made a priority in Northern Ireland healthcare. A multi-disciplinary team including policy makers, primary care staff; secondary care staff; pharmacists and members of the public worked collaboratively to produce the respiratory framework (Department of Health Social Services and Public Safety, 2009). Including patients when developing solutions for healthcare governance has been recommended due to the added value of their perspective which frames discussions around what matters most at point of care (Ross et al., 2014).

Support from internal and external colleagues is critical to the success of an intervention (Beck et al., 2004; Conrad et al., 2013; Fagan et al., 2010; Mandel & Kotagal, 2007) and both external and internal support were provided by the Public Health Agency at the start of the LES in terms of resources, funding and

availability of specialist respiratory training for nurses. Indeed, many of the nurses interviewed stated that they had been providing a high level of care prior to the introduction of the LES, implying there had already been an existing culture of action plan provision but now it was recorded for the LES. This is consistent with previous research which found that financial incentives may improve reporting rather than improving care (Campbell et al., 2007). However, average action plan ownership in Northern Ireland is consistently much higher than the rest of the UK (Asthma UK, 2016) where there is no financial incentive for action plan provision, and it would seem unlikely this difference was just due to improved reporting.

Individuals in areas of low socio-economic status often receive lower quality care in what is known as the inverse care law (Hart, 1971; McLean et al, 2006; Saxena et al., 2007). However, case study 4 was in an area of extremely high deprivation but had high achievement on the LES. Patients were reviewed every time they came to practice, not just on an annual basis, and any reliever medication request was only authorised after an appointment with the nurse. These appointments could often be arranged for the same day, which is not possible in all practices.

11.4.3 Multi-disciplinary teamwork

Analysis from the qualitative phase indicated there were high levels of collaboration between staff members who were working in multi-disciplinary teams. Individually, staff members had defined roles within the practices and collectively they were aware of how they contributed to the effort to reach LES targets and supported their colleagues. Defined roles and identification of key individuals to drive forward new organisational processes are essential for their normalization into routine practice (May et al., 2009). This programme of work identified asthma care provision as being a nurse-led process with administration staff focussing on reporting tasks and GPs involved in diagnosing patients, complex cases and performing supervisory roles in respiratory clinics. Financial incentive schemes can improve teamwork in

primary care and practices with effective communication had effective collaboration and higher levels of job satisfaction (Gillam et al., 2012).

11.4.4 Communicating with patients

The provision of asthma care was predominantly a nurse-led process, which was observed a decade ago in Scottish general practices (Wiener-Ogilvie et al., 2008) and more recently in a UK wide study (Morrow et al., 2017). Patients with asthma were perceived by primary care staff members as notoriously difficult to engage which is consistent with previous findings (Morrow et al., 2017). Staff developed strategies to increase engagement by contacting patients multiple times a year through a variety of means to encourage them to attend their annual review. These strategies followed a yearly cycle of sending out bulk mailing of letters, followed by phone calls and opportunistically speaking to patients if they were in the practice for another reason. A number of practices warned patients that they would stop providing reliever inhaler prescriptions if they did not attend a review, however only one practice had actually taken this measure and removed all reliever inhalers from repeat prescriptions. GPs are advised by the General Medical Council (2013) to “*prescribe drugs or treatment, including repeat prescriptions, only when you have adequate knowledge of the patient’s health, and are satisfied that the drugs or treatment serve the patient’s needs*”, therefore, it is within GPs’ rights to remove reliever inhalers from repeat prescriptions despite it being an unpopular strategy among participants.

Staff members felt their relationships with patients were strengthened by the LES. It encouraged nurses to regularly review patients’ asthma and they were communicating more effectively. Using a patient-centred approach and developing a good relationship with patients improves medication adherence (Peláez et al., 2015). Effective communication is essential to support successful self-management for asthma (Miles et al., 2017) and poor communication between clinical staff and patients can lead to impaired asthma care (Moffat et al., 2006). Patients would primarily contact the nurse in the practice to discuss asthma care and reception staff were aware of these

relationships so would put calls through more readily. This increase in continuity of care resulting from the LES is different to previous research which identified a reduction in continuity of care, after the implementation of the QOF, for patients with chronic conditions (Campbell et al., 2010). Potentially the difference may be that the LES focussed on self-management which required development of good patient/professional relationships, and is more patient focussed than most QOF indicators.

11.4.5 Measuring effectiveness of financial incentive interventions

Due to lack of available quantitative data, I was unable to explore the associations between the LES and implementation and health outcomes for asthma in Northern Ireland. Results from Asthma UK's (2013) survey showed that asthma ownership in Northern Ireland was 60%, results from the quantitative phase identified that action plan provision remained high over a five year period with the figure for 2012/2013 recorded as 79%. It must be remembered that action plan ownership is from the patient perspective and action plan provision is from the clinician perspective, explaining the discrepancy between these figures. The primary function of the LES annual returns was for the Public Health Agency to calculate financial incentives payments for practices and not for the research purposes which meant there were issues with the robustness of the data. This chasm is a known limitation when using routine data for healthcare research as it is often not robust enough for statistical analysis (Hashimoto et al., 2014).

When the LES was introduced, the Public Health Agency provided all practices in Northern Ireland with a supply of action plans they had produced in collaboration with primary care, secondary care and patient representatives. They also funded specialist respiratory training for nurses to ensure they were sufficiently qualified to provide an enhanced level of asthma care to patients in primary care. This means the introduction of the LES brought more than just financial incentives for delivering self-management education including an action plan, to patients with asthma. Practical support from government or

external agencies can help increase the effectiveness of a financial incentive scheme (Beck et al., 2004; Felt-Lisk et al., 2007; Mandel & Kotogal, 2007).

Understanding practice staff perceptions of the LES and the processes they undertook to implement it in routine practice adds to the existing evidence for understanding change in healthcare organisations (Allan et al., 2013). NPT provided a useful framework for exploring the process of adoption into routine practice of the LES by primary care staff. A recent systematic review reported that researchers found the NPT a valuable tool for implementation science and can be used in a wide range of studies including: process evaluations, feasibility studies, intervention design and ethnographic case studies (May et al., 2018). Echoing the findings discussed in this systematic review, I had some difficulty differentiating between some of the constructs, which is more evident in researchers using it in a framework approach than those following an inductive approach.

When measuring the effectiveness of financial incentive schemes, questions are raised about what deems a scheme successful and at what stage should its effectiveness be measured? For example, if GP behaviour changes, but there is no change in health outcomes – is this effective? Or, if GP behaviour is changed but once the financial incentive is removed it deteriorates to pre-scheme level (or below) – is this successful? Evaluation may need to take place at multiple stages through the intervention process from pre to late post implementation when interventions are (hopefully) successfully embedded. In addition, the NPT provides a concept of de-normalization which advises that normalization is not a permanent state and could be replaced, disturbed, disrupted, or cease to be accepted by participants involved (May et al., 2007).

11.5 Patient and public involvement contribution

After completing all my data collection and analysis, I arranged a meeting with five PPI representatives to present my findings from the whole programme of work. Their response was positive and they believed that this work identified provision of an enhanced level of asthma care that would be appreciated in

other areas of the UK. They believed that the PhD was well balanced and explored a number of important aspects surrounding the implementation of a health care scheme and highlighted the importance of the patient perspective in evaluating supported self-management for asthma. In particular, the PPI representatives were concerned about what the impact would be on patients if the LES was removed.

Interestingly, of these five PPI representatives, only one had a written asthma action plan and they thought that an action plan would be better for carers or for patients with asthma to provide to someone in case of an exacerbation. This is similar to the Asthma UK action plan provided in case study 2 (Appendix 21). A number of representatives also mentioned that 30 minutes was too long for an asthma review and that their own appointments only lasted approximately 10-15 minutes which they believed was adequate.

11.6 Summary and next steps

This chapter has provided a discussion of the complete programme of working including the strength and limitations and interpretation to previously published work. The next chapter will outline the implications of my findings in relation to policy, practice and research.

Chapter 12 Implications

12.1 Introduction

In chapter 12, I will discuss the implications of findings and outline potential future directions regarding implementation of financial incentives in primary care to support asthma self-management.

12.2 Implications for policy and practice

12.2.1 Policy makers

This is the first study exploring the impact of financial incentives on the implementation of self-management for asthma in Northern Ireland primary care practices. The programme of work has explored the perceptions of primary care staff towards supported self-management for asthma and financial incentives and the process by which this healthcare scheme was normalized into routine care.

Results from the systematic review show that as well as financial considerations, there are other factors influencing healthcare professionals' behaviour in delivering supported self-management for asthma and diabetes. Smaller practices may lack the infrastructure that is required to improve quality of care (Young et al., 2007), and practices with a patient population of low socio-economic status face barriers that make financial incentive schemes less effective in these areas (Rosenthal et al., 2005; Gulliford et al., 2007). The use of 'exception reporting' for individuals who do not meet QOF (or other financial incentive scheme's) guidelines needs to be monitored to ensure that individuals who require specialised, complex or more critical care are not being overlooked. When devising incentive schemes designers need to consider: the existing infrastructure in the organisation; target populations; the size of the incentive and time; effort and resources required to implement change; as well as unintended consequences.

An important factor highlighted in the quantitative phase was the lack of reliable data available to measure changes associated with the introduction of the LES. This raises questions around what health care data are being recorded, why

they are being recorded and how they can be utilised to evaluate interventions and healthcare schemes. The data provided enabled me to observe trends over a five year period, but there were no reliable data to assess the association of the LES on organisational or health outcomes. This highlights the importance of determining effective data recording pre-implementation of an intervention to enable post-implementation evaluations. An additional consideration is the impact that healthcare schemes such as the LES or the QOF have on coding practices in primary care practices. A number of participants stated that the LES had encouraged them to record their existing good practice and previous research has found that financial incentive schemes may improve practices' organisational processes (Coleman et al., 2007) and record keeping (Campbell et al., 2007) rather than increasing quality of care. In addition, limited data may make interpretation difficult. For example, the data provided were at Health and Social Care Board level (not practice level) for action plan provision, and asthma related hospital admissions excluded demographic information, including socio-economic status which is known to impact on health care provision and usage (Al Sallakh et al., 2017).

The discussion surrounding financial incentives and the potential impact of removing them is relevant to policy makers considering introducing a financial incentive scheme. Participants advised that a removal of financial incentives or changing of targets would result in a reduction of asthma self-management provision in primary care. The effort required to engage patients, with no option of exception reporting, was substantial and participants required an incentive to complete this. Policy makers should consider the monetary amount provided, sufficiently matching it to the work required to reach target: too little and it will not motivate people or enable effective action. In addition, removing financial incentives altogether may become a controversial issue with concerns about detriment to care. Agencies introducing financial schemes must consider how they will maintain their support to practices, particularly in resource provision that facilitates the delivery self-management support in primary care. In addition, external partners, such as government

bodies and charities, should collaborate with primary care to develop awareness campaigns to be strategically delivered to coincide with practice processes to engage patients. The National Asthma Programme in Finland (2006) is an example of how this can be successful.

12.2.2 Primary care practices

These findings may be useful for primary care practice staff who are about to, or are in the process of, implementing new processes as the result of the introduction of a financial incentive scheme. Primary care practices must take into account context prior to implementing a new intervention and adaptation of new processes (within reason) must be allowed. Just as policy makers should consider the support provided to practices, practice management must consider the support provided to their practice staff. If a key role is identified as necessary for driving forward the new processes, expectations must be realigned with regards to impact on workload; amended appointment durations to enable an “enhanced” level of service; available resources and training.

Engaging patients with asthma was identified as difficult and healthcare organisations may need to consider how they communicate with patients and how to build relationships to increase engagement. Although difficult to implement in all contexts and situations, continuity of care and a named contact in the practice for asthma provided stability for patients and a starting block for relationship building.

Developing tailored supported self-management targeted at higher risk populations such as individuals in areas of high deprivation, should be considered to try and reduce differences in socioeconomic inequalities in asthma related hospital admissions and deaths. In addition, the LES targets patients registered in primary care who have been prescribed a preventer inhaler, but excludes individuals who have been provided only a reliever inhaler as they have been identified as low risk. However, the variable nature of asthma and high turnover in active asthma registers (Pinnock et al., 2007) creates a changing target population. If patients have not been reviewed there

is the potential that there have been changes in their symptoms but no change in their medication plan, resulting in patients with poorly controlled asthma, over-reliant on reliever inhalers but excluded from self-management targets. Excessive reliever inhaler usage was found to be a risk factor for asthma related deaths by the National Review of Asthma Deaths and 9% of deaths were in patients registered as having mild asthma (Levy et al., 2014).

12.3 Implications for research

The limited number of studies investigating the impact of financial incentives on the implementation of supported self-management for asthma or diabetes identifies a gap in the literature, where further research is required. In particular, only one study investigating the impact of financial incentives on the implementation of supported self-management for asthma was identified (Mandel & Kotagal, 2007). There is a further gap in research assessing the impact of financial incentives paid to healthcare professionals, on behavioural outcomes such as self-efficacy, activation or adherence to medication as no studies were identified in this area. Further research is needed to understand the process by which financial incentives impact (or not) on care, particularly in poorly performing practices. Determinants of how financial incentives impact on organisation of care and health outcomes are multifactorial and complex.

In this study, I utilised both quantitative and qualitative methods to explore the impact of financial incentives on the implementation of asthma self-management in primary care in Northern Ireland. Without data prior to the LES, it was impossible to confirm the association between the LES and asthma action plan provision rates but trends suggest that provision has remained high over a five year period between 2011/12 and 2015/16. The similarities in financial incentive framework (Adam et al., 2014) domain configurations between Mandel and Kotagal's (2007) financial incentive scheme and the LES should be explored further as both are associated with high action plan provision rates.

The involvement of patients in supported self-management of asthma means that the context for implementing the LES is both inside the practice (with practice staff) and outside the practice (with patients). I explored practice staff perspectives, but was not able to interview patients with asthma due to time restrictions and recruitment issues. There is limited published research on the patient perspective of supported self-management for asthma and further research is required to explore the patients' perceptions of their GP practice being paid to provide supported self-management education in primary care. In addition, this programme of work was undertaken to explore the impact of incentives on the implementation of asthma self-management in Northern Ireland. However, there is a need for comparative work, with good quality quantitative data collection, with an area where action plan provision is not financially incentivised, for example one of the other three UK nations.

12.4 Implication for patient organisations

Practice staff in Northern Ireland were supported by patient organisations such as Asthma UK and British Lung Foundation, utilising their resources, both in the written form of action plans and online as a tool to discuss asthma self-management with patients. Patients with asthma were identified as being difficult to engage with their asthma care, with a tendency to be reactive than proactive regarding managing their symptoms. There is a need to educate patients on the positive benefits of supported self-management for asthma and how their role within it can empower them to manage their own asthma symptoms and improve their quality of life. Practice staff believed that increased advertising would promote awareness surrounding the potential severity of asthma and the need to attend annual reviews. Patient organisations were identified as being well placed to produce and lead these campaigns in collaboration with health care professionals and lay representatives.

References

- Abdelhamid AS, Maisey S, Steel N. Predictors of the quality of care for asthma in general practice: an observational study. *Family Practice*. 2010;27(2):186-91.
- Adams J, Giles EL, McColl E, Sniehotta FF. Carrots, sticks and health behaviours: a framework for documenting the complexity of financial incentive interventions to change health behaviours. *Health psychology review*. 2014;8(3):286-95.
- Al Sallakh MA, Rodgers SE, Lyons RA, Sheikh A, Davies GA. Socioeconomic deprivation and inequalities in asthma care in Wales.(Report). *The Lancet*. 2017;390:S19.
- Allan HT, Brearley S, Byng R, Christian S, Clayton J, Mackintosh M, et al. People and teams matter in organizational change: professionals' and managers' experiences of changing governance and incentives in primary care. *Health services research*. 2014;49(1):93-112.
- Armour BS PM, Maclean R, Cangialose C, Kishel M, Imai H, et al. The effect of explicit financial incentives on physician behavior. *Archives of Internal Medicine*. 2001;161(10):1261-6.
- Askew DA, Clavarino AM, Glasziou PP, Del Mar CB. General practice research: attitudes and involvement of Queensland general practitioners. *Medical Journal of Australia*. 2002;177(2):74-7.
- Asthma UK. Compare your care report: Asthma UK; 2013 [cited 2015 October]. Available from: <https://www.asthma.org.uk/globalassets/campaigns/compare-your-care-2013.pdf>.
- Asthma UK. Time to take action on asthma: Asthma UK; 2015 [cited 2015 September]. Available from: <https://www.asthma.org.uk/globalassets/campaigns/compare-your-care-2014.pdf>
- Asthma UK. Annual Asthma Survey 2016 report: Asthma UK; 2017 [cited 2018 January]. Available from: <https://www.asthma.org.uk/share/?rid=3690>
- Asthma UK. UK asthma death rates among worst in Europe: Asthma UK; 2018 [cited 2018 February]. Available from: <https://www.asthma.org.uk/about/media/news/press-release-uk-asthma-death-rates-among-worst-in-europe/>
- Bandura A. Self-efficacy mechanism in human agency. *American Psychologist*. 1982;37(2):122.

Barbour R, Kitzinger J. Developing focus group research: politics, theory and practice: Sage; 1998.

Bauer MS, Damschroder L, Hagedorn H, Smith J, Kilbourne AM. An introduction to implementation science for the non-specialist. BMC Psychology. 2015;3(1):32.

Baxter P, Jack S. Qualitative Case Study Methodology: Study Design and Implementation for Novice Researchers. Qualitative Report. 2008;13(4):544-59.

BBC News. NI GPs resignation from NHS 'inevitable': BBC; 2017 [cited 2018 January]. Available from: <https://www.bbc.co.uk/news/uk-northern-ireland-38634728>

Beck JK, Logan KJ, Hamm RM, Sproat SM, Musser KM, Everhart PD, et al. Reimbursement for pediatric diabetes intensive case management: a model for chronic diseases? Pediatrics. 2004;113(1):e47-e50.

Bidwal M, Lor K, Yu J, Ip E. Evaluation of asthma medication adherence rates and strategies to improve adherence in the underserved population at a Federally Qualified Health Center. Research in Social and Administrative Pharmacy. 2017;13(4):759-66.

Biesta G. Pragmatism and the philosophical foundations of mixed methods research. Sage handbook of mixed methods in social and behavioral research. 2010;2:95-118.

Bjermer L. History and future perspectives of treating asthma as a systemic and small airways disease. Respiratory medicine. 2001;95(9):703-19.

Bowers P. Northern Ireland Budget Bill 2017-19 [Bill 123]. House of Commons Library; 2017.

British Medical Association. 2016/17 General Medical Services (GMS) contract Quality and Outcomes Framework (QOF) Guidance for GMS contract 2016/17: NHS Employers; 2016 [cited 2016 October]. Available from: <http://www.nhsemployers.org/~media/Employers/Documents/Primary%20care%20contracts/QOF/2016-17/2016-17%20QOF%20guidance%20documents.pdf>

British Thoracic Society; Scottish Intercollegiate Guideline Network. British guideline on the management of asthma: A national clinical guideline 2014. Available from: <http://sign.ac.uk/pdf/SIGN153.pdf>

British Thoracic Society; Scottish Intercollegiate Guideline Network. British guideline on the management of asthma: A national clinical guideline September 2016. Available from: <https://www.brit-thoracic.org.uk/document-library/clinical-information/asthma/btssign-asthma-guideline-2016/>

Brooks EG, Reed KD. Principles and pitfalls: a guide to death certification. *Clinical Medicine & Research*. 2015;13(2):74-82.

Buckingham S, Kendall M, Ferguson S, MacNee W, Sheikh A, White P, Worth A, Boyd K, Murray SA, Pinnock H. HELPing older people with very severe chronic obstructive pulmonary disease (HELP-COPD): piloting a practical intervention. *npjPrimary Care Respiratory Medicine* 2015; 25: 15020

Burrige LH, Foster MM, Donald M, Zhang J, Russell AW, Jackson CL. A qualitative follow-up study of diabetes patients' appraisal of an integrated diabetes service in primary care. *Health & social care in the community*. 2017;25(3):1031-40.

Cabana MD, Rand CS, Powe NR, Wu AW, Wilson MH, Abboud P-AC, et al. Why don't physicians follow clinical practice guidelines?: A framework for improvement. *JAMA*. 1999;282(15):1458-65.

Campbell S, Hannon K, Lester H. Exception reporting in the Quality and Outcomes Framework: views of practice staff - a qualitative study. *British Journal of General Practice*. 2011;61(585):183.

Campbell SM, Kontopantelis E, Reeves D, Valderas JM, Gaehl E, Small N, et al. Changes in patient experiences of primary care during health service reforms in England between 2003 and 2007. *Annals of Family Medicine*. 2010;8(6):499-506.

Campbell S, Reeves D, Kontopantelis E, Middleton E, Sibbald B, Roland M. Quality of primary care in England with the introduction of pay for performance. *New England Journal of Medicine*. 2007 Jul 12;357(2):181-90.

Campbell SM, Reeves D, Kontopantelis E, Sibbald B, Roland M. Effects of pay for performance on the quality of primary care in England. *New England Journal of Medicine*. 2009 Jul 23;361(4):368-78.

Carman KL, Dardess P, Maurer M, Sofaer S, Adams K, Bechtel C, et al. Patient and family engagement: a framework for understanding the elements and developing interventions and policies. *Health Affairs*. 2013;32(2):223-31.

Casey D, Houghton C. Clarifying case study research: examples from practice: Dymna Casey and Catherine Houghton explore the use of case studies with examples from their research.(issues in research). *Nurse Researcher*. 2010;17(3):41.

Centers for Disease Control and Prevention. New asthma estimates: tracking prevalence, health care, and mortality. Atlanta: Centers for Disease Control and Prevention. 2001.

Charmaz K. Constructing grounded theory : a practical guide through qualitative analysis: Thousand Oaks, California : Sage Publications; 2006.

Checkland K, Harrison S. The impact of the Quality and Outcomes Framework on practice organisation and service delivery: summary of evidence from two qualitative studies. *Quality in primary care*. 2010 Apr 1;18(2).

Chien AT, Eastman D, Li Z, Rosenthal MB. Impact of a pay for performance program to improve diabetes care in the safety net. *Preventive medicine*. 2012;55:S80-S5.

Coleman T. Do financial incentives for delivering health promotion counselling work? Analysis of smoking cessation activities stimulated by the quality and outcomes framework.(Debate)(Report). *BMC Public Health*. 2010;10:167.

Conrad DA, Grembowski D, Perry L, Maynard C, Rodriguez H, Martin D. Paying physician group practices for quality: A statewide quasi-experiment. *Healthcare*. 2013;1(3-4):108-16.

Conrad DA, Perry L. Quality-based financial incentives in health care: can we improve quality by paying for it? *Annual Review of Public Health*. 2009;30:357-71.

Cope SF, Ungar WJ, Glazier RH. Socioeconomic factors and asthma control in children. *Pediatric Pulmonology*. 2008;43(8):745-52.

Corbin JM, Strauss AL. Basics of qualitative research: techniques and procedures for developing grounded theory. 3rd edition: London: Sage Publications; 2008.

Corrigan JM GA, Adams K, editors. 1st Annual Crossing the Quality Chasm Summit: A focus on communities Washington DC: National Academies Press; 2004.

Coulter A. Patients' views of the good doctor. *BMJ*. 2002;325(7366):668.

Coulter A RS, Dixon A. Delivering better services for people with long-term conditions: The King's Fund; 2013. Available from: https://www.kingsfund.org.uk/sites/files/kf/field/field_publication_file/delivering-better-services-for-people-with-long-term-conditions.pdf.

Creswell JW. Qualitative inquiry and research design: choosing among five traditions: London: Sage Publications; 1998.

Creswell JW, Plano Clark VL. Designing and conducting mixed methods research. 2nd edition: London: Sage; 2011.

Daines L, Morrow S, Wiener-Ogilvie S, Steed E, Taylor S, Pinnock H. Exploring patient and carer perspectives on asthma self-management: a qualitative study from the IMP2ART programme. ERS International Congress 2017; Milan: European Respiratory Society; 2017.

Dalton A, Alshamsan R, Majeed A, Millett C. Exclusion of patients from quality measurement of diabetes care in the UK pay-for-performance programme. *Diabetic Medicine*. 2011;28(5):525-31.

Department of Health. *Self Care – A Real Choice*. London: Department of Health; 2005.

Department of Health. GP-led Care Working Group to be established: Department of Health; 2015 [cited 2018 January]. Available from: <https://www.health-ni.gov.uk/news/gp-led-care-working-group-be-established>

Department of Health. *The Primary Medical Services (Directed Enhanced Services) Directions (Northern Ireland) 2016*: Department of Health; 2016 [cited 2016 November]. Available from: <https://www.health-ni.gov.uk/sites/default/files/publications/health/pms-des-directions-2016.pdf>

Department of Health. *Review of GP-Led Primary Care Services in Northern Ireland*: Department of Health; 2016 [cited 2018 January]. Available from: <https://www.health-ni.gov.uk/sites/default/files/publications/dhssps/review-gp-led-primary-care-services.pdf>

Department of Health Social Services and Public Safety. *The Primary Medical Services (Directed Enhanced Services) Directions (Northern Ireland) 2008* [cited 2015 February]. Available from: <http://www.dhsspsni.gov.uk>

Department of Health Social Services and Public Safety. *Service Framework for Respiratory Health and Wellbeing*. Department of Health Social Services and Public Safety; 2009.

Department of Health Social Services and Public Safety. *Service Framework for Respiratory Health and Wellbeing 2015-18*: Department for Health; 2015 [cited 2016 October]. Available from: <https://www.health-ni.gov.uk/topics/safety-and-quality-standards/safety-and-quality-standards-service-frameworks>

Diabetes UK. 42% of people with type 2 diabetes "not confident managing their condition": Diabetes UK; 2015 [cited 2016 October]. Available from: https://www.diabetes.org.uk/About_us/News/42-percent-of-people-with-Type-2-diabetes-not-confident-managing-their-condition/

Diabetes UK. *Diabetes Facts and Stats*: Diabetes UK; 2016 [cited 2016 November]. Available from: https://www.diabetes.org.uk/Documents/Position%20statements/DiabetesUK_Facts_Stats_Oct16.pdf

Dixon A, Khachatryan A, Wallace A, Peckham S, Boyce T, Gillam S. Impact of Quality and Outcomes Framework on health inequalities. London: The King's Fund. 2011.

Doran T, Fullwood C, Kontopantelis E, Reeves D. Effect of financial incentives on inequalities in the delivery of primary clinical care in England: analysis of clinical activity indicators for the quality and outcomes framework. *The Lancet*. 2008;372(9640):728-36.

Douglass J, Aroni R, Goeman D, Stewart K, Sawyer S, Thien F, et al. A qualitative study of action plans for asthma. *BMJ*. 2002;324(7344):1003.

Downing A, Rudge G, Cheng Y, Tu Y-K, Keen J, Gilthorpe MS. Do the UK government's new Quality and Outcomes Framework (QOF) scores adequately measure primary care performance? A cross-sectional survey of routine healthcare data. *BMC Health Services Research*. 2007;7(1):166.

Downs SH, Black N. The feasibility of creating a checklist for the assessment of the methodological quality both of randomised and non-randomised studies of health care interventions. *Journal of Epidemiology & Community Health*. 1998;52(6):377-84.

Doyle S, Lloyd A, Williams A, Chrystyn H, Moffat M, Thomas M, et al. What happens to patients who have their asthma device switched without their consent? *Primary Care Respiratory Journal*. 2010;19(2):131-9.

Dudley RA MR, Korenbrot TY, Luft HS. The impact of financial incentives on quality of health care. *Milbank Quarterly*. 1998;76(4):649-86.

Dugdale S, Elison S, Davies G, Ward J, Dalton M. A qualitative study investigating the continued adoption of Breaking Free Online across a national substance misuse organisation: Theoretical conceptualisation of staff perceptions. *The Journal of Behavioral Health Services & Research*. 2017;44(1):89-101.

Dy SM, Garg P, Nyberg D, Dawson PB, Pronovost PJ, Morlock L, et al. Critical pathway effectiveness: assessing the impact of patient, hospital care, and pathway characteristics using qualitative comparative analysis. *Health services research*. 2005;40(2):499-516.

Eccles MP, Mittman BS. Welcome to implementation science. *BioMed Central*; 2006.

Effective Practice and Organisation of Care (EPOC). Data extraction and management. EPOC Resources for review authors: Norwegian Knowledge Centre for the Health Services; 2013 [cited 2015 October]. Available from: <http://epoc.cochrane.org/epoc-specific-resources-review-authors>

Engelkes M, Janssens HM, de Jongste JC, Sturkenboom MC, Verhamme KM. Medication adherence and the risk of severe asthma exacerbations: a systematic review. *European Respiratory Journal*. 2014;erj00756-2014.

F E. Key issues in the design of pay for performance programs. *The European Journal of Health Economics*. 2013;14(1):117-31.

Fagan PJ, Schuster AB, Boyd C, Marsteller JA, Griswold M, Murphy SM, et al. Chronic Care Improvement in Primary Care: Evaluation of an Integrated Pay-for-Performance and Practice-Based Care Coordination Program among Elderly Patients with Diabetes. *Health services research*. 2010;45(6p1):1763-82.

Felt-Lisk S, Gimm G, Peterson S. Making pay-for-performance work in Medicaid. *Health affairs (Project Hope)*. 2007;26(4).

Finch T, Girling M, May C, Mair F, Murray E, Treweek S, et al. NoMAD: Implementation measure based on Normalization Process Theory [Measurement instrument]. 2015. Available from: <http://www.normalizationprocess.org>

Fishwick D, D'Souza W, Beasley R. The asthma self-management plan system of care: what does it mean, how is it done, does it work, what models are available, what do patients want and who needs it? *Patient education and counseling*. 1997;32:S21-S33.

Flodgren G EM, Shepperd S, Scott A, Parmelli E, Beyer FR. An overview of reviews evaluating the effectiveness of financial incentives in changing healthcare professional behaviours and patient outcomes. *Cochrane Database Systematic Reviews*. 2011;7(7).

Forster DA, Newton M, McLachlan HL, Willis K. Exploring implementation and sustainability of models of care: can theory help? *BMC Public Health*. 2011;11(5):S8.

Friis RH, Sellers T. *Epidemiology for public health practice*. Sudbury, Massachusetts: Jones & Bartlett Publishers; 2013.

Gagné ME, Boulet L-P. Implementation of asthma clinical practice guidelines in primary care: A cross-sectional study based on the Knowledge-to-Action Cycle. *Journal of Asthma*. 2018;55(3):310-7.

Gatheral TL, Rushton A, Evans D, Mulvaney C, Halcovitch N, Whiteley G, Eccles F, Spencer S. Personalised asthma action plans for adults with asthma. *Cochrane Database of Systematic Reviews*. 2017 Apr 10;4.

General Medical Council (Great Britain). *Good medical practice*. London: General Medical Council; 2013.

Georgiou A, Pearson M. Measuring outcomes with tools of proven feasibility and utility: the example of a patient-focused asthma measure. *Journal of Evaluation in Clinical Practice*. 2002;8(2):199-204.

Gibson PG, Ram FS, Powell H. Asthma education. *Respiratory medicine*. 2003;97(9):1036-44.

Gibson PG. Asthma action plans: use it or lose it. *Primary Care Respiratory Journal*. 2004;13:17-18.

Gibson PG, Powell H. Written action plans for asthma: an evidence-based review of the key components. *Thorax*. 2004;59(2):94-9.

Gill P, Stewart K, Treasure E, Chadwick B. Methods of data collection in qualitative research: interviews and focus groups. *British Dental Journal*. 2008;204(6):291.

Gillam SJ, Siriwardena A, Steel N. Pay-for-Performance in the United Kingdom: Impact of the Quality and Outcomes Framework-A Systematic Review. *Annals of Family Medicine*. 2012;10:461-8.

Giuffrida A, Torgerson DJ. Should We Pay the Patient? Review of Financial Incentives to Enhance Patient Compliance. *BMJ*. 1997;315(7110):703-7.

Glaser BG. *Theoretical sensitivity: advances in the methodology of grounded theory*: Mill Valley, California: Sociology Press; 1978.

Glaser BG, Strauss AL. *Awareness of dying*: Chicago: Aldine; 1966.

Glaser BG, Strauss AL. *The discovery of grounded theory: strategies for qualitative research*: Chicago: Aldine 1967.

Glaser BG, Strauss AL. *Time for dying*: Chicago: Aldine; 1968.

Glasziou PP, Buchan H, Del Mar C, Doust J, Harris M, Knight R, et al. When financial incentives do more good than harm: a checklist. *BMJ*. 2012;345.

Global Asthma Network. *The Global Asthma Report 2014*. Available from: <http://www.globalasthmareport.org>

Global Initiative for Asthma. *2018 GINA Report, Global Strategy for Asthma Management and Prevention 2018*. Available from: <https://ginasthma.org/gina-reports/>.

Global Initiative for Asthma (GINA). *Global strategy for asthma management and prevention 2016 [updated 2016; cited 2018 February]*.

Greene J, Hibbard JH. Why does patient activation matter? An examination of the relationships between patient activation and health-related outcomes. *Journal of general internal medicine*. 2012;27(5):520-6.

- Guest G, Bunce A, Johnson L. How Many Interviews Are Enough? *Field Methods*. 2006;18(1):59-82.
- Guest G, MacQueen KM. *Handbook for team-based qualitative research*. Lanham, Maryland: Altamira Press; 2008.
- Guevara JP, Wolf FM, Grum CM, Clark NM. Effects of educational interventions for self management of asthma in children and adolescents: systematic review and meta-analysis. *BMJ*. 2003;326(7402):1308-9.
- Gulliford M, Ashworth M, Robotham D, Mohiddin A. Achievement of metabolic targets for diabetes by English primary care practices under a new system of incentives. *Diabetic Medicine*. 2007;24(5):505-11.
- Gupta S, Kaplan A. Solving the mystery of the yellow zone of the asthma action plan. *npj Primary Care Respiratory Medicine*. 2018;28(1):1-.
- Haahtela T, Tuomisto LE, Pietinalho A, Klaukka T, Erhola M, Kaila M, Nieminen MM, Kontula E, Laitinen LA. A 10 year asthma programme in Finland: major change for the better. *Thorax*. 2006 Aug 1;61(8):663-70.
- Hammersley M. *Ethnography : principles in practice*. Second edition.. ed. Atkinson P, editor. London: London : Routledge; 1995.
- Hart JT. The inverse care law. *The Lancet*. 1971;297(7696):405-12.
- Harvard Catalyst. *Clinical and Translational Research Spectrum* [cited 2017 January]. Available from: <https://catalyst.harvard.edu/pathfinder>
- Hashimoto RE, Brodt ED, Skelly AC, Dettori JR. Administrative database studies: goldmine or goose chase? *Evidence-based spine-care journal*. 2014;5(2):74.
- Health and Social Care Board. *Transforming Your Care: Strategic Implementation Plan*: Department of Health; 2013. Available from: <http://www.transformingyourcare.hscni.net/wp-content/uploads/2013/11/Transforming-Your-Care-Strategic-Implementation-Plan.pdf>
- Health and Social Care Board. *GP Federations*: Department of Health; 2018 [cited 2018 January]. Available from: <http://www.hscboard.hscni.net/our-work/integrated-care/gps/gp-federations/>
- Health and Social Care Board. *Integrated Care Partnerships (ICPs)*: Department of Health; 2018 [cited 2018 January]. Available from: <http://www.hscboard.hscni.net/icps/>
- Health and Social Care Information Centre. *National Diabetes Audit 2015–16: Report 1: Care Processes and Treatment Targets*: NHS Digital; 2017 [cited 2017 February]. Available from:

<http://www.content.digital.nhs.uk/catalogue/PUB23241/nati-diab-rep1-audi-2015-16.pdf>

Higgins JP GSe. Cochrane Handbook for Systematic Reviews of Interventions Version 5.1.0 [updated March 2011]: The Cochrane Collaboration; 2011 [cited 2015 March]. Available from: www.handbook.cochrane.org

Hipwell A, Turner A, Barlow J. 'We're not fully aware of their cultural needs': tutors' experiences of delivering the Expert Patients Programme to South Asian attendees. *Diversity in Health & Social Care*. 2008;5(4).

Hurtado DA, Nelson CC, Hashimoto D, Sorensen G. Supervisors' support for nurses' meal breaks and mental health. *Workplace health & safety*. 2015;63(3):107-15.

Iezzi E, Bruni ML, Ugolini C. The role of GP's compensation schemes in diabetes care: evidence from panel data. *Journal of Health Economics*. 2014;34:104-20.

Jackson T, Shields MD, Heaney LG, Kendall M, Pearce CJ, Hui CY, et al. The impact of financial incentives on the implementation of asthma or diabetes self-management: A systematic review. *PLOS ONE*. 2017;12(11):e0187478.

Jahan F, Al Maqbali A, Siddiqui MA, Al Zadjali NM. Attitude and Barrier towards Research amongst Health Care Professionals Working in Primary Care Service of Oman. *Journal of Health Education Research & Development*. 2015:1-5.

Jenkins M, Dharmage S, Flander L, Douglass J, Ugoni A, Carlin J, et al. Parity and decreased use of oral contraceptives as predictors of asthma in young women. *Clinical & Experimental Allergy*. 2006;36(5):609-13.

Johnson RB, Onwuegbuzie AJ. Mixed Methods Research: A Research Paradigm Whose Time Has Come. *Educational Researcher*. 2004;33(7):14-26.

Kaba R, Sooriakumaran P. The evolution of the doctor-patient relationship. *International Journal of Surgery*. 2007;5(1):57-65.

Kaner EFS, Haighton CA, McAvoy BR. "So much post, so busy with practice - so, no time!": A telephone survey of general practitioners' reasons for not participating in postal questionnaire surveys. *British Journal of General Practice*. 1998;48(428):1067-9.

Kantarevic J, Kralj B. Link between pay for performance incentives and physician payment mechanisms: evidence from the diabetes management incentive in Ontario. *Health economics*. 2013;22(12):1417-39.

Kelly E, Stoye G. Does GP practice size matter? GP practice size and the quality of primary care: IFS Reports, Institute for Fiscal Studies; 2014.

Kielmann T, Huby G, Powell A, Sheikh A, Price D, Williams S, et al. From support to boundary: a qualitative study of the border between self-care and professional care. *Patient education and counseling*. 2010;79(1):55-61.

Kontopantelis E, Reeves D, Valderas JM, Campbell S, Doran T. Recorded quality of primary care for patients with diabetes in England before and after the introduction of a financial incentive scheme: a longitudinal observational study. *BMJ Quality & Safety*. 2013;22(1):53-64.

Kontopantelis E, Springate D, Reeves D, Ashcroft DM, Valderas JM, Doran T. Withdrawing performance indicators: retrospective analysis of general practice performance under UK Quality and Outcomes Framework. *BMJ*. 2014;348:g330.

Kontopantelis E, Springate DA, Ashcroft DM, Valderas JM, van Der Veer SN, Reeves D, et al. Associations between exemption and survival outcomes in the UK's primary care pay-for-performance programme: a retrospective cohort study. *BMJ Quality & Safety*. 2015.

Koster ES, Philbert D, Winters NA, Bouvy ML. Adolescents' inhaled corticosteroid adherence: the importance of treatment perceptions and medication knowledge. *Journal of Asthma*. 2015;52(4):431-6.

LeBlanc E, Bélanger M, Thibault V, Babin L, Greene B, Halpine S, et al. Influence of a Pay-for-Performance Program on Glycemic Control in Patients Living with Diabetes by Family Physicians in a Canadian Province. *Canadian Journal of Diabetes*. 2017;41(2):190-6.

Leese B, Bosanquet N. Change in general practice and its effects on service provision in areas with different socioeconomic characteristics. *BMJ*. 1995;311(7004):546.

Lester H, Schmittiel J, Selby J, Fireman B, Campbell S, Lee J, et al. The impact of removing financial incentives from clinical quality indicators: longitudinal analysis of four Kaiser Permanente indicators. *BMJ*. 2010;340:c1898.

Levy M, Andrews R, Buckingham R, Evans H, Francis C, Houston R, et al. Why asthma still kills: the National Review of Asthma Deaths (NRAD): Royal College of Physicians; 2014.

Leynaert B, Sunyer J, Garcia-Esteban R, Svanes C, Jarvis D, Cerveri I, et al. Gender differences in prevalence, diagnosis and incidence of allergic and non-allergic asthma: a population-based cohort. *Thorax*. 2012;67(7):625-31.

- Lorig KR, Ritter P, Stewart AL, Sobel DS, Brown Jr BW, Bandura A, et al. Chronic disease self-management program: 2-year health status and health care utilization outcomes. *Medical care*. 2001;39(11):1217-23.
- Luce T, Smith J. Death certification reform in England. *BMJ*. 2018;361.
- Maguire P, Pitceathly C. Key communication skills and how to acquire them. *BMJ*. 2002;325(7366):697-700.
- Mair FS, May C, O'Donnell C, Finch T, Sullivan F, Murray E. Factors that promote or inhibit the implementation of e-health systems: an explanatory systematic review. *Bulletin of the World Health Organization*. 2012;90(5):357-64.
- Mandel KE, Kotagal UR. Pay for performance alone cannot drive quality. *Archives of Pediatrics & Adolescent Medicine*. 2007;161(7):650-5.
- May C. A rational model for assessing and evaluating complex interventions in health care. *BMC Health Services Research*. 2006;6(1):86.
- May C, Finch T. Implementing, embedding, and integrating practices: an outline of normalization process theory. *Sociology*. 2009;43(3):535-54.
- May C, Finch T, Mair F, Ballini L, Dowrick C, Eccles M, et al. Understanding the implementation of complex interventions in health care: the normalization process model. *BMC Health Services Research*. 2007;7(1):148.
- May CR, Cummings A, Girling M, Bracher M, Mair FS, May CM, et al. Using Normalization Process Theory in feasibility studies and process evaluations of complex healthcare interventions: a systematic review. *Implementation Science*. 2018;13(1):80.
- May CR, Finch T, Ballini L, MacFarlane A, Mair F, Murray E, et al. Evaluating complex interventions and health technologies using normalization process theory: development of a simplified approach and web-enabled toolkit. *BMC Health Services Research*. 2011;11(1):245.
- May CR, Johnson M, Finch T. Implementation, context and complexity. *Implementation Science*. 2016;11(1):141.
- May CR, Mair F, Finch T, MacFarlane A, Dowrick C, Treweek S, et al. Development of a theory of implementation and integration: Normalization Process Theory. *Implementation Science*. 2009;4(1):29.
- May CR, Mair FS, Dowrick CF, Finch TL. Process evaluation for complex interventions in primary care: understanding trials using the normalization process model. *BMC Family Practice*. 2007;8(1):42.

May CR, Rapley T, Mair FS, Treweek, S, Murray, E, Ballini, et al. Normalization Process Theory On-line Users' Manual, Toolkit and NoMAD instrument. (2015) Available from <http://www.normalizationprocess.org>

McCleary N, Nwaru BI, Nurmatov UB, Critchley H, Sheikh A. Endogenous and exogenous sex steroid hormones in asthma and allergy in females: a systematic review and meta-analysis. *Journal of Allergy and Clinical Immunology*. 2018.

McDonald R, Cheraghi-Sohi S, Tickle M, Roland M, Doran T, Campbell S. The impact of incentives on the behaviour and performance of primary care professionals. Queen's Printer and Controller of HMSO. 2010.

McEvoy R, Ballini L, Maltoni S, O'Donnell CA, Mair FS, MacFarlane A. A qualitative systematic review of studies using the normalization process theory to research implementation processes. *Implementation Science*. 2014;9(1):2.

McGivern L, Shulman L, Carney JK, Shapiro S, Bundock E. Death Certification Errors and the Effect on Mortality Statistics. *Public Health Reports*. 2017;132(6):669-75.

McLean G, Sutton M, Guthrie B. Deprivation and quality of primary care services: evidence for persistence of the inverse care law from the UK Quality and Outcomes Framework. *Journal of Epidemiology & Community Health*. 2006;60(11):917-22.

McShane M, Mitchell E. Person centred coordinated care: where does the QOF point us? *BMJ: British Medical Journal (Online)*. 2015;350.

Mendelson A, Kondo K, Damberg C, Low A, Motúapuaka M, Freeman M, et al. The effects of pay-for-performance programs on health, health care use, and processes of care: a systematic review. *Annals of Internal Medicine*. 2017;166(5):341-53.

Miles C, Arden-Close E, Thomas M, Bruton A, Yardley L, Hankins M, et al. Barriers and facilitators of effective self-management in asthma: systematic review and thematic synthesis of patient and healthcare professional views. *npj Primary Care Respiratory Medicine*. 2017;27(1).

Milstein R SJ. Pay for performance in the inpatient sector: A review of 34 P4P programs in 14 OECD countries. *Health Policy*. 2016;120(10):1125-40.

Mintz M, Gilsenan AW, Bui CL, Ziemiecki R, Stanford RH, Lincourt W, et al. Assessment of asthma control in primary care. *Current medical research and opinion*. 2009;25(10):2523-31.

Mitchell C, Dwyer R, Hagan T, Mathers N. Impact of the QOF and the NICE guideline in the diagnosis and management of depression: a qualitative study. *British Journal of General Practice*. 2011;61(586):e279-e89.

- Moffat M, Cleland J, Van Der Molen T, Price D. Poor communication may impair optimal asthma care: a qualitative study. *Family Practice*. 2006;24(1):65-70.
- Morris ZS, Wooding S, Grant J. The answer is 17 years, what is the question: understanding time lags in translational research. *Journal of the Royal Society of Medicine*. 2011;104(12):510-20.
- Mukherjee M, Gupta R, Strachan D, Phillips C, Davies G, Sheikh A. Asthma mortality in the UK and member nations between 2001 and 2011. *European Respiratory Society*; 2016.
- Mukherjee M SA, Gupta RP, Nwaru BI, Farr A, Heaven M, et al. The epidemiology, healthcare and societal burden and costs of asthma in the UK and its member nations: analyses of standalone and linked national databases. *BMC Medicine*. 2016;14 (1)(113).
- Murray E, Treweek S, Pope C, MacFarlane A, Ballini L, Dowrick C, et al. Normalisation process theory: a framework for developing, evaluating and implementing complex interventions. *BMC Medicine*. 2010;8(1):63.
- Newell K, Lawlor R, Bunce R. Co-creating personalised asthma action plans. *Nursing Times*. 2015;111(18):12-5.
- NHS Employers. 2014/15 General Medical Services (GMS) Contract quality and Outcomes Framework (QOF). : NHS Employers; 2014 [cited 2015 October]. Available from: <http://www.nhsemployers.org>
- National Centre for Health Statistics. New Asthma Estimates: Tracking Prevalence, Health Care and Mortality. National Centre for Health Statistics; 2001 [cited 2017 December]. Available from <https://www.cdc.gov/nchs/pressroom/01facts/asthma.htm>
- O'Cathain A, Murphy E, Nicholl J. Why, and how, mixed methods research is undertaken in health services research in England: a mixed methods study. *BMC Health Services Research*. 2007;7:85.
- Office for National Statistics. Northern Ireland population mid-year estimate 2017. Available from: <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/timeseries/nipop/pop>
- Office of the Regulator of Community Interest Companies, Department for Business Innovation & Skills. The Expert Patients Programme 2013 [cited 2018 March]. Available from: <https://www.gov.uk/government/case-studies/the-expert-patients-programme>
- Ogilvie D, Fayer D, Petticrew M, Sowden A, Thomas S, Whitehead M, et al. The harvest plot: a method for synthesising evidence about the differential effects of interventions. *BMC Medical Research Methodology*. 2008;8(1):8.

OpenDataNI. GP Practice Reference File - October 2016: Department of Health; 2016 [cited 2018 January]. Available from: <https://www.opendatani.gov.uk/dataset/gp-practice-list-sizes/resource/a5eb0f5f-1c7a-450f-bfac-2cf1878a8923>)

OpenDataNI. GP Practice Reference File - January 2018: Department of Health; 2018 [cited 2018 February]. Available from: <https://www.opendatani.gov.uk/dataset/3d1a6615-5fc9-4f0e-ab2a-d2b0d71fb9ed/resource/9f9f3b03-d1b9-46f1-9601-0566c8b2e755/download/gp-practice-reference-file---january-2018.csv>

Pape UJ, Huckvale K, Car J, Majeed A, Millett C. Impact of 'stretch' targets for cardiovascular disease management within a local pay-for-performance programme. PLOS ONE. 2015;10(3):e0119185.

Partridge M, Hill S. Enhancing care for people with asthma: the role of communication, education, training and self-management. 1998 World Asthma Meeting Education and Delivery of Care Working Group. European Respiratory Journal. 2000;16(2):333-48.

Pearce G, Parke HL, Pinnock H, Epiphaniou E, Bourne CL, Sheikh A, et al. The PRISMS taxonomy of self-management support: derivation of a novel taxonomy and initial testing of its utility. Journal of health services research & policy. 2016;21(2):73-82.

Peinemann F, Tushabe DA, Kleijnen J. Using multiple types of studies in systematic reviews of health care interventions—a systematic review. PLOS ONE. 2013;8(12):e85035.

Peláez S, Lamontagne AJ, Collin J, Gauthier A, Grad RM, Blais L, et al. Patients' perspective of barriers and facilitators to taking long-term controller medication for asthma: a novel taxonomy. BMC Pulmonary Medicine. 2015;15(1):42.

Pinnock H. Supported self-management for asthma. Breathe. 2015;11(2):99-109.

Pinnock H, Adlem L, Gaskin S, Harris J, Snellgrove C, Sheikh A. Accessibility, clinical effectiveness and practice costs of providing a telephone option for routine asthma reviews: Phase IV controlled implementation study. British Journal of General Practice. 2007; 57: 714-722

Pinnock H, Barwick M, Carpenter CR, Eldridge S, Grandes G, Griffiths CJ, et al. Standards for reporting implementation studies (StaRI) statement. BMJ. 2017;356:i6795.

Pinnock H, Barwick M, Carpenter CR, Eldridge S, Grandes G, Griffiths CJ, et al. Standards for Reporting Implementation Studies (StaRI): explanation and elaboration document. *BMJ Open*. 2017;7(4).

Pinnock H, Burton C, Campbell S, Gruffydd-Jones K, Hannon K, Hoskins G, et al. Clinical implications of the Royal College of Physicians three questions in routine asthma care: a real-life validation study. *Primary Care Respiratory Journal*. 2012;21(3):288.

Pinnock H, Epiphaniou E, Pearce G, Parke H, Greenhalgh T, Sheikh A, et al. Implementing supported self-management for asthma: a systematic review and suggested hierarchy of evidence of implementation studies. *BMC Medicine*. 2015;13:127.

Pinnock H, Fletcher M, Holmes S, Keeley D, Leyshon J, Price D, et al. Setting the standard for routine asthma consultations: a discussion of the aims, process and outcomes of reviewing people with asthma in primary care. *Primary Care Respiratory Journal*. 2010;19(1):75.

Pinnock H, Parke HL, Panagioti M, Daines L, Pearce G, Epiphaniou E, et al. Systematic meta-review of supported self-management for asthma: a healthcare perspective. *BMC Medicine*. 2017;15(1):64.

Pinnock H, Taylor S, Epiphaniou E, Sheikh A, Griffiths C, Eldridge S, et al. Developing standards for reporting implementation studies of complex interventions (StaRI): a systematic review and e-Delphi. *Implementation Science*. 2015;10(42).

Pinnock H EE, Pearce G, Parke H, Greenhalgh T, Sheikh A, et al. Implementing supported self-management for asthma: a systematic review and suggested hierarchy of evidence of implementation studies. *BMC Medicine*. 2015;13 (1)(127).

Pinnock H PH, Panagioti M, Daines L, Pearce G, Epiphaniou E, et al. Systematic meta-review of supported self-management for asthma: a healthcare perspective. *BMC Medicine*. 2017;15 (64).

Powell H, Gibson PG. Options for self-management education for adults with asthma. *Cochrane Database of Systematic Reviews*. 2002;3.

Prior L. Repositioning Documents in Social Research. *Sociology*. 2008;42(5):821-36.

Public Health Agency. Northern Ireland General Practice Nursing Workforce Survey Report 2016: Department of Health; 2016 [cited 2017 November].

Rapport F, Clay-Williams R, Churrua K, Shih P, Hogden A, Braithwaite J. The struggle of translating science into action: foundational concepts of implementation science. *Journal of evaluation in clinical practice*. 2018 Feb;24(1):117-26.

- Ratanawongsa N, Roter D, Beach MC, Laird SL, Larson SM, Carson KA, et al. Physician burnout and patient-physician communication during primary care encounters. *Journal of General Internal Medicine*. 2008;23(10):1581.
- Real FG, Svanes C, Omenaas ER, Antò JM, Plana E, Jarvis D, et al. Lung function, respiratory symptoms, and the menopausal transition. *Journal of allergy and clinical immunology*. 2008;121(1):72-80. e3.
- Reddel H, Peters M, Everett P, Flood P, Sawyer S. Ownership of written asthma action plans in a large Australian survey. 2013.
- Reddel H, Taylor D, Bateman E, Boulet L, Boushey H, Busse W, et al. An Official American Thoracic Society/European Respiratory Society Statement: Asthma Control and Exacerbations Standardising Endpoints for Clinical Asthma Trials and Clinical Practice. *American Journal of Respiratory and Critical Care Medicine*. 2009;180:59-99.
- Reddel HK, Bateman ED, Becker A, Boulet L-P, Cruz AA, Drazen JM, et al. A summary of the new GINA strategy: a roadmap to asthma control. *European Respiratory Journal*. 2015;46(3):622-39.
- Richards L, Morse JM. *Readme first for a user's guide to qualitative methods*. 2nd ed: Thousand Oaks, California : Sage Publications; 2007.
- Richardson G, Kennedy A, Reeves D, Bower P, Lee V, Middleton E, et al. Cost effectiveness of the Expert Patients Programme (EPP) for patients with chronic conditions. *Journal of Epidemiology & Community Health*. 2008;62(4):361-7.
- Ring N, Booth H, Wilson C, Hoskins G, Pinnock H, Sheikh A, et al. The 'vicious cycle' of personalised asthma action plan implementation in primary care: a qualitative study of patients and health professionals' views. *BMC Family Practice*. 2015;16(1):145.
- Ring N, Jepson R, Hoskins G, Wilson C, Pinnock H, Sheikh A, et al. Understanding what helps or hinders asthma action plan use: a systematic review and synthesis of the qualitative literature. *Patient education and counseling*. 2011;85(2):e131-e43.
- Roland M, Campbell S, Bailey N, Whalley D, Sibbald B. Financial incentives to improve the quality of primary care in the UK: predicting the consequences of change. *Primary Health Care Research & Development*. 2006;7(1):18-26.
- Romieu I, Fabre A, Fournier A, Kauffmann F, Varraso R, Mesrine S, et al. Postmenopausal hormone therapy and asthma onset in the E3N cohort. *Thorax*. 2010;65(4):292-7.
- Rosenthal MB, Frank RG, Li Z, Epstein AM. Early experience with pay-for-performance: from concept to practice. *JAMA*. 2005;294(14):1788-93.

Ross F, Smith P, Byng R, Christian S, Allan H, Price L, et al. Learning from people with long-term conditions: new insights for governance in primary healthcare. *Health & social care in the community*. 2014;22(4):405-16.

Royal College of General Practitioners. GPs in Northern Ireland call on politicians to 'put patients first and save our health service': Royal College of General Practitioners; 2018 [cited 2018 January]. Available from: <http://www.rcgp.org.uk/about-us/news/2018/january/gps-in-northern-ireland-call-on-politicians-to-put-patients-first-and-save-our-health-service.aspx>

Sadeghi-Bazargani H, Tabrizi JS, Azami-Aghdash S. Barriers to evidence-based medicine: a systematic review. *Journal of evaluation in clinical practice*. 2014;20(6):793-802.

Sarrazin MSV, Rosenthal GE. Finding pure and simple truths with administrative data. *JAMA*. 2012;307(13):1433-5.

Saunders B, Sim J, Kingstone T, Baker S, Waterfield J, Bartlam B, et al. Saturation in qualitative research: exploring its conceptualization and operationalization. *Quality and Quantity*. 2017:1-15.

Sawicki G, Haver K. Patient education: Asthma symptoms and diagnosis in children (Beyond the Basics).

Saxena S, Thornicroft G, Knapp M, Whiteford H. Resources for mental health: scarcity, inequity, and inefficiency. *The Lancet*. 2007;370(9590):878-89.

Scott A, Sivey P, Ait Ouakrim D, Willenberg L, Naccarella L, Furler J, et al. The effect of financial incentives on the quality of health care provided by primary care physicians. *The Cochrane Collaboration*. 2011;9(9).

Scott A SP, Ait Ouakrim D, Willenberg L, Naccarella L, Furler J, Young D. The effect of financial incentives on the quality of health care provided by primary care physicians. *Cochrane Database of Systematic Reviews*. 2011(9).

Senf JH. The Option to Refuse: A Tool in Understanding Nonresponse in Mailed Surveys. *Evaluation Review*. 1987;11(6):775-81.

Signorelli C, Wakefield CE, Fardell JE, Thornton-Benko E, Emery J, McLoone JK, et al. Recruiting primary care physicians to qualitative research: Experiences and recommendations from a childhood cancer survivorship study. *Pediatric Blood & Cancer*. 2018;65(1).

Song F, Hooper L, Loke Y. Publication bias: what is it? How do we measure it? How do we avoid it? *Open Access Journal of Clinical Trials*. 2013;2013(5):71-81.

- Stake RE. Multiple case study analysis: New York : The Guilford Press; 2006.
- Stokke K, Olsen NR, Espehaug B, Nortvedt MW. Evidence based practice beliefs and implementation among nurses: a cross-sectional study. *BMC Nursing*. 2014;13(1):8.
- Sweeney L-A, Molloy GJ, Byrne M, Murphy AW, Morgan K, Hughes CM, et al. A qualitative study of prescription contraception use: the perspectives of users, general practitioners and pharmacists. *PLOS ONE*. 2015;10(12):e0144074.
- Tapp S, Lasserson TJ, Rowe BH. Education interventions for adults who attend the emergency room for acute asthma. *Cochrane Database of Systematic Reviews* 2007, Issue 3. Art. No.: CD003000
- Tariq S, Woodman J. Using mixed methods in health research. *JRSM Short Reports*. 2013;4(6).
- Taylor SJ PH, Epiphaniou E, Pearce G, Parke HL, Schwappach A, et al. A rapid synthesis of the evidence on interventions supporting self-management for people with long-term conditions: PRISMS—Practical systematic Review of Self-Management Support for long-term conditions. *Health Services and Delivery Research*. 2014;2 (53).
- Thomas G. How to do your case study. 2nd edition. London: SAGE; 2016.
- Thomas M, Gruffydd-Jones K, Stonham C, Ward S, Macfarlane TV. Assessing asthma control in routine clinical practice: use of the Royal College of Physicians '3 questions'. *Primary Care Respiratory Journal*. 2009;18(2):83.
- Thompson W, Cupples M, Sibbett C, Skan D, Bradley T. Challenge of culture, conscience, and contract to general practitioners & care of their own health: Qualitative study. *BMJ*. 2001;323(7315):728-31.
- Thurston WE, Cove L, Meadows LM. Methodological congruence in complex and collaborative mixed method studies. *International Journal of Multiple Research Approaches*. 2008;2(1):2-14.
- Tung HH, Lin CY, Chen KY, Chang CJ, Lin YP, Chou CH. Self-management intervention to improve self-care and quality of life in heart failure patients. *Congestive Heart Failure*. 2013;19(4).
- UK Parliament National Audit Office. Healthcare across the UK: A comparison of the NHS in England, Scotland, Wales and Northern Ireland. UK Parliament; 2012.
- Vamos EP, Pape UJ, Bottle A, Hamilton FL, Curcin V, Ng A, et al. Association of practice size and pay-for-performance incentives with the

- quality of diabetes management in primary care. *Canadian Medical Association Journal*. 2011;cmaj. 101187.
- Van der Laan AL, Boenink M. Beyond bench and bedside: disentangling the concept of translational research. *Health care analysis*. 2015;23(1):32-49.
- VanGeest JB, Johnson TP, Welch VL. Methodologies for improving response rates in surveys of physicians: A systematic review. *Evaluation and the Health Professions*. 2007;30(4):303-21.
- Vink NM, Postma DS, Schouten JP, Rosmalen JG, Boezen HM. Gender differences in asthma development and remission during transition through puberty: the TRacking Adolescents' Individual Lives Survey (TRAILS) study. *Journal of allergy and clinical immunology*. 2010;126(3):498-504. e6.
- Wallace JE, Lemaire JB, Ghali WA. Physician wellness: a missing quality indicator. *The Lancet*. 2009;374(9702):1714-21.
- Wetzel D, Himmel W, Heidenreich R, Hummers-Pradier E, Kochen MM, Rogausch A, et al. Participation in a quality of care study and consequences for generalizability of general practice research. *Family Practice*. 2005;22(4):458-64.
- Wiener-Ogilvie S, Huby G, Pinnock H, Gillies J, Sheikh A. Practice organisational characteristics can impact on compliance with the BTS/SIGN asthma guideline: qualitative comparative case study in primary care. *BMC Family Practice*. 2008;9(1):32.
- Wiener-Ogilvie S, Pinnock H, Huby G, Sheikh A, Partridge MR, Gillies J. Do practices comply with key recommendations of the British Asthma Guideline? If not, why not? *Primary Care Respiratory Journal*. 2007;16(6):369.
- Williamson MK, Pirkis J, Pfaff JJ, Tyson O, Sim M, Kerse N, et al. Recruiting and retaining GPs and patients in intervention studies: the DEPS-GP project as a case study. *BMC Medical Research Methodology*. 2007;7(42):42.
- Wilson PM, Kendall S, Brooks F. Nurses' responses to expert patients: the rhetoric and reality of self-management in long-term conditions: a grounded theory study. *International Journal of Nursing Studies*. 2006;43(7):803-18.
- Woerle HJ, Neumann C, Zschau S, Tenner S, Irsigler A, Schirra J, et al. Impact of fasting and postprandial glycemia on overall glycemic control in type 2 diabetes: importance of postprandial glycemia to achieve target HbA1c levels. *Diabetes research and clinical practice*. 2007;77(2):280-5.
- World Health Organisation. *International Statistical Classification of Diseases and Related Health Problems 2010* [cited 2017 July]. Available from: <http://apps.who.int/classifications/icd10/browse/2010/en#/J40-J47>

Yin RK. Case study research : design and methods. Third edition.. ed.
Thousand Oaks, Calif. ; London: Thousand Oaks, Calif. ; London : Sage
Publications; 2003.

Young GJ, Meterko M, Beckman H, Baker E, White B, Sautter KM, et al.
Effects of paying physicians based on their relative performance for quality.
Journal of General Internal Medicine. 2007;22(6):872-6.

Appendices

Appendix 1: Systematic review protocol registered on PROSPERO

The impact of incentives on the implementation of asthma or diabetes self-management

Protocol for a systematic review

Research Team

Tracy Gibson	Asthma UK Centre for Applied Research, Usher Institute of Population Health Sciences and Informatics, The University of Edinburgh
Professor Liam Heaney	Asthma UK Centre for Applied Research, Centre for Infection & Immunity, Queen's University Belfast
Professor Mike Shields	Asthma UK Centre for Applied Research, Centre for Infection & Immunity, Queen's University Belfast
Io Hui Chi Yan	Asthma UK Centre for Applied Research, Usher Institute of Population Health Sciences and Informatics, The University of Edinburgh
Dr Hilary Pinnock	Asthma UK Centre for Applied Research, Usher Institute of Population Health Sciences and Informatics, The University of Edinburgh

Library Services

Marshall Dozier	College of Medicine and Veterinary Medicine, University of Edinburgh
-----------------	----------------------------------------------------------------------

Funding

This work is funded by The University of Edinburgh CMVM PhD Studentship [Asthma UK Centre for Applied Research PHD/14/16]



THE UNIVERSITY of EDINBURGH



**Asthma UK Centre
for Applied Research**

Table of Contents

Introduction

Aim of the systematic review

Research questions

Plan of investigation

Identification of studies

Search strategy

Study selection

Exclusion criteria

Data extraction

Quality appraisal and weighting

Analysis and synthesis

Conflicts of interest

Dissemination

Timetable

References

Appendix: Search strategy

Introduction

Asthma and diabetes in the United Kingdom

Asthma affects 5.4 million people in the United Kingdom (UK)¹ and each day three people die because of asthma². Supported self-management including education and Personalised Asthma Action Plans (PAAPs) have consistently been proven to improve asthma control, minimise exacerbations and reduce emergency use of healthcare resources³⁻⁷. The British Guideline on the Management of Asthma recommends that all individuals with asthma should be provided with self-management education and offered a PAAP⁸. However, as identified by Asthma UK, ownership of PAAPs remains low with only 24% of individuals with asthma in the UK being in possession of a PAAP⁹.

There are 3.9 million people in the UK who have been diagnosed with diabetes and it is estimated that approximately 590,000 are as yet undiagnosed¹⁰. Self-management of diabetes, including lifestyle changes, adherence to medication and monitoring and adjusting dosages accordingly can greatly improve quality of life. However, Diabetes UK have found that 42% of individuals with Type 2 diabetes do not feel confident managing their diabetes and in England and Wales, only 16% of individuals with diabetes were offered an education course when first diagnosed¹¹. Within the UK there are eight annual checks that individuals with diabetes should receive to manage their diabetes effectively and reduce the possibility of complications. Only 36% of individuals with diabetes are meeting the targets set for these annual checks¹², though this has increased since the National Diabetes Audit 2011–1213 which reported that the percentage of individuals meeting the targets was 21%.

Quality and Outcome Framework (QOF) for Long Term Conditions (LTC)

While it has been routine in the past for doctors to have their quality of care reviewed, in recent years this reviewing has been conducted by external bodies and financial incentives have been introduced to achieve set targets hoping to improve “good practice” in clinical care. Since 2004 in the UK, clinical performance targets are included in the contracts of General Practitioners (GPs), enabling them to gain additional income through financial incentives received from attaining targets within the QOF¹⁴. The QOF focuses on nineteen clinical areas including asthma and diabetes¹⁵. The QOF targets for asthma are: establishing and maintaining an asthma register and providing an annual review to assess asthma control, respond to assessment and adjustment of management and explore perceptions and support self-management¹⁶, however self-management is not an incentivised target. In contrast, QOF targets for treating individuals with diabetes include referring newly diagnosed individuals with diabetes to a structured education programme within nine months of being added to the diabetes register¹⁷.

Northern Ireland's Directed Enhanced Service (DES) for asthma

Established in 2008, Northern Ireland's (NI) DES includes a scheme which pays a financial incentive, in addition to QOF, to general practices that provide self-management education, including a PAAP to people with asthma¹⁸. There are three levels to the financial incentive depending on whether the general practice provides self-management education to 50%, 65% or 75% of the individuals with asthma on their practice register¹⁹. Asthma UK (2013), estimated that the proportion of people with asthma who own a PAAP in NI was 60%, which is double the proportion in Scotland, and identified the DES as the major contributor to this.

Our overall programme of work

This systematic review is part of a research project that will investigate the increase in PAAP ownership in NI, identify what actions practices implemented in order to achieve this improvement and measure the effectiveness of the DES. While the research project is focussed on asthma, literature on diabetes has been included in this systematic review due to diabetes being a LTC comparative condition with existing incentive schemes. By reviewing the literature on the impact of financial incentives used to implement asthma self-management and diabetes checks, this review will provide the underpinning evidence for this research project. As part of a wider programme of work within the Asthma UK Centre for Applied Research investigating the implementation of supported self-management this project will directly inform programme 1 of the AUKCAR; "How do we empower and enable people to take control of their asthma so they can live full and active lives?". Implementation of supported self-management is challenging¹⁷, and this work will be of interest to policy makers and commissioners and providers of healthcare services seeking to embed self-management into routine clinical care.

Aim of the systematic review

To systematically review the evidence investigating the impact of financial incentives on organisational process outcomes, individual behavioural outcomes, and health outcomes for individuals with asthma or diabetes.

Research questions

- What is the impact of financial incentives for implementation of asthma or diabetes supported self-management on professional/organisational process outcomes (ownership of PAAPs, asthma/diabetes reviews)
- What is the impact of financial incentives for implementation of asthma or diabetes supported self-management on disease control (asthma/diabetes control, risk of exacerbation, hospital admittance rates)

- What is the impact of financial incentives for implementation of asthma or diabetes supported self-management on behaviour of individuals with asthma or diabetes (self-efficacy, activation, adherence to preventer medication, adherence to insulin medication)

Outcome measures

We are interested in primary and secondary outcomes in relation to the 3 research questions, these are details in table 1.

Table 1: Primary and secondary outcomes

	Primary	Secondary
1. Organisational process	<ul style="list-style-type: none"> • asthma - ownership of a personalised asthma action plan • diabetes - attendance at a patient training/self-management course 	<ul style="list-style-type: none"> • attendance at reviews supporting self-management
2. Measure of disease control	<ul style="list-style-type: none"> • asthma - symptom control • asthma - exacerbations • diabetes - glycaemic control 	<ul style="list-style-type: none"> • unscheduled care • diabetes - hypotension
3. Individual behaviour	<ul style="list-style-type: none"> • self-efficacy 	<ul style="list-style-type: none"> • activation • adherence to medication

Plan of investigation

We will follow the procedures described in the Cochrane Handbook for Systematic Reviews of Interventions.

Identifications of studies

A PICOS search strategy, shown in table 2, will be utilised to search databases, examine bibliographies and identify unpublished and in progress studies.

Search strategy

- Databases searched: Cochrane Central Register of Controlled Trials (CENTRAL); Cochrane Database of Systematic Reviews (CDSR); MEDLINE; PsychInfo; CINAHL; ScienceDirect; Web of Science; Embase
- References from published studies: The bibliographies of all eligible studies will be examined to identify potential studies for inclusion.
- Unpublished and in progress studies: UK Clinical Research Network: Portfolio Database and the metaRegister of Controlled Trials will be included in the review.
- It is anticipated that most of the studies retrieved will be reporting on implementation studies, therefore a broad range of studies have been included in the search strategy.

Table 2: PICOS search strategy

Population	<ul style="list-style-type: none">• Healthcare professionals incentivised (or whose organisation is incentivised) to provide self-management• Individuals with asthma or diabetes receiving care from an organisation which is receiving financial incentive
Intervention	<ul style="list-style-type: none">• Any financial intervention provided to a healthcare organisation and/or healthcare professionals that is designed to improve supported self-management in asthma or diabetes
Comparison	<ul style="list-style-type: none">• Healthcare professionals not incentivised (or whose organisation

	<p>is not incentivised) to provide self-management.</p> <ul style="list-style-type: none"> • Individuals with asthma or diabetes who are receiving usual, non-incentivised care
Outcome	<ul style="list-style-type: none"> • Organisational process: increase in quality of care, PAAP ownership and/or asthma/diabetes reviews • Disease control: decrease in exacerbations and/or hospitalisations, improved asthma/diabetes control • Individual behaviour: self-efficacy, activation, adherence to medication
Setting	<ul style="list-style-type: none"> • Any healthcare setting
Study Design	<ul style="list-style-type: none"> • Randomised controlled trials (RCTs) • Quasi -RCTs • Controlled before and after studies • Interrupted time series • Repeated measures

Study selection

One reviewer (TJ) will conduct the search and download all search results into Endnote.

Training: Two reviewers (TJ and HP) will screen a random selection of 100 papers, compare and discuss decisions in order to reach agreement. This process will be repeated until the reviewers are in agreement with the search criteria and its application to the studies.

Title and abstract screening: One reviewer (TJ) will consider the remaining titles and abstracts rating them “full text screening required” or “reject”. Full text will then be retrieved for the potentially relevant papers.

Full text screening: Two reviewers (TJ and IH) will independently review the full text papers, with a discussion between two reviewers to resolve disagreements with a third reviewer (HP) being involved when an agreement cannot be achieved.

Exclusion criteria

- Reviews, systematic reviews, and meta-analyses
- Study protocols (though we will search for published results if we identify a relevant protocol)
- Surveys
- Editorials, and opinion pieces
- Articles not reported as full papers (abstracts), letters, case reports, audits, guidelines, editorials
- Articles where the incentive recipient is the patient
- Articles where the incentive is not financial
- Articles where the focus is not on supported self-management

Data extraction

Data will be extracted from included papers by one reviewer and checked by a second using a customised data extraction tool which will be piloted prior to the review to ensure it captures all relevant information and is interpreted simply and consistently. Discussion between two reviewers will resolve disagreements with a third reviewer being involved when an agreement cannot be achieved. We will extract details about the interventions under the following headings: “setting”, “financial incentive”, “methodology” and “outcomes”.

Forward citations of the included studies will be checked for descriptions of interventions, nested qualitative studies, and process evaluations in order to provide context. If the descriptions in the papers are inadequate, authors will be contacted and a short qualitative interview may be undertaken in order to provide further information on the intervention.

Quality appraisal and weighting

Randomised controlled trials papers selected for retrieval will be assessed for quality by one reviewer and checked by a second using methods detailed in section six of the Cochrane Handbook for Systematic Reviews of Interventions. Seven domain-based parameters will be used to assess quality; adequate sequence generation; allocation concealment; blinding of participants and personnel; blinding of outcome assessment; incomplete outcome data addressed; selective reporting and free of other bias. Parameters will be graded as: A- low risk of bias; B- moderate risk of bias; C – high risk of bias and an overall assessment for each controlled trial using the same three criteria will be made. For non-randomised interventions

studies, the Cochrane Effectiveness and Practice Organisation of Care (EPOC) guidelines will be used for assessment and the Good practice data extraction form used²⁰.

A broad range of studies are anticipated in the results as the studies retrieved will be reporting on implementation studies. In order to manage the diverse range of methodologies in these papers, we will weight the included papers. The approach of Pinnock et al (2015) will be adopted and papers will be classified by robustness of methodology, number of participants and the quality score. Methodological quality assessment will be used to assess the agreement of reviewers and any disagreements will be resolved by discussions. In the event that an agreement cannot be reached, a third reviewer will be brought in to mediate.

Analysis and synthesis

Asthma and diabetes will be analysed separately. Preliminary literature searches have suggested that a limited number of eligible trials with substantial heterogeneity will be identified so meta-analysis will not be appropriate. Therefore, a narrative synthesis will be undertaken. We will classify components of the interventions (e.g. whether the financial incentive is paid to the individual (self-employed) healthcare professional or an organisation interventions; payment for process standards (e.g. attendance at a diabetes course) or health outcomes (reduced unscheduled care) We will develop a matrix of interventions shown to be effective or ineffective under the headings of: “organisational process”; “measure of disease control” and “individual behaviour”.

However, if sufficient trials suitable for inclusion in a meta-analysis are identified then the standard procedures described in the Cochrane handbook will be followed.

Conflicts of interest

The authors declare that there are no conflicts of interest.

Dissemination

The findings in this study will be presented at conferences, submitted to peer-reviewed journals and is aligned to Programme 1 of the AUKCAR which is “How do we empower and enable people to take controls of their asthma so they can live full and active lives?” This review will also contribute towards the submission of a Population Health Sciences PhD.

Timetable

Months 1 - 6	<ul style="list-style-type: none">• Write protocol• Develop search strategy• Search databases• Collect data• Initial data analysis
Months 6-9	<ul style="list-style-type: none">• Select papers for review
Month 10	<ul style="list-style-type: none">• Prospero registration
Month 11	<ul style="list-style-type: none">• Extract data• Quality appraisal
Months 12-15	<ul style="list-style-type: none">• Final data analysis• Compose report• Write paper

References

1. Asthma UK. Asthma Facts and FAQs. Asthma UK. 2014. Available from <http://www.asthma.org.uk> (accessed February 2015)
2. Royal College of Physicians. Why asthma still kills, The National Review of Asthma Deaths (NRAD). Royal College of Physicians. 2014. Available from <http://www.rcplondon.ac.uk> (accessed February 2015)
3. Taylor SJC, Pinnock H, Epiphaniou E, Pearce G, Parke H. A rapid synthesis of the evidence on interventions supporting self-management for people with long-term conditions. (PRISMS Practical Systematic Review of Self-Management Support for long-term conditions) *Health Serv Deliv Res* 2014; 2:54
4. Gibson PG, et al. Self-management education and regular practitioner review for adults with asthma. *Cochrane Database of Systematic Reviews* 2002, Issue 3. Art.No:CD001117
5. Tapp S, et al. Education interventions for adults who attend the emergency room for acute asthma. *Cochrane Database of Systematic Reviews* 2007, Issue 3. Art. No.: CD003000
6. Gibson PG, et al. Written action plans for asthma: an evidence-based review of the key components. *Thorax* 2004;59:94–99
7. Powell H, et al. Options for self-management education for adults with asthma. *Cochrane Database of Systematic Reviews* 2002, Issue 3. Art. No.: CD004107
8. British Thoracic Society, Scottish Intercollegiate Guideline Network, A national clinical guideline: The British Guideline on the Management of Asthma. British Thoracic Society. 2014. Available from <http://www.sign.ac.uk> (accessed April 2015)
9. Asthma UK. Compare your care report. Asthma UK. 2013 Available from <http://www.asthma.org.uk> (accessed February 2015)
10. Diabetes UK. Diabetes Facts and Stats. Diabetes UK. 2015. Available from www.diabetes.org.uk (Accessed October 2015)
11. Diabetes UK. 42% of people with Type 2 diabetes “not confident managing their condition”. Diabetes UK. 2015. Available from www.diabetes.org.uk (Accessed October 2015)
12. HSCIC: National Diabetes Audit 2012/13: Report 1: Care Processes and Treatment Targets. Available from <http://www.hscic.gov.uk> (accessed October 2015)
13. HSCIC: National Diabetes Audit 2011/12: Report 1: Care Processes and Treatment Targets. Available from <http://www.hscic.gov.uk> (accessed October 2015)
14. Downing A. et al. Do the UK government's new Quality and Outcomes Framework (QOF) scores adequately measure primary care performance? A cross-sectional survey of routine healthcare data. *BMC Health Services Research* 2007; 7:166
15. NHS Employers. 2014/15 General Medical Services (GMS) Contract quality and Outcomes Framework (QOF). NHS Employers. 2014. Available from <http://www.nhsemployers.org> (accessed October 2015)

16. Pinnock H, Fletcher M, Holmes S, Keeley D, Leyshon J, Price D, Russell R, Versnel J, Wagstaff B. Setting the standard for routine asthma consultations: a discussion of the aims, process and outcomes of reviewing people with asthma in primary care. *Prim Care Respir J* 2010; 19: 75-83
17. NHS Employers. 2015/16 General Medical Services (GMS) Contract quality and Outcomes Framework (QOF). NHS Employers. 2015. Available from <http://www.nhsemployers.org> (accessed October 2015)
18. Department of Health, Social Services, and Public Safety. The Primary Medical Services (Directed Enhanced Services) Directions (Northern Ireland) 2008. Available from <http://www.dhsspsni.gov.uk> (accessed February 2015)
19. Pinnock H, Epiphaniou E, Pearce G, Parke HL, Greenhalgh T, Sheikh A, Griffiths CJ, Taylor SJC. Implementing supported self-management for asthma: a systematic review of implementation studies. *BMC Medicine* 2015; 13:127
20. Effective Practice and Organisation of Care (EPOC). EPOC Resources for review authors. Oslo: Norwegian Knowledge Centre for the Health Services; 2015. Available at: <http://epoc.cochrane.org/epoc-specific-resources-review-authors>

Appendix: Search strategy

Search terms for Cochrane Central Register of Controlled Trials (CENTRAL); Cochrane Database of Systematic Reviews (CDSR); CINAHL; ScienceDirect; Web of Science

(asthma* or diabet*)

AND

{{managed care program} OR {fee for service} OR {fee-for-service} OR {reimbursement} OR
{financial incentiv*} OR {pay for performance} OR {pay-for-performance} OR {cash transfer*}
OR {incentive reimbursement*} OR {direct* enhance* service}}

AND

{{self management} OR {self-management} OR {self-care} OR {self care} OR {asthma action
plan}}

Search terms for MEDLINE

1. exp Asthma/
2. exp Diabetes Mellitus, Type 1/ or exp Diabetes Mellitus, Type 2/ or exp Diabetes Mellitus/
3. 1 or 2
4. exp Managed Care Programs/
5. exp Reimbursement, Incentive/
6. ("financial incentiv*" or "pay for performance" or "pay-for-performance" or "cash transfer*" or "incentive reimbursement*" or "directed enhanced service").mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]
7. 4 or 5 or 6
8. exp self care/ or exp blood glucose self-monitoring/ or exp self administration/
9. ("self management" or "self-management" or "management" or "self-care" or "self care" or "asthma action plan").mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]
10. 8 or 9
11. 3 and 7 and 10

Search terms for PsychInfo

1. exp Asthma/
2. exp Diabetes/ or exp Diabetes Mellitus/
3. 1 or 2

4. exp Fee for Service/
5. exp Incentives/ or exp Monetary Incentives/
6. exp Managed Care/
7. ("financial incentiv*" or "pay for performance" or "pay-for-performance" or "cash transfer*" or "incentive reimbursement*" or "directed enhanced service").mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
8. 4 or 5 or 6 or 7
9. exp Self Care Skills/ or exp Self Management/
10. exp Self Monitoring/ or exp Self Management/
11. ("self management" or "self-management" or "management" or "self-care" or "self care" or "asthma action plan").mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
12. 9 or 10 or 11
13. 3 and 8 and 12


Search terms for Embase

1. exp asthma/
2. exp diabetes mellitus/
3. 1 or 2
4. reimbursement, incentive.mp. or exp reimbursement/
5. exp medical fee/
6. exp managed care/
7. ("financial incentiv*" or "pay for performance" or "pay-for-performance" or "cash transfer*" or "incentive reimbursement*" or "directed enhanced service").mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
8. 4 or 5 or 6 or 7
9. exp self care/
10. ("self management" or "self-management" or "management" or "self-care" or "self care" or "asthma action plan").mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
11. 9 or 10
12. 3 and 8 and 11

Appendix 2: Access NI Certificate

OFFICIAL – SENSITIVE [PERSONAL]
a70f7f01-b905-4fde-b1bb-aceeda6fd0bc

Mrs Tracy Jackson
1f2 1 Abbey Street
EDINBURGH
EH7 5SJ


**ACCESS
NORTHERN
IRELAND**
www.nidirect.gov.uk/accessni

Access NI
PO Box 1085
Belfast
BT5 9BD
t: 0300 200 7888
e: ani@accessni.gov.uk

Date of Issue: 02 March 2016

ENHANCED DISCLOSURE CERTIFICATE
AccessNI No. 2000161658

Applicant Name & Address:
Mrs Tracy Jackson, 1f2 1 Abbey Street, Edinburgh,
EH7 5SJ
DOB: 01/07/1983

Registered Body Name & Address:
NI Association for Mental Health, Central Office,
80 University Street, Belfast, BT7 1HE
Details of Position: Principal Investigator -
interviewing children and vulnerable adults, NI
Association for Mental Health
Preferred Ref: Umbrella Body

CONVICTIONS
No information found

NON-COURT DISPOSALS
No information found

POLICE INFORMATION
No information found

DISCLOSURE ENDS

OFFICIAL – SENSITIVE [PERSONAL] 1 of 1

Appendix 3: Letter from NHS Ethics

South East Scotland Research Ethics Service

Waverley Gate
2-4 Waterloo Place
Edinburgh
EH1 3EG



Mrs Tracy Jackson
Post Phd Student
Asthma UK Centre for Applied Research, Usher
Institute of Population Health
Sciences and Informatics
University of Edinburgh
Doorway 1, Medical School, Teviot Place, Edinburgh

Date: 13/12/2016
Your Ref:
Our Ref:
Enquiries to:
Direct Line: 0131 465 5679
Email:

Dear Mrs Tracy Jackson,

Project Title: Impact of incentives on implementation of asthma self-management: qualitative study

You have sought advice from the South East Scotland Research Ethics Service on the above project. This has been considered and you are advised that, based on the submitted documentation (email correspondence and draft IRAS form), it does not need NHS ethical review under the terms of the Governance Arrangements for Research Ethics Committees (A Harmonised Edition).

The advice is based on the following:

- *The project is a survey seeking the views of NHS staff and patients on service delivery*

If the project is considered to be health-related research you will require a sponsor and ethical approval as outlined in The Research Governance Framework for Health and Community Care. You may wish to contact your employer or professional body to arrange this. You may also require NHS management permission (R&D approval). You should contact the relevant NHS R&D departments to organise this.

For projects that are not research and will be conducted within the NHS you should contact the relevant local clinical governance team who will inform you of the relevant governance procedures required before the project commences.

This letter should not be interpreted as giving a form of ethical approval or any endorsement of the project, but it may be provided to a journal or other body as evidence that NHS ethical approval is not required. However, if you, your sponsor/funder feel that the project requires ethical review by an NHS REC, please write setting out your reasons and we will be pleased to consider further. You should retain a copy of this letter with your project file as evidence that you have sought advice from the South East Scotland Research Ethics Service.

Yours sincerely,

SESREC 2 Manager



1 Headquarters
Waverley Gate, 2-4 Waterloo Place
Edinburgh EH1 3EG
Chair: Mr Brian Houston
Chief Executive: Tim Davison
Lothian NHS Board is the common name of Lothian Health Board

South East Scotland Research Ethics Service



PP
On behalf SO South East Scotland Research Ethics Service

Differentiating clinical audit, service evaluation, research and usual practice/surveillance work in public health

RESEARCH	SERVICE EVALUATION*	CLINICAL AUDIT	SURVEILLANCE	USUAL PRACTICE (in public health)
The attempt to derive generalizable new knowledge including studies that aim to generate hypotheses as well as studies that aim to test them.	Designed and conducted solely to define or judge current care.	Designed and conducted to produce information to inform delivery of best care.	Designed to manage outbreak and help the public by identifying and understanding risks associated.	Designed to investigate outbreak or incident to help in disease control and prevention.
Quantitative research – designed to test a hypothesis. Qualitative research – identifies/explores themes following established methodology.	Designed to answer: "What standard does this service achieve?"	Designed to answer: "Does this service reach a predetermined standard?"	Designed to answer: "What is the cause of this outbreak?"	Designed to answer: "What is the cause of this outbreak?" and treat.
Addresses clearly defined questions, aims and objectives.	Measures current service without reference to a standard.	Measures against a standard.	Systematic, statistical methods to allow timely public health action.	Systematic, statistical methods may be used.
Quantitative research – may involve evaluating or comparing interventions, particularly new ones. Qualitative research – usually involves studying how interventions and relationships are experienced.	Involves an intervention in use only. The choice of treatment is that of the clinician and patient according to guidance, professional standards and/or patient preference.	Involves an intervention in use only. The choice of treatment is that of the clinician and patient according to guidance, professional standards and/or patient preference.	May involve collecting personal data and samples with the intent to manage the incident.	Any choice of treatment is based on clinical best evidence or professional consensus.
Usually involves collecting data that are additional to those for routine care but may include data collected routinely. May involve treatments, samples or investigations additional to routine care.	Usually involves analysis of existing data but may include administration of interview or questionnaire.	Usually involves analysis of existing data but may include administration of simple interview or questionnaire.	May involve analysis of existing data or administration of interview or questionnaire to those exposed.	May involve administration of interview or questionnaire to those exposed.
Quantitative research – study design may involve allocating patients to intervention groups. Qualitative research – uses a clearly defined sampling framework underpinned by conceptual or theoretical justifications.	No allocation to intervention: the health professional and patient have chosen intervention before service evaluation.	No allocation to intervention: the health professional and patient have chosen intervention before audit.	Does not involve an intervention.	May involve allocation to control group to assess risk and identify source of incident but treatment unaffected.
May involve randomisation.	No randomisation.	No randomisation.	No randomisation.	May involve randomisation but not for treatment.
Normally requires REC review. Refer to www.nres.npsa.nhs.uk/applications/apply/ for more information.	Does not require REC review.	Does not require REC review.	Does not require REC review.	Does not require REC review.

* Service development and quality improvement may fall into this category.



2 Headquarters
Waverley Gate, 2-4 Waterloo Place
Edinburgh EH1 3EG
Chair: Mr Brian Houston
Chief Executive: Tim Davison
Lothian NHS Board is the common name of Lothian Health Board

Appendix 4: Quantitative phase Level 1 ethics form

University of Edinburgh,
Usher Institute of Population Health Sciences and Informatics
RESEARCH ETHICS SUBGROUP

Self-Audit Checklist for Level 1 Ethical Review **for PGR projects**

See **Intra** website for further information: <http://www.cphs.mvm.ed.ac.uk/intra/research/ethicalReview.php>

NOTE to student: Completion of this form should be under the **oversight** of your supervisor. A good strategy would be to complete a draft as best you can, then discuss with your supervisor before completing a final copy for your supervisor to sign.

Proposed Project (State research question and topic area, and briefly describe method/ data. Specify also countries in which data will be collected.):

The impact of incentives on the implementation of asthma self-management: quantitative phase
Question: What changes in A) the implementation of supported self-management, and B) asthma morbidity since the introduction of the Northern Ireland Locally Enhanced Service in 2008?
Method: Quantitative analysis of the anonymised Locally Enhanced Service returns for Northern Ireland. These are routine service data at the level of Health and Social Care Trust and Local Commissioning Group, no individual patient level data will be used.

1. Bringing the University into disrepute

Is there any aspect of the proposed research which might bring the University into disrepute? YES/ NO

2. Data protection and consent

Are there any issues of **DATA PROTECTION** or **CONSENT** which are **NOT** adequately dealt with via established procedures? YES/ NO

These include well-established sets of undertakings. For example, a 'No' answer is justified *only if*:

- There is compliance with the University of Edinburgh's Data Protection procedures (see www.recordsmanagement.ed.ac.uk);
- Respondents give consent regarding the collection, storage and, if appropriate, archiving and destruction of data;
- Identifying information (eg consent forms) is held separately from data;
- There is Caldicott Guardian approval for (or approval will be obtained prior to) obtaining/ analysing NHS patient-data.
- There are no other special issues arising about confidentiality/consent.

3. Study participants

a) Will a study researcher be in direct contact with participants to collect data, whether face-to-face, or by telephone, electronic means or post, or by observation? (eg interviews, focus groups, questionnaires, assessments) YES/ NO

b) Answer this **only if** qu. 3 above = 'YES':

In ethical terms, could any participants in the research be considered to be 'vulnerable'?

e.g. children & young people under age of 16, people who are in custody or care (incl. school), a marginalised/stigmatised group

Please tick one:

'vulnerable' not 'vulnerable'

4. Moral issues and Researcher/Institutional Conflicts of Interest

Are there any **SPECIAL MORAL ISSUES/CONFLICTS OF INTEREST**? YES/ NO

- An example of conflict of interest for a researcher would be a financial or non-financial benefit for him/herself or for a relative of friend.
- Particular moral issues or concerns could arise, for example where the purposes of research are concealed, where respondents are unable to provide informed consent, or where research findings could impinge negatively/ differentially upon the interests of participants.
- Where there is a dual relationship between researcher and participant (eg where research is undertaken by practitioners so that the participant might be unclear as to the distinction between 'care' and research)

5. Protection of research subject confidentiality

Are there any issues of CONFIDENTIALITY which are NOT adequately handled by normal tenets of confidentiality for academic research?

YES/ NO

These include well-established sets of undertakings that should be agreed with collaborating and participating individuals/organisations. For example, a 'No' answer is justified *only if*:

- (a) There will be no attribution of individual responses;
- (b) Individuals (and, where appropriate, organisations) are anonymised in stored data, publications and presentation;
- (c) There has been specific agreement with respondents regarding feedback to collaborators and publication.

6. Potential physical or psychological harm, discomfort or stress

(a) Is there a FORSEEABLE POTENTIAL for PSYCHOLOGICAL HARM or STRESS for participants?

YES/ NO

(b) Is there a FORSEEABLE POTENTIAL for PHYSICAL HARM or DISCOMFORT for participants?

YES/ NO

(c) Is there a FORSEEABLE RISK to the researcher?

YES/ NO

Examples of issues/ topics that have the potential to cause psychological harm, discomfort or distress and should lead you to answer 'yes' to this question include, but are not limited to:

relationship breakdown; bullying; bereavement; mental health difficulties; trauma / PTSD; violence or sexual violence; physical, sexual or emotional abuse in either children or adults.

7. Duty to disseminate research findings

Are there issues which will prevent all relevant stakeholders* having access to a clear, understandable and accurate summary of the research findings if they wish?

YES/ NO

* If, and *only if*, you answered 'yes' to 3 above, 'stakeholders' includes the participants in the research

Overall assessment

- If every answer above is a definite NO, the self-audit has been conducted and confirms the **ABSENCE OF REASONABLY FORESEEABLE ETHICAL RISKS** – *please tick box*
This means that regarding *this study, as currently self-audited*, no further ethical review actions are required within Usher. However, if in the coming weeks/months there is any change to the research plan envisaged now (and outlined above), the study should be **re-audited** against a Level 1 form, because it may be that the change made negates the absence of ethical risks signed off here.
- If one or more answers are YES, then risks have been identified and prior to commencing any data collection **formal ethical review is required** - either:
 - ~ by NHS REC (NB copy of ethics application and decision letter to be sent to Usher Ethics); or
 - ~ if not to be formally reviewed by NHS REC, then Usher **level 2/3 ethical review required** [If either 4 is 'yes' or 3b is 'vulnerable' then it is possible level 3 review is required.]



Two copies of this form should be taken for inclusion in the final dissertation/thesis and the original should be returned to the Usher Ethics administrator.

Tracy Jackson
Student Name

Hilary Pinnock
Supervisor Name

Tracy Jackson
Student Signature

[Handwritten Signature]
Supervisor Signature *

*** NOTE to supervisor:** The Usher Ethics Subgroup will not check this form (the light touch Level 1 form means we have insufficient detail to do so). By counter-signing this check-list as truly warranting all 'No' answers, you are taking responsibility, on behalf of Usher and UoE, that the research proposed truly poses no potential ethical risks. Therefore, if there is any doubt on any issue, it would be a wise precaution to mark it as 'uncertain' and contact the Ethics Subgroup as to whether a level 2 form might be required as well. (See Intra Ethics website – URL at top of form)

13 Dec 2016

Appendix 5: Qualitative phase Level 2 ethics approval letter



THE UNIVERSITY of
EDINBURGH

Centre for Population Health
Sciences
THE USHER INSTITUTE of
POPULATION HEALTH SCIENCES
AND INFORMATICS
The University of Edinburgh
Medical School
Teviot Place
Edinburgh
EH8 9AG
Tel: +44 (0)131 650 3237
Fax +44 (0)131 650 6909
www.ed.ac.uk
email: cphs.ethics@ed.ac.uk

04 April 2017

Ms Tracy Jackson

Dear Tracy

Re: The impact of incentives on implementation of asthma self-management: qualitative study

The documentation and revisions for above study have been reviewed by the Usher Ethics committee and we are pleased to grant ethical approval.

Please be aware that this ethical approval is in respect of the protocol and methods as described in the documents submitted to the committee (with amended documents superseding predecessors). If there is in the future *a change* to the study design/protocol/methods, you should check whether this means your level 2 application form needs to be revised, and submit to the committee (via me), any documents that have been revised (study materials/protocol/level 2 form), using tracked changes. You should make clear in your covering email whether:

- (i) you are requesting ethical review of a study amendment; or
- (ii) you are not sure whether such is needed and, in the first instance, would like the committee's opinion on whether a formal approval is needed of the amended design/methods.

Best wishes for successful completion of the research.

Yours sincerely

A handwritten signature in black ink that reads 'Diane White'.

Diane White
Ethics Review Group Administrator



Ethical Review Group : <http://www.cphs.mym.ed.ac.uk/intra/research/ethicalReview.php> (Staff & PGR Students only)

CPHS: <http://www.cphs.mym.ed.ac.uk>

The University of Edinburgh is a charitable body, registered in Scotland, with registration number SC005336

Appendix 6: Poster presented at ERS Conference 2016

THE IMPACT OF INCENTIVES ON THE IMPLEMENTATION OF ASTHMA SELF-MANAGEMENT: A SYSTEMATIC REVIEW



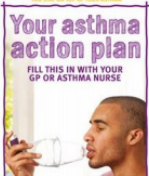
aukcar.ac.uk @aukcar

Tracy Jackson¹, Liam Heaney², Mike Shields², Marilyn Kendall¹, Chi Yan Hui¹, Christina Pearce³, Hilary Pinnock¹
 Librarian: Marshall Dozier¹; Statistician: Richard Parker¹

¹University of Edinburgh, ²Queen's University Belfast, ³University College London

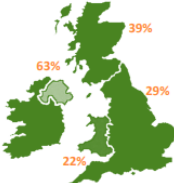
BACKGROUND
Asthma in the United Kingdom

- Asthma affects 5.4 million people in the United Kingdom (UK)
- Each day three people die because of asthma
- Supported self-management improves asthma control, minimises exacerbations and reduces emergency use of healthcare resources
- However, ownership of Personalised asthma action plans (PAAP) remains low with only 24% of individuals with asthma in the UK being in possession of a PAAP




Northern Ireland's Directed Enhanced Service (DES)

- Established in 2008
- Pays financial incentive to GPs that provide self-management education, including a PAAP
- Estimated 60% of NI individuals with asthma have a PAAP
- Asthma UK (2013) identifies DES as the major contributor to this



AIM
 To systematically review the evidence investigating the impact of **financial incentives** for implementation of supported self-management on **organisational process** outcomes, **individual behavioural** outcomes, and **health outcomes** for individuals with asthma or diabetes.

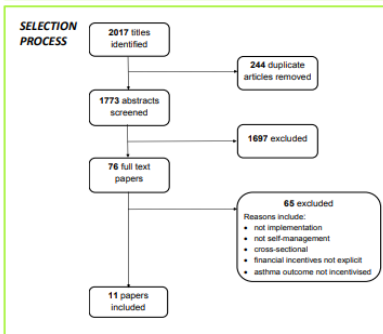


Why include diabetes?

- Lack of literature on financial incentives for self-management in asthma
- Another long term condition with self-management aspects
- Existing financial incentivized schemes

METHODS

- Followed Cochrane methodology
- Searched 8 databases
- Used a PICOS search strategy
- POPULATION**
Healthcare professionals incentivised to provide self-management for asthma or diabetes or individuals with asthma or diabetes receiving incentivised care
- INTERVENTION**
Financially incentivised care to increase supported self-management of asthma or diabetes
- COMPARISON**
Non-incentivised care
- OUTCOMES**
Organisational process: PAAP ownership and/or asthma/diabetes reviews
Disease control: decrease in exacerbations and/or hospitalisations, improved asthma/diabetes control
Individual behaviour: self-efficacy, activation, adherence to medication
- SETTING**
Any healthcare setting
- STUDY DESIGN**
Randomised control trials, quasi-experiments, controlled before and after studies, interrupted time series, repeated measures

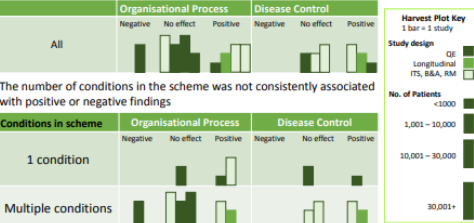


This review provides the underpinning evidence for my PhD research project "The impact of incentives on the implementation of asthma self-management: a mixed methods assessment"

RESULTS

- ARTICLES: 2017 identified; 11 met our inclusion criteria
- COUNTRY: US (n=7) and UK (n=4)
- STUDY DESIGN: 5 quasi-experiments; 1 longitudinal; 3 ITS; 1 B&A; 1 RM
- OUTCOMES: 9 organisational process; 6 disease control; 0 individual behaviour
- PAYMENT TYPE: 1 reimbursement; 1 ranked; 1 piece work; 9 target achievement

The impact of financial incentives on implementing self-management was mixed. However, the single asthma study showed improved organisational process outcomes



The number of conditions in the scheme was not consistently associated with positive or negative findings

- Four of the studies which reported no statistically significant effect noted that the size of the financial incentive may have contributed to this. It was potentially too modest to change physician behaviour and that physicians may gain very little for the effort and money spent on achieving target
- Only one intervention targeted individuals of a lower SES and found no effect from financial incentives. However, two studies noted practices in lower SES areas have barriers which require additional support
- Two studies identified increased 'exception reporting' (patients excluded from GP reporting due to pre-determined criteria) as directly contributing to target achievement

CONCLUSIONS

- The impact of financial incentives on implementing self-management is inconsistent. Predominantly no effect or positive impact, however one study showed a negative effect on organisational outcomes
- Determinants of how financial incentives impact on organisation of care and health outcomes are multifactorial and complex. Designers of incentive schemes need to consider the existing infrastructure and target populations, the size of the incentive and time, effort & resources required to implement change, as well as unintended consequences (such as 'exception reporting')
- Further research is needed to confirm findings and understand the process by which financial incentives impact (or not) on care

Abbreviations
 ITS – interrupted time series B&A – before & after RM – repeated measures
 SES – socio-economic status PAAP – personalised asthma action plan



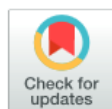
RESEARCH ARTICLE

The impact of financial incentives on the implementation of asthma or diabetes self-management: A systematic review

Tracy Jackson¹, Michael D. Shields^{2*}, Liam G. Heaney², Marilyn Kendall³, Christina J. Pearce⁴, Chi Yan Hui¹, Hilary Pinnock¹

1 Asthma UK Centre for Applied Research, Usher Institute of Population Health Sciences and Informatics, The University of Edinburgh, Edinburgh, United Kingdom, **2** Asthma UK Centre for Applied Research, Centre for Experimental Medicine, Queen's University Belfast, Belfast, United Kingdom, **3** Usher Institute of Population Health Sciences and Informatics, The University of Edinburgh, Edinburgh, United Kingdom, **4** UCL School of Pharmacy, Centre for Behavioural Medicine, BMA House, London, United Kingdom

* m.shields@qub.ac.uk



Abstract

Introduction

Financial incentives are utilised in healthcare systems in a number of countries to improve quality of care delivered to patients by rewarding practices or practitioners for achieving set targets.

Objectives

To systematically review the evidence investigating the impact of financial incentives for implementation of supported self-management on quality of care including: organisational process outcomes, individual behavioural outcomes, and health outcomes for individuals with asthma or diabetes; both conditions with an extensive evidence base for self-management.

Methods

We followed Cochrane methodology, using a PICOS search strategy to search eight databases in November 2015 (updated May 2017) including a broad range of implementation methodologies. Studies were weighted by robustness of methodology, number of participants and the quality score. We used narrative synthesis due to heterogeneity of studies.

Results

We identified 2,541 articles; 12 met our inclusion criteria. The articles were from the US (n = 7), UK (n = 4) and Canada (n = 1). Measured outcomes were HbA1c tests undertaken and/or the level achieved (n = 10), written action plans for asthma (n = 1) and hospital/emergency department visits (n = 1). Three of the studies were part of a larger incentive scheme including many conditions; one focused on asthma; eight focussed on diabetes. In asthma, the proportion receiving 'perfect care' (including providing a written action plan) increased

OPEN ACCESS

Citation: Jackson T, Shields MD, Heaney LG, Kendall M, Pearce CJ, Hui CY, et al. (2017) The impact of financial incentives on the implementation of asthma or diabetes self-management: A systematic review. *PLoS ONE* 12(11): e0187478. <https://doi.org/10.1371/journal.pone.0187478>

Editor: Emma Giles, Teesside University, UNITED KINGDOM

Received: March 23, 2017

Accepted: October 20, 2017

Published: November 6, 2017

Copyright: © 2017 Jackson et al. This is an open access article distributed under the terms of the [Creative Commons Attribution License](https://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Data Availability Statement: All relevant data are within the paper and its Supporting Information files.

Funding: TJ is funded by The University of Edinburgh CMVM PhD Studentship [Asthma UK Centre for Applied Research PHD/14/16]. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Competing Interests: The authors declare that there are no conflicts of interest.

from 4% to 88% in one study, and there were fewer hospitalisations/emergency department visits in another study. Across the diabetes studies, quality-of-care/GP performance scores improved in three, were unchanged in six and deteriorated in one.

Conclusions

Results for the impact of financial incentives for the implementation of self-management were mixed. The evidence in diabetes suggests no consistent impact on diabetic control. There was evidence from a single study of improved process and health outcomes in asthma. Further research is needed to confirm these findings and understand the process by which financial incentives may impact (or not) on care.

Trial registration

Protocol registration number: CRD42016027411

Introduction

The prevalence of long term conditions is increasing and supported self-management is a strategy to enable healthcare services to cope with this increase [1]. Self-management has been defined as ‘the tasks that individuals must undertake to live with one or more chronic conditions. These tasks include having the confidence to deal with medical management, role management and emotional management of their conditions’ [2]. A core responsibility of professionals and healthcare organisations is to provide support to enable people with long-term conditions to manage their own condition [3]. Asthma and diabetes are two long-term conditions with a robust evidence base for supported self-management [4, 5].

Asthma and diabetes in the United Kingdom

In the United Kingdom (UK), 3.6 million people are being treated for clinician-diagnosed asthma, costing £1.1 billion annually in healthcare resources [6]; globally up to 334 million people are affected [7]. Supported self-management, including education and personalised asthma action plans (PAAPs) have consistently been shown to improve asthma control, minimise exacerbations and reduce emergency use of healthcare resources [5, 8–10]. The British Guideline on the Management of Asthma recommends that all individuals with asthma should be provided with self-management education and offered a PAAP [11]. However, ownership of PAAPs remains low with only 24% of people with asthma in the UK reporting that they are in possession of a PAAP [12].

There are 3.5 million people in the UK who have been diagnosed with diabetes and approximately 1.1 million are as yet undiagnosed [13]. Self-management of diabetes, including lifestyle changes, adherence to medication, monitoring blood sugars and adjusting dosages accordingly can greatly improve quality of life. However, only 16% of individuals with diabetes were offered an education course when first diagnosed [14]. In the UK GPs are incentivised through the Quality Outcome Framework (QOF) to provide eight routine checks, as recommended by National Institute for Health and Care Excellence, to individuals with diabetes [15] but just 43.3% of individuals with Type 1 diabetes were receiving all eight of the recommended care processes in 2010–11 and this has further dropped to 36.5% in 2015–16 [16].

Financial incentive schemes

Physician focussed financial incentive schemes are a potential strategy for changing physician behaviour to improve quality of care which has recently been employed in national and local schemes [15, 17]. Financial incentives which place the physician at financial risk have been found to modify resource use (measured by hospitalisation rates and primary care visits) but the evidence investigating the impact of bonus payments shows mixed results in terms of impact [18]. Pay-for-performance can be effective in healthcare but providers should be involved with programme design and schemes need to be tailored to the setting [19] and patient population [20]. Incentives need to be tied to improvements in information systems and quality reporting standards [21]. Policy makers must remain aware of unintended consequences and carefully weigh potential benefits against the risks for their individual setting [22]. For example, general practitioners (GPs) interviewed about QOF highlighted the potential for reduced continuity of care, lack of attention to non-incentivised conditions and potential damage to healthcare professional's internal motivation [23].

There is therefore uncertainty about the appropriate models employed in financial incentive schemes and inconclusive insufficient evidence of their impact on quality of care [24]. This paper reports the findings of a systematic review describing the features of financial incentive schemes promoting supported self-management, and evaluating the impact of the schemes on quality of care, specifically organisational process outcomes, individual behavioural outcomes, and health outcomes.

Methods

Our protocol is available on PROSPERO, registration number: CRD42016027411 ([S1 Appendix](#)), and we followed the procedures described in the Cochrane Handbook for Systematic Reviews of Interventions [25]. The searches were run in November 2015 and updated in May 2017.

Search strategy

Our PICOS search strategy is shown in [Table 1](#). We searched eight databases: Cochrane Central Register of Controlled Trials (CENTRAL); Cochrane Database of Systematic Reviews (CDSR); MEDLINE; PsychInfo; CINAHL; ScienceDirect; Web of Science; Embase. We searched for asthma OR diabetes AND financial incentives AND self-management keywords ([S2 Appendix](#) gives a detailed search strategy) and did not restrict the date range. The bibliographies of all eligible studies were examined to identify potential studies for inclusion and we searched registries for studies in progress.

Study selection

One reviewer (TJ) conducted the searches in November 2015 and May 2017, 2,541 articles were identified ([Fig 1](#)). Two reviewers (TJ and HP) screened a random selection of 100 papers, compared and discussed decisions in order to reach agreement on the application of the inclusion/exclusion criteria. After this training process, one reviewer (TJ) screened the remaining titles and abstracts for potentially relevant papers. Full text screening was undertaken by two reviewers (TJ and CYH) independently. Uncertainties and disagreements were resolved in discussion with a third reviewer (HP). Reviewers achieved 100% agreement with articles selected for inclusion.

Table 1. PICOS search strategy.

COMPONENT	DESCRIPTION, INCLUSION/EXCLUSION CRITERIA
POPULATION	<ul style="list-style-type: none"> • Healthcare professionals incentivised (or whose organisation is incentivised) to provide self-management • Individuals with asthma or diabetes receiving care from an organisation which is receiving financial incentives
INTERVENTION	<ul style="list-style-type: none"> • Any financial incentive provided to a healthcare organisation and/or healthcare professionals that is designed to improve supported self-management in asthma or diabetes
COMPARISON	<ul style="list-style-type: none"> • Healthcare professionals not incentivised (or whose organisation is not incentivised) to provide self-management. • Individuals with asthma or diabetes who are receiving usual, non-incentivised care
OUTCOMES	<ul style="list-style-type: none"> • Organisational process: increase in quality of care, PAAP ownership and/or asthma/diabetes reviews • Disease control: decrease in exacerbations and/or hospitalisations, improved asthma/diabetes control • Individual behaviour: self-efficacy, activation, adherence to medication
SETTING	<ul style="list-style-type: none"> • Any healthcare setting
STUDY DESIGN	<ul style="list-style-type: none"> • Randomised controlled trials (RCTs) • Quasi-RCTs • Controlled before and after studies • Interrupted time series • Repeated measures

<https://doi.org/10.1371/journal.pone.0187478.t001>

Quality assessment

It was anticipated that most of the studies included would be reporting implementation studies, therefore we did not apply any methodological filters. In order to weight the papers which we expected would include a diverse range of methodologies, we adopted the approach of Pinnock 2015 [4] and papers were classified by robustness of study design, number of participants and the quality score (using Downs' and Black checklist [26]).

Outcomes

We defined our outcomes of interest in three categories:

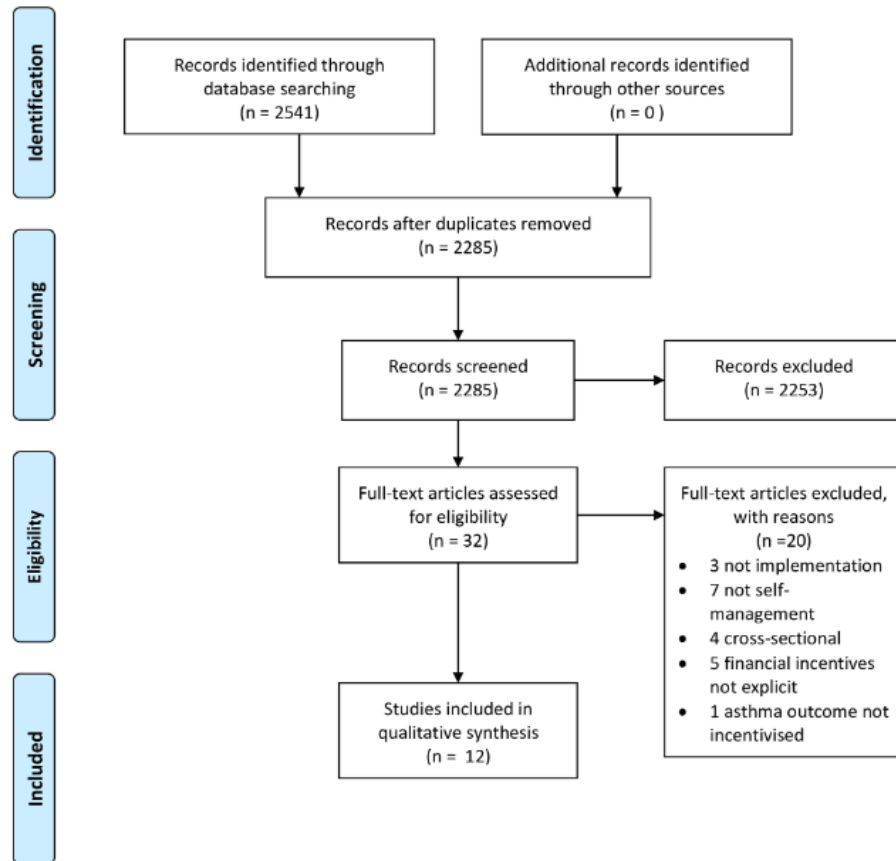
1. *Organisational process outcomes.* Specific examples are ownership of a personalised asthma action plan; attendance at patient training self-management courses for asthma or diabetes; attendance at reviews providing supported self-management of asthma or diabetes.
2. *Individual behavioural outcomes.* Examples include self-efficacy, activation, adherence to preventer medication, adherence to insulin regimes.
3. *Health outcomes.* Examples are symptom control, reducing asthma exacerbations, unscheduled care or use of emergency health services, and measuring glycaemic control for people with diabetes (glycated haemoglobin (HbA1c) levels reflect the overall glycaemic exposure over the previous 2–3 months) [27].

Data extraction

Data were extracted from included papers by two reviewers (TJ and CJP) using a previously piloted customised version of the Effective Practice and Organisation of Care (EPOC) Good Practice data extraction form [28]. The extracted data were then compared and disagreements resolved by discussion. We extracted details about the interventions under the following



PRISMA 2009 Flow Diagram



From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

For more information, visit www.prisma-statement.org.

Fig 1. Prisma 2009 flow diagram.

<https://doi.org/10.1371/journal.pone.0187478.g001>

headings: “setting”, “risk of bias assessment”, “participants”, “intervention groups”, “methods”, “outcomes” and “results”.

Linked papers of the included studies were checked for descriptions of interventions, nested qualitative studies, and process evaluations in order to supplement the information available and to provide context. All authors were contacted to ask if any follow up work had been conducted on their study and if they had any data available that were not included in the systematic review.

Analysis and synthesis

We anticipated substantial heterogeneity in study design and intervention [29]; meta-analysis was therefore not appropriate and a narrative synthesis was undertaken. Asthma and diabetes papers were analysed separately. We classified components of the interventions (e.g. whether the financial incentive was paid to the individual (self-employed) healthcare professional or to an organisation); whether payment was for achieving process standards (e.g. attendance at a diabetes course) or health outcomes (e.g. reduced unscheduled care). A matrix of interventions was developed with the interventions being shown to be effective or ineffective under the headings of: “organisational process”, “measure of disease control” and “individual behaviour”. We used Adams’ 2013 framework, which has been specifically designed for documenting financial incentive interventions [30]. The framework contains nine domains which we used to identify the features and describe the schemes in detail. These domains are: direction (positive reward or avoidance of penalty), form (cash or healthcare costs), magnitude (total value of incentive available to participant), certainty (certainty of receiving payment if behaviour is successfully changed: certain, certain chance or uncertain chance), target behaviour (process, intermediate or outcome), frequency of reward (all or some instances incentivised), immediacy (time between behaviour and payment), schedule (fixed or variable), and recipient(s) of incentives (clinicians).

We synthesised our results in the form of Harvest Plots, as they are a useful method for illustrating the different effects of interventions because they represent all relevant data in one plot [31]. In a Harvest plot, each bar represents an individual study, the bar colour indicates the study design, the bar height reflects the number of participants in the study and the number reflects the Downs and Black quality score.

Results

From the 2,541 papers found, 12 papers were eligible for the systematic review (Fig 1 is the PRISMA diagram with details of the selection process).

Study characteristics

The 12 papers were published between 2004–2017, seven were conducted in the United States of America [32–38], four in the UK [39–42] and one in Canada [43]. One study reported on an asthma-only scheme [36], three focused on diabetes-only schemes [32, 33, 43] and the remaining eight looked at diabetes within a multiple condition scheme [34, 35, 37–42].

Risk of bias of included studies

There were problems with allocation concealment, selection bias, purposive sampling, random sequence generation and selective outcome reporting in the selected studies. We used Review Manager 5.3 to record and generate the risk of bias summary figure for the included studies (S1 Fig). Beck’s [32] participants had volunteered to take part in the intensive case

management programme and the control group were those who had chosen not to, creating a non-randomised, biased sample biased by willingness to participate. Conrad's [34] participating group were selected by the Health Insurer, Fagan's [35] participants were selected by the managed care organisation as they had a "leadership which was willing to champion the proposed quality improvement initiative" and Gulliford's [39] participants were a self-selected group that agreed to participate in an evaluation of diabetes care. Due to the nature of financial incentive schemes, participant blinding is not an option so that allocation concealment was an important source of bias.

Study quality and weight of evidence

The study designs varied (Fig 2) and included: five quasi-experimental [32–35, 37]; three interrupted time series [38, 40, 42]; two longitudinal [39, 43]; one repeated measures [36] and one controlled before and after study [41].

The quality scores ranged from 10 to 18 (Table 2). In common with other reviews assessing the quality of implementation studies [44], we observed that some questions in the Downs' and Black checklist [26] were not applicable to studies involving financial incentives. For example, blinding of participants is not relevant in schemes which rely on publicity to promote financial incentives awarded for achieving pre-set targets. Similarly, questions regarding the randomisation process were not applicable to many of the quasi-experimental studies.

The size of the studies, in terms of patients, varied widely from 16 children admitted to hospital with an episode of diabetic ketoacidosis who elected to participate in the scheme [32] to 1,174,294 patients with diabetes whose health insurance company, PacifiCare, trialled a pay-

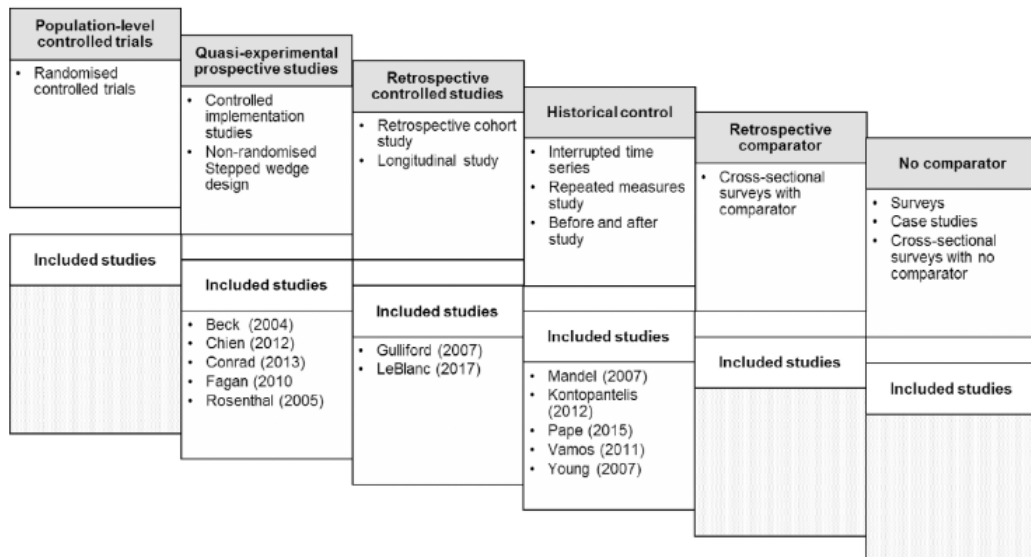


Fig 2. Hierarchy of included studies. Hierarchy based on: randomisation and status of comparator groups; prospective/retrospective design. These categories overlap and other factors will influence the robustness of the evidence (adapted for this review from Pinnock 2015 [4]).

<https://doi.org/10.1371/journal.pone.0187478.g002>

Table 2. Characteristics of included studies.

Author, date, country, LTC, intervention length	Design, participants and quality	Intervention (domains of financial incentives framework ²) Recipient = clinician for all studies	Comparison group	Results (all statistics details given where available)	Impact
Beck (2004) USA Diabetes 1–15 months	Quasi-experimental. 1 hospital, 16 paediatric patients who had an incident of diabetic ketoacidosis. Quality score = 15	Pediatric Diabetes Intensive Case Management • Direction: avoidance of penalty • Form: healthcare costs • Magnitude: variable • Chance: uncertain • Target: process • Frequency: all instances incentivised • Immediacy: unclear • Schedule: variable	Participants who opted out of intervention	Organisational process Programme participation • Participants greater telephone contact (16 crisis management calls vs 0; $p = 0.001$) Disease control Hospital admissions • Decrease in hospital admissions from intervention group (1 emergency department visit or diabetic ketoacidosis episode vs 5 diabetic ketoacidosis hospitalisations; $p = 0.039$)	Positive for all outcomes
Chien (2012) USA Diabetes 5 years	Quasi-experimental. 118 practices, 5557 patients with diabetes Quality score = 13	Hudson Health Plan P4P program • Direction: positive reward • Form: cash • Magnitude: % of fee schedule • Chance: certain • Target: process • Frequency: all instances incentivised • Immediacy: annually • Schedule: fixed	Medicaid-focused health plans within New York	Organisational process HbA1c testing Intervention group • HbA1c testing: 2003 = 84% & 2004 = 85%, 2006 = 86% & 2007 = 91% Control Group • HbA1c testing: 2003 = 83% & 2004 = 85%, 2006 = 86% & 2007 = 87% Disease control HbA1c levels Intervention group • HbA1c <9b: 2003 = 36% & 2004 = 35%, 2006 = NA & 2007 = 32% Control group • HbA1c <9b: 2003 = 43% & 2004 = 38%, 2006 = NA & 2007 = 33% (The coefficient on intervention*post (difference in difference) was reported as not significant in these results, no p value provided.)	No significant effect on either outcome
Conrad (2013) USA Diabetes 4 years	Quasi-experimental. 19 medical groups, 21,365 patients Quality score = 10	Washington state P4P scheme • Direction: positive reward • Form: cash • Magnitude: % of revenue • Chance: certain • Target: process • Frequency: some instances incentivised • Immediacy: annually • Schedule: variable	5 Medical groups not part of the QSC or QIP (not randomised)	Organisational process HbA1c testing Quality Incentive Programme • regression results: 2003–04 = -0.001 & 2005–07 = -0.04 Quality scorecard • regression results: 2003–04 = -0.019 & 2005–07 = -0.004	Negative
Fagan (2010) USA Diabetes 12 months	Quasi-experimental. 20,943 65+ year old patients. Quality score = 16	Chronic care improvement initiative consisting of P4P practice-based care co-ordination • Direction: positive reward • Form: cash • Magnitude: % of capitation fee • Chance: certain • Target: process • Frequency: some instances incentivised • Immediacy: annually • Schedule: variable	No financial incentive but retained a call centre disease management program	Organisational process HbA1c testing • Intervention Group—Odds ratio = 1.66; 95% CI (1.14, 2.43) • Comparison Group—Odds ratio = 3.76; 95%CI (3.42, 4.13) • Intervention relative to Comparison—Odds ratio = 0.44; 95%CI (0.30, 0.65)	No effect

(Continued)

Table 2. (Continued)

Author, date, country, LTC, intervention length	Design, participants and quality	Intervention (domains of financial incentives framework ²) Recipient = clinician for all studies	Comparison group	Results (all statistics details given where available)	Impact
Gulliford (2007) UK Diabetes 12 months	Longitudinal. 26 general practices, 2099 patients. Quality score = 17	Quality Outcome Framework (QOF) • Direction: positive reward • Form: cash • Magnitude: Set £ value per point • Chance: certain • Target: process • Frequency: some instances incentivised • Immediacy: annually • Schedule: variable	Pre QOF	Organisational process HbA1c testing • HbA1c recorded in year (mean): 2000 = 60, 2001 = 72, 2002 = 80, 2003 = 78, 2005 = 95 Disease control HbA1c levels • HbA1c <7.4% (mean): 2000 = 22, 2001 = 32, 2002 = 37, 2003 = 38, 2005 = 57 • HbA1c <10% (mean): 2000 = 52, 2001 = 64, 2002 = 70, 2003 = 72, 2005 = 89 (No further statistics provided on these outcomes)	Positive for both outcomes
Kontopantelis (2012) UK Diabetes 6 years	Interrupted time series. 148 practices, 23,920 patients. Quality score = 17	Quality Outcome Framework (QOF) • Direction: positive reward • Form: cash • Magnitude: Set £ value per point • Chance: certain • Target: process • Frequency: some instances incentivised • Immediacy: annually • Schedule: variable	Pre QOF	Organisational process HbA1c testing • HbA1c recorded in year (SD): 2000/1 = 71.1 (45.3), 2001/2 = 77.9 (41.5), 2002/3 = 82.8 (37.7), 2003/4 = 89.2 (31.1), 2004/5 = 93.0 (25.5), 2005/6 = 93.7 (24.3), 2006/7 = 93.5 (24.6) Disease control HbA1c levels • HbA1c <7.4% (SD): 2000/1 = 45.5 (49.8), 2001/2 = 48.4 (50.0), 2002/3 = 50.2 (50.0), 2003/4 = 52.2 (50.0), 2004/5 = 55.6 (49.7), 2005/6 = 56.4 (49.6), 2006/7 = 59.3 (49.1) • HbA1c <10% (SD): 2000/1 = 88.5 (31.9), 2001/2 = 90.4 (29.4), 2002/3 = 90.8 (28.9), 2003/4 = 91.8 (27.4), 2004/5 = 92.6 (26.3), 2005/6 = 92.5 (26.3), 2006/7 = 92.7 (26.0)	Positive for both outcomes
LeBlanc (2017) Canada Diabetes 10 years	Longitudinal. 583 physicians, 83,580 adult patients Quality score = 13	New Brunswick P4P Scheme • Direction: positive reward • Form: cash • Magnitude: set \$ value per patient • Chance: certain • Target: process • Frequency: all instances incentivised • Immediacy: ongoing • Schedule: fixed	Pre-incentive scheme	Organisational Process HbA1c testing • <2 HbA1c tests per year: univariate model OR = 1.16 (p<0.0001); 99%CI (1.11, 1.20). Multivariate model OR = 1.23 (p<0.0001); 99%CI (1.18, 1.28) Disease control HbA1c levels • All patients: univariate model OR = 0.00; 99%CI (-0.03, 0.02). Multivariate model OR = -0.01; 99%CI (-0.03, 0.02) • HbA1C 6.5% to 7.0%: univariate model OR = -0.02 (p<0.0001); 99%CI (-0.04, 0.01). Multivariate model OR = -0.02 (p<0.0001); 99%CI (-0.04, 0.01) • HbA1C 7.1% to 8.9%: univariate model OR = 0.03; 99%CI (-0.01, 0.08). Multivariate model OR = 0.02; 99%CI (-0.02, 0.06) • HbA1C ≥9%: univariate model OR = 0.04; 99%CI (-0.06, 0.15). Multivariate model OR = 0.00; 99%CI (-0.10, 0.10)	Positive organisational process No effect for disease control
Mandel (2007) USA Asthma 26 months	Repeated measures. 44 paediatric practices 13 380 children. Quality score = 16	Cincinnati Children's Hospital Medical Center asthma improvement collaborative • Direction: positive reward • Form: cash • Magnitude: % of fee schedule • Chance: certain • Target: process • Frequency: some instances incentivised • Immediacy: unclear • Schedule: variable	Pre-incentive scheme	Organisational process Asthma action plan ownership. • 19 (70%) achieved the 80% threshold for the PAAP. The cumulative percentage of the network all-payer asthma population receiving "perfect care" increased from 4% to 88%, with 18 of 44 practices (41%) achieving a perfect care percentage of 95% or greater (no statistics reported)	Positive

(Continued)

Table 2. (Continued)

Author, date, country, LTC, intervention length	Design, participants and quality	Intervention (domains of financial incentives framework ²) Recipient = clinician for all studies	Comparison group	Results (all statistics details given where available)	Impact
Pape (2015) UK Diabetes 1 year	Before and after study. 1 primary care trust, 6,142 patients. Quality score = 18	Quality Outcome Framework "stretch" scheme (QOF+) • Direction: positive reward • Form: cash • Magnitude: Set £ value per point • Chance: certain • Target: process • Frequency: some instances incentivised • Immediacy: annually • Schedule: variable	Pre QOF+	Disease control HbA1c levels HbA1c of <8%: • Exception reporting Baseline = 0.085, Secular trend effect = 0.001 (p = 0.910), QOF+ baseline = 0.060 (p = 0.018) • Controlled Patients Baseline = 0.725, Secular trend effect = 0.015 (p = 0.005), QOF+ baseline = 0.002 (p = 0.968) HbA1c of <9%: • Exception reporting Baseline = 0.062, Secular trend effect = 0.001 (p = 0.891), QOF+ baseline = 0.043 (p = 0.049) • Controlled Patients Baseline = 0.822, Secular trend effect = 0.015 (p = 0.002), QOF+ baseline = 0.003 (p = 0.934)	No effect
Rosenthal (2005) USA Diabetes 1 year	Quasi-experimental. 205 physician groups, 1,174,294 patients. Quality score = 18	PacificCare P4P program • Direction: positive reward • Form: cash • Magnitude: set \$ value per patient once target met • Chance: certain • Target: process • Frequency: some instances incentivised • Immediacy: quarterly • Schedule: fixed	Same performance figures but no financial incentives	Organisational process HbA1c testing Intervention group • Pre Quality Incentive Programme—62.0%, after QIP 64.1%, • Difference (Post-pre), 2.1% (SE 1.0) • P value .02 Control group • Pre Quality Incentive Programme—62.0%, after QIP 64.1%, • Difference (Post-pre), 2.1% (SE 1.0) • P value .02	No effect
Vamos (2011) UK Diabetes 1 year	Interrupted time series. 422 general practices 154 945 patients. Quality score = 15	Quality Outcome Framework (QOF) • Direction: positive reward • Form: cash • Magnitude: Set £ value per point • Chance: certain • Target: process • Frequency: some instances incentivised • Immediacy: annually • Schedule: variable	Pre-QOF	Organisational process HbA1c measured • HbA1c measured (95% CI)- 1997, by quintile: 32.8 (31.8–33.7), 31.2 (30.2–32.0), 34.6 (33.7–35.6), 32.2 (31.2–33.0), 37.7 (36.7–38.7) • HbA1c measured (95% CI)- 2005, by quintile: 74.0 (73.4–74.6), 76.4 (75.8–76.9), 77.3 (76.7–77.8), 73.9 (73.3–74.5), 76.2 (75.6–76.8) Disease control HbA1c mean levels • HbA1c mean (95% CI)- 1997, by quintile, 7.6 (7.5–7.7), 7.6 (7.5–7.7), 7.7 (7.6–7.8), 7.5 (7.4–7.6), 8.2 (8.1–8.3) • HbA1c mean (95% CI)- 2005, by quintile, 7.5 (7.5–7.5), 7.4 (7.4–7.4), 7.4 (7.4–7.4), 7.5 (7.4–7.5), 7.4 (7.4–7.5) • Baseline proportion of patients meeting HbA1c <7.0% in 1997: 35.3, 95% CI = 31.0–39.7, p<0.05 • Annual change before introduction of P4P: 2.0, 95% CI = 1.3–2.7, p<0.05 • Annual change in the year P4P introduced: 0.8, 95% CI = -1.8–3.5, • Annual change after P4P was introduced: -2.2, 95% CI = -4.0–-0.4, p<0.01	No effect

(Continued)

Table 2. (Continued)

Author, date, country, LTC, intervention length	Design, participants and quality	Intervention (domains of financial incentives framework*) Recipient = clinician for all studies	Comparison group	Results (all statistics details given where available)	Impact
Young (2007) USA Diabetes 2 years	Interrupted time series. 334 Primary care physicians, unknown number of patients. Quality score = 16	Rochester (New York) Individual Practice Association P4P program <ul style="list-style-type: none"> • Direction: positive reward % avoidance of penalty • Form: cash • Magnitude: % of incentive pool comprised of % of physician fees • Chance: certain • Target: process • Frequency: some instances incentivised • Immediacy: annually • Schedule: variable 	Pre-incentive scheme	Organisational process HbA1c testing <ul style="list-style-type: none"> • Adherence rates: mean (SD) pre-intervention: 1999 = 0.56 (0.23), 2000 = 0.57 (0.19), 2001 = 0.59 (0.17) • Adherence rates: mean (SD) post-intervention: 2002 = 0.62 (0.17), 2003 = 0.61 (0.18), 2004 = 0.63 (0.18) • Change in adherence rate: 2000–2001 = 0.018; 2001–2002 = 0.026, p<0.05 • Difference in rate of change (2001–2000) (vs (2002–2004) = 0.009 (no p value given) 	No effect

P4P = Pay for performance HbA_{1c} = glycated haemoglobin

* **Financial incentive framework (1) consists of 9 domains:** **Direction**- whether the reward is positive gain or avoidance of negative penalty; **Form**- nature of incentive e.g. cash, vouchers etc.; **Magnitude**-value of incentive available to participant; **Certainty**- likelihood of receiving incentive if behaviour changes; **Target**- type of behaviour being targeted; **Frequency**- number of instances of behaviour that are incentivised; **Immediacy**- how soon after the behaviour the incentive is provided; **Schedule**- whether the incentive amount its fixed or variable; **Recipient**- who is in receipt of incentives

<https://doi.org/10.1371/journal.pone.0187478.t002>

for-performance scheme in their California medical groups and compared results to their medical practices in Oregon and Washington [37]. In these cluster randomised implementation studies, the total number of eligible patients was not always clear. We contacted three authors: two were able to confirm patient numbers [37, 41] and one was not [38]. However, from the number of physicians in this latter study we were able to estimate the number of patients.

The overall weightings [4] which reflect the robustness of the study design (Fig 2), number of participants and quality score are summarised in Table 2.

Features of the financial incentive schemes

Table 2 describes the characteristics of the studies; the key features of the schemes mapped to the financial incentive framework for documenting financial incentive interventions to change health behaviours [30] are listed in the “Intervention” column. The studies are described below using the domains of this framework.

Direction and form. One scheme used avoidance of penalty [32], ten studies used positive rewards [33–37, 39–43] and one study used a mixture of avoidance of penalty and positive rewards [38] as the reward component of the incentive scheme. One study looked at a reimbursement scheme in which the insurance company refunded practices for preventative self-management education costs [30], the remaining eleven schemes were cash incentives paid to the clinicians or practice for achieving targets [33–43].

Magnitude and certainty. One study looked at a scheme which paid a financial incentive for each HbA_{1c} test that was completed [33]. One study described a scheme which involved receiving a payment for each performance target met or exceeded [37]. One study described a scheme where physicians were paid a set amount per patient that received two HbA_{1c} tests per year [43]. Eight studies looked at a target achievement scheme where there were pre-set “percentage of patients” targets that physicians had to achieve in order to receive the financial

incentive [34–36, 38–42] and ten studies had ‘certain’ incentives if practices successfully achieved targets [33, 35–43]. One scheme had an ‘uncertain’ chance of receiving the financial incentive if they changed their behaviour at the start of the scheme (years 2003–2004) as the payments were only paid to top scoring groups [34]. In the second phase of the scheme (years 2005–2007) this was altered and all groups had a certain chance of receiving a payment if they changed their behaviour. Beck’s 2004 [32] study of children with diabetes in Oklahoma had an uncertain chance of receiving a return on the amount spent on the incentive case management scheme, it depended on whether, and how many times, the participant was rehospitalised.

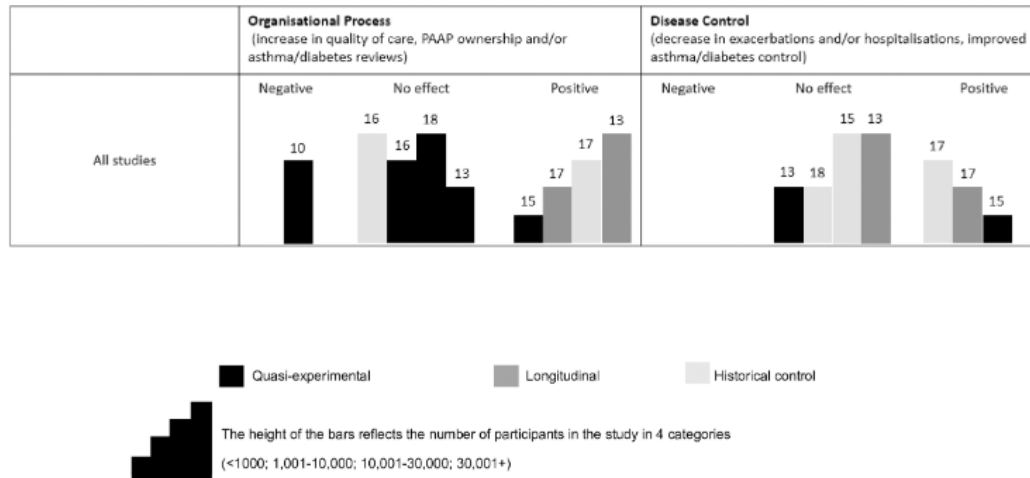
Target and frequency. All schemes [30–43] focussed on “process” behaviours, these are clinician actions that are likely to improve health outcomes. All of the studies included in this review were assessing the impact of financial incentives on clinician behaviour. There were four studies that focussed on a single condition, asthma or diabetes [32, 33, 36, 43]. Three of which reported a positive impact on supported self-management behaviour: Beck 2004 [32] (quasi-experimental, 1 hospital, 16 children, D&B = 15); LeBlanc 2017 [43] (longitudinal, 583 physicians, 83,580 adult patients, D&B = 13) and Mandel 2007 [36] (repeated measures, 44 practices, 13,380 children, D&B = 16). The final study, Chien 2012 [33] (quasi-experimental, 118 practices, 5,557 participants, D&B = 13), showed no effect. The rest of the studies looked at multiple condition schemes which included diabetes and reported a mixture of positive results [39, 40], no effect [35, 37, 38, 41, 42] and a negative outcome was reported by Conrad 2013 [34] (quasi-experimental, 19 medical groups, 21, 365 patients, D&B = 10). Two schemes [32, 33] incentivised all instances of the behaviour and the remaining studies had some instances incentivised as they had to reach percentage targets [34–42].

Immediacy and schedule. The financial incentive framework [30] defines immediacy as how soon the recipient receives the incentive payment after the behaviour. If the time between behaviour and reward is too long, recipients may not link the two and the incentive will fail to be effective. Eight of the included schemes paid incentives on an annual basis [33–35, 38–42]. Two studies reported an explicit link between performance and payment; Rosenthal 2005 [37] described a scheme which paid a quarterly bonus of \$0.23 per member per month for each performance target that was met or exceeded by the physician group and Chien 2012 [33] reporting practices receiving \$100 for each patient for which missing care processes were completed. It was unclear in the article by LeBlanc (2017) [43] when the physicians received the payment for achieving the target of two HbA1c tests per year.

In the only asthma study included [36], the Cincinnati asthma improvement collaborative comprised of three stages with two different payment phases: all awards were assessed on 31 December 2004 and first-level fee schedule increases implemented from 1 May 2004 through to 31 December 2005; second and third-level fee schedule increases effective from 1 March 2005, through to 31 December 2005.

Beck 2003 [32] developed a 15-month scheme with a less tangible reward of reduced healthcare costs where they calculated financial impact of participation in the programme versus the healthcare costs per participant and non-participant.

Recipients. Although all studies looked at a financial incentive paid to either the clinician or the practice, the papers differed in the way in which they reported numbers of study participants: nine articles noted number of patients [32–35, 39, 40, 42, 43]; seven referred to the number of practices/medical groups [33–37, 39, 40, 42, 43]; one study discussed a primary care trust (administrative body responsible for primary healthcare services in England) [41] and one discussed number of physicians [38]. Fagan [35] described an intervention for individuals with diabetes aged 65 years plus, two studies focussed on a targeted population of children [32, 36] and Chien 2012 [33] evaluated the impact of a scheme where lower socio-economic populations were targeted.



The height of the bars reflects the number of participants in the study in 4 categories (<1000; 1,001-10,000; 10,001-30,000; 30,001+)

Fig 3. Harvest plot. Illustrating the impact of financial incentives schemes on organisational process and disease control outcomes. Notes: Each bar represents an individual study. The colour of the bar indicates the study design, the height of the bar reflect the number of participants in the study and the number is the Downs and Black quality score. The decisions that underpin this plot are detailed in S1 Table.

<https://doi.org/10.1371/journal.pone.0187478.g003>

Impact of the schemes on process, behavioural and health outcomes

Table 2 summarizes the key findings from each of the studies and Fig 3 illustrates our synthesis with supporting information in S1 Table.

Organisational process. One study described an asthma improvement collaborative in Cincinnati [36] (repeated measures, 44 practices, 13,380 children, D&B = 16) which consists of a three level reward system. Practices had to reach a set target in each level in order to be eligible to proceed to the next level. Written action plans for patients with asthma were part of the criteria for the third level of the reward system. Authors concluded that the asthma pay-for-performance scheme had a positive impact on the proportion of patients with asthma receiving “perfect care” which increased from 4% before the intervention to 88% after. “Perfect care” was assessed on performance of components including: provision of a written action plan; provision of controller medication (if required); and recording patients’ control based on National Heart, Lung, and Blood Institute guideline recommended classification.

Nine studies reported proportion of patients who received HbA1c tests [33–35, 37–40, 42, 43]. Six reported that the financial incentive scheme had no effect [33, 35, 37, 38, 42], three reported that financial incentives had a positive effect on increasing frequency of HbA1c testing [39, 40, 43] and one study reported negative impact on the number of HbA1c tests performed [34]. Fagan 2010 [35] (Quasi-experimental, 20,943 65+ year old patients, D&B = 16) found that although the intervention group improved, it did not improve as much as the comparison group; the authors concluded that the study did not generate significant evidence to support a pay for performance scheme.

Chien [33] (quasi-experimental, 118 practices, 5,557 participants, D&B = 13) found no statistically significant improvement in patterns of care or clinical outcomes. They identified that younger adults and those with more comorbidities were less likely to receive recommended care and experienced a diabetes-related emergency department visit more often. However, two studies noted that practices in lower socio-economic status areas require additional support to overcome barriers [37, 39].

Disease control. Six studies reported on test results for HbA1c levels [33, 39–43], with four studies reporting no effect [33, 41, 42] and two reporting a positive effect [39, 40]. One study evaluated an intensive case management scheme offered to 16 children who had been hospitalised after an incident of diabetic ketoacidosis [32]. They reported that participation in the intensive program was associated with fewer hospitalisations resulting in lower costs for participants (\$1063 per individual) than non-participants (\$2396 per individual).

Individual behavior. None of the studies reported on self-efficacy, activation or adherence to medication which we had classified as “individual behaviour”.

Discussion

Statement of principal findings

A total of 12 papers (three diabetes; one asthma; eight multiple condition schemes including diabetes but not asthma) reporting on self-management interventions met the inclusion criteria and were included in the review. The impact of financial incentives paid to healthcare professionals for implementing self-management to patients with asthma or diabetes is inconsistent. Although most showed no effect [33, 35, 37, 38, 41, 42, 43] or a positive impact [32, 36, 39, 40, 43] on organisational process or disease control outcomes, one study targeting organisational processes showed a negative effect on the proportion of people with HbA1c testing [34]. We found no articles which analysed the impact of financial incentives on individual behaviour outcomes.

Interpretation of findings in relation to previously published work

The schemes targeted a range of organisational and health outcomes including: programme participation, asthma action plan ownership, HbA1c testing, HbA1c level testing and hospitalisations. However, we did not find any studies matching our inclusion criteria which looked at individual behavioural outcomes, identifying a gap in the research literature. For the organisational process outcomes five of the studies reported positive results [32, 36, 39, 40, 43], five reported no statistically significant effect [33, 35, 37, 38, 42] and one reported that the financial incentive scheme had a negative impact on results [34]. In the studies targeting disease control outcomes; three reported positive effects [32, 39, 40] and four reported no effect [33, 41, 42, 43]. Effective implementation strategies involve a multifaceted approach accommodating patient, professional and organisational aspects [5] but financial incentive schemes do not incorporate all of these aspects. Typically, they focus on the professionals, the organisations, or the patients separately but do not take a whole systems approach which proposes that all of these aspects require inclusion for successful implementation.

The financial incentives schemes were diverse and incorporated features across all the domains of the financial incentives framework (1). It was difficult to draw conclusions on which type of scheme was the most effective in changing healthcare professionals' behaviour in relation to providing supported self-management to individuals with asthma or diabetes. Four of the studies that reported no statistically significant effect noted that the magnitude of the financial incentive might have contributed to the lack of effect [33–35, 37]. If the health

care professional deems the size of the incentive potentially too modest for the effort and money spent on achieving the target, they are unlikely to change their behaviour.

The one negative result is a reminder that providing financial incentives may have unintended consequences and the implementation of financial incentive schemes must be approached with caution. Previous work has identified the potential negative impact of financial incentives schemes and produced a checklist to prevent inappropriate implementation [45]. Glazsiou's checklist consists of nine questions and is divided into two parts "Part A: Is a financial incentive appropriate?" and "Part B: Implementation". All six questions in Part A must be answered yes before continuing to considering implementation in Part B. One question in the checklist addresses the potential for unintended consequences and specifically highlights harm to the patient-clinician relationship. They provide evidence from a report showing that some UK clinicians became reluctant to register patients with complex poorly controlled conditions that would make it difficult for them to achieve their QOF targets [46]. Within QOF guidelines, practices are able to exclude patients from their reporting if the intervention was considered inappropriate, or was declined by the patient. Two studies identified overuse of 'exception reporting' as a strategy for potentially achieving more favourable results [39, 41]. Gulliford 2007 [39] raised concerns that an increase in 'excepted' cases was a potential reason for high QOF achievements. Pape [41] found that with the introduction of QOF+ (a UK scheme with more ambitious targets than the national QOF scheme), 'exception reporting' increased significantly in the indicators for HbA1c and concluded that financial incentives schemes had no significant effect.

When applying the financial incentives framework [30] to schemes for clinicians, the 'Recipient' domain does not take into consideration the patient population and whether the scheme was targeted at a specific population, for example lower socio-economic status was a population identified by two authors as having barriers which require additional support [37, 39]. Glazsiou's checklist for implementing a financial incentive scheme identifies the importance of understanding and assessing potential barriers to changing clinician behaviours [45]. Evidence has shown that while financial incentives have the potential to reduce the inequalities in achievement related to area deprivation, differences do still exist [47], these must therefore be considered when designing future financial incentives schemes aimed at clinician behaviour.

The number of conditions in the scheme, a domain not included in the financial incentives framework [30], was not consistently associated with positive or negative findings and further research is required into whether an incentive scheme focussing on a single condition rather than multiple conditions would produce more positive results.

Strengths and limitations

The heterogeneity of methodologies used in studies investigating financial incentives paid to health care professionals for providing self-management education to their patients with asthma or diabetes made it difficult to compare studies. Therefore, we adopted the approach of Pinnock 2015 [4] and classified papers by methodology robustness, number of participants and quality score. A number of questions on the quality checklist employed in this review [26] were not appropriate for the papers included which led to low quality scores. A recently published quality checklist for reporting implementation studies may provide a framework better able to assess the quality of implementation research [29].

All studies were conducted in either the United States of America, Canada or the UK which limits the generalisability of the findings. Research looking at financial incentives aimed at healthcare professionals uses self-reporting data which presumes that all information provided is accurate and truthful.

All the studies were nonrandomised studies which are inherently more biased than randomised control trials [48], though the risk of bias in the included studies was assessed as low or unclear in the majority of the studies. Selection bias, purposive sampling, and selective outcome reporting were also identified in the selected studies.

We were unable to complete funnel plots to measure the extent of publication bias as we conducted a narrative analysis not a meta-analysis due to the heterogeneity of the study designs. However, the results of the included studies were a mixture of positive, no effect and negative on health and process outcomes in self-management of asthma or diabetes which suggests that there was not a high percentage of publication bias [49].

Time and resource constraints meant that the initial screening of title and abstracts was conducted by a single reviewer. However, training and quality assessment were undertaken on 5% of title/abstracts screened to reduce subjectivity and minimise potential inaccuracies. Full text screening and data extraction was completed by two reviewers.

Implications for future research, clinical care and policy

The limited number of studies investigating the impact of financial incentives on the implementation of asthma or diabetes self-management identifies a gap in the literature where further research is required. In particular, we only identified one study investigating the impact of financial incentives on the implementation of asthma self-management [36]. There is a further gap in research assessing the impact of financial incentives paid to healthcare professionals, on behavioural outcomes such as self-efficacy, activation or adherence to medication; no studies were identified in this area.

Further research is needed to confirm findings and understand the process by which financial incentives impact (or not) on care. Determinants of how financial incentives impact on organisation of care and health outcomes are multifactorial and complex. Results from this systematic review show that as well as money, there are other factors influencing healthcare professionals' behaviour in delivering self-management for asthma and diabetes. Smaller practices may lack the infrastructure that is required to improve quality of care [38] and practices with a patient population of low socioeconomic status face barriers that make financial incentives schemes less effective in these areas [37, 39]. The use of 'exception reporting' for individuals who do not meet QOF (or other financial incentives scheme's) guidelines needs to be monitored to ensure that individuals who require specialised, complex or more critical care are not being overlooked. When producing incentive schemes designers need to consider: the existing infrastructure in the organisation; target populations; the size of the incentive and time; effort and resources required to implement change; as well as unintended consequences.

Conclusion

The evidence provided in this systematic review showed mixed results for whether financial incentives have an impact on behaviour change in healthcare professionals to provide self-management to individuals with asthma or diabetes. Due to the diversity of the schemes, it is difficult to draw conclusions on what aspects of the incentives are most effective. However, size of financial incentives, exception reporting and socio-economic status of patient population were all reported as being influential. The number of conditions in an incentive scheme, i.e. targeted on one condition or multiple condition scheme, was not associated with the success of the scheme. Further research is required in order to understand the complex nature of behaviour changing interventions on healthcare professionals in relation to increasing self-management in individuals with asthma or diabetes.

Supporting information

S1 Appendix. Published protocol.
(PDF)

S2 Appendix. Search strategy for identification of studies for financial incentives in relation to self-management of asthma or diabetes.
(PDF)

S1 Table. Supporting information for Harvest plots.
(PDF)

S2 Table. PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) checklist.
(PDF)

S1 Fig. Risk of bias summary.
(TIF)

Acknowledgments

The authors acknowledge and thank the assistance and support of Marshall Dozier, Senior Liaison Librarian for the College of Medicine and Veterinary Medicine, The University of Edinburgh and Richard Parker, Senior Statistician at the Health Services Research Unit, The University of Edinburgh.

Author Contributions

Conceptualization: Tracy Jackson, Michael D. Shields, Liam G. Heaney, Hilary Pinnock.

Formal analysis: Tracy Jackson, Christina J. Pearce, Chi Yan Hui, Hilary Pinnock.

Funding acquisition: Michael D. Shields, Liam G. Heaney, Hilary Pinnock.

Investigation: Tracy Jackson, Christina J. Pearce, Chi Yan Hui, Hilary Pinnock.

Methodology: Tracy Jackson, Michael D. Shields, Liam G. Heaney, Marilyn Kendall, Hilary Pinnock.

Project administration: Tracy Jackson.

Supervision: Michael D. Shields, Liam G. Heaney, Marilyn Kendall, Hilary Pinnock.

Validation: Tracy Jackson, Christina J. Pearce, Chi Yan Hui, Hilary Pinnock.

Visualization: Tracy Jackson, Hilary Pinnock.

Writing – original draft: Tracy Jackson, Hilary Pinnock.

Writing – review & editing: Tracy Jackson, Michael D. Shields, Liam G. Heaney, Marilyn Kendall, Christina J. Pearce, Chi Yan Hui, Hilary Pinnock.

References

1. Coultter A, Roberts S, Dixon A. Delivering better services for people with long-term conditions. The King's Fund; 2013. Available from: https://www.kingsfund.org.uk/sites/files/kf/field/field_publication_file/delivering-better-services-for-people-with-long-term-conditions.pdf.
2. Corrigan JM, Groiner AC, Adams K, editors. 1st Annual Crossing the Quality Chasm Summit: A focus on communities. Washington DC: National Academies Press; 2004.

3. Pearce G, Parke HL, Pinnock H, Epiphaniou E, Bourne CL, Sheikh A, Taylor SJ. The PRISMS taxonomy of self-management support: derivation of a novel taxonomy and initial testing of its utility. *Journal of health services research & policy*. 2016 April; 21(2): p. 73–82.
4. Pinnock H, Epiphaniou E, Pearce G, Parke H, Greenhalgh T, Sheikh A, et al. Implementing supported self-management for asthma: a systematic review and suggested hierarchy of evidence of implementation studies. *BMC Medicine*. 2015 June; 13(1): 127. <https://doi.org/10.1186/s12916-015-0361-0> PMID: 26032941
5. Taylor SJ, Pinnock H, Epiphaniou E, Pearce G, Parke HL, Schwappach A, et al. A rapid synthesis of the evidence on interventions supporting self-management for people with long-term conditions: PRISMS—Practical systematic Review of Self-Management Support for long-term conditions. *Health Services and Delivery Research*. 2014 December; 2(53). <https://doi.org/10.3310/hsdr02530>
6. Mukherjee M, Stoddart A, Gupta RP, Nwaru BI, Farr A, Heaven M, et al. The epidemiology, healthcare and societal burden and costs of asthma in the UK and its member nations: analyses of standalone and linked national databases. *BMC Medicine*. 2016 August 29; 14(1): p. 113 <https://doi.org/10.1186/s12916-016-0657-8> PMID: 27568881
7. Global Asthma Network. The Global Asthma Report. Global Asthma Network. 2014. Available from: <http://www.globalasthma-report.org>. Cited October 2016.
8. Pinnock H, Parke HL, Panagioti M, Daines L, Pearce G, Epiphaniou E, et al. Systematic meta-review of supported self-management for asthma: a healthcare perspective. *BMC Medicine*. 2017 March; 15(64). <https://doi.org/10.1186/s12916-017-0823-7> PMID: 28302126
9. Gibson PG, Powell H. Written action plans for asthma: an evidence-based review of the key components. *Thorax*. 2004 February; 59(2): p. 94–9. <https://doi.org/10.1136/thorax.2003.011858> PMID: 14760143
10. Powell H, Gibson PG. Options for self-management education for adults with asthma. *Cochrane Database of Systematic Reviews*. 2002 July; 3. <https://doi.org/10.1002/14651858.CD004107>
11. British Thoracic Society, Scottish Intercollegiate Guideline Network. British guideline on the management of asthma: A national clinical guideline. Scottish Intercollegiate Guidelines Network. 2014. Available from: <http://sign.ac.uk/pdf/SIGN153.pdf>.
12. Asthma UK. Compare your care report. Asthma UK. 2013. Available from: <https://www.asthma.org.uk/globalassets/campaigns/compare-your-care-2013.pdf>. Cited October 2015.
13. Diabetes UK. Diabetes Facts and Stats. [Online]. Diabetes UK. 2016. Available from: https://www.diabetes.org.uk/Documents/Position%20statements/DiabetesUK_Facts_Stats_Oct16.pdf. Cited November 2016.
14. Diabetes UK. 42% of people with type 2 diabetes "not confident managing their condition". Diabetes UK. 17 June 2015. Available from https://www.diabetes.org.uk/About_us/News/42-percent-of-people-with-Type-2-diabetes-not-confident-managing-their-condition-/. Cited October 2016.
15. British Medical Association, NHS Employers. 2016/17 General Medical Services (GMS) contract Quality and Outcomes Framework (QOF) Guidance for GMS contract 2016/17. NHS Employers. 2016. Available from: <http://www.nhsemployers.org/-/media/Employers/Documents/Primary%20care%20contracts/QOF/2016-17/2016-17%20QOF%20guidance%20documents.pdf>. Cited October 2016.
16. Health and Social Care Information Centre. National Diabetes Audit 2015–16: Report 1: Care Processes and Treatment Targets. NHS Digital; 2017. Available from <http://www.content.digital.nhs.uk/catalogue/PUB23241/nati-diab-rep1-audi-2015-16.pdf>. Cited February 2017.
17. Department of Health. The Primary Medical Services (Directed Enhanced Services) Directions (Northern Ireland) 2016. Department of Health. 2016. Available from: <https://www.health-ni.gov.uk/sites/default/files/publications/health/pms-des-directions-2016.pdf>. Cited November 2016.
18. Armour BS, Pitts MM, Maclean R, Cangialose C, Kishel M, Imai H, et al. The effect of explicit financial incentives on physician behavior. *Archives of Internal Medicine*. 2001 May; 161(10): p. 1261–6. <https://doi.org/10.1001/archinte.161.10.1261> PMID: 11371253
19. Eijkenaar F. Key issues in the design of pay for performance programs. *The European Journal of Health Economics*. 2013 February; 14(1): p. 117–31. <https://doi.org/10.1007/s10198-011-0347-6> PMID: 21882009
20. Flodgren G, Eccles MP, Shepperd S, Scott A, Parmelli E, Beyer FR. An overview of reviews evaluating the effectiveness of financial incentives in changing healthcare professional behaviours and patient outcomes. *Cochrane Database Syst Rev*. 2011 July; 7(7). <https://doi.org/10.1002/14651858.CD008608>
21. Dudley RA, Miller RH, Korenbrot TY, Luft HS. The impact of financial incentives on quality of health care. *Milbank quarterly*. 1998 December; 76(4): p. 649–86. <https://doi.org/10.1111/1468-0009.00109> PMID: 9879306

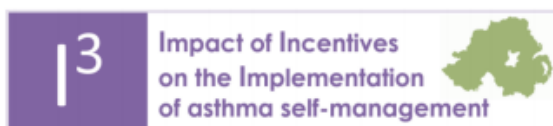
22. Milstein R, Schreyoegg J. Pay for performance in the inpatient sector: A review of 34 P4P programs in 14 OECD countries. *Health Policy*. 2016 October; 120(10): p. 1125–40. <https://doi.org/10.1016/j.healthpol.2016.08.009> PMID: 27745916
23. Roland M, Campbell S, Bailey N, Whalley D, Sibbald B. Financial incentives to improve the quality of primary care in the UK: predicting the consequences of change. *Primary Health Care Research and Development*. 2006; 7(01): p. 18–26. <https://doi.org/10.1191/1463423606pc272oa>.
24. Scott A, Sivey P, Ait Ouakrim D, Willenberg L, Naccarella L, Furler J, et al. The effect of financial incentives on the quality of health care provided by primary care physicians. *Cochrane Database Syst Rev*. 2011 September; 9(9). <https://doi.org/10.1002/14651858.CD008451.pub2> PMID: 21901722
25. Higgins JP, Green S. *Cochrane handbook for systematic reviews of interventions* Chichester: Wiley-Blackwell; 2008.
26. Downs SH, Black N. The feasibility of creating a checklist for the assessment of the methodological quality both of randomised and non-randomised studies of health care interventions. *Journal of epidemiology and community health*. 1998 June; 52(6): p. 377–384. PMID: 9764259
27. Woerle HJ, Neumann C, Zschau S, Tenner S, Insigler A, Schirra J, et al. Impact of fasting and postprandial glycomia on overall glycomic control in type 2 diabetes: importance of postprandial glycomia to achieve target HbA1c levels. *Diabetes Research and Clinical Practice*. 2007 August; 77(2): p. 280–5. <https://doi.org/10.1016/j.diabres.2006.11.011> PMID: 17240473
28. Effective Practice and Organisation of Care (EPOC). Data extraction and management. EPOC Resources for review authors. Norwegian Knowledge Centre for the Health Services. [Online]. 2013. Available from: <http://epoc.cochrane.org/epoc-specific-resources-review-authors>. Cited October 2015.
29. Pinnock H, Barwick M, Carpenter CR, Eldridge S, Grandes G, Griffiths C et al. Standards for Reporting Implementation Studies (StaRI) Statement. *BMJ*. 2017 March; 365. <https://doi.org/10.1136/bmj.i6795> PMID: 28264797
30. Adams J, Giles EL, McColl E, Sniechotta FF. Carrots, sticks and health behaviours: a framework for documenting the complexity of financial incentive interventions to change health behaviours. *Health Psychology Review*. 2014 July; 8(3): p. 286–95. <https://doi.org/10.1080/17437199.2013.848410> PMID: 25053215
31. Ogilvie D, Fayer D, Petticrew M, Sowden A, Thomas S, Whitehead M, et al. The harvest plot: a method for synthesising evidence about the differential effects of interventions. *BMC medical research methodology*. 2008 February; 8(1). <https://doi.org/10.1186/1471-2288-8-8> PMID: 18298827
32. Beck JK, Logan KJ, Hamm RM, Sproat SM, Musser KM, Everhart PD, et al. Reimbursement for pediatric diabetes intensive case management: A model for chronic diseases? *Pediatrics*. 2004 January; 113(1): p. e47–50. <https://doi.org/10.1542/peds.113.1.e47>
33. Chien AT, Eastman D, Li Z, Rosenthal MB. Impact of a pay for performance program to improve diabetes care in the safety net. *Preventive Medicine*. 2012 November; 55: p. S80–5. <https://doi.org/10.1016/j.ypmed.2012.05.004> PMID: 23046985
34. Conrad DA, Grembowski D, Perry L, Maynard C, Rodriguez H, Martin D. Paying physician group practices for quality: A statewide quasi-experiment. *Healthcare*. 2013 December; 1(3–4): p. 108–116. <https://doi.org/10.1016/j.hjdsi.2013.04.012> PMID: 26249780
35. Fagan PJ, Schuster AB, Boyd C, Marsteller JA, Griswold M, Murphy SM, et al. Chronic Care Improvement in Primary Care: Evaluation of an Integrated Pay-for-Performance and Practice-Based Care Coordination Program among Elderly Patients with Diabetes. *Health services research*. 2010 December; 45(6p1): p. 1763–82. <https://doi.org/10.1111/j.1475-6773.2010.01166.x> PMID: 20849553
36. Mandel KE, Kotagal UR. Pay for performance alone cannot drive quality. *Archives of Pediatrics & Adolescent Medicine*. 2007 July; 161(7): p. 650–5. <https://doi.org/10.1001/archpedi.161.7.650> PMID: 17606827
37. Rosenthal MB, Frank RG, Li Z, Epstein AM. Early experience with pay-for-performance: From concept to practice. *Journal of the American Medical Association*. 2005 October; 294(14): p. 1788–93. <https://doi.org/10.1001/jama.294.14.1788> PMID: 16219882
38. Young GJ, Meterko M, Beckman H, Baker E, White B, Sautter KM, et al. Effects of paying physicians based on their relative performance for quality. *Journal of General Internal Medicine*. 2007 June; 22(6): p. 872–6. <https://doi.org/10.1007/s11606-007-0185-5> PMID: 17443360
39. Gulliford MC, Ashworth M, Robotham D, Mohiddin A. Achievement of metabolic targets for diabetes by English primary care practices under a new system of incentives. *Diabetic Medicine*. Achievement of metabolic targets for diabetes by English primary care practices under a new system of incentives. *Diabetic Medicine*. 2007 May; 24(5): p. 505–11. <https://doi.org/10.1111/j.1464-5491.2007.02090.x> PMID: 17381507

40. Kontopantelis E, Reeves D, Valderas JM, Campbell S, Doran T. Recorded quality of primary care for patients with diabetes in England before and after the introduction of a financial incentive scheme: a longitudinal observational study. *BMJ Qual Saf.* 2013 January; 22(1): p. 53–64. <https://doi.org/10.1136/bmjqs-2012-001033> PMID: 22918988
41. Pape UJ, Huckvale K, Car J, Majeed A, Millett C. Impact of 'stretch' targets for cardiovascular disease management within a local pay-for-performance programme. *PLOS ONE.* 2015 March; 10(3): p. e0119185. <https://doi.org/10.1371/journal.pone.0119185> PMID: 25811487
42. Vamos EP, Pape UJ, Bottle A, Hamilton FL, Curcin V, Ng A, et al. Association of practice size and pay-for-performance incentives with the quality of diabetes management in primary care. *Canadian Medical Association Journal.* 2011 August. <https://doi.org/10.1503/cmaj.101187> PMID: 21810950
43. LeBlanc E, Bélanger M, Thibault V, Babin L, Greene B, Halpine S, et al. Influence of a Pay-for-Performance Program on Glycemic Control in Patients Living with Diabetes by Family Physicians in a Canadian Province. *Canadian journal of diabetes.* 2017 April; 41(2): p. 190–196. <https://doi.org/10.1016/j.cjcd.2016.09.008> PMID: 27908559
44. Pinnock H, Epiphaniou E, Sheikh A, Griffiths C, Eldridge S, Craig P, et al. Developing standards for reporting implementation studies of complex interventions (StaRI): a systematic review and e-Delphi. *Implementation Science.* 2015 March; 10:42. <https://doi.org/10.1186/s13012-015-0235-z> PMID: 25888928
45. Glasziou P, Buchan H, Mar CD, Doust J, Harris M, Knight R, et al. When financial incentives do more good than harm: a checklist. *BMJ.* 2012 July; e5047: p. 345–50. <https://doi.org/10.1136/bmj.e5047>
46. McDonald R, Cheraghi-Sohi S, Tickle M, Roland M, Doran T, Campbell S. The impact of incentives on the behaviour and performance of primary care professionals. Queen's Printer and Controller of HMSO; 2010. Available from: <http://www.netscc.ac.uk/hedr/files/adhoc/158-final-report.pdf>. Cited January 2017.
47. Doran T, Fullwood C, Kontopantelis E, Reeves D. Effect of financial incentives on inequalities in the delivery of primary clinical care in England: analysis of clinical activity indicators for the quality and outcomes framework. *The Lancet.* 2008 September; 372(9640): p. 728–36. [https://doi.org/10.1016/S0140-6736\(08\)61123-X](https://doi.org/10.1016/S0140-6736(08)61123-X)
48. Peinemann F, Tushabe DA, Kleijnen J. Using multiple types of studies in systematic reviews of health care interventions—a systematic review. *PLOS ONE.* 2013 December; 8(12). <https://doi.org/10.1371/journal.pone.0085035> PMID: 24416098
49. Song F, Hooper L, Loke Y. Publication bias: what is it? How do we measure it? How do we avoid it? *Open Access Journal of Clinical Trials.* 2013 July; 2013(5) p. 71–81. <https://doi.org/10.2147/OAJCT.S34419>

Appendix 8: Letter and information leaflet for practices



The University of Edinburgh
Old Medical School, Teviot Place,
Edinburgh EH8 9AG



Date:xx/xx/xx

Dear xx:

We are a research team working in the Asthma UK Centre for Applied Research, Queen's University Belfast (QUB) and University of Edinburgh (UoE) and this is an invitation to take part in a study about self-management for people with asthma.

In most of the UK only about a quarter of people with asthma have an action plan which advises them what to do if their asthma starts to deteriorate. In Northern Ireland nearly two thirds of people with asthma have a plan. We want to understand why Northern Ireland has the best rates of action plan ownership in the UK and how it was achieved. The findings of this study could inform policy in the rest of the UK.

We would like to carry out a 15 minute interview with a person in the practice who can tell us about how your practice achieved the standards in the asthma locally enhanced service. We will reimburse the practice for the time that this takes at standard rates.

We enclose a leaflet that provides more information about this study. If you require any further information on the study, please contact Tracy Jackson (Telephone: 0131 650 3034 or email: tracy.jackson@ed.ac.uk). She will be pleased to answer any questions.

Thank you for taking the time to read this letter.

Yours sincerely,

Professor Liam Heaney

Professor Mike Shields

Research team: Tracy Jackson (UoE), Professor Hilary Pinnock (UoE), Dr Marilyn Kendall (UoE), Professor Liam Heaney (QUB), Professor Mike Shields (QUB).

NI_ScreeningInterviews_IL_V1.0_231116

AN INVITATION FOR GENERAL PRACTICES TO TAKE PART IN AN ASTHMA RESEARCH STUDY

We are recruiting general practices to help us with a qualitative research study investigating the implementation of the Northern Ireland Local Enhanced Service (NILES) for Chronic Respiratory Conditions within local practices. This leaflet tells you about the study and what participation involves for practices.

Background to the study

There is overwhelming trial evidence that asthma self-management, supported by regular professional review and provision of a personalised asthma action plan (PAAP) reduces unscheduled care and improves asthma control. This leads to less time off school/work, reduced risk of asthma attacks and better control of asthma symptoms.

Although we know PAAPs and supported self-management are effective, in the UK, only about 1/4 of people with asthma have a PAAP (for more information on this survey visit www.asthma.org.uk). Northern Ireland has the highest rate of PAAP ownership in the UK with about two thirds of individuals with asthma having one. We want to understand why Northern Ireland has the best rates of PAAP ownership in the UK and how it was achieved. Information gathered in this study could be used to influence policy in the rest of the UK

We want to interview GPs, asthma nurses, administrative staff and people with asthma from general practice.

STAGE 1 Screening interviews in 20 practices

- A short (15 minute) telephone interview with one member of staff. This will give us an overview of how practices achieved the NILES standards.



Taking part in a screening interview does not commit a practice to helping with any other aspects of the study.

STAGE 2 Case studies in 4 practices

- We will ask to interview members of staff (ideally a GP, asthma nurse and administrator) to find out more about how asthma care is organised. These interviews will take up to half an hour and will be arranged at a time that is convenient to the practice.
- We will ask about and collect copies of any resources you use in your practice to help provide asthma care and to achieve the standards of the NILES, specifically in relation to asthma.
- We will also arrange interviews with up to 5 patients with asthma recruited from the practice list. We will ask practices to identify patients with active asthma on their practice database. We will provide an invitation letter, an information leaflet and an expression of interest form. Expression of interest forms will be returned directly to researchers at the University of Edinburgh who will contact selected participants to arrange interview or focus group participation.

Time taken away from routine practice to participate in the research will be reimbursed at the standard rate.



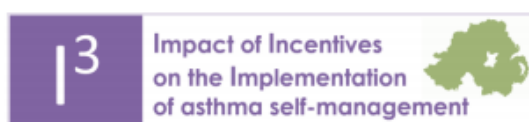
Who is organising the research?

Tracy Jackson, a PhD student from the University of Edinburgh, will conduct the interviews. Her supervisors are Professor Hilary Pinnock and Dr Marilyn Kendall (University of Edinburgh), and Professor Liam Heaney and Professor Mike Shields (Queen’s University, Belfast).

Tracy Jackson will be pleased to answer any questions you have about the study. You can contact her on Telephone: 0131 650 3034 or Email: tracy.jackson@ed.ac.uk



Appendix 9: Scoping interviews participant information leaflet



This is an invitation for a doctor, asthma nurse or administrator in the practice to take part in a research study to tell us about how the practice addressed the standards of the Northern Ireland Local Enhanced Service (NILES) for Chronic Respiratory Conditions. This study is part of a PhD research project.

Before deciding whether to take part, it is important for you to understand why the research is being undertaken and what will be involved. Please take your time to read the following information carefully and if you wish, discuss it with others. If you have any questions or queries, please ask us (details overleaf).

Background to the study

There is over-whelming evidence from trials that asthma self-management, supported by regular professional review and the provision of an action plan reduces unscheduled care and improves asthma control. This leads to less time off work or school, reduced risk of asthma attacks and better control of asthma symptoms.

Although we know action plans and supported self-management are effective, in the UK, only about a quarter of people with asthma have an action plan (for more information on this survey visit <http://www.asthma.org.uk>).

Northern Ireland (NI) has the highest rate of action plan ownership in the UK with about two thirds of people with asthma having one. We want to understand why Northern Ireland has the best rates of action plan ownership in the UK and how it was achieved. Information gathered in this study could be used to influence policy in the rest of the UK



What is involved if I decide to take part?

We will arrange a convenient time for a brief 15-20 minute telephone interview. The interviews will be conducted by Tracy Jackson and will be audio recorded to aid note-taking and may be transcribed later.

Tracy will ask about your thoughts on the Northern Ireland Local Enhanced Service (NILES) for Chronic Respiratory Conditions, especially in the context of supported self-management. How is the NILES viewed in your practice? How did you achieve the targets set in the NILES? What strategies worked, and what didn't? Is there anything else you think is important about the NILES standards for asthma care, or about how asthma self-management services could be improved?

Why have I received this invitation?

We have approached your practice because you contributed to the NILES, and your name has been suggested as someone who may be able to tell us about how asthma care is organised in your practice. We want to interview people from a wide range of practices; city or rural; large or small practices so that we can find out about the different strategies practices used to address the challenges of meeting the standards of the NILES.

Can I be sure that what I say will be kept confidential?

Yes. Anything you say or any information about you we will keep confidential. Your name and contact details will be kept securely at the University of Edinburgh. Everything that you tell us will be transcribed, any details that could identify you or your practice will be removed so that we can use the information you give us anonymously



NI_Screening interview_PIL_V1.0_23.11.16

13 Impact of Incentives on the Implementation of asthma self-management



What will happen to the results of the study?

When the study has been completed, we will send you a summary of our findings. Findings will be presented at conferences, published in a journal and will contribute towards the submission of a PhD thesis at the University of Edinburgh Population Health Sciences.

Can I change my mind about taking part?

Yes. Your participation in this research is completely voluntary. You are able to change your mind at any point and you do not have to provide a reason.

What are the benefits of taking part?

While there may not be an immediate personal benefit by taking part in this research, the information we gain from this study may help us to make recommendations for encouraging the implementation in routine care of supported self-management for people with asthma.

Will taking part affect my status at work?

We know that general practice is very busy and with this in mind, we are aware that the main disadvantage is the time that the interview will take (up to 20 minutes). Whether you decide to participate or not will not affect your professional standing within the practice. The practice will be reimbursed for the time the interview takes.

Who is organising the research?

Tracy Jackson is a PhD student from the University of Edinburgh and will be leading the interviews. She will be supervised by Professor Hilary Pinnock and Dr Marilyn Kendall from University of Edinburgh, and Professor Liam Heaney and Professor Mike Shields from Queen's University Belfast. Tracy Jackson's PhD is funded by the University of Edinburgh.

I have some questions about the study:

Tracy Jackson will be pleased to answer any questions you have about the study.
You can contact her on: Telephone: 0131 650 3034 or Email: tracy.jackson@ed.ac.uk



To speak with my supervisor, you can contact Professor Hilary Pinnock by email: hilary.pinnock@ed.ac.uk

If you wish to speak with an independent researcher, contact Bruce Mason by email: bruce.mason@ed.ac.uk or telephone: 0131 650 9237

If you have any complaint about this research, please contact Professor Sarah Cunningham Burley, Dean of Molecular, Genetic and Population Health Sciences by email: sarah.c.burley@ed.ac.uk or telephone: 0131 650 3217

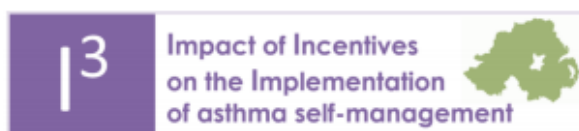
I have decided I am interested in taking part, what should I do now?

Please complete the enclosed form, sign it and return it in the reply paid envelope or scan it and e-mail it to tracy.jackson@ed.ac.uk

Tracy will contact you to discuss any questions you have and arrange a suitable time for you to be interviewed.



Appendix 10: Scoping interviews topic guide



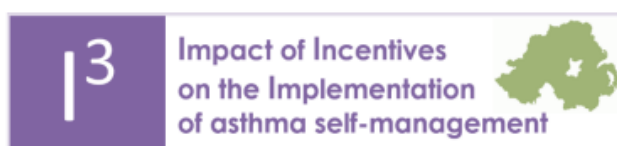
Detailed topic guides – screening interviews

<p>Note: the topic guide will evolve iteratively as themes emerge, with later interviews exploring emerging themes and ideas</p>	
<p>Opening Statement: Good morning/afternoon, my name is Tracy and I'm the researcher for this study. We are going to discuss your thoughts on the Northern Ireland Local Enhanced Service (NILES) for Chronic Respiratory Conditions within your practice and I'm particularly interested in the self-management aspect of this. There are no right or wrong answers so please feel free to say what is on your mind, it is all of interest to this study. Before we start, I would like to say thank you for being in touch with us regarding this interview and taking the time to be involved, we really value your opinion on this topic. This interview will be recorded and you have right to end the interview at any point. I just want to confirm that you are aware of this and if you are still happy to proceed.</p>	
Opening question	Key prompts and topics for further exploration
What is your role in the practice with regard to asthma care/NILES	
What is your understanding of the NILES?	Reimbursement for targets? What are the asthma targets? Who receives the payment(s)? How are payments calculated? When do you receive payment(s)?
Establish an understanding of the Locally Enhanced Service in NI before moving to the next series of questions	
What changes (if any) were made in your practice in response to the introduction of the asthma NILES?	Changes to achieve target standards (which standards) Change in processes? Time spent with patients? Additional training for practice staff? Self-management education given to patients? Change in understanding/involvement from patients regarding their asthma
What would you like to see changed in regards to the NILES?	Practice staff training? Financial incentive amount? Educational/information materials?
What are your thoughts on receiving financial incentives for achieving quality targets?	Good/bad? Redundant? Affect the quality of treatment provided? Highlights areas that require attention? Too many conditions have financial incentives, difficult to achieve them all?
Final question: Before we finish, is there anything else you would like to add to today's interview?	
Closing statement: Thank you very much for your time today, I feel it was really insightful and I appreciate you taking the time to tell me your thoughts on asthma self-management.	



NI_Screening interview_CF_V1.0_231116

Appendix 11: Case study practice information sheet



AN INVITATION FOR GENERAL PRACTICES TO TAKE PART IN AN ASTHMA RESEARCH STUDY – STAGE 2

Thank you for taking part in Stage 1 of this study. We appreciate you taking the time to participate in this study and provide your views and experience on the implementation of the Northern Ireland Local Enhanced Service (NILES) for Chronic Respiratory Conditions within your practice.

We are now recruiting for Stage 2 of this study. To help you decide if your practice is able to participate, this leaflet tells you about the study and what participation involves for practices.

Background to the study

There is over-whelming trial evidence that asthma self-management, supported by regular professional review and provision of a personalised asthma action plan (PAAP) reduces unscheduled care and improves asthma control. This leads to less time off school/work, reduced risk of asthma attacks and better control of asthma symptoms.

Although we know PAAPs and supported self-management are effective, in the UK, only about 1/4 of people with asthma have a PAAP (for more information on this survey visit www.asthma.org.uk). Northern Ireland has the highest rate of PAAP ownership in the UK with about two thirds of individuals with asthma having one.

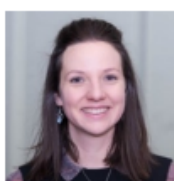
We want to understand why Northern Ireland has the best rates of PAAP ownership in the UK and how it was achieved. Information gathered in this study could be used to influence policy in the rest of the UK

What is involved with Stage 2?

- We will ask to interview members of staff (ideally a GP, asthma nurse and administrator) to find out more about how asthma care is organised. These interviews will take up to half an hour and will be arranged at a time that is convenient to the practice.
- We will ask about and collect copies of any resources you use in your practice to help provide asthma care and to achieve the standards of the NILES, specifically in relation to asthma.
- We will also arrange interviews with up to 5 patients with asthma recruited from the practice list. We will ask practices to identify patients with active asthma on their practice database. We will provide an invitation letter, an information leaflet and an expression of interest form. Expression of interest forms will be returned directly to researchers at the University of Edinburgh who will contact selected participants to arrange interview or focus group participation.



Time taken away from routine practice to participate in the research will be reimbursed at the standard rate.



Who is organising the research?

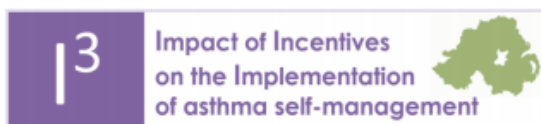
Tracy Jackson, a PhD student from the University of Edinburgh, will conduct the interviews. Her supervisors are Professor Hilary Pinnock and Dr Marilyn Kendall (University of Edinburgh), and Professor Liam Heaney and Professor Mike Shields (Queen's University, Belfast).

Tracy Jackson will be pleased to answer any questions you have about the study. You can contact her on Telephone: 0131 650 3034 or Email: tracy.jackson@ed.ac.uk



NI_CS_PIL_V1.0_231116

Appendix 12: Case study participant information sheet



This is an invitation for a doctor, asthma nurse or administrator in the practice to take part in a research study to tell us about how the practice addressed the standards of the Northern Ireland Local Enhanced Service (NILES) for Chronic Respiratory Conditions. This study is part of a PhD research project.

Before deciding whether to take part, it is important for you to understand why the research is being undertaken and what will be involved. Please take your time to read the following information carefully and if you wish, discuss it with others. If you have any questions or queries, please ask us (details overleaf).

Background to the study

There is over-whelming evidence from trials that asthma self-management, supported by regular professional review and the provision of an action plan reduces unscheduled care and improves asthma control. This leads to less time off work or school, reduced risk of asthma attacks and better control of asthma symptoms.

Although we know action plans and supported self-management are effective, in the UK, only about a quarter of people with asthma have an action plan (for more information on this survey visit <http://www.asthma.org.uk>).

Northern Ireland (NI) has the highest rate of action plan ownership in the UK with about two thirds of people with asthma having one. We want to understand why Northern Ireland has the best rates of action plan ownership in the UK and how it was achieved. Information gathered in this study could be used to influence policy in the rest of the UK



What is involved if I decide to take part?

We will arrange a convenient time for a telephone or face to face interview. The interview will be conducted by Tracy Jackson who will ask you about the Northern Ireland Local Enhanced Service (NILES) for Chronic Respiratory Conditions, especially in the context of supported self-management. How is the NILES viewed in your practice? How is it implemented? How did you achieve the targets set in the NILES? What strategies worked, and what didn't? Is there anything else you think is important about the NILES standards for asthma care, or about how asthma self-management services could be improved?

The interview may take up to 30 minutes and will be audio recorded and transcribed word for word. Tracy and the research team will then analyse what people from all the participating practices have told us about the NILES so that we understand more about how practices in Northern Ireland have improved the provision of supported self-management for people with asthma.

Why have I received this invitation?

Your practice has agreed to take part as a case study practice. This means we would like to hear from doctors, nurses and administrative staff in your practice about how asthma care is organised. Your name has been suggested as someone who may be able to tell us about an aspect of asthma care in your practice.



NI_Practice interview_PIL_V1.0_231116

13 Impact of Incentives on the Implementation of asthma self-management



Can I be sure that what I say will be kept confidential?

Yes. Anything you say or any information about you we will keep confidential. Your name and contact details will be kept securely at the University of Edinburgh. Everything that you tell us will be transcribed and anything that might identify you or the practice will be removed.

What will happen to the results of the study?

When the study is complete, we will send you a summary of our findings. Findings will be presented at conferences, published in a journal and will contribute towards the submission of a PhD thesis at the University of Edinburgh.

Can I change my mind about taking part?

Yes. Your participation in this research is completely voluntary. You are able to change your mind at any point and you do not have to provide a reason.

What are the benefits of taking part?

While there may not be an immediate personal benefit by taking part in this research, the information we gain from this study will help us to make recommendations for improving the provision of supported self-management of asthma in routine clinical care.

Will taking part effect my status at work?

We know that general practice is very busy and with this in mind, we are aware that the main disadvantage is the time that the interview will take (up to 30 mins). The practice will be reimbursed for the time the interview takes. Whether you decide to participate or not will not affect your professional standing within the practice.

Who is organising the research?

Tracy Jackson is a PhD student from the University of Edinburgh and will be leading the interviews. She will be supervised by Professor Hilary Pinnock and Dr Marilyn Kendall from University of Edinburgh, and Professor Liam Heaney and Professor Mike Shields from Queen's University Belfast. Tracy Jackson's PhD is funded by the University of Edinburgh.



I have some questions about the study:

Tracy Jackson will be pleased to answer any questions you have about the study. You can contact her on: Telephone: 0131 650 3034 or Email: tracy.jackson@ed.ac.uk

To speak with my supervisor, you can contact Professor Hilary Pinnock by email: hilary.pinnock@ed.ac.uk

If you wish to speak with an independent researcher, contact Bruce Mason by email: bruce.mason@ed.ac.uk or telephone: 0131 650 9237

If you have any complaint about this research, please contact Professor Sarah Cunningham Burley, Dean of Molecular, Genetic and Population Health Sciences by email: sarah.c.burley@ed.ac.uk or telephone: 0131 650 3217

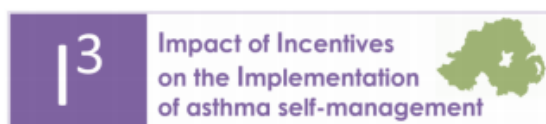
I have decided I am interested in taking part, what should I do now?

Please complete the enclosed form, and return it in the reply paid envelope or scan it and e-mail it to tracy.jackson@ed.ac.uk and Tracy will contact you to discuss any questions you have and arrange a suitable time for you to be interviewed.



NI_Practice interview_PIL_V1.0_231116

Appendix 13: Case study in-depth interviews topic guide



Detailed topic guides – in-depth interviews – practice staff

<p>Note: the topic guide will evolve iteratively as themes emerge, with later interviews exploring emerging themes and ideas</p>	
<p>Opening Statement: Good morning/afternoon, my name is Tracy and I'm the researcher for this study. We are going to discuss asthma self-management within your practice and learn more about your thoughts on this topic. There are no right or wrong answers so please feel free to say what is on your mind, it is all of interest to this study. Before we start, I would like to say thank you for being in touch with us regarding this interview and taking the time to be involved, we really value your opinion on this topic. This interview will be recorded and you have right to end the interview at any point. I just want to confirm that you are aware of this and if you are still happy to proceed.</p>	
Opening question	Key prompts and topics for further exploration
What is your role in the practice with regard to asthma care/NILES?	
What is your understanding of the Northern Ireland Local Enhanced Service (NILES) for Chronic Respiratory Conditions? In respect to asthma patients	<ul style="list-style-type: none"> Guidelines? Reporting? Processes? Self-management education? Asthma action plans? Financial incentives?
<p>Establish an understanding of the Northern Ireland Local Enhanced Service (NILES) for Chronic Respiratory Conditions before moving to the next series of questions</p>	
What changes (if any) were made in your practice in response to the introduction of the NILES?	<ul style="list-style-type: none"> Changes to achieve target standards (which standards) Change in processes, Time spent with patients, Additional training for practice staff, Self-management education given to patients Change in understanding/involvement from patients regarding their asthma
What do you feel have been the most positive aspect since the introduction of NILES?	<ul style="list-style-type: none"> Increase of patients with better asthma control? Increased understanding of asthma More training
What do you feel have been negative aspects since the introduction of NILES?	<ul style="list-style-type: none"> Increased reporting More guidelines to follow Not enough training



NI_Practice interview_TG_V1.0_231116

13 Impact of Incentives on the Implementation of asthma self-management



What would you like to see changed in regards to the NILES?	Practice staff training? Financial incentive amount? Educational/information materials?
What are your thoughts on receiving financial incentives for achieving quality targets?	Good/bad? Redundant?, Affect the quality of treatment provided? Highlights areas that require attention? Too many conditions have financial incentives, difficult to achieve them all?
If time permits: further questions about self-management	
When I say "supported self-management", what does that term mean to you? (in the context of asthma)	Terminology? Education/information? Supporting patients in taking responsibility for adjusting treatment? Recognising, managing acute attacks? Asthma action plans? Living with asthma? What aspects of asthma management/ treatment would you like your patients to have more control of?
On a practical level what do you find makes it difficult to provide self-management for asthma? How could these issues be overcome?	Lack of information, knowledge, confidence? Only suitable for some people? No action plan (or can't find them)? Patients not having emergency drugs? Day to day barriers e.g. time, resources etc. How would these fit within routine practice?
What practical strategies might help implement self-management? How do you think they could be introduced into routine practice?	Elicit participant ideas first, then consider offering some of the following: Computer reminders, Better access to action plans (Format? Digital?) 'Advertising' action plans (e.g. on repeat prescriptions, review invitation letters, practice leaflets, posters/electronic display boards) Access to (better) information? Trigger data eg pollen count, viral load Flexible access to professional advice? Telephone? E-mail? Helpline? Regular monitoring? Cloud-based records? Patient access to EHR?
How keen would you be to see supported self-management implemented as a normal way of working?	Any more ideas about how this could be achieved within the routines of primary care? What might be the advantages/disadvantages?
Final question: Before we finish, is there anything else you would like to add to today's interview?	
<p>Closing statement: Thank you very much for your time today, I feel it was really insightful and I appreciate you taking the time to tell me your thoughts on asthma self-management.</p> <p>Just to remind you, the recording of this interview will be transcribed word for word and I will analyse it to look for themes about what people think about how people look after their asthma and how practices can help them. I will use the findings in my PhD thesis, and present what we have learnt at conferences and in a journal paper</p>	



NI_Practice interview_TG_V1.0_231116

Appendix 14: Additional interview quotations in support of qualitative findings

Sub theme	Quote
<p><i>Communication and barriers to engagement</i></p>	<p><i>“We actually had clinics where our nurses are ringing them beforehand and speaking to them and they were confirming they were coming in and they didn’t turn up. We were holding clinics, we were booking 20 patients in at every clinic and you were lucky if you got 2 booked in. Total waste of nursing time.” (Manager, T06)</i></p>
	<p><i>“Now, you can’t deny them inhaler, they don’t come in and they order another one, you have to give it because you don’t want them having an asthma attack and you’re withholding medication from them.” (Nurse, T11)</i></p>
<p><i>Understanding patients and personalisation</i></p>	<p><i>“...we try to accommodate even the night time ones [appointments] but then it doesn’t suit because the night time they like to get them to bed early for school and during the day times don’t suit because they’re in school. So, we try to do the school ones between maybe the later afternoon after school and we’re trying to slot them in.” (Manager, T02)</i></p>
<p><i>Empowering patients to self-manage</i></p>	<p><i>“Sometimes I think people actually need to be really ill, have a really bad scare and attack, and then they’ll say, like, ‘What you were telling me? I’m going to do it now.’” (Nurse, T11)</i></p>
<p><i>Funding and receiving financial incentives</i></p>	<p><i>“And I do think the financial incentive does help along the way.” (Manager, T02)</i></p>
	<p><i>“...now it is part of primary care but I think that it would be perhaps not well received, you know, if the financial payment for that was to be taken away because there’s a significant amount of work involved obviously, with the management of these patients.” (GP, T03)</i></p>
	<p><i>“...we need to have some level of funding because the funding helps run the service. Would the same impetus be there if the funding wasn’t allocated, you would hope it was but I couldn’t guarantee it.” (Manager, T07)</i></p>

	<p><i>“They’re reducing the amount of money that they’re getting, and I know for a fact that if they removed the management thing I strongly suspect that if it all flipping dropped, the management plans will drop.”</i> (Nurse, T11)</p>
	<p><i>“The thing that they did was, they produced guidance for those plans and everyone got sent out booklets on them, but then that dried up...there’s a lack of continuity of support.”</i> (GP, T14)</p>
<i>Reporting and targets</i>	<p><i>“...the payment is based on 30 to 80%, 80% being what you need to get for the maximum”</i> (Manager, T02)</p>
	<p><i>“I think sometimes it’s very rigid...the Northern Ireland LES doesn’t allow any exemption reporting. It’s my understanding the, the LES doesn’t and I think from that point of view we are not really giving patient choice, there is no option for patient choice in there.”</i> (Nurse, T12)</p>
<i>QOF versus LES</i>	<p><i>“So, I think I would bring the two [reporting timescales] in line, either bring the contract [QOF] down to 12 months or ... the NI LES up to 15 months.”</i> (Manager, T05)</p>
<i>Complementary roles</i>	<p><i>“...my personal focus is to get patients in for face to face for good care. Money is aside but because we are run like businesses we do have to be involved with that but I would still rather reach out to a patient.”</i> (Nurse, T12)</p>
	<p><i>“...the respiratory nurse and the doctor that oversees that are actually very motivated in terms of those patients anyway...as much as the financial aspect of it is probably more important for me [manager], I don’t really think that is primary for them.”</i> (Manager, T10)</p>
<i>Updated processes and legacy work</i>	<p><i>“...as a group of patients, the asthma ones were quite well looked after here by our nurse practitioner who is now retired. So, we didn’t really make any major changes because our</i></p>

	<p><i>uptake was already pretty good.”</i> (Manager, T05)</p>
	<p><i>“I did my asthma diploma, like, eighteen years ago, so, I can only talk for what I’m doing, and I would have always been giving a management plan, because that was what you were advised to do, even back then.”</i> (Nurse, T11)</p>
	<p><i>“my role in all of that would have been checking at least quarterly to see that, see the percentage achievement was going up in line with what it should be so that they weren’t struggling towards sort of February time in trying to get up to the 80%.”</i> (Manager, T04)</p>
	<p><i>“...it’s going through the templates, it’s going through giving them management plans, bringing them back in, it’s an opportunity to check inhaler use and to also make sure they’re using them correctly.”</i> (Manager, T07)</p>
Annual cycle	<p><i>“You see, the thing is, we just do it every 12 months anyway...And sometimes it’s before the 12 months because I just go through the whole register once April starts again and send for the patients, we do it every 12 anyway.”</i> (Manager, T02)</p>
	<p><i>“I would look at who is due to be seen to have an asthma review and send for them, and they would get three letters every year...we would prefer to maybe put a wee bit of pressure maybe by ringing the patient towards, maybe, sometime between Christmas and March.”</i> (Manager, T01)</p>
	<p><i>“...we have practice managers and business managers who would do the searches for these patients so I suppose you hear more about this post-Christmas when you are trying to complete your targets”</i> (Nurse, T12)</p>
	<p><i>It’s opportunistic and again if you have a mother then you say ‘look, it’s summer time now any children at home? Would it be easier to see them over the summer just to make life easier</i></p>

	<p><i>when September comes?”</i> (Nurse, T12)</p>
<p><i>Team members, roles and interaction</i></p>	<p><i>“...my role is practice manager and what I do is on a rolling monthly basis, I would look at who is due to be seen to have an asthma review and send for them, and they would get three letters every year.”</i> (Manager, T01)</p>
	<p><i>“...the input that federation pharmacists would have now in Northern Ireland, I’m not sure if that’s something that’s across the water too but they sort of are another incentive.”</i> (Manager, T04)</p>
	<p><i>“There would be an argument for community pharmacies to become involved, again with the backup and training.”</i> (GP, T14)</p>
	<p><i>“...the nurse, she’s here quite a while so she’s, sort of, very au fait with it.”</i> (Manager, T01)</p>
<p><i>Time management</i></p>	<p><i>“...you need about 20 minutes to half an hour to do an asthma review.”</i> (Manager, T04)</p>
	<p><i>“...it’s a thing the doctor’s keep forgetting to do, their peak flows... they end up having to get just the full works done by the nurse which is a longer time taken by the nurse.”</i> (Manager, T02)</p>
<p><i>Identifying risk</i></p>	<p><i>“I think we got a 34.7% decrease in short acting bronchodilator use in a year. It was huge and much better controlled patients.”</i> (Nurse, T13)</p>
<p><i>Seeing the value in work and prioritisation</i></p>	<p><i>“...if a patient’s had an asthma action plan, they’ve had at least one. It might have been two, three, some may be four years ago. But we try and update them at least every one to two years. Or, if there is an admission or a significant event.”</i> (GP, T14)</p>
<p><i>Internalization</i></p>	<p><i>“the sort of focus on it is trying to... you know, it’s really more on the preventative side, trying to help people to manage their asthma so that they are not ending up having to use, sort of,</i></p>

	<p><i>secondary care services really.”</i> (GP, CS2)</p>
	<p>Nurse: <i>Your main aim is to try and keep them out of hospital</i></p> <p>GP: <i>Yes, absolutely</i></p> <p>Nurse: <i>And keep the costs down and manage them at home. That is what they want and that is what the hospital wants for the money</i></p> <p>(Nurse & GP, CS3)</p>
<i>Activation</i>	<p><i>“During the course of the year, [nurse] would maybe contact patients, and she would see her clinics...and then if numbers were falling behind, then I would say, ‘Look, you know, we really need to get on the ball here’. So, at that stage I’ll be then suggesting ‘Look, I’ll compile a letter and send a letter out, just ask people to come in’.”</i> (Admin, CS2)</p>
	<p><i>“...if you were to withdraw the financial incentive now, it sort of would be the last straw for GPs because, I mean, money is already very tight in a lot of areas.”</i> (Manager, T04)</p>
<i>Interactional workability</i>	<p><i>“So, to me, whenever it was here, you got to report on it [the LES]. It was just another report as far as I was concerned.”</i> (Admin, CS2)</p>
<i>Relational integration</i>	<p>Admin: <i>It’s [the standard] probably 90% for the LES, the three or four things in the LES thing. But we get it. We have got it for years. It’s my job to make sure we get it.</i></p> <p>GP: <i>[It’s] because [Admin] is so good at her job that we do do it.</i></p> <p>(Admin & GP, CS4)</p>
<i>Skill set workability</i>	<p><i>“I had my own way of doing things in that I download information from the database on the spreadsheet. That’s an Excel spreadsheet. So I have spent an awful lot of my career manipulating spreadsheets so I can create my</i></p>

	<p><i>register and see at a glance who is in, or sorry, who needs to be brought in and why, and I would do that maybe once a quarter.”</i> (Admin, CS2)</p>
<i>Contextual integration</i>	<p><i>“...you would probably see maybe one [pharmaceutical company rep] a fortnight or one a month. I mean that’s great because I am always getting action plans off them. I will say “do you have any action plans” and they’ll say “oh, I’ll just nip down, can I come in for five minutes?” We’re using them as much as they’re using us.”</i> (Nurse, CS2)</p>
<i>Individual appraisal</i>	<p><i>“I’ve been doing some of the asthma and I certainly do find it useful to kinda get a little bit of a framework to the kind of things that need to be asked. Cause there’s so many things you could talk about, it is useful to have a bit of guidance and a bit of framework to kinda guide you with that anyway.”</i> (Admin, T08)</p>
	<p><i>“I don’t tend to, sort of, just do tick boxing.”</i> (GP, T14)</p>
<i>Reconfiguration</i>	<p><i>“It’s hard to get them in during the day, on a working day, so a text reminder or a text invite is usually quite good because they either ring straight back, or they’ll ring at some other stage. But, at least you can get them, and it’s recorded in the patient’s record as well.”</i> (Admin, CS1)</p>

Appendix 15: Excerpt of case study 1 annual review invitation letter

Dear [patient]

Asthma is a condition that needs to be reviewed regularly even if you feel well. A severe asthma attack could occur at anytime without warning. Your appointment is an opportunity to help prevent any exacerbation of your asthma. According to our records you are due to be reviewed by our specialist respiratory nurse.

Please contact [Practice Manager] at the surgery on [phone number] to make an appointment.

If you have been prescribed an antibiotic recently or have had a chest infection please wait till 6 weeks after this before making an appointment

Please bring all your inhalers with you (even if there are some you don't use) and complete the enclosed asthma control test

**IF YOU DO NOT ATTEND FOR A REVIEW, YOUR ASTHMA MEDICATION MAY
BE REFUSED UNTIL YOU ARE SEEN.**

Appendix 16: Excerpt of case study 1 asthma action plan

Patient Name:

GP: [GP Name]

Issue Date: [DATE]

Part 1 – How do I know if my asthma is under control?

Your asthma is under control if:

- You have no, or minimal symptoms during the day or night (wheezing, coughing, short of breath, tightness in chest).
- You can do all of your normal activities without asthma symptoms.
- Your peak flow reading is at least 80% of your best.

My usual medications include:

[Date] Salbutamol 100micrograms/dose inhaler CFC free 1 TO 2 PUFFS UP TO
FOUR TIMES DAILY AS REQUIRED 200 [GP]
[Date] Aveeno cream (Johnson & Johnson Ltd) ASD 300 [GP]
[Date] Montelukast 10mg tablets 1 TABLET ONCE AT NIGHT 28 [GP]

How do I know if my asthma is getting worse?

Are you waking from sleep due to asthma?
Do you have your usual asthma symptoms during the day?
Does your asthma interfere with your usual activities?
Do you need your reliever medicine more often?

How do I know if it is an asthma emergency?

- It is an asthma emergency if:
- Your reliever in(blue) inhaler does not help
 - Your symptoms get worse
 - You are too breathless to speak
 - You are feeling frightened
 - Your peak flow is really low

My action plan

**[Date] Asthma causes symptoms most nights [Nurse]
[date] Asthma annual review [Nurse]
[Date] Asthma management plan given [Nurse]
[Date] Inhaler technique shown Ability: go back to slow deep tidal breathing
with volumatic, demonstrated at length at clinic rinse after [Nurse]
[Date] Recall on [date] for Asthma annual review with [Nurse]
Status: Outstanding [Nurse]**

**AS DEMONSTRATED AT CLINIC
MOST IMPORTANT!!!**

Appendix 17: Excerpt of case study 2 annual review invitation letter

Dear [patient]

Asthma Review

The Surgery is holding Annual Asthma Review Clinics and the Doctors strongly advise that you take this opportunity to have your Asthma review carried out.

Please make your appointment with [Nurse] by telephone the Surgery on [phone number], as soon as possible. Please refer to this letter when making an appointment and bring it with you to your appointment.

Bring any Inhalers you may be using

[Nurse] can check your inhaler technique which may improve your Asthma control and issue you with a Written Management Plan.

Thank you

Appendix 18: Public Health Agency leaflet for parents of children with asthma

Inhaled treatments are given by two different types of devices:

- **Aerosol:** Metered Dose Inhaler (MDI), Evohaler, Easi-Breathe.
- **Dry powder for inhalation:** Turbohaler, Clickhaler or Accuhaler.

The type of inhaler device recommended for your child will depend on their age. Type of device recommended:

Holding chamber: Yes / No
If yes, state colour:

The asthma/allergy nurse will show you how to use your treatments.



Holding chambers or 'spacers' should be maintained as follows:

- Soak the chamber for 15 minutes in lukewarm water with mild detergent approximately every 2 weeks.
- Shake out excess water and air dry upright.
- Replace holding chamber every 6–12 months.

Handy hint

Have a routine for your child – a set time of day to take the inhaled preventer medication. For example, taking the preventer before brushing teeth and washing face to ensure mouth and face are cleaned well (this helps to prevent oral thrush).

Other airways treatments

- **Montelukast (Singulair)** Available as granules or tablets. Singulair helps to calm the airways of the lungs.
- **Theophylline (Slo-phyllin)** Theophylline capsules are used as a bronchodilator for asthma.
- **Antihistamine tablets/solutions (Xyzal, Cetirizine, Neoclariytin, Telfast, Piriton)** Antihistamines are used in the treatment of allergies and are used to help control your child's trigger factors.
- **Nasal sprays (Avamys, Nasonex, Beconase)** Nasal sprays are used to treat inflammation of the nasal passages (allergic rhinitis).

This is to confirm that I have received information on managing my child's asthma.

Signature:

Date:



Public Health Agency, 12–22 Linenhall Street, Belfast BT2 8BS.
Tel: 0300 555 0114 (local rate).
www.publichealth.hscni.net

07/14



Asthma information for parents

Child's name:

Address:

DOB:

GP:

Telephone:

Asthma/allergy nurse:

Telephone:

Hospital consultant:

For further information on asthma visit:

- www.asthma.org.uk
- www.lunguk.org

What is asthma?

Asthma is an inflammatory disease of the airways. The inflammation causes the airways to narrow, which can make it difficult to breathe.

What are the symptoms of asthma?

- Wheezing (a whistling sound when breathing).
- A cough which is worse at night, after physical activity or which keeps coming back.
- Shortness of breath, especially after physical activity.
- A tight chest – some children may describe this as having a sore tummy or tight pain in their chest.

Your child may not have all these symptoms.

What causes an asthma attack?

An asthma attack can be triggered by various factors, including:

- a cold
- animals
- pollen
- tobacco smoke
- sprays, eg perfume or polish
- physical activity
- house dust mites
- changes in weather.

How can I help my child's asthma?

Using the medication prescribed in the **green** section of your asthma action plan should keep your child's asthma under control, although he or she may still experience occasional symptoms.

You can also help your child's asthma by:

1. Making sure your child takes all medication prescribed.
2. Stopping smoking. Failing this, do not smoke indoors or in cars.
3. Reducing house dust mites by:
 - damp dusting;
 - cutting down clutter;
 - vacuuming soft furnishings regularly with a high filtration (HEPA) vacuum cleaner;

- vacuuming the mattress every two weeks;
- using hypoallergenic pillows and duvets and using pillow, duvet and mattress covers for added protection;
- placing cuddly toys in a plastic bag in the freezer for six hours once a month and then defrosting and vacuuming them.

What if my child's symptoms get worse?

When your child's symptoms get worse (eg coughing a lot, wheezing, getting breathless), use the reliever and any other medication as instructed in the **amber** section of your action plan.

If your child doesn't respond well or responds well but:

- continues to need the reliever every four hours; or
- needs the reliever before the four hours are up; contact your GP/out-of-hours GP or asthma nurse that day.

What if my child has a dangerous asthma attack?

- coughing or wheezing all the time;
 - tired and too breathless to talk;
 - using his or her tummy muscles to help breathing;
 - shows a change in skin colour, such as paleness or a blue tinge;
- you should:

- give reliever as instructed in the **red** section of your asthma action plan;
- loosen any tight clothing;
- give your child space to breathe, encourage him or her to sit in an upright position;
- **take your child to hospital immediately (or ring 999 for an ambulance)**. On the way to hospital or while waiting for an ambulance, give further doses of reliever as instructed in the **red** section of your asthma action plan.

Treatments

Inhaled treatments fall into three main groups:

1. Relievers (bronchodilators): (blue in colour)

Relievers open up the airways to make it easier to breathe. They act quickly and aim to give relief for up to four hours. They should only be taken when needed.

The main relievers are: Salbutamol (Ventolin) and Terbutaline (Bricanyl).

2. Preventers: (brown or orange in colour)

Preventers are steroid based and reduce airway inflammation. Preventers must be taken every day even if your child is well. A drink is recommended after inhaled steroids; side effects can include a sore throat or oral thrush. If using a facemask, wipe your child's face after treatment with a damp face cloth.

Types of preventers: Beclomethasone (Clenil, Qvar), Budesonide (Pulmicort), Fluticasone (Flixotide), Ciclesonide (Alvesco).

3. Combined treatments: (red/white or purple in colour)

Combined treatments contain a steroid and long-acting reliever; their aim is to reduce airway inflammation. Combined treatments are taken twice daily (unless indicated otherwise by your doctor).

Types of combined inhalers: Budesonide/Formoterol fumarate (Symbicort) and Fluticasone/SerEVENT (Seretide).

Appendix 19: Public Health Agency asthma action plan for age 14+




Asthma self-management action plan
(for ages 14+)*

Part 3 How do I know if it is an asthma emergency?

- My reliever inhaler does not help
- My symptoms get worse
- I am too breathless to speak

What should I do in an emergency?

- Take your reliever inhaler
- Sit up and loosen tight clothing
- If there is no immediate improvement, continue to take one dose/puff of reliever inhaler every minute until symptoms improve or up to a maximum of five minutes.
- If my symptoms do not improve in five minutes, or if I am unsure, I should call 999 or a doctor urgently.

*This action plan may not be suitable for all patients with asthma. In some cases, your doctor or nurse will provide you with other specific information and actions to follow.

Produced by the Public Health Agency on behalf of the Northern Ireland Regional Respiratory Forum, Public Health Agency, 18 Ormeau Avenue, Belfast BT2 8HS.
 Tel: 028 9031 1611. Textphone/Text Relay: 18001 028 9031 1611.
www.publichealth.hscni.net

03/12

Name: _____

Date: _____

Issued by: _____

Contacts	Name	Telephone
GP practice		
Community respiratory team		
Pharmacy		
Out-of-hours service		
Hospital respiratory team		

Part 1 How do I know if my asthma is under control?

- I have no, or minimal symptoms during the day or night (wheezing, coughing, shortness of breath, tightness in chest)
- I can do all my normal activities without any symptoms
- My peak flow reading is at least (80% of my best)

My usual asthma medications include:

- **Preventer medicine** (This should be used every day, even when I am feeling well)

Name:

Colour:

Take: doses/puffs when

- **Reliever medicine** (This should be used when I have symptoms)

Name:

Colour:

Take: doses/puffs when

- **Other regular asthma medicines that may be added to my treatment**

Name:

Colour:

Take: doses/puffs when

Part 2 How do I know if my asthma is getting worse?

- Am I waking from sleep due to asthma?
- Do I have my usual asthma symptoms during the day?
- Does my asthma interfere with my usual activities?
- Do I need my reliever medicine more often?
- Is my peak flow reading less than usual?

My actions should include:

- Ensure that I am taking my usual medication and inhalers as prescribed
- Use a spacer with my inhaler device if I have been given one
- Add or increase the following medication or inhalers if prescribed:

Name Take doses/puffs when

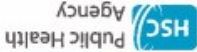

- Stay on this dose until I have had no symptoms for days, then return to my normal dose.

Seek advice from

If my symptoms do not improve after hours/days, then I should:

- contact as soon as possible
- start by taking of my 5mg prednisolone (steroid) tablets if I keep these at home
- continue to take of them every morning for days or until my symptoms have improved or my peak flow has been at for two days.
- see my doctor within 1–2 days to let them know I have started the tablets.

Appendix 20: Public Health Agency asthma action plan (A8)

When your symptoms are under control or you're very well, take this medication:

Please remember to bring all your medicines, inhalers and holding chambers to every appointment.

HSC number: _____

Issue date: _____ Date of birth: _____

Name: _____

Address: _____

Asthma action plan

Any other information?

Are you using high dose steroids?

Have you been issued with a steroid card?

Always remember: Avoid cigarette smoke, especially at home and in the car.

1	Preventer: Device:	
2	Preventer: Device:	
3	Montelukast:	
4	Reliever: (only if needed) Device:	
5	Antihistamine:	
6	Other:	
7	Other:	

When your symptoms get worse (eg coughing a lot, wheezing, getting breathless):

- Take ___ puffs of your blue reliever every four hours.
- Take your first dose of oral steroid if they have been given to you by your doctor for use at home.
- If you still need your reliever every four hours (or before the four hours are up), contact your GP/out-of-hours GP or asthma nurse **that day**.

Other advice:

When you're having a dangerous asthma attack (eg coughing or wheezing all the time, tired and too breathless to talk, using tummy muscles to breathe, skin turning pale or blue):

- Take ___ puffs of blue reliever or, if prescribed, nebulised Salbutamol/Terbutaline.
- go to hospital immediately (or ring 999 for an ambulance)**. On the way to hospital or while waiting for an ambulance, take repeat doses of reliever every 15 minutes.

Hospital consultant:

Asthma and allergy doctor/nurse:

Tel: _____

GP: _____

Tel: _____

Appendix 21: Asthma UK “What to do in an asthma attack”

- **DON'T** hug me or lie me down – this will restrict my breathing
- **LISTEN** to what I am saying – I have had attacks before
- **RELIEVER** medication is very safe. During an attack do not worry about overdosing
- **ASK** your doctor for an asthma action plan

Asthma UK Adviceline
 Ask an asthma nurse specialist
08457 01 02 03
 (9am - 5pm, Monday to Friday)
asthma.org.uk/adviceline

© 2004 Asthma UK Registered charity number 802164

What to do in an asthma attack

A pocket guide

Name

Next of kin contact number

Medical contact number

Signs of an attack →

These are my commonest signs of an attack

- Coughing
- Being short of breath
- Wheezy breathing
- Feeling of tight chest
- Being unusually quiet
- Other

What should you do?

- Keep calm – do not panic
- Make sure I take two puffs of reliever (blue) inhaler
- Loosen tight clothing
- Reassure me

If no immediate improvement →

During an attack, continue to give me one puff of reliever inhaler every minute for five minutes or until my symptoms improve

CALL 999 or a doctor urgently if: →

- My symptoms do not improve in 5-10 minutes
- I am too breathless or exhausted to talk
- My lips are blue
- ... OR IF YOU ARE IN DOUBT

Appendix 22: Chiesi asthma action plan (A8)

Is it an asthma attack?

You are having an asthma attack if one of the following happens:

- Your reliever isn't helping or lasting over four hours.
- Your symptoms are getting worse (cough, breathlessness, wheeze or tight chest).
- You're too breathless or it's difficult to speak, eat or sleep.
- Your breathing may get faster and it feels like you can't get your breath in properly.

After an emergency attack:

Within 24 hours of your attack, make an appointment with your doctor or nurse for an asthma review.

Produced in accordance with Chiesi Ltd

Chiesi DENTON WAY, ALLENBY, YORK YO10 2BB

Asthma attack action plan

Name

Next of kin contact number

Medical contact number

breathing well

asthma review

This asthma attack information is not designed for people who use their controller inhaler as maintenance and reliever therapy. If you use one of these speak to your GP or asthma nurse to get the correct asthma attack information.

What to do in an asthma attack:

1. Sit up straight – don't lie down. Try to keep calm.
2. Take one puff of my reliever inhaler every 30 to 60 seconds up to a maximum of 10 puffs.
3. If you feel worse at any point, or do not feel any better after taking your inhaler as instructed above:

Call 999 or a doctor urgently.

If an ambulance does not arrive within 15 minutes, repeat step 2 while you wait.

PREVENTER

Treatment:

Dose:

When:

RELIEVER

Treatment:

Dose:

When:

OTHER

Treatment:

Dose:

When:

Appendix 23: Chiesi asthma action plan (A5)

Asthma Action Plan



breathing well Action Plan

Name:

Name of doctor or nurse:

Surgery contact number:

Date plan updated:

Date of next review:

Drug allergies/asthma triggers:



About Your Action Plan

This plan shows how to recognise when your asthma is getting worse and what course of action you need to take.

It shows you what medication(s) you are taking and when to take them.

Regular review of your asthma is important. Take this plan when you visit your doctor or asthma nurse and they will fill it in with you. You should have your asthma reviewed at least once a year.

Do not reduce the dose or stop taking your medicine without talking to your doctor or asthma nurse first.

Produced as a service to medicine by Chiesi Ltd

Additional Information

Notes:

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Where Can I Find Out More?



Asthma UK Adviceline
Asthma.org.uk/helpine

Asthma UK website
Asthma.org.uk

Date of preparation: September 2015 | Job code: CHIEL20140933A

Your Asthma Treatment

Your Preventer

Name:

Colour:

Take: (Number of puffs/doses)

When:

Take your preventer inhaler every day, even when you are feeling well. It reduces the inflammation in your airways which is the main cause of coughing, wheezing, breathlessness and chest tightness.

Your Reliever

Name:

Colour:

Take: (Number of puffs/doses)

When:

Your reliever gives rapid but short term relief of asthma symptoms by relaxing tightened airways. Your reliever should only be taken when necessary.

Additional Medication

Name:

Colour:

Take: (Number of puffs/doses)

When:

<h3>How Do You Feel?</h3>	<h4>Good Control</h4> <ul style="list-style-type: none"> You have no or minimal symptoms during the day and night (wheezing, coughing, shortness of breath or chest tightness). You can complete all normal activities without asthma symptoms.
<h4>Worsening Asthma</h4> <p>Your asthma is getting worse if you have ONE or more of the following symptoms:</p> <ul style="list-style-type: none"> You need to use your reliever inhaler more than twice a week. You have difficulty sleeping because of your asthma. You have seasonal symptoms (e.g. hay fever, cold). 	<h4>Severe Asthma</h4> <p>Your asthma is severe if you have ONE or more of the following symptoms:</p> <ul style="list-style-type: none"> You need to take your reliever inhaler every 4 hours or more often. You are unable to manage your normal activities. You wake most nights with cough, wheeze, shortness of breath or chest tightness.
<h4>Emergency</h4> <p>It is an asthma emergency if any of the following happen:</p> <ul style="list-style-type: none"> Your reliever inhaler does not help. You are too breathless to speak, eat or sleep. 	

<h3>What is Your Peak Flow Reading?</h3>	<h4>My best peak flow reading is:</h4> <p>Your peak flow reading is above 80% of your best reading. For you this means</p>
<p>Your peak flow reading is below 80% of your best reading. For you this means</p>	<p>Your peak flow reading is less than 60% of your best reading. For you this means</p>
<p>Your peak flow reading is less than 40% of your best reading. For you this means</p> <h3>Remember to take your inhaler with a spacer if you need to</h3>	

<h3>Actions</h3>	<p>No Change. Continue your normal asthma treatment of:</p> <ol style="list-style-type: none"> Preventer Reliever Additional Medication <p>If your control is always good, your doctor or asthma nurse may want to reduce your regular medication.</p>
<ol style="list-style-type: none"> Increase your medication as agreed with your doctor or asthma nurse. Stay on this dose until you have 'Good Control' of your asthma. If your symptoms do not improve in [] days, contact your doctor or asthma nurse. Continue to take your reliever inhaler whilst these symptoms persist. 	<ol style="list-style-type: none"> Continue taking your medication as in 'Worsening Asthma'. If you have been prescribed steroid tablets, begin taking them and let your doctor or asthma nurse know within 24 hours. Take [] 5mg prednisolone tablets immediately and again every morning for [] days or until your symptoms have improved and your peak flow is back to normal (Good Control reading). If you have not been prescribed steroid tablets, see your asthma nurse urgently.
<ol style="list-style-type: none"> Sit up straight – don't lie down. Try to keep calm. Take one puff of your reliever inhaler every 30 to 60 seconds up to a maximum of 10 puffs. If you feel worse at any point while using your inhaler OR do not feel any better after 10 puffs, call 999. <p>DO NOT IGNORE WORSENING SYMPTOMS. GET MEDICAL HELP IMMEDIATELY, DAY OR NIGHT. After an emergency you should call your doctor or asthma nurse for an urgent appointment – even if you feel better.</p> <p>This asthma attack information is not designed for people who use their combination inhaler as maintenance and reliever therapy. If you use your inhaler in this way speak to your GP or asthma nurse to get the correct asthma attack information.</p>	

Appendix 24: Excerpt of case study 3 annual review invitation letter

Dear [patient]

You are now due for your annual asthma review.

It is important that you attend at least once a year to have an assessment of your asthma and check that your symptoms are well controlled and that you are on optimal therapy to control your asthma symptoms. **This will also allow safe prescribing if you request an inhaler in the future.**

Can you please ring the surgery on [phone number] and arrange a 20 minute appointment for your **asthma review and Flu Vaccine if required.**

Appendix 25: Excerpt of case study 4 annual review invitation letter

Dear [patient]

Our records show that you are prescribed inhalers and are now due a Respiratory Review and Inhaler Assessment.

A special clinic has been organised with the Practice Nurse for your review on:

[Date]

Please attend at any time between the following hours:

[Time]

This is an ideal opportunity for you to discuss any health queries you may have.

If you cannot attend on this day please telephone the surgery on [phone number]

Please bring your INHALERS and a list of your current medication.

Thank you.