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Understanding the Role of Primary Care in the Management of Adults with Co-morbid Obesity: A mixed methods programme

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2 VOLUMES

VOLUME 1 – THESIS

Abstract

Introduction

Obesity is widely regarded as one of the biggest public health problems in the UK today. Policy suggests more can be done in primary care to support adults with obesity, particularly identifying and referring individuals with "high risk" obesity (obesity with co-morbidities) to weight management services. The aims of this thesis were to examine the role of primary care in the management of adults with co-morbid obesity; to understand the barriers facing patients and practitioners in accessing NHS adult weight management services via primary care; and to explore theory-driven, evidence-based interventions targeted at primary care practitioners to improve the management of co-morbid obesity.

Methods

This was a mixed methods study, integrating qualitative and quantitative approaches. There were 4 phases of research in this thesis: Phase 1) Semi-structured interviews with 9 senior dietitians involved in planning and delivery of adult weight management in Scotland; Phase 2) A realist review of interventions targeted at primary care practitioners to improve the identification and referral of adults with obesity; Phase 3) Analysis of 9,677 GP referrals to the largest NHS weight management service in Scotland, the Glasgow and Clyde Weight Management Service (GCWMS); Phase 4) Analysis of interviews with 20 patients who had been referred to GCWMS, as well as 17 primary care practitioners (GPs and practice nurses) from referring practices.

Key results

Phase 1) identified that there is no consensus among key stakeholders (senior dietitians) about the role of primary care in adult weight management, with a number of tensions apparent related to who should be doing what, where, and how. Phase 2) found 12 mechanisms that were characteristic of successful interventions targeting primary care practitioners, many of which could be activated by improving communication between primary care and weight management services. A number of important contextual factors that influence

these interventions were also identified, at micro (individual/interpersonal), meso (institutional) and macro (infrastructural) levels. Phase 3) found that roughly a third (n=3250, 33.6%) of 9,677 adults with obesity referred to GCWMS attended at least one session. The likelihood of attendance increased with age, BMI category, and increasing affluence. Practice-level characteristics that were most strongly associated with attendance were being a non-training practice, having a larger list size, and not being in the most deprived areas. Phase 4) helped to explain some of this variation in attendance, related to geographical and structural barriers, particularly for working adults and those from areas of high socio-economic deprivation. An expanded conceptual model of candidacy theory is proposed, advancing our understanding of access to weight management.

Conclusion

GPs and practice nurses are well placed to discuss weight and related health issues and to refer patients to further sources of support. This support should ideally be local, familiar, and relatively quick and easy to access, particularly important in areas of high socio-economic deprivation, which have the highest proportion of referrals to GCWMS but the lowest likelihood of attendance.

To improve the identification and referral of adults with obesity, future interventions should consider training of practitioners, audit/feedback on referrals, and tools to aid both identification (e.g. automatic BMI calculators, posters in waiting area) and referral. To improve attendance following referral, however, greater emphasis needs to be placed on improved communication between weight management services and primary care, and improved accessibility of services.

Table of Contents

Appendices are provided in Volume 2

List of Tables

List of Figures

Acknowledgements

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Participants

I thank the study participants, including all the patients recruited from GCWMS, the GPs and practice nurses, and the service leads and other stakeholders, without whom this project would not have been possible.

Friends and Family

Finally, I would like to thank my friends and family for their support throughout my studies. My mother-in-law, Dr Mary Higgins, provided invaluable babysitting, and proof read most of this thesis. My mum and step-dad have been incredible, and have helped my wife and I hold it together through the depths of sleep deprivation.

Last but certainly not least, my wonderful wife Miriam has been by my side every step of the way; I simply could not have done this without her. Our daughters, Hannah and Rachel, were not around when we started out on this PhD journey; without them, this thesis would have been finished much sooner (!), but I love them dearly.

Author's Declaration

I declare that I am the sole author of this thesis and was responsible for leading all aspects of this research, under guidance from my supervisors. A number of colleagues collaborated at various stages and they are formally acknowledged below.

Stakeholder interviews

Frances Birch, from NHS Health Scotland, helped with the recruitment of stakeholders by sending out an initial email invitation. My secondary supervisor Sara Macdonald accompanied me on the first three interviews and contributed to discussions about coding and analysis, along with my primary supervisor Kate O'Donnell (as described in Chapter 4). Michere Beaumont transcribed the interviews.

Realist review

The search strategy for the realist review was developed after discussion with Heather Worrledge-Andrew from the University of Glasgow Library. I acted as first reviewer during all stages of the review including paper screening, data extraction, quality appraisal and analysis. Sara Macdonald and Kate O'Donnell acted as second reviewers for screening and data extraction and supported my thinking in relation to the analysis.

Analysis of GP referral data

The data used for analysis was provided with permission from the Glasgow and Clyde Weight Management Service (GCWMS) and was cleaned and curated by Billy Sloan, Data Development Manager at the University of Glasgow. I performed further data cleaning and all descriptive analyses, as well as most of the logistic regression modelling. Philip McLoone assisted me with aspects of statistical analysis (particularly multi-level modelling) and the use of STATA software. Paula Barton, Mapping analyst from NHS Greater Glasgow & Clyde, calculated distances from the practices to the nearest weight management class, which was used as a variable in the analysis.

Patient and practitioner interviews

Recruitment of participants from GCWMS was supported by Louise Bryan at GCWMS and recruitment of practitioners was supported by Tracy Ibbotson of the Scottish Primary Care Recruitment Network. Michere Beaumont transcribed the patient and practitioner interviews. I carried out all analyses, in discussion with my supervisors.

Competing interests

During the conduct of this research, I have represented the Royal College of General Practitioners (RCGP) on the Steering group of Obesity Action Scotland, established in 2015 to provide clinical leadership and independent advocacy on preventing and reducing overweight and obesity in Scotland. It is funded by a grant from the Scottish Government and hosted by the Royal College of Physicians and Surgeons of Glasgow on behalf of the Academy of Medical Royal Colleges and Faculties. In this role, I have provided briefings to representatives of the Scottish Government.

I am also on the steering group of the General Practitioners at the Deep End group. GPs at the Deep End work in 100 general practices serving the most socio-economically deprived populations in Scotland.

Publications & Presentations

Publications arising from this project

Blane DN, Macdonald S, Morrison D, O'Donnell CA. (2015) Interventions targeted at primary care practitioners to improve the identification and referral of patients with co-morbid obesity: a realist review protocol. Systematic Reviews, 4, 61. (Appendix 1)

Blane DN, Macdonald S, Morrison D and O'Donnell CA. (2017) The role of primary care in adult weight management: qualitative interviews with key stakeholders in weight management services. BMC Health Services Research, 17, 764. (Appendix 2)

Blane DN, McLoone P, Morrison D, Macdonald S and O'Donnell CA. (2017) Patient and practice characteristics predicting attendance and completion at a specialist weight management service in the UK: a cross-sectional study. BMJ Open, 7(11), e018286. (Appendix 3)

Selected presentations arising from this project

Blane DN, Macdonald S, Morrison D and O'Donnell CA. *The ATTAIN study - Access To Weight Management in Primary Care: a mixed method case study. Annual Meeting of the North American Primary Care Research Group (NAPCRG).* Montreal, Canada; November 2017 (Oral Presentation).

Blane DN, Macdonald S, and O'Donnell CA. Interventions targeted at primary care practitioners to improve the identification and referral of adults with co-morbid obesity: a realist review. *Society for Academic Primary Care (SAPC) Annual Scientific Meeting.* Dublin, Ireland; July 2016 (Oral presentation).

Blane DN, Macdonald S, Morrison D and O'Donnell CA. Primary care interventions to improve the identification and referral of adults with co-morbid obesity: a realist review. *European Obesity Summit.* Gothenburg, Sweden; June 2016 (Poster presentation).

Blane DN, Macdonald S, Morrison D and O'Donnell CA. GP Referrals to Weight Management: A Mixed Methods Realist Case study. *International Institute for Qualitative Methodology (IIQM) Qualitative Methods conference.* Glasgow, UK; May 2016 (Oral presentation).

Blane DN, Macdonald S, Morrison D and O'Donnell CA. Access to adult weight management in primary care: qualitative interviews with key stakeholders from NHS weight management services. *Society for Academic Primary Care (SAPC) Annual Scientific Meeting.* Oxford, UK; July 2015 (Oral presentation).

Abbreviations

AoMRC	Academy of Medical Royal Colleges
ATTAIN	**A**ccess **t**o Weigh**t** M**a**nagement **in** Primary Care
BCW	Behaviour Change Wheel
BED	Binge eating disorder
BMA	British Medical Association
BME	Black and Minority Ethnic
BMI	Body Mass Index
BOCF	Baseline observation carried forward
BOGOF	Buy one get one free
BWeL	Brief intervention for Weight Loss
CBPR	Community Based Participatory Research
CCG	Clinical Commissioning Group
CI	Confidence Interval
CMO	Chief Medical Officer
	Context-Mechanism-Outcome
CMOc	Context-Mechanism-Outcome configuration
COM-B	Capability, Opportunity, Motivation - Behaviour
CPD	Continuing Professional Development
CWM	Commercial weight management
DPH	Director of Public Health
DSM	Diagnostic and Statistical Manual of Mental Disorders
EHR	Electronic Health Record
EMR	Electronic Medical Record
EPOC	Effective Practice and Organisation of Care
FG	Focus group
FTO	Fat mass and obesity associated (gene)
GCWMS	Glasgow and Clyde Weight management service
GDP	Gross Domestic Product
GGC	Greater Glasgow and Clyde
GP	General practitioner
GPPC	General Practice and Primary Care
HFSS	High in fat, salt and sugar
ICSI	Institute for Clinical Systems Improvement
ISD	Information Services Division
KBS	Knowledge, Behaviour, Status
LMIC	Low and middle income country
LOCF	Last observation carried forward
MDT	Multi-disciplinary team
MLIC	Metropolitan Life Insurance Company
MRC	Medical Research Council
MRT	Middle-range theory
NCD	Non-communicable disease
NHANES	National Health and Nutrition Examination Survey
NHS	National Health Service
NICE	National Institute for Health and Care Excellence
NIH	National Institutes of Health
NIHR	National Institute for Health Research
NPF	National Performance Framework
	National Planning Forum
NPT	Normalisation Process Theory
OR	Odds Ratio

ORM	Obesity Route Map
OSOP	One sheet of paper
PARiHS	Promoting Action on Research Implementation in Health Services
PCP	Primary care practitioner
PDSA	Plan-do-study-act
PHAT-G	Provider and Healthcare team Adherence to Treatment Guidelines
PHN	Public health nurse
PN	Practice nurse
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PROSPERO	International Prospective Register of Systematic Reviews
QC	Quality Circle
QOF	Quality and Outcomes Framework
RAMESES	Realist And Meta-narrative Evidence Syntheses: Evolving Standards
RCGP	Royal College of General Practitioners
RCP	Royal College of Physicians
RCT	Randomised Control Trial
REC	Research Ethics Committee
SAPE	Small Area Population Estimates
SCI	Scottish Care Information
SES	Socio-economic status
SIGN	Scottish Intercollegiate Guidelines Network
SIMD	Scottish Index of Multiple Deprivation
SPICe	Scottish Parliament Information Centre
TCL	Take Charge Lite
TDF	Theoretical Domains Framework
TICD	Tailored implementation for chronic diseases
TOFI	Thin on the Outside, Fat on the Inside
UK	United Kingdom
US	United States
USPSTF	United States Preventive Services Task Force
WC	Waist circumference
WHO	World Health Organisation
WMS	Weight management service

Glossary

CMO configuration	CMO configuring is a heuristic used in realist research to generate causative explanations pertaining to the data. The process draws out and reflects on the relationship of context, mechanism, and outcome of interest in a particular programme. A CMO configuration may pertain to either the whole programme or only certain aspects. Configuring CMOs is a basis for generating and/or refining the theory that becomes the final product of a realist review.
Co-morbidity	The presence of one or more long-term conditions in addition to an index condition (in this case, obesity).
Conceptual Model	A conceptual model is a model made of the composition of concepts, which are used to help people know, understand, or simulate a subject the model represents.
Context	The term context has been used in this thesis to refer to conditions at different levels (micro, meso and macro) that impact on the operation of a programme or intervention.
Formal theory	Formal, or substantive, theory is existing theory within particular disciplines, such as sociology, economics, psychology, etc. Examples include game theory in economics and attachment theory in human development.
Mechanism	There are many definitions of mechanism, but a common thread is that they generate outcomes. In realist research, mechanisms are often considered to be underlying entities, processes, or structures which operate in particular contexts to generate outcomes of interest.
Middle-range theory	This is an implicit or explicit explanatory theory that can be used to assess programmes and interventions. "Middle-range" means that it can be tested with the observable data and is not abstract to the point of addressing larger social or cultural forces (i.e. grand theories).
Programme theory	This is theory about what a programme or intervention is expected to do, or how it is expected to work
Realism	Realism refers to a philosophy of science. It sits, broadly speaking, between positivism ('there is a real world which we can see and understand directly through observation') and constructivism ('we cannot know for sure what the nature of reality is, because all knowledge has been interpreted through human senses, language and culture').
Theory	There are multiple definitions of the word 'theory'. One simple way of thinking of theory is as an attempt to organise facts (proven or conjectural) into a structurally coherent system. Different types of theory are described in this glossary.

1 Introduction to the thesis

Obesity is widely regarded as one of the most significant public health challenges in the developed world [1]. Obesity is a risk factor for, amongst others, coronary heart disease, diabetes, stroke, osteoarthritis and a number of different cancers [2], and is, ultimately, associated with premature death [3]. The benefits of weight loss for adults with obesity include reduced progression to type 2 diabetes [4, 5] and lower blood pressure and cholesterol [6]. Although overweight and obesity in children is of growing concern to policymakers [7, 8], practitioners [9, 10], and, indeed, many parents and families [11], the focus throughout this thesis will be on obesity in adults.

Strategies to prevent and treat adult obesity include interventions aimed at the individual, family, health care provider, and the lived environment [1]. Current UK and Scottish guidelines on obesity emphasise the central role of primary care (particularly general practitioners and practice nurses) in its prevention and management [12, 13]. The strengths of primary care – population coverage, first contact, continuity, and relationships of trust built over serial encounters [14] – support this role in theory, but there is a considerable gap between policy rhetoric ("every health care contact is a health improvement opportunity" [15]) and the reality in practice. Adult obesity remains under-treated in primary care: few are referred to external sources of support, where they exist, and there are wide variations in referral rates and attendance following referral [16-18].

This thesis seeks to understand the reasons for this observed variation in primary care engagement with weight management, and to explore suggestions for improving it. It does this by following a familiar process of starting with the general, then concentrating on the specific, before considering the general again.

The thesis begins with the general by examining the role of primary care in the management of adults with co-morbid obesity. The rationale for the focus on adults with co-morbid obesity – that is, obesity with weight-related co-morbidities such as diabetes or hypertension – is two-fold: first, given the high prevalence of obesity (more than 1 in 4 adults in Scotland), most health systems

have adopted a tiered approach to weight management services, based on clinical need, as there is no capacity to see all individuals with obesity.

Secondly, given the increasing incidence of more severe and complex obesity, general practitioners (GPs) and practice nurses (PNs) are likely to see patients with weight-related co-morbidities more frequently and should, therefore, become better at supporting these individuals and offering them access to specialist weight management services.

The role of primary care in adult weight management is, however, a contested area, with different perspectives from policy makers, weight management service planners, primary care practitioners, and patients, i.e. adults living with obesity. The first core contribution of this thesis is to clarify the key tensions and contradictions in this field, drawing upon qualitative data from these different perspectives.

The thesis then concentrates on the specific case of identification and referral of adults with co-morbid obesity in primary care. It does this in two ways: first, by a detailed literature synthesis (realist review) of interventions targeted at primary care practitioners to improve the identification and referral of adults with obesity; and second, by a mixed method case study of GP referrals to a specialist National Health Service (NHS) adult weight management service. The second core contribution of this thesis is to propose a new model of access to adult weight management, producing an expanded model of 'candidacy' theory [1][19].

Finally, returning to the general, the thesis offers recommendations to improve access to adult weight management services and to inform the development of future interventions targeted at primary care to improve the care of adults with co-morbid obesity.

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[1] Single quotation marks will be used for three purposes throughout this thesis: i) the first time a new term is introduced (so the start and end of the term being discussed is clear), ii) to refer to published reports, and iii) to indicate a concept which could be considered problematic. Double quotation marks will be used for short quotations (longer quotations will be indented and separate from the main text). Italics will be used for emphasis or when foreign language words are used.

1.1 **Research motivation**

I would like, in this short section, to write in the first person, in order to describe my motivation for carrying out this piece of research in this particular way.

I finished my GP training in 2010 and went straight into a one year Health Inequality Fellowship, which satisfied both my sense of social justice and my interest in academic general practice. During that year, I started a part-time Master in Public Health, as I was particularly interested in the interface between primary care and public health. Obesity featured throughout the course as a 'wicked problem' of modernity, i.e. a complex problem that is resistant to resolution [20, 21].

Then in 2012, I attended the North American Primary Care Research Group (NAPCRG) conference and saw a fantastic presentation of a realist synthesis by Dr Justin Jagosh from McGill University in Canada [22]. I began to explore whether realist methods, which explicitly embrace complexity, might help us to understand obesity. In particular, through my clinical experience of discussing weight with adults with obesity in general practice, I wanted to explore the role of primary care in adult weight management, and the reasons why some referrals were more successful than others.

Finally, recognising that there is a social gradient in obesity as with most other health problems, and having been involved since 2010 in the 'GPs at the Deep End' group (which represents the 100 general practices serving the most socio-economically deprived populations in Scotland [23]), I was particularly keen to understand how we might improve access to weight management services for those most disadvantaged in society.

A proposal for funding was drafted in collaboration with my three supervisors and submitted to the Chief Scientist Office Clinical Academic Fellowship scheme. I was awarded funding for a 3-year fellowship to allow me to undertake the project, with the aim of achieving a PhD.

1.2 Aims and research questions

The aim of this thesis is to gain a better understanding of the challenges of identifying and referring patients with co-morbid obesity to weight management services, from multiple perspectives. The long-term aim is the development of a theory-driven, evidence-based intervention targeted at primary care practitioners to improve the management of co-morbid obesity, in line with Phase 1 of the MRC Framework for design and evaluation of complex interventions [24]. The findings of this thesis could inform such intervention development, as described in the Methodology Chapter.

In order to fulfil this aim, the following research questions (RQs) were generated. The process of generating the research questions is described in more detail in Chapter 3.

RQ1 – What is the role of primary care in adult weight management, from the perspective of key stakeholders involved in the planning and delivery of adult weight management services?

RQ2a – What is the 'programme theory' of interventions targeted at primary care practitioners to improve the identification and referral of adults with co-morbid obesity?

RQ2b – What are the mechanisms at play in different components of these interventions and what are the contextual factors that enable these mechanisms to produce successful outcomes?

RQ3 – What are the patient and practice-level predictors of attendance and completion at adult weight management services after primary care referral?

RQ4a – What is the role of primary care in adult weight management, from the perspective of patients (adults with co-morbid obesity) and primary care practitioners?

RQ4b – What are the barriers and facilitators to primary care referral to, and subsequent attendance at, adult weight management services?

These research questions were addressed over four phases of research, as shown in Figure 1-1, and outlined below:

Phase 1 involved qualitative semi-structured interviews with key stakeholders involved in planning and delivery of adult weight management in Scotland. The aim of this phase was to answer RQ1, and to inform the subsequent phase of the project: the realist review.

Phase 2 was a realist review of interventions targeted at primary care practitioners to improve the identification and referral of adults with obesity. This phase aimed to answer RQs 2a and 2b. Findings from this phase were also used to shape the interview topic guide for Phase 4 (qualitative interviews with patients and practitioners).
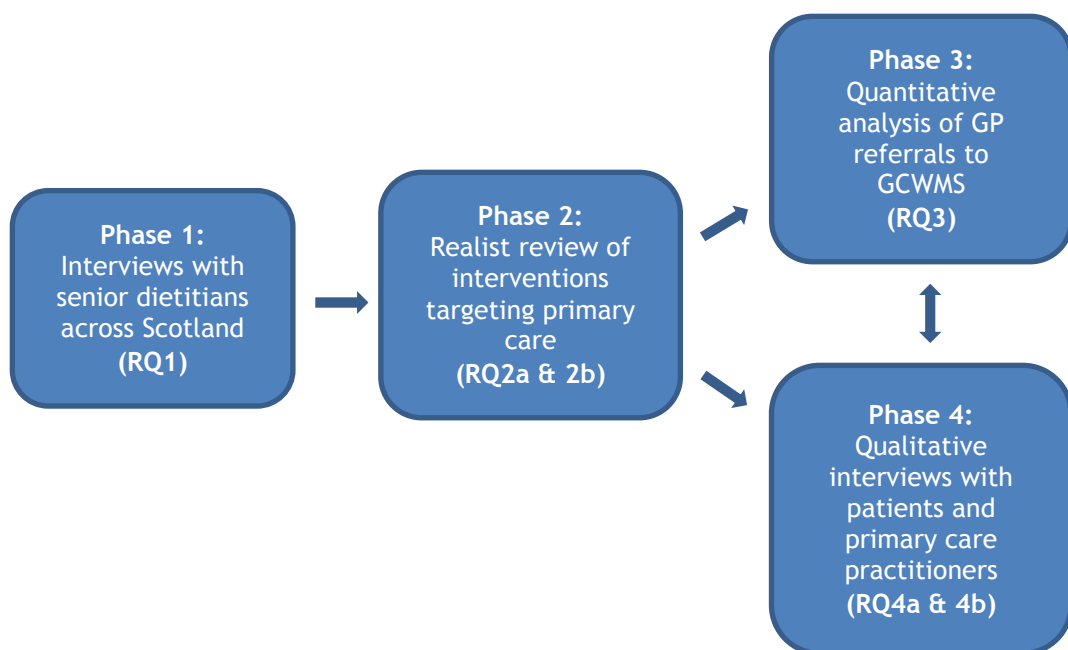
Figure 1-1: Overview of research phases and research questions

Phases 3 and 4 are two parts of a mixed methods case study. Phase 3 involved quantitative analysis of GP referrals to the largest NHS weight management service in Scotland, the Glasgow and Clyde Weight Management Service (GCWMS). Predictors of attendance and completion in the service were explored (RQ3), using individual (patient) and practice-level factors. Phase 3 was also used to develop the sampling frame for Phase 4.

Phase 4 involved qualitative semi-structured interviews with patients who had been referred to GCWMS, as well as primary care practitioners (GPs and practice nurses) from the referring practices. The aim of this phase was to answer RQs 4a and 4b.

1.3 Overview of the thesis

The material covered within each chapter of this thesis is now briefly outlined.

Chapter 2 provides a background overview of obesity, framing it as a complex problem and situating the role of primary care in adult weight management in this context. It also presents the policy perspective on the role of primary care in adult weight management and introduces the rationale for the focus on identification and referral of adults with co-morbid obesity.

Chapter 3 describes the methodological issues arising from this work. In particular, the rationale for the choice of methods to answer the research questions will be presented. The rationale for the choice of candidacy as the theoretical framework used throughout the thesis will be provided in this chapter.

There are then four results chapters, which cover the methods, results and discussion of: the Phase 1 Stakeholder interviews (Chapter 4); the Phase 2 Realist review (Chapter 5); the Phase 3 Quantitative analysis of GP referral data (Chapter 7); and the Phase 4 Qualitative analysis of interviews with patients and practitioners (Chapter 8). Chapter 6 provides an introduction to the mixed methods case study of GP referrals to GCWMS (Phases 3 and 4).

Chapter 9 is the discussion chapter, drawing upon the findings from the four results chapters to critique the theoretical framework of candidacy, and to propose an expanded model of candidacy to aid understanding of access to adult weight management services. Implications for policy and practice will be discussed, the findings will be considered in the context of other literature, and strengths and limitations of the thesis, as well as considerations for future research, will be presented.

2 Background

2.1 Overview

This chapter will provide an overview of the epidemiology of adult obesity, including trends in prevalence, its causes (with a particular focus on the relationship between obesity and socioeconomic status) and its health and economic consequences. The chapter also positions the role of primary care in adult weight management in the context of UK and Scottish obesity policy, comparing this to selected global policies including those from the World Health Organisation, the United States and Australia. It concludes by providing a rationale for the focus on identification and referral of adults with obesity presented in this work.

2.2 Epidemiology of obesity

2.2.1 Defining obesity

The World Health Organisation (WHO) defines overweight and obesity as "abnormal or excessive fat accumulation that may impair health"[25]. The term obesity is derived from the Latin *obesus*, which itself comes from two Latin words *ob* and *edere*, meaning to devour and to eat away [26]. This etymology points to the underlying cause of obesity as being excess dietary intake. Indeed, weight management is often characterised as being about "calories in versus calories out", but the reality is far more complex, as will be made clear later in this chapter.

The best means of measuring or diagnosing obesity is an area of considerable contention [26]. There are no current methods of direct quantitative measurement of body fat that are accurate, economical or practical for widespread use [27]. Present and historical definitions of obesity are therefore based on simple anthropometric measures such as weight and height.

In 1942, for instance, the Metropolitan Life Insurance Company (MLIC) produced ideal body weight tables, after finding an association between longevity and body weight [28]. These were renamed desirable weight tables in 1953 then revised to height-weight tables in 1983 [29]. In each case, obesity was defined

as increased body weight of 20% or more above a person's ideal or desirable weight. This approach was used for many years, but had a number of limitations. The MLIC tables were complex and not easily applied in clinic or field settings [29], they incorporated unvalidated measures of body frame size [30], and were based on a select reference population (of adults aged 25 to 59) not generalizable to more heterogeneous populations [26].

In 1985, a panel of the National Institutes of Health (NIH) Consensus Development Conference on the Health Implications of Obesity recommended the use of body mass index (BMI) as the measurement standard for assessing patients with overweight or obesity [26]. BMI is defined as a person's weight (in kilograms) divided by the square of their height (in metres), expressed as kg/m^2. They defined a single category of overweight/obesity as a BMI of 27.8 or greater for men and 27.3 or greater for women [28], roughly equating to the 20% MLIC approach.

In 1997, the WHO endorsed BMI as the most useful measure of obesity [31]. They produced a classification of adult weight status that has been internationally adopted into clinical guidelines and practice [12, 13]. Table 2-1 shows the standard categories for obesity classification in adults. A BMI of 30 or greater remains the most widely accepted clinical definition of obesity today.

Table 2-1: Classification of overweight and obesity in adults (Adapted from NICE [12])

BMI range (kg/m^2)	Weight classification
<18.5	Underweight
18.5 – 24.9	Healthy weight
25 – 29.9	Overweight
30 – 34.9	Mild obesity (Class I)
35 – 39.9	Moderate obesity (Class II)
40+	Morbid obesity (Class III)

Although widely used, BMI has a number of limitations. At the simplest level, it has been criticised because body weight does not give any information about body composition – for instance, an athlete may be heavy due to high muscle mass and not excess body fat. It is also well recognised that individuals with a normal BMI can have metabolic obesity (i.e. have phenotypic characteristics of individuals with obesity, so called 'TOFI', or 'Thin on the Outside, Fat on the Inside') [32]; similarly, some people with high BMIs can be metabolically healthy

(i.e. have a metabolic profile characterised by high levels of insulin sensitivity, no hypertension, and favourable lipid, inflammation, hormonal, liver enzyme and immune profile) [33, 34].

Some guidelines, such as that from the Scottish Intercollegiate Guideline Network (SIGN), therefore recommend combining BMI with another anthropometric marker of obesity – waist circumference (WC) [13]. A raised waist circumference (>94cm for men and >80cm for women) is a proxy for abdominal fat, which is associated with increased risk of ill health (particularly type 2 diabetes, hypertension, and cardiovascular disease) even in people of normal weight [35]. However, accurately measuring WC can be problematic and even using BMI and WC in combination does not tell us anything about an individual's quality of life, level of functioning, or other contextual factors that may guide clinical management [26].

In answer to this, Sharma and colleagues have proposed a clinical and functional staging system for obesity, which allows clinicians to describe the morbidity and functional limitations associated with excess weight, and provides a framework for management in clinical practice [26]. Table 2-2 provides an edited version of this staging system. However, it has yet to be evaluated and applied widely in practice.

Other researchers have recognised the heterogeneity of obesity and attempted to characterise distinctive clusters of obesity based on demographic, clinical and behavioural factors [36, 37]. Using data from the Yorkshire Health Study, Green et al found six distinct subgroups of individuals with obesity: heavy drinking males; young healthy females; the affluent and healthy elderly; the physically sick but happy elderly; the unhappy and anxious middle aged; and a cluster with the poorest health (who are more likely to be socio-economically deprived and multimorbid) [36]. A similar cluster analysis using data from the US National Health and Nutrition Examination Survey (NHANES) also found six subgroups, and considerable overlap with the Green et al clusters, though some differences also, reflecting different demographic and racial-ethnic populations [37]. The important implications of this work are that a 'one size fits all' approach to obesity is likely to be inappropriate and ineffective.

In summary, while the use of BMI and WC, either individually or in combination, have proved valuable for epidemiological classification of overweight and obesity, assessment of obesity-related co-morbidities, and/or other risk factors, is more important for determining appropriate treatment and needs to be applied more widely in clinical settings [13]. There is considerable scope to improve the identification and management of obesity-related co-morbidities in primary care and this recognition underpins the focus on co-morbid obesity throughout this thesis.

Table 2-2: Proposed clinical and functional staging of obesity [adapted from Sharma et al [26]]

Stage	Description	Management
0	No apparent obesity-related risk factors, no physical symptoms, no psychopathology, no functional limitations	Identification of factors contributing to increased body weight. Counselling on healthy eating and physical activity.
1	Presence of obesity-related subclinical risk factors (e.g. impaired fasting glucose, elevated liver enzymes, etc.), mild physical symptoms, mild psychopathology	Investigation for other (non-weight related) contributors to risk factors. More intense lifestyle interventions. Monitoring of risk factors and health status.
2	Presence of established obesity-related chronic disease (e.g. hypertension, type 2 diabetes, sleep apnoea, etc.), moderate limitations in activities of daily living	Obesity treatments including consideration of behavioural, pharmacological and surgical options. Close monitoring and management of co-morbidities.
3	Established end-organ damage such as heart failure, diabetic complications, significant psychopathology, significant functional limitations	More intensive obesity treatment as above. Aggressive management of co-morbidities.
4	Severe (potentially end-stage) disabilities from obesity-related chronic diseases, severe disabling psychopathology, severe functional limitations	Aggressive obesity management as deemed feasible. Palliative measures including pain management, occupational therapy and psychosocial support.

2.2.2 Obesity prevalence and trends

Obesity prevalence is increasing worldwide. The global prevalence of obesity nearly doubled between 1980 and 2008, from levels of 4.8% for men and 7.9% for women in 1980 to 9.8% of men and 13.8% of women [38]. Once associated with the trappings of modernity in high-income countries (for example through more

sedentary lifestyles, easy access to energy-dense food), obesity is now also prevalent in low- and middle-income countries.

Among high-income countries, average BMI rose the most in the United States (by more than 1 kg/m^2/decade), and the US continues to lead the way in world obesity league tables, with an adult prevalence in 2014 of 36.5% [39]. Scotland is not far behind, however, with figures from the 2013 Scottish Health Survey finding just over a quarter of all adults in Scotland aged 16 years and over (27.1%) had obesity [40]. These levels are similar – though slightly worse – than those of the other home nations of the UK (see Table 2-3), and represent a profound change from 1980 when around 7% of British adults had obesity [41].

Table 2-3: Comparison of adult overweight and obesity rates among the UK nations, 2013 [42]

	Age range (years)	% overweight (including obese)		% obesity	
		Men	**Women**	**Men**	**Women**
Scotland	16+	68	61	25	29
England	16+	67	57	26	24
Wales	16+	63	54	22	23
N. Ireland	19+	69	57	26	24

While challenging to predict trends of overweight and obesity in the future, the Scottish Government suggests that the prevalence of adult obesity could reach over 40% by 2030 [7].

There are notable differences in obesity prevalence by age, gender, ethnicity, and socio-economic status (SES), or position. Levels are generally higher among middle-aged and older people, with around three quarters of those aged 45-74 being overweight (including obesity) in 2013, and over a third of those aged 55-74 having obesity [40]. Obesity prevalence is also higher among women than men (29.3% compared with 24.9%) [40].

In terms of ethnic differences, data from England found that 25% of African-Caribbean men live with obesity, compared with only 6% of Chinese and Bangladeshi men. For women, obesity is most prevalent among black African women (38%), compared to 32% of black Caribbean and 28% of Pakistani women [43]. However, the relationship between BMI and body fat percentage is not the same across ethnic groups. For first generation migrants from South Asia to the

UK, for instance, a given BMI is associated with greater total percent fat mass than in the white population [44]. As a result, both the UK National Institute for Health and Care Excellence (NICE) guidance and the SIGN guidelines in Scotland recommend using lower BMI cut-offs to define obesity-related risk in South Asians: they may be considered overweight at BMI > 23 kg/m^2 and obese at BMI > 27.5 kg/m^2 [13, 45].

2.2.3 Socioeconomic status (SES) and obesity

The relationship between obesity and socio-economic status is complex. At the international level, looking at *between* country differences, obesity is positively associated with income, with those countries with higher average income having higher rates of obesity than low-income countries [46]. However, at the national level, *within* countries, obesity is positively associated with income in low-income countries, but negatively associated with income in high-income countries, like Scotland [46].

This is not the case for all groups, however, as there are clear gender differences in the social patterning of obesity. A systematic review of UK-based literature published in 2012 found that measures of SES were more predictive of obesity in women than in men, with lower levels of SES associated with higher levels of obesity [47]. This finding is supported by other systematic reviews of the relation between SES and obesity [46, 48], and is evident in data from the Scottish Health Survey, which show that socioeconomic factors are more strongly associated with obesity in women than in men [49].

That social conditions are fundamental causes of obesity is unsurprising [50, 51], but it is worth considering some of the potential mechanisms that might explain the relationship between SES and obesity in high-income countries. At the individual level, education, employment and income (key components of SES) influence obesity risk through: access to health information and the ability to process that information (i.e. health literacy [52]) in order to make healthy food and physical activity choices [53]; direct access (via financial and other resources) to healthier food options and less food insecurity [54]; and access to aids and opportunities for physical activity (e.g. gym membership and leisure time respectively) [55, 56]. Other potential mechanisms at the individual level

include locus of control, or agency, and fatalism [57, 58]. Individuals from lower SES groups may feel less able to influence their living conditions or life chances, have less reason to invest in future longevity and more reason to focus on the present in their decision-making about health behaviours [59, 60].

At the community or area level, there are further potential mechanisms that might explain the association between SES and obesity. First, relatively deprived or low-income neighbourhoods often have poorer access (real and perceived) to recreational facilities [61, 62]; yet also have a higher density of fast-food outlets [63-65]. However, this observation is not consistent across all studies and contexts [66-68]. Second, networks of family and social support and peer influence can affect health behaviours – positively and negatively – and this may contribute to inequalities in obesity along socio-economic lines [69]. Three processes through which social networks influence obesity have been identified: social contagion (if your friends and family have poor diets and are physically inactive, then you are more likely to adopt these behaviours as well); social capital (your sense of belonging and social support influences your health behaviours and weight); and social selection (whereby your network develops according to your weight, e.g. choice of partner)[70].

As well as thinking about the different exposures, strengths and vulnerabilities – at both the individual and community level - that put people from different SES groups at higher or lower risk of obesity, another important dimension to consider is the cumulative effect of these factors over time: the so-called 'life course' approach [71].
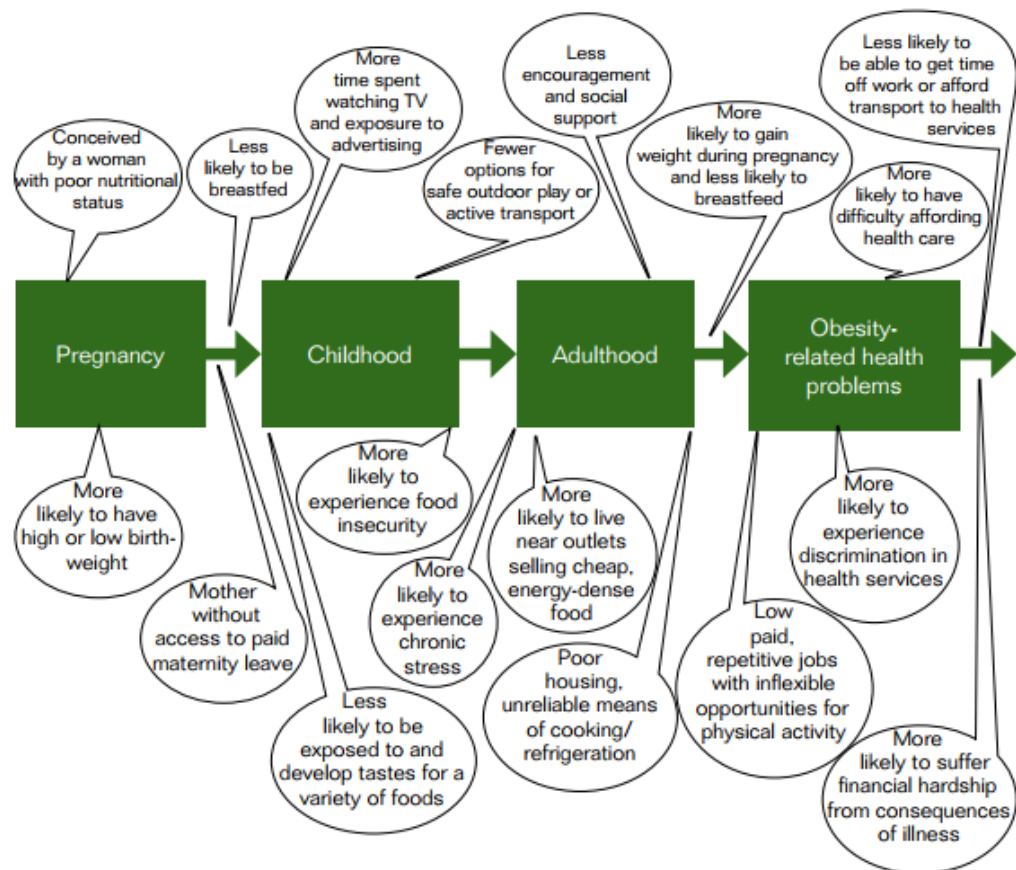
Figure 2-1: How inequities in obesity compound over the life course
Reproduced from Loring B, Robertson A. Obesity and inequities: Guidance for addressing
inequities in overweight and obesity. WHO Regional Office for Europe. With permission
from the World Health Organization.

As illustrated in Figure 2-1 above, the life course approach identifies particular periods in life (sometimes referred to as critical or sensitive periods) that are important for the development of obesity [72]. It also shows how obesity risk and obesity-related health problems can accumulate over time [71, 73]. Identification of modifiable early life determinants of obesity – and effective strategies to alter them – becomes particularly important in light of this understanding, particularly as many of these determinants are socially patterned [74, 75].

2.2.4 Causes of obesity

The previous section unpacked some of the mechanisms which help to explain the relationship between socioeconomic status and obesity. There are, however, a number of other factors which are associated with obesity in adults, as shown in Table 2-4, adapted from analysis done for the Scottish Health Survey

2011 [76]. It is important to note, however, that this analysis does not provide evidence on causality and some of the associations could be bi-directional (e.g. physical activity and obesity).

Table 2-4: Factors associated with obesity in adults

Energy intake	
	Consumption of sugary drinks
	Snack food
	Fast food
	Low fibre foods
	Energy dense foods
	Low cost foods composed of refined grains, with high fat and sugar
	Larger portions
	Eating away from home
	Skipping breakfast
	Eating less frequently
Energy expenditure	
Low physical activity (evidence mixed). Obesity is associated with:	
	Sedentary behaviour (reverse causality cannot be excluded)
Marital status	
For men only, obesity is associated with:	
	Being married
Lifestyle factors	
	Obesity is associated with non-smoking
	Obesity is associated with heavy drinking especially spirits; however, overall the evidence is inconclusive.

In addition to the factors listed in Table 2-4, there is also a genetic component to obesity, with dozens of single gene forms of obesity known currently, and new ones reported every year with advances in DNA sequencing technology [77-79]. Out of all these genes, the fat mass and obesity associated (FTO) gene explains the largest amount of the genetic variance in obesity traits [80].

Despite this growing understanding of different genetic predispositions to obesity, the accumulation of fat stores in the body ultimately occurs when energy intake exceeds energy expenditure, and this is shaped by environmental exposures. Furthermore, most research into the causes of obesity suggest that it is excess energy intake – rather than reduced energy expenditure – which is the most compelling explanation for increases in obesity in high-income countries [1].

In recognition of the interplay between an individual's biology and the environmental drivers of health behaviours (in particular diet and physical activity) which relate to this energy balance equation, Egger and Swinburn proposed an 'ecological' model of obesity that regarded obesity as a normal response to an abnormal, or 'obesogenic', environment, rather than vice versa [81]. The concept of obesogenic environments, defined as "the sum of influences that the surroundings, opportunities, or conditions of life have on promoting obesity in individuals or populations" [82], has been hugely influential and has informed numerous policy documents related to obesity (see section 2.3 of this chapter).

In 2007, the landmark Foresight Report was published in the UK [1]. This report expanded the concept of obesogenic environments and referred to a "complex web of societal and biological factors that have in recent decades, exposed our inherent human vulnerability to weight gain" [1]. An obesity systems map was presented with over a hundred variables identified as either directly or indirectly influencing energy balance. Figure 2-2 in section 2.3.3 of this chapter shows the seven key cross-cutting themes: Biology, Activity environment, Physical activity, Societal influences, Individual psychology, Food environment, and Food consumption. The report drew similarities between tackling obesity and tackling climate change, and called for urgent action across a range of government sectors and science, business and civil society stakeholders. Obesity has remained a public health priority since this time.

2.2.5 Health consequences of obesity

The health risks associated with overweight and obesity increase with increasing BMI. Table 2-5 shows some of the conditions associated with obesity, including coronary heart disease, diabetes, osteoarthritis and a number of different cancers [2, 83]. There are also several mental health conditions that are associated with obesity, including depression [84, 85], dementia [86, 87], schizophrenia [88, 89] and bipolar disorder [90, 91]. Some of these associations are likely to be bi-directional: an individual with obesity may be more likely to develop mental health problems through low self-confidence related to weight stigma and discrimination; and someone with a mental health condition may be more likely to gain weight due to a lack of confidence or motivation to

participate in physical activity, unhealthy behaviours or medication side effects [89, 92].

Table 2-5: Health consequences of obesity (adapted from Haslam et al [93])

Greatly increased risk (relative risk > 3)
• Diabetes
• Hypertension
• Dyslipidaemia
• Breathlessness
• Sleep apnoea
• Gall bladder disease
Moderately increased risk (relative risk about 2-3)
• Coronary heart disease or heart failure
• Osteoarthritis (knees)
• Gout and hyperuricaemia
• Complications of pregnancy (e.g. pre-eclampsia)
Increased risk (relative risk about 1-2)
• Cancer (many cancers in men and women)
• Impaired fertility / polycystic ovary syndrome
• Low back pain
• Increased risk during anaesthesia
• Foetal defects arising from maternal obesity

There is also a specific sub-group of adults with obesity who have binge eating disorder (BED), which became an officially recognised diagnosis in the most recent version of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) released by the American Psychiatric Association [94]. The key diagnostic features of BED are:

1) Recurrent and persistent episodes of binge eating (at least one day a week for 3 months);

2) Binge eating episodes are associated with three (or more) of the following:

- eating much more rapidly than normal

- eating until feeling uncomfortably full

- eating large amounts of food when not feeling physically hungry

- eating alone because of being embarrassed by how much one is eating

- feeling disgusted with oneself, depressed, or very guilty after overeating;

3) Marked distress regarding binge eating;

4) Absence of regular compensatory behaviours (such as purging).

Lifetime prevalence estimates of BED in the general population are approximately 3% [95], but this increases significantly (to between 15 and 50%) for patients with obesity seeking treatment for weight management [96, 97]. It is estimated that approximately 30% of patients attending the Glasgow and Clyde Weight Management Service meet the criteria for BED (personal communication).

As well as these diagnosed mental health conditions, obesity is associated with lower self-rated quality of life, including negative impacts on self-esteem and self-confidence [98]. Weight-related stigma and discrimination are widespread in many cultures, including among health professionals [99, 100].

Obesity is also associated with premature death [3]. Indeed, life expectancy decreases as the severity of obesity increases. The relationship between weight and mortality is not, however, entirely straightforward. An analysis of data from 57 longitudinal studies (roughly 900,000 individuals) demonstrated a J-shaped curve, with increasing mortality (overall and cause-specific) in the underweight (BMI < 19.9 kg/m^2) and obesity (BMI >30 kg/m^2) ranges [3]. For individuals with class I obesity (BMI 30-35 kg/m^2), life expectancy shortens by 2 to 4 years, while for those with a BMI between 40 and 50 kg/m^2, it is shortened by 8 to 10 years [3]. Broadly similar results were found in the European Prospective Investigation into Cancer and Nutrition [101].

There is also an anomalous finding of a protective effect of obesity against mortality for patients with heart failure [102] and coronary heart disease [103]. This so-called 'obesity paradox' [104] has been partly explained by individuals with obesity getting symptomatic, but less severe, forms of disease at an earlier age than 'normal weight' individuals, thereby biasing their survival [105]. The impact of unintentional weight loss (cachexia) may also contribute to the

observed paradox, but there is ongoing uncertainty as to the risks and benefits of intentional weight loss for patients with heart failure who have obesity [106].

For the majority of adults with obesity, however, the benefits of moderate, sustained weight loss (defined as 5-10kg or 5-10% after one year [13]) include:

- reduced all-cause mortality and mortality linked to cancer and type 2 diabetes [6];

- improved blood glucose control in people with type 2 diabetes [6, 107] and reduced risk of developing type 2 diabetes in those at risk [108]

- reduced blood pressure [109-111] and cholesterol [6, 112];

- improved lung function for people with asthma [113]; and

- reduced osteoarthritis-related disability [114, 115].

Furthermore, for many people intentional weight loss can make them more able and more inclined to be more physically active, which has health benefits independent of weight loss [116, 117] and may promote a positively reinforcing cycle of health improvement [42].

2.2.6 Economic costs of obesity

The economic costs of overweight and obesity are difficult to quantify, principally because they are risk factors for so many other conditions (Table 2-5), the costs of which may not yet be apparent [42]. In a report for the Scottish Parliament Information Centre (SPICe), the total annual economic cost of obesity to Scotland was estimated at between £0.9 billion and £4.6 billion, largely related to the loss of productivity due to people dying early or suffering health problems as a result of their weight [42]. This estimate was based on research by the McKinsey Global Institute, which put the economic impact of obesity to the UK as the equivalent of 3% of Gross Domestic Product (GDP) [118].

In terms of costs to the health service, a study from 2011 (using data from 2006/7) estimated the cost of obesity to the NHS in England as £5.1 billion each

year, based on the costs of diseases associated with poor diet and physical inactivity [119]. A similar study using older Scottish data produced a figure of £171 million [120](or over £220 million in 2014 after adjusting for inflation [42]). This study by Walker estimated that 60% of the total cost of obesity to NHS Scotland was due to medicines prescribed, 30% to hospital care, and 10% to GP consultations [120]. Looking at hospital bed days, the eight major categories of long-term conditions associated with the most bed days in Scotland are all conditions which adults with obesity are at greater risk of developing [121].

Thus far in this chapter, the health and economic costs of obesity have been described. It is often financial arguments that are most persuasive for politicians and policy makers, but there are other influences on obesity policy too. It is this policy context to which I now turn, comparing obesity strategies in the UK and internationally. In particular, the potential role of primary care in adult weight management, as articulated in key documents, will be considered.

2.3 Policy context

The aim of this section is to understand the role of primary care in adult weight management in the UK, as set out in key policy documents. There will be a particular focus on Scottish obesity policy and how this differs from that in the UK as a whole. A secondary aim is to understand how this UK policy compares with the wider international policy context on adult weight management in primary care. In particular, obesity policy positions from the World Health Organisation (WHO), as the international body which leads on global health challenges, will be described, as well as those from the United States (US) and Australia, two high-income English-speaking countries that have comparable obesity prevalence to that of the UK and share many of the socio-cultural drivers of obesity and, therefore, might be expected to have formulated similar responses. There is a paucity of literature in this area, with only two similar policy comparisons that I was able to locate: a 2009 review of obesity policy in the devolved administrations of the UK, covering the period 1992 to 2008 [122], and a 2015 paper by Signild Vallgarda, which compared obesity policies in England, France, Germany and Scotland [123].

First, it is necessary to define what we mean by policy, and how the term will be used in this chapter.

2.3.1 What is policy?

There are a number of definitions of the term 'policy', and it is used in different ways by different stakeholders in different settings [124]. One of the more common uses of the term is in relation to specific policy documents:

> Policy is a guide to action to change what would otherwise occur, a decision about amounts and allocations of resources: the overall amount is a statement of commitment to certain areas of concern; the distribution of the amount shows the priorities of decision makers. Policy sets priorities and guides resource allocation [125].

Another way of understanding policy is in terms of context, content, process and power [126]. Taking each in turn, *context* is the setting within which interventions are played out, which shapes and is shaped by external factors like policy. *Content* refers to the object of policy and policy analysis, and can be divided into technical (e.g. related to specific health conditions) or institutional (e.g. related to the organisation and management of services) policies [127]. The policy *process*, often presented as a linear, rational process, is perhaps more accurately viewed as disjointed and 'messy'[124], with the legacy of former decisions creating a degree of 'path dependency'[128]. Finally, *power* refers to the range of interests involved in policy negotiation, compromise, and development.

As with policy itself, there are a range of approaches to the analysis of policy. Yanow's interpretive policy analysis focuses on the *meanings* of policies – on the values, feelings or beliefs they express [129]. These meanings are embedded in policy artefacts (language, objects, acts) in a symbolic (representational) relationship. Policies must always be interpreted within their context and the goal of a coherent, uniform policy is an illusory one.

Other approaches to policy analysis, such as policy-as-discourse, focus not only on the *meanings* of policies but also on their *effects* (i.e. how they impact on real people) and on the *actors* involved (i.e. the political projects they

represent)[130]. This approach draws attention to how problems are defined (or 'problematized' [131]) and what is left out, or ignored, in this process.

The purpose of this chapter is not to conduct a detailed policy analysis, but rather to set the scene for the remainder of the thesis – to situate the role of primary care (specifically general practitioners and practice nurses) within broader health service and government strategies for adult weight management. As such, I will draw upon some of the approaches used in policy analysis but without the depth or rigour of a formal policy analysis. In particular, the way in which obesity is framed or problematized in different policy documents will be considered, and their proposed role of primary care in adult weight management (i.e. their potential *effects* on primary care *actors*) will be described.

2.3.2 Key tensions in obesity policy

In a paper commissioned by the Foresight programme of the Office of Science and Innovation, Lang and Rayner describe the complexity and incoherence of the policy landscape on obesity as a "cacophony", with "noise drowning out symphony of effort"[132]:

> This cacophony is not helpful because policymakers need coherent directions on which they feel they can deliver. Obesity policy is already weighed down by complexity, accentuated by the multi-level (global, European, national, regional and local) nature of modern systems of governance. It is also shrouded by ideological fears such as interventions being interpreted as 'nanny-ish' or restricting 'personal' choices in food and lifestyle [132].

The latter of these – the ideological fears of a nanny state intervening in citizens' individual choices – is perhaps the most critical tension in obesity policy [133, 134]. Its persistence, fuelled by the powerful lobbying of the food and drink industry [135], has contributed to the limited success in stemming obesity globally, with no government implementing a comprehensive set of policy approaches [133, 136, 137].

Lang and Rayner go on to describe two further dimensions, beyond those of layers of governance and ideological disputes, which have muddied the waters for policymakers – and practitioners – in tackling obesity. The first of these is time frame. Current levels of obesity have developed over decades and will

inevitably take decades to reverse, yet politicians operate on short electoral timetables [132]. The second is the shortage of good evidence on what works, with clear implications for the funding and availability of weight management interventions, which is discussed further in Chapter 9.

A further tension in obesity policy relates to how obesity has been conceptualised in research, with the view of obesity as a serious public health issue (or even a disease) on one side [138, 139], set against the view among 'fat studies' or 'critical obesity research' proponents rejecting the notion of BMI as a measure of health on the other side [140, 141]. The latter characterise the former's efforts as medicalisation of body size and study how people with obesity have been affected by such stigmatisation [99].

How obesity is problematized (or not), will profoundly affect any solutions (or policies) proposed to address it, as articulated in the paper by Vallgarda [123]:

> …obesity will be seen as a different problem with different causes depending on whether those defining it are governments, obese individuals, the food and drink industry, medical doctors etc.

For the purposes of this chapter, the documents under review (i.e. those defining the problem) are from governments and health professional organisations, in the shape of guidelines or position papers. The voice of adults with obesity (not 'obese individuals'[2]) will be heard in Chapter 7; the concerns of the food and drink industry are beyond the scope of this thesis.

2.3.3 UK policy context

Table 2-6 shows a timeline of key UK policy on adult obesity from the start of the 21st century. This is not a comprehensive list of all the policies on obesity produced during this period, but includes the most influential documents. These were identified by searching UK Government and NHS websites, as well as drawing on key professional organisations concerned with health care delivery and postgraduate medical education.

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[2] Throughout this thesis, 'people-first' language will be used as much as possible; this is becoming the standard for respectfully addressing people with chronic disease, rather than labelling them by their illness. The Canadian Obesity Network has been leading the way in this regard (see http://www.obesitynetwork.ca/people-first for further details).

Table 2-6: Timeline of UK policy on adult obesity

DATE	KEY EVENT
2000	NHS Plan launched, including '5 A DAY Programme'
2001	National Audit Office report 'Tackling Obesity in England'
2003	Annual report of the CMO for England 2002 – describes obesity as a "timebomb"
2004	House of Commons Health Select Committee Report on Obesity
	Department of Health 'Choosing Health' policy paper
2006	NICE clinical guideline CG43: Obesity prevention
2007	Foresight report 'Tackling Obesities: Future Choices'
2008	'Healthy Weight, Healthy Lives' report published
2010	Public Health White Paper 'Healthy Lives, Healthy People: Our Strategy for Public Health in England'
	Royal College of Physicians report 'The training of health professionals for the prevention and treatment of overweight and obesity.'
2011	'Healthy Lives, Healthy People': A call to action on obesity in England
2013	Academy of Medical Royal Colleges report: 'Measuring Up: the medical professions' prescription of the nation's obesity crisis'
	Royal College of Physicians report 'Action on obesity: comprehensive care for all'
2014	NHS England publication 'Joined up Clinical Pathways for Obesity: Report of the Working Group'
	NICE clinical guideline CG189: Obesity: identification, assessment and management
	NHS England 'Five Year Forward View'
2015	Royal College of General Practitioners Position Statement on Obesity and Malnutrition

It is beyond the scope of this chapter to summarise all of these documents, but it is instructive to look at the following in more detail:

- The two most influential government reports: the 2007 Foresight Report and the 2011 'Healthy Lives Healthy People' policy; these illustrate both the complexity of obesity and the inherent tensions for governments in formulating policy responses to obesity.

- The four reports from the health professional bodies: the Royal College of Physicians (2010 and 2013 reports), the Academy of Medical Royal Colleges, and the Royal College of General Practitioners; these help us to understand the role of health professionals – and primary care practitioners in particular – in adult weight management.

Foresight report 'Tackling Obesity: Future Choices' (2007)

The Foresight Programme of the UK Government Office for Science produced, through a multi-stakeholder process [142], perhaps the most influential policy report on obesity [1]. Its most recognisable output was the obesity system map, a conceptual model of more than 100 interconnected variables, vividly demonstrating the complexity and interdependency of obesity determinants [143]. As previously mentioned, the report categorised those variables into seven broad domains, shown below (Figure 2-2), which operate at different levels from the individual to society.
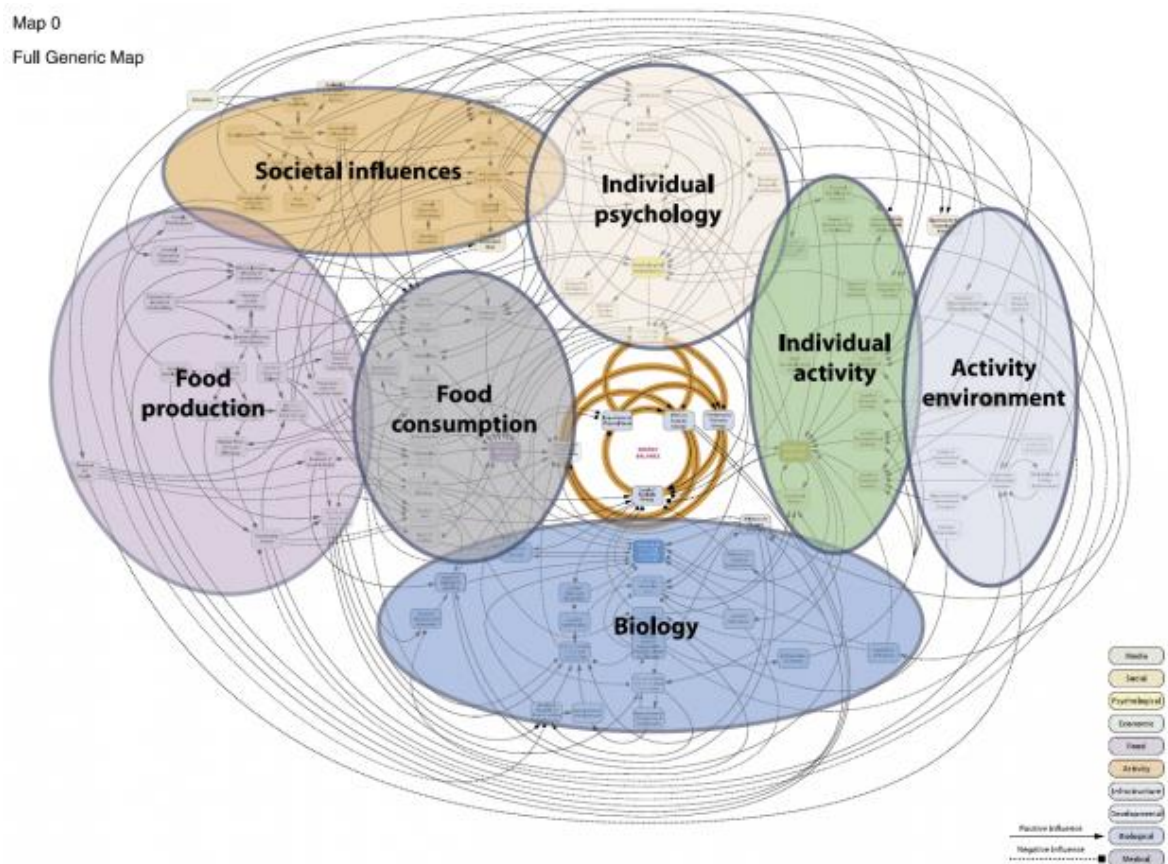
Figure 2-2: Obesity system map, from Foresight report
(Licensed for reproduction under the Open Government Licence v3.0)

A more tangible impact of the report was the economic model that was produced, which has been used to project disease burden of obesity-related conditions and direct health care costs for these conditions in a number of other countries [144, 145].

The report helped to create a more considered debate about the roles of the individual and the environment in relation to excess weight gain. In particular, it highlighted that some people are biologically more susceptible to weight gain and that individual 'choices' are constrained by an obesogenic environment [143]. Discussion of 'solutions' moved away from ineffective single intervention approaches towards more system-wide responses to this 'wicked problem' [21, 146, 147].

In particular, the report emphasised the need for "broadly based societal interventions" to counter the reality for many people who find that unhealthy behaviours (in relation to diet and physical activity) are not only the 'easy' option, but may also be the only option; this 'passive obesity' not only contributes to the normalisation of obesity, but also makes public demand for significant action relatively weak [148].

With such a strong emphasis on the need for changes to socio-cultural norms and the obesogenic environment, the report contained very little in the way of specific recommendations for primary care or, indeed, for the health service generally. In the section on Treatment, the report states:

> Currently, only a small proportion of obese people receive optimal care because of limitations in resources (including trained staff). As a result, clinical management practices may prioritise the treatment of co-morbidities over weight loss. Alternatively, associated medical complications are attributed to obesity and the patient is simply told to lose weight. There is a need to identify individuals most likely to benefit from specific treatment of their obesity.[1]

The lack of resources for weight management, lack of training for staff, lack of sensitivity in raising the issue of weight ("simply told to lose weight"), and importance of identifying individuals who are most likely to benefit from support, are key themes that recurred throughout many of the policy documents reviewed in this section. Interestingly, of the six examples of targeted interventions for the treatment of obesity in the UK that were provided in the Foresight report, only one – Counterweight – involved primary care staff [149].

Another critical response to the Foresight report, and the obesity system map in particular, relates to its complexity: "If the causes are so complex, where do we

begin?"[118]. This question has been addressed by Finegood et al [143], who produced a simplified Foresight map (Figure 2-3), with the number of individual connections between variables in each cluster represented in the thickness of the connecting lines, whereas the number of connections within a cluster is shown as the cluster's border thickness.
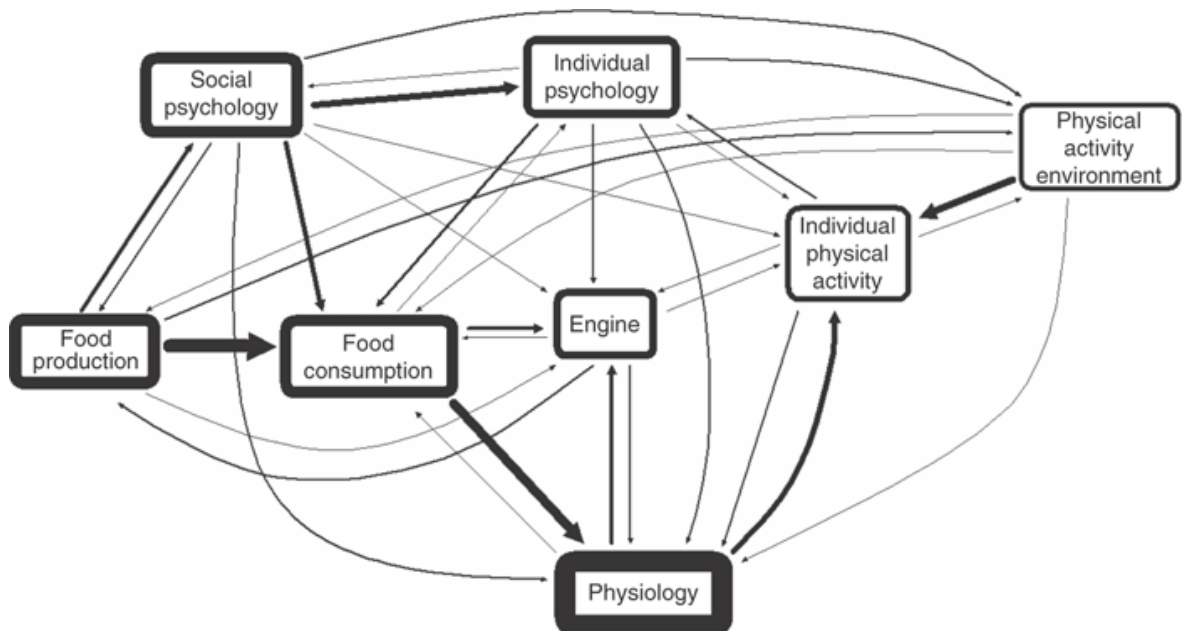
Figure 2-3: Simplified obesity system map
(Reproduced from Finegood DT, et al. Implications of the Foresight Obesity System Map for Solutions to Childhood Obesity. Obesity 2010;18:S13-16. With permission from John Wiley & Sons Ltd.)

The thickest arrow goes from Food production to Food consumption, reflecting the 22 direct influences from variables in the Food production cluster on variables in the Food consumption cluster, and the thickest border is around Physiology, reflecting the 33 interconnections among variables in this cluster [143]. By reducing the visual complexity in this way, some relationships become more apparent.

For instance, if we accept that diet is a more important driver of obesity than physical activity (Foresight's weighted causal linkages map supports this [150]) and focus on the left hand side of the figure, we can see that the three clusters with the thickest borders (other than physiology, which is harder to influence) are social psychology, food production and food consumption. In the context of targeting particular foods that are known to contribute to obesity, such as those high in fat, salt and sugar (HFSS), then these three clusters could easily be re-

conceptualised in the well-known public health approach of targeting the '3As' of Affordability (Food consumption), Availability (Food production) and Acceptability (Social psychology) [151]. It is not hard to imagine a range of complementary and potentially synergistic interventions that could be targeted at each of these areas [136]. For instance, making HFSS products less affordable, or healthy foods more affordable, by the introduction of taxes and subsidies respectively; reducing availability of HFSS products (e.g. in schools and workplaces); and making them less socially acceptable by restricting marketing, or by education campaigns [136].

In summary, despite receiving criticism from some quarters, the Foresight report on obesity was a truly landmark publication, and has shaped much of the policy and strategy around obesity in the decade since its publication, including the first ever obesity strategy in England 'Healthy Weight, Healthy Lives' [152] in 2008, and its successor, 'Healthy Lives, Healthy People' [153], to which I now turn.

Healthy Lives, Healthy People: A call to action on obesity in England (2011)

Published under the Conservative and Liberal Democrat coalition government of 2010 to 2015, and following on from the Public Health White Paper of the same name [154], this report set out how action on obesity would be delivered at a time of considerable reform for the NHS, and for public health systems in particular [155], culminating in the Health and Social Care Act 2012. While this political context is clearly important for understanding the motivations behind the report and some of the proposals therein, it is beyond the scope of this chapter to explore this context in detail. Rather, the focus will be on how obesity is problematized and the proposed role of health professionals.

Starting with the framing of obesity, there are two significant contradictions that are apparent in the report. The first relates to the framing of who is responsible for action on obesity; the second concerns the understanding of obesity-related health inequalities.

With regard to responsibility, the report accepts, on the one hand, the evidence from the Foresight report that we live in an obesogenic environment:

> There is clear evidence that built and physical environments are important factors in influencing people's physical activity, access to and consumption of healthy food, and social interaction. (p.38)

Yet throughout the report, the emphasis is on individual responsibility for health, and on maximising individual 'choice' and minimising the role and responsibilities of government. The following excerpts are taken from the Foreword to the report, by then Secretary of State for Health Andrew Lansley:

> We need to be honest with ourselves and recognise that we need to make some changes to control our weight. Increasing physical activity is important but, for most of us who are overweight and obese, eating and drinking less is key to weight loss.
>
> Each of us is ultimately responsible for our own health. It's right that we should be free to make choices about diet and physical activity for ourselves and for our families. (p.4)

The limited role of central government is echoed in the following key components for delivering the two national ambitions for downward trends in the levels of excess weight in children and adults by 2020:

- *Empowering individuals* – This would be achieved through guidance, information, encouragement and tailored support. The report states "We will favour interventions towards the less intrusive end of the Nuffield ladder – with a focus on equipping people to make the best possible choices." The Nuffield ladder (Table 2-7) illustrates that public health interventions can be classified along a spectrum of 'intrusiveness' to individual choice, ranging from the lowest level (doing nothing) to the highest (eliminating choice) [156]. It has been criticised for being simplistic, for assuming that public health initiatives automatically compromise autonomy [157], and for not taking account of how relevant stakeholders perceive the concepts of intrusion and autonomy [158]. Interestingly, there is some evidence that interventions higher up the ladder are more effective [159], though more research is needed in this area.

- *Giving partners the opportunity to play their part* – This approach relied on the food and drink industry to reduce collective calorie intake through

the Responsibility Deal Food Network, including voluntary commitments related to nutrition labelling, salt reduction, calorie reduction, fruit and vegetable consumption, and reduction of saturated fats [160]. Evaluations of the Responsibility Deal have found it to have had limited 'added value' over and above what participating companies were already doing [160, 161].

- *Giving local government the lead role in driving health improvement and harnessing partners at local level* – This component was welcomed by many commentators, including the UK Faculty of Public Health [162], with the significant caveat that local government also needs national government support and that there are many actions on obesity that only national government can take (e.g. those requiring legislation, taxation, or central planning).

Table 2-7: Adapted Nuffield ladder of public health interventions

7	Eliminate choice
6	Restrict choice
5	Guide choices through disincentives
4	Guide choices through incentives
3	Guide choices through changing the default policy
2	Enable choice
1	Provide information
0	Do nothing or simply monitor the current situation

The second significant contradiction in the report relates to health inequalities. The rhetoric throughout the report is of commitment to addressing health inequalities. For example:

> ...given the different levels of risk faced by different groups, it is vital that action on obesity reduces health inequalities. Particular attention needs to be given to specific socio-economic and ethnic groups and to disabled people and people with mental health needs.(p.23)

Despite this rhetoric, the emphasis throughout the report on the responsibilities of the individual is likely to entrench and increase inequalities, as the most disadvantaged members of society are least able to adopt the 'healthy choices' – in relation to both diet and physical activity – advocated by the Call to Action [162, 163].

One of the few areas where a stronger role for government was acknowledged is in relation to childhood obesity. This is a common theme in UK obesity policy; it is more acceptable to propose more 'intrusive' interventions for childhood obesity than adult obesity:

> While we do not believe it is right to remove choices or mandate what people should eat and drink, there are some groups in society where there is a clear duty of care and more stringent action by Government and others may be warranted, especially in relation to children or other vulnerable groups. (p.42)

There are two other aspects of the framing of obesity throughout the report which are worth noting: first, that obesity is a serious public health concern ("the most widespread threat to health and wellbeing in this country" (p.5)); and second, that overweight and obesity are "a threat to the economic growth on which the country's future prosperity and wellbeing depend." (p.17)

Finally, and in keeping with Foresight, the report had less to say about the role of health care professionals:

> It is not the role of Government to tell professionals how best to do their job or how to relate to the individuals and families with whom they work closely in their local communities. Professional bodies are already playing an important role, for example by shaping the curricula of key health professionals in order to build confidence and capability in raising the issue of overweight and obesity. We are working with Royal Colleges and other bodies to explore how doctors and other health professionals might best be further supported to make every contact count. (p.39)

The idea of 'making every contact count' was picked up (though not endorsed without reservation) in some, though not all, of the policy documents produced by health professional bodies. Four of these will now be considered in chronological order, starting with the first of two reports by the Royal College of Physicians (RCP).

Royal College of Physicians report (2010)

In March 2010, the Royal College of Physicians (RCP) published a report for the Foresight team entitled 'The training of health professionals for the prevention and treatment of overweight and obesity'[164], which was endorsed by the Royal College of General Practitioners, the Royal College of Paediatrics and Child Health, and the Royal College of Nursing.

The framing of obesity throughout the report was articulated in the opening paragraph:

> There has been a *dramatic* increase in the prevalence of overweight and obesity in the UK in the last 20 years. This increase in a *clinical (sic) significant condition* has not been matched by a proportionate expansion of the provision of continuing education and training provided for health professionals, irrespective of their discipline. Too often health professionals *ignore the obvious signs or symptoms of obesity* or simply instruct the individual to go on a diet and lose significant weight. It is therefore not surprising that most health care intervention only happens when medical complications and morbidity are apparent. This oversight by health care professionals reflects a poor understanding and lack of recognition of the social and environmental determinants of obesity, complexity of nutritional issues and physical activity, and lack of understanding of the factors that impact behavioural change. (p.1, *emphasis added*)

This quote demonstrates the view that obesity is a medical condition and that increased weight (visible – indeed, 'obvious' – to the naked eye) equates to poor health, or at least increased risk of poor health. The economic costs of overweight and obesity were re-stated and the Foresight report was referenced both in relation to the complexity of obesity aetiology and to the need for a comprehensive long-term strategy to address prevention and treatment. The health inequalities dimension to obesity was also noted, although only in one paragraph:

> Foresight has noted that the greater prevalence of obesity among poorer social groups implies that efforts to counter health inequalities must take account of obesity; conversely, action on obesity must take account of socioeconomic factors. (p.4)

In terms of the balance between diet and physical activity as drivers of obesity, the report suggested that they are on an equal footing, two halves of the 'energy balance' equation [165]:

> Energy In (Dietary Calories from Food & Drink) v Energy Out (Basal Metabolic rate + Physical Activity) = Energy Balance (Weight gain, Weight Loss or Weight Maintenance). (p.8)

The report highlighted barriers to engagement with weight management by health professionals: namely, lack of training, lack of confidence, the perception that it is too difficult to tackle or is not a medical problem [164]. The last section of this chapter will explore barriers to engagement with weight management in more detail, drawing on wider research literature.

The clear message for health care professionals from the RCP report was that "managing overweight and obesity is everybody's business". There were specific long term medical conditions mentioned in relation to obesity, namely: cardiovascular diseases, diabetes, joint pain and some cancers (citing Foresight again), and several others that were cited in relation to nutrition; essentially making the point that nutrition is an integral part of all patient pathways.

The report set out different areas of influence for health professional roles and practice:

- **Educational** – health professionals are held in high regard by the public as providers of authoritative information and advice on food, health and nutrition and therefore need to keep up-to-date with consistent messaging about food and physical activity;

- **Advisory** – the importance of health professionals working beyond their immediate clinical settings;

- **Organisational** – health professionals should be able to signpost overweight or obese individuals to local support services such as physical activity and weight management programmes;

- **Self-care** - Health care professionals need the insight to acknowledge the effect their own obesity or overweight status has on their interactions with patients. They need to be adequately skilled to be able to raise lifestyle issues sensitively with patients, their families or parents, prevent resistance and offer appropriate advice

The report set out two educational frameworks for all health professionals, divided into generalist and specialist, based on the expected knowledge and skills for those either working specifically in weight management (specialists), or for all other health professionals who "encounter overweight and obese patients as part of their daily clinical practice" – the generalists (p.23).

The framework for generalists, which includes all general practitioners, can be seen in Appendix 4. I have included only those elements that pertain to adult weight management, and not those that are only relevant to child weight management, pregnancy and childbirth, or commissioning of services which is not relevant to GPs in Scotland. A key point from these learning outcomes is the emphasis on knowledge and skills to allow appropriate identification and referral (or signposting) of adults with obesity to appropriate services. This supports the rationale for the focus of this thesis on identification and referral, on which there is more at the end of this chapter.

The final point to take from the RCP report, with regard to the framing of obesity, was the parallel that is drawn between weight management and smoking cessation, which was also made in the 'Healthy Lives, Healthy People' report and others, and which will be re-visited in Chapter 9.

> Many health professionals are taught to take a 'social history', or enquire about 'risk factors' as part of their assessment. This includes questions about occupation, alcohol consumption and smoking. In future health professionals should be encouraged to include a brief assessment of regular diet and physical activity within this part of their assessment. Many health professionals use this part of their assessment to opportunistically advise people on smoking cessation or

> moderate alcohol consumption. This is also the right time to initiate discussion about improving physical activity habits and diet. (p.6)

The second report from RCP will now be considered.

Royal College of Physicians report (2013)

In January 2013, the RCP published 'Action on obesity: comprehensive care for all' [166]. This report, which was the product of a working group that included GP representatives, took a similar approach to the 2010 report in terms of its framing of obesity. The term 'epidemic' was used in the Preface, the health and economic consequences of obesity were reiterated, parallels with smoking cessation were drawn again, and the important – but hitherto largely neglected – role of health professionals in the prevention and treatment of obesity was laid out in no uncertain terms, with recommendations for education in obesity and nutrition in medical undergraduate curricula and in "all specialist postgraduate exams" [166].

Particular attention was paid to the need for multidisciplinary teams (MDTs) to manage severe and complex obesity, and for these to be accessible across the UK [167]. This recommendation coincided with the release of the NHS Commissioning Board's draft service specifications for severe and complex obesity [168], which reinforced the findings of the RCP report with regard to the need for formal training for health professionals involved in weight management.

In relation to the role of primary care in adult weight management, the report included a specific section on general practitioners, with the following recommendations.

1. Primary care has a core responsibility for obesity prevention, assessment of risk and morbidity in the obese, facilitating access to weight management support, and providing shared care in the long-term for patients who have been managed in specialist services.

2. GPs should, where possible and appropriate, deal with weight issues as part of their agenda to address risk factors. Each consultation provides a

potential opportunity for this, although patient receptiveness also needs assessing for maximum effectiveness.

3. It is therefore important that GPs have training in a range of practical behavioural techniques such as in motivational interviewing. The effective application of these skills to weight management and obesity should be part of GP training and ongoing continuing professional development.

4. Inclusion of evidence-based targets for successful obesity management should be included in the Quality Outcome Framework (QOF) (sic) in order to support this practice.

5. A model for the commissioning of community services that integrates where required the specialist needs of patients should be developed.

6. The particular needs of some disadvantaged groups who find difficulty accessing community weight management groups should be addressed. These groups include people with learning disability, physical disability, mental health issues, those living in rural locations, socially excluded groups and those with severe degrees of morbid obesity.

The last two of these recommendations relate to commissioning of weight management services, which GPs in Scotland are not involved in, but in relation to the last recommendation, it is notable that no guidance on how the needs of these disadvantaged groups should be addressed was offered.

With regard to the other recommendations, the framing of the role of the GP in adult weight management was again very much one of identification of patients who were likely to benefit from weight management support and facilitating access to this support (either by signposting or referral). On the question of primary care led in-house weight management clinics, for example, the report concluded that "the evidence indicates that GPs should not offer in-house clinics as a first-line approach for patients with uncomplicated obesity but should direct patients to a community service." (p.41)

The rhetoric of 'making every contact count' was repeated in the second recommendation for GPs, framed as "each consultation provides an opportunity for this [dealing with weight issues]", though with the important caveat of "where possible and appropriate".

Finally, despite numerous mentions of "sensitively raising the issue" and "the need to leave judgmental attitudes behind", it is worth noting the use of the more stigmatising terms "the obese" (as in recommendation 1 above) or "obese patients" throughout rather than "patients with obesity" or "people with obesity", as preferred by advocates of 'people-first' language [169-171].

Academy of Medical Royal Colleges report (2013)

In February 2013, the Academy of Medical Royal Colleges (AoMRC), which brings together representatives from across the medical profession, published 'Measuring up: the medical profession's prescription for the nation's obesity crisis' [172]. The report presented 10 key recommendations (an 'action plan') in three areas:

- Actions to be taken by the health care professions (4 recommendations);

- Changing the 'obesogenic' environment (3 recommendations); and

- Making the healthy choice the easy choice (3 recommendations).

Their first recommendation was for improved training of all health professionals, in particular "basic training in sensitive recognition and appropriate referral for overweight and obese patients" (p.20):

> Royal Colleges, Faculties and other professional clinical bodies should promote targeted education and training programmes for health care professionals in both primary and secondary care to ensure 'making every contact count' becomes a reality, particularly for those who have most influence on patient behaviour.

The phrase "making every contact count" was repeated four times throughout the report. However, the report recognised that this will be "little more than a

platitude if practitioners do not have the appropriate services to refer on to"
(p.20). Accordingly, the second recommendation was that:

> The departments of health in the four nations should together invest
> at least £100m in each of the next three financial years to extend and
> increase provision of weight management services across the country,
> to mirror the provision of smoking cessation services. This should
> include both early intervention programmes and greater provision for
> severe and complicated obesity, including bariatric surgery.
> Adjustments could then be made to the Quality and Outcomes
> Framework, providing incentives for GPs to refer patients to such
> services.

As the above quote illustrates, the parallels between weight management and
smoking cessation were made several times in the AoMRC report. Setting the
figure of £100 million in context, the report cited a briefing paper by Action on
Smoking and Health, which estimated that the NHS spent £88.2 million on
smoking cessation services in 2011/12 [173].

The two other recommendations for actions to be taken by the health care
professions related to: improving the quality of food within all UK hospitals
(making the case that health professionals should set an example with their own
weight status, and that NHS staff and patients should be given healthy catering
options); and expanding the health visitor workforce, including 'skilling up' the
wider early years workforce to deliver basic food preparation skills to new
parents, and to encourage breastfeeding and healthy food choices.

As noted, the remaining six recommendations related to changing the
obesogenic environment and making the healthy choice the easy choice, but
these recommendations are beyond the scope of this chapter.

There are, however, two more points to make about the AoMRC report's position
on the role of primary care in adult weight management. First, in keeping with
the RCP reports, the authors recognised that GPs "do not have the time in each
appointment to thoroughly address obesity" and are better placed, therefore, to
"refer patients to other resources (weight management programmes, exercise)".

Second, the report recognised the potential of the GP pay-for-performance
scheme, the Quality and Outcomes Framework (QOF), via inclusion of indicators

around weight management, to either encourage or discourage certain referral patterns and interventions. Indeed, in 2016, NICE's QOF committee proposed a new indicator to record BMI in adults every 5 years, but this was opposed by the GP Committee of the British Medical Association (BMA) [174]. It is important to note, however, that the QOF was phased out in Scotland in 2016/2017, replaced by a new GP contract and the creation of 'GP clusters'. The potential for these GP clusters to engage with weight management is considered in Chapter 9.

The fourth and final health professional report on obesity from the UK is that of the Royal College of General Practitioners (RCGP).

Royal College of General Practitioners Position Statement (2015)

In October 2015, the RCGP published a Position Statement on Obesity and Malnutrition [175]. In the opening paragraph, they stated that:

> GPs and primary health care teams have important but quite specific roles in raising awareness of the impact of obesity and malnutrition on health and risk of illness, plus an important role in encouraging physical activity, signposting to appropriate support and undertaking some specific aspects of management

The paper went on to state that "GPs already perceive a clear role in smoking cessation and alcohol intervention" and that they should equally engage in supporting patients to address physical activity and unhealthy diets. They cited WHO data on non-communicable diseases (NCDs) to suggest that these four health behaviours are the major risk factors for NCDs [176].

The Position Statement also outlined roles for the RCGP, for Clinical Commissioning Groups (CCGs), and for GPs, in the management of obesity. Taking each in turn, the Statement suggested that the RCGP has an important role to:

- Support the call for national action on obesity in the NHS Five Year Forward View [177].

- Support the availability of evidence based interventions such as bariatric surgery to *be available for GPs to refer patients* for in all four countries of the UK (emphasis added).

- Ensure that obesity and nutrition are covered in the MRCGP (Membership of RCGP exam) curriculum and assessment processes as well as being included as an important part of ongoing postgraduate continuing professional development.

- Support the Academy of Medical Royal Colleges working group on nutrition.

- Highlight the responsibility of Government to address the obesogenic environment through strategies such as restricting the targeting of customers at checkouts with confectionary, advertising high calorie foodstuffs to children, exploring a sugar tax, and the ending of BOGOF [Buy one get one free] and similar price discounting schemes.

With regard to CCGs, the paper states they should ensure GPs are aware of the availability of local services (for weight management) provided by public health and community groups, as well as the access criteria and referral mechanisms. GP members of CCGs should raise it with their commissioners and with local Health and Wellbeing Boards if local services to support overweight and obesity are inadequate or absent. They should also engage with service developers to ensure that the available services are feasible, practical and costed for primary care.

Finally, the RCGP Position Statement provided five points (with illustrative examples) about the role of GPs in the management of obesity. These can be summarised as:

1. Helping individuals understand the impact of obesity on their health.

2. Explaining the link that obesity has with other co-morbidities.

3. Understanding the role of brief interventions.

4. Targeting efforts towards individuals most likely to benefit from weight loss, e.g. those with known pre-diabetes and women before, during and after pregnancy.

5. Understanding the criteria and local referral arrangements for Tier 3 and Tier 4 obesity services.

In no uncertain terms, the RCGP position was that GPs "do not have a specific role to directly oversee active weight loss attempts." Citing two randomised controlled trials (RCTs) that compared primary care referral to commercial weight management with standard care [178] and primary care led weight management programmes [179], they concluded that there was "clear evidence that running in house weight management programmes are not an effective use of GP time and resources." In the summary section, the paper stated that "The RCGP supports an awareness raising and signposting role for GPs in relation to obesity".

To summarise this section on UK obesity policy context, there are similarities and differences in both the framing (or problematization) of obesity, and the proposed role of primary care in adult weight management, across the six obesity policy documents reviewed here. The most obvious differences are between the two Government documents – the Foresight report and the 'Healthy Lives, Healthy People' paper – where responsibility for addressing obesity in the former is for all sectors of society (with a strong role for central government), while for the latter responsibility rests largely on individuals, private companies and local government (with a limited role for central government). The four reports from UK health professional organisations are much more consistent in their messages. In relation to the role of primary care in adult weight management, the focus is very much on identification and referral.

2.3.4 Scottish policy context

As with the previous section, this section will examine influential policy documents related to obesity in Scotland, paying particular attention to how obesity is framed in the documents and the proposed role of primary care in adult weight management. Table 2-8 shows recent Scottish policy on adult

weight management, starting with the Scottish Intercollegiate Guidelines Network (SIGN) guideline on obesity from 1996 [180].

The Scottish Government's commitment to tackling obesity is demonstrated by the National Performance Framework (NPF)[3] national indicator on child healthy weight which is being monitored via the Scottish Health Survey. There have, however, been no such high-level targets for adult weight management.

Table 2-8: Timeline of Scottish policy on adult obesity

DATE	KEY EVENT
1996	SIGN guideline 8: 'Obesity in Scotland: Integrating Prevention with Weight Management'
1999	Towards a Healthier Scotland
2000	*Counterweight* initiative of primary care-based weight management begins
2003	Publication of Scotland's national strategy for physical activity 'Let's Make Scotland More Active'
2005	Review of Bariatric Surgical Services in Scotland
2006	Physical Activity and Health Alliance launched
2007	'Better Health Better Care' published
2008	'Equally Well' reports published 'Healthy Eating, Active Living' report published
2010	'Preventing Overweight and Obesity in Scotland: A Route Map Towards Healthy Weight' report published
	SIGN guideline 115: Management of Obesity
2015	Review of the Obesity Route Map (ORM)
2016	Obesity Indicators 2016
2017	'A Healthier Future – action and ambitions on diet, activity and healthy weight' consultation document

In this section, three of these documents will be described in more detail:

- The Obesity Route map (2010).

- The updated SIGN guideline (2010).

- The recent consultation document, 'A Healthier Future – Action and Ambitions on Diet, Activity and Healthy Weight' (2017).

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[3] Introduced in 2007 and refreshed in 2011 and 2016, the NPF sets out a vision for Scotland and is a single framework to which all public services in Scotland are aligned. The updated 2016 NPF includes: the Government's Purpose; 5 Strategic Objectives; 16 National Outcomes; and 55 National Indicators.

Obesity Route map (2010)

The Scottish Government's 'Preventing Overweight and Obesity in Scotland: A Route Map Towards Healthy Weight', often referred to as the Obesity Route Map (ORM), remains the current strategy for obesity prevention in Scotland [7]. The ORM set out a broad package of cross-governmental measures to make fundamental changes to the social, cultural and environmental circumstances that contribute to obesity; as a result of these comprehensive and far-reaching measures, the ORM is considered a ground-breaking strategy internationally [181].

Preventative action on obesity was grouped under four categories:

- Energy consumption – controlling exposure to, demand for and consumption of excessive quantities of high calorific foods and drinks.

- Energy expenditure - increasing opportunities for and uptake of walking, cycling and other physical activity in our daily lives and minimising sedentary behaviour.

- Early years - establishing life-long habits and skills for positive health behaviour through early life interventions.

- Working lives - increasing responsibility of organisations for the health and wellbeing of their employees.

In terms of the framing of obesity, therefore, the ORM took a similar approach to Foresight in stating that the causes of obesity are complex, that the obesogenic environment is a fundamental driver, and that there are serious health and economic consequences of obesity [7]. It went further than Foresight with regard to obesity-related inequalities, however, by asserting that the Scottish Government saw obesity as not just a consequence but also a cause of social inequalities:

> These consequences of obesity will reflect, perpetuate and potentially increase social inequalities in health in Scotland.(p.8)

There was a stronger emphasis throughout on political responsibility for action by changing the environment, in stark contrast to the 'Healthy Weight Healthy Lives' policy document. The ORM contained fewer appeals to individuals to take responsibility, and placed less emphasis on health information as a solution:

> The evidence suggests that the provision of health information, although important, is not sufficient and that to make the changes necessary we have to reshape our living environment from one that promotes weight gain to one that supports healthy choices. (p.v)

Furthermore, the Scottish Government was, and remains, more open to the prospect of using regulation (e.g. restricting advertising of HFSS foods) and legislation:

> Where voluntary approaches to reformulation, portion size adjustment and stocking policies do not achieve sufficient progress towards a healthier balance in the meals, food and drinks sold in Scotland we will consider appropriate statutory means to increase the rate of change. (p.18)

This approach to the food and drink industry represents a significant diversion from that adopted by the Westminster Government's Responsibility Deal. However, despite setting out such a comprehensive framework to tackle obesity, a review of the ORM in 2015 found that progress on implementation of the strategy had been slow and better monitoring was required [182].

Finally, let us now consider the proposed role of the health service in relation to obesity. As the title suggests, the focus of the ORM report was on prevention, and although detailed recommendations related to management and treatment of obesity were outwith the scope of the report, there was a short section asserting the Scottish Government's commitment to cost-effective and appropriate weight management services and treatments for obesity. In particular, the ORM confirmed a commitment to:

- Invest in resources for the continuing professional development of primary care professionals to develop a better understanding of obesity, its management and treatment.

- Review and, if necessary revise the HEAT target[4] for child healthy weight, to help Boards and their local partners establish effective child healthy weight intervention programmes and consider expansion to include adult weight management services.

- Ask the National Planning Forum[5] to approve the establishment of a pan-Scotland group to develop clinical pathways, in the light of forthcoming advice from SIGN (see below) and other groups.

- Take account of the National Planning Forum recommendations on equal access to clinically effective services for morbidly obese patients from all areas of Scotland, taking into account waiting time requirements.

- Regularly assess progress in developing local obesity management and treatment strategies by NHS Scotland at the NHS Boards' Annual Reviews.

With regard to adult weight management in primary care, therefore, the key points from the ORM were that primary care practitioners required further training related to obesity and that there needed to be improved access to weight management services across Scotland (particularly for those with morbid obesity), with clearer clinical pathways, informed by the SIGN guideline, which was published later that year.

SIGN guideline (2010)

The Scottish Intercollegiate Guidelines Network, or SIGN, was formed in 1993 and was one of the first national programmes of evidence-based clinical practice guidelines [183]. The network published two guidelines on obesity in its first ten years; one in 1996 [180] and another (on the management of obesity in children and young people) in 2003 [184]. In 2007, a review of these was commissioned and a 27-member multi-disciplinary Guideline Development Group was set up

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[4]The system of HEAT (health improvement, efficiency, access, treatment) targets and Standards, used to assess the performance of NHS Scotland, was replaced by LDP (Local Delivery Plan) Standards in 2015/16.

[5] The National Planning Forum was established as a high level NHS/Scottish Government Health Department group to secure greater joint ownership of the national planning agenda. The Forum includes members from all 22 Health Boards, as well as other key stakeholders.

[185]. Recognising that the National Institute for Health and Clinical Excellence (NICE), as it was then known, had produced a guideline on obesity the previous year [12], the group used a guideline adaptation framework to avoid any duplication of effort [185].

The 2010 SIGN guideline provided evidence-based recommendations on primary prevention of obesity (defined as intervention during healthy weight and/or overweight to prevent or delay the onset of obesity) within the clinical setting, as well as for the treatment of overweight and obesity by lifestyle measures, medications and surgery [13]. It addressed obesity in children, young people and adults and was aimed at practitioners in primary, secondary and tertiary care. One of the biggest challenges for the Guideline Development Group was in constraining the remit to clinical aspects of obesity prevention, as the group recognised that broad multi-sectoral action (e.g. education, food policy, transport policy) is required for obesity prevention [185]. As such, the SIGN guideline framed obesity in a similar way to the Foresight report and the ORM, as a complex condition with considerable health and economic consequences requiring action at multiple levels.

Focussing on the role of primary care in adult weight management, there are several pertinent sections of the guideline. First, in the section on weight management programmes and support for weight loss maintenance in adults, the guideline stated that:

> All practitioners delivering weight management services should be appropriately trained and qualified to deliver the specific interventions and have ongoing specialist supervision

It then cited the Counterweight programme as feasible for delivery in primary care [16, 149, 186]. This programme used a multifaceted approach (including dietary changes, exercise and behaviour modification and pharmacotherapy) and was delivered by trained nurses in primary care. The Scottish Government supported the roll-out of Counterweight across Health Boards between 2008 and 2011. However, as will be discussed further in Chapter 4, when Scottish Government funding of Counterweight was withdrawn in 2012, it was not fully integrated into general practice and is now only running in a few areas of

Scotland. In another section on referral and service provision in adults, the guideline stated that:

> No specific evidence was identified on when to refer patients from primary to secondary care for weight management. Management pathways will depend on local service provision.

An illustrative primary care pathway for adults with overweight and obesity was included, summarised as follows:

1. Assess weight/BMI – if BMI>25 kg/m^2, raise the issue of weight and assess whether patient willing to change.

2. If yes, recommend healthy eating, physical activity, brief behavioural advice and drug therapy if indicated. Consider individual aims.

3. If no progress/weight loss in keeping with aims, consider referral to specialist service for further support (if appropriate and available).

In summary, in contrast to the other obesity policy documents produced by or for health professionals, the SIGN guideline outlined a clearer role for primary care in initial weight management of adults with a BMI>25 kg/m^2. There is, however, clearly still an element of identification of adults with obesity who may benefit from support, and the potential to refer those patients on to appropriate weight management services, but the guideline authors were clearly aware of the highly patchy provision of such services at the time.

'A Healthier Future – Action and Ambitions on Diet, Activity and Healthy Weight' (2017)

In October 2017, the Scottish Government launched a consultation on a new Diet and Obesity Strategy [187]. The document outlines a number of measures that the Scottish Government proposes to take to improve the diet of the nation and achieve healthy weight across the population. These wide-ranging actions are grouped in three broad areas – transforming the food environment, living healthier and more active lives, and leadership and exemplary practice - and include:

- Action on price promotions of junk food.

- Action on junk food advertising.

- Action on food purchases for consumption outside the home.

- Investment to support people with Type 2 diabetes to lose weight.

- Preventative services including information, advice and support for children and families on healthy eating.

- Practical support for small and medium sized food manufacturers to reformulate and develop healthier products.

- A range of opportunities for people to be more active.

- Working with the public sector and a wide range of partners to support local improvement work on diet and weight.

The framing of obesity is in keeping with previous Scottish Government reports, including the ORM which is specifically referred to. The links between obesity and deprivation are restated, and there is again more emphasis on government responsibility than individual responsibility.

> Interventions that rely less on individual choice and more on changes to the wider environment are essential in making healthier choices easier when we eat at home, eat out or eat on the go.

With regard to adult weight management, the focus is very much on patients with type 2 diabetes. The Scottish Government have made a 'Programme for Government'[6] commitment to invest £42m over five years to establish supported weight management interventions as a core part of treatment services for people with, or at risk of, type 2 diabetes. They propose to target 95,000 people (30% of those diagnosed) in order to make an impact on population health.

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[6] The Scottish Government's Programme for Government 2017-18 sets out the actions the Government will take in the forthcoming year

This investment in adult weight management has been welcomed by many stakeholders, though concerns have been expressed about the exclusive nature of a focus only on those people with, or at risk of, type 2 diabetes [188]. There is, however, no mention of primary care or general practice in the consultation document.

In summary, the Scottish obesity policy context has many similarities with that in the UK (for instance, in framing obesity as a major public health concern with significant health and economic consequences), but there has been a clear divergence in relation to proposed solutions, with the Scottish Government advocating a far stronger role for central government, including legislation and industry regulation, while the Westminster Government continues to emphasise individual and industry responsibility on a voluntary basis. The next section will provide a brief summary of key global obesity policy documents to help situate the UK and Scottish policy in this wider context.

2.3.5 Comparison with global policy context

This section will provide an overview of some of the key policy documents from the World Health Organisation, as well as from two high-income countries (US and Australia) that have comparable obesity prevalence to that of the UK. This is not to say that obesity is not an issue in low- and middle-income countries (LMICs); indeed, many LMICs have recognised obesity as a major public health problem and have initiated large-scale efforts to address it [189-191], but it is beyond the scope of this thesis to explore these.

WHO obesity policy

The WHO Consultation on Obesity met in Geneva in June 1997 to review epidemiological information on obesity and provide recommendations for public health policies and programmes to improve the prevention and management of obesity. At a subsequent press release, the worldwide increase in obesity was described as a "global epidemic" [192] The report that followed defined obesity as a "chronic disease" as well as a key risk factor in the natural history of many non-communicable diseases (NCDs) [193].

The framing of obesity was of a "complex, multifactorial disease", with significant health and economic costs, requiring comprehensive long-term strategies for its prevention and management, very much in keeping with the Foresight approach.

Regarding the role of primary care, the 250+ page report had only two brief mentions of primary care. First, as a setting for prevention strategies: "The aim is to improve the knowledge and skills of groups of people so as to allow them to deal more effectively with the factors that place them at high risk of developing obesity."(p.174)

Second, as a setting for weight management programmes: however, citing the 1996 SIGN guideline on Obesity in Scotland [180], the report cautioned that this "has received little formal assessment so far, and its potential role appears to be undervalued and underutilized"(p.244)

In 2004, the WHO's 'Global Strategy on Diet, Physical Activity and Health' was adopted by the World Health Assembly [194]. The Strategy called upon all stakeholders to take action at global, regional and local levels to improve diets and physical activity patterns at the population level. There was a strong emphasis on government responsibility to develop policies and programmes in relation to food, agriculture, education, urban planning, transportation, and health [194].

With regard to primary care, the Strategy noted the potential for "routine enquiries" in primary care about diet and physical activity, combined with "simple information and skill-building to change behaviour", to "reach a large part of the population and be a cost-effective intervention."(p.9) There was also particular mention of the "identification of specific high-risk groups and measures to respond to their needs" (p.10). In terms of strategies to deliver on this role for primary care (which is the focus of the realist review in Chapter 5), the Strategy proposed:

> Training of health personnel, dissemination of appropriate guidelines, and availability of incentives are key underlying factors in implementing these interventions.

The recommendations set out in the WHO's Strategy were endorsed in 2011 in the Political Declaration of the High Level Meeting of the United Nations General Assembly on the Prevention and Control of Non-communicable Diseases and also as part of the WHO's 'Global Action plan for the prevention and control of non-communicable diseases 2013-2020' [195].

US obesity policy

The United States (US) has one of the highest rates of obesity worldwide, with more than one third (36.5%) of US adults estimated to have obesity [39]. As one might expect in such a large and diverse country, with a complex array of federal and state legislation and an even more complex mix of public and private health care funders and providers, the policy context in the US is not straightforward [196]. There are numerous policies related to the food and beverage environment, the physical activity environment, and the health care environment, amongst others [196].

In relation to health care, there have been influential reports by the Institute of Medicine [197], the US Department of Health and Human Services [198], and the United States Preventive Services Task Force (USPSTF) [199]. Focussing on the latter, as it is of most relevance to primary care, the USPSTF report recommended that physicians "screen all adult patients for obesity" and that adult patients with known risk factors for cardiovascular and diet-related chronic disease, such as diabetes mellitus, should be offered intensive counselling and behavioural interventions to promote sustained weight loss, to be delivered either by primary care physicians themselves or through referral to other services.

The 2010 Patient Protection and Affordable Care Act [200] furthered these expectations by requiring all health insurance carriers to cover this and other USPSTF recommendations, with no patient deductible or co-payment. This requirement was assisted in 2013 by the American Medical Association decision to officially recognise obesity as a chronic disease (in keeping with the WHO view, but in contrast to the policy position in the UK and Europe[7]). Yet despite

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[7] In April 2016, ten Members of the European Parliament submitted a Written Declaration to the European Parliament for obesity to be recognised as a chronic disease. It was signed by only

this, there remain issues with many health insurers not covering obesity or reimbursing patients for obesity treatment, including medication, surgery and counselling [201, 202].

Australian obesity policy

Like the US, Australia is one of the few countries in the world with an adult obesity prevalence of greater than 25% [203]. In their synthesis of Australian obesity policy relevant to general practice, Sturgiss and colleagues reviewed the following guidelines aimed at GPs [204]:

- The Australian National Health and Medical Research Council's 'Clinical practice guidelines for the management of overweight and obesity in adults, adolescents and children in Australia [205].

- The Australian National Heart Foundation's report 'Physical activity and energy balance' [206].

- The Royal Australian College of General Practitioners' (RACGP's) 'Guidelines for preventive activities in general practice' [207].

- The RACGP's 'National guide to a preventive health assessment for Aboriginal and Torres Strait Islander People' [208].

- The RACGP and Diabetes Australia's 'General practice management of type 2 diabetes – 2014–15' [209].

They concluded that there is no "clear and concise" programme for GPs to follow, but that most of the guidelines recommend knowledge of: Nutrition, Physical activity, and Behavioural interventions.

Furthermore, the guidelines recommended referral to other health professionals for assistance with nutrition and physical activity, but it is not clear which 'other health professional' is best placed to help with this, with suggestions

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144 of the Parliament's 751 elected MEPs by the end of the 3 month window and, therefore, lapsed.

including practice nurses, exercise physiologists, dietitians, Aboriginal health workers, multicultural health workers, psychologists, diabetes educators and physiotherapists [204].

Interestingly, the authors have since developed and piloted a GP-led primary-care based weight management programme [210, 211]. They cite lack of availability of weight management services, patient preference for GP involvement, and the potential for a less fragmented patient care experience as rationale for this approach [212-215].

To conclude this section on obesity policy context, there is remarkable consistency - from the perspective of governments and health professionals - in the conceptualisation of obesity as a serious public health issue with considerable health and economic consequences. Whether or not obesity is defined as a disease, the view that BMI is a flawed measure with no relation to health did not feature in any of the documents reviewed.

It is also clear, however, that there are a number of tensions and contradictions in obesity policy pronouncements, both within and between countries. This is true both of the framing or problematization of obesity (e.g. the extent to which obesity is an individual versus a government/society's responsibility) and of the proposed role that primary care practitioners might play in 'tackling' the 'wicked problem' that is obesity (e.g. along a spectrum from identification and referral of selected patients to "every contact counts").

The next section will draw upon both the epidemiological and policy information presented in this chapter to provide a rationale for the focus of this thesis on the identification and referral of adults with co-morbid obesity.

2.4 Rationale for focus on identification and referral of adults with co-morbid obesity

This short section provides the rationale for the focus of this thesis, based on epidemiological and policy reasoning. It also introduces some literature on barriers to identification and referral of adults with obesity in primary care, which help us to understand the gap between the policy rhetoric of "every

health care contact is a health improvement opportunity" and the reality in practice.

Starting with the epidemiological reasoning, the focus on adults with co-morbid obesity, as opposed to all adults with a BMI>30 kg/m^2, is related to the observation that not all adults with obesity will have adverse health outcomes related to their increased BMI [33, 34]. Indeed, people with obesity represent a heterogeneous group, clinically and socio-demographically [36, 37].

Therefore, recognising that not all GPs and practice nurses feel comfortable talking about weight, as documented in policy such as the RCGP and RCP reports [164, 166, 175], it is reasonable to assume that practitioners may find it easier to discuss weight (and weight management) with adults who have established weight-related co-morbidities, such as diabetes, hypertension, or osteoarthritis. Indeed, one might argue that primary care practitioners have a duty of care to discuss weight management with such individuals, whereas there is a potential to do harm if raising the issue of weight in someone who is otherwise well [216].

A separate but related epidemiological argument for focussing on adults with co-morbid obesity is to do with the actual number of patients involved. If we accept that roughly two-thirds of the UK adult population are overweight and over a quarter have obesity (and the proportions among patients that regularly attend their GP are likely to be even higher [217]), then this represents a significant number of consultations where the issue of weight could potentially be raised. In the context of a UK-wide GP "crisis" [218], with rising demand outstripping capacity, this additional workload is simply not feasible or acceptable.

Notwithstanding the practical challenges of adopting an "every contact counts" approach to adult weight management in primary care, this does not fit with the prevailing policy context in the UK, as described above. In contrast, a focus on identification and referral is supported by: the Foresight report ("there is a need to identify individuals most likely to benefit from specific treatment of their obesity"); both RCP reports ("health professionals should be able to signpost overweight or obese individuals to local support services such as... weight management programmes"); the AoMRC report (which advocates "basic training in sensitive recognition and appropriate referral for overweight and obese

patients"); and the RCGP report (which endorses "an awareness raising and signposting role for GPs in relation to obesity").

Having made the case for focussing on identification and referral of adults with co-morbid obesity in primary care, the last part of this section will briefly summarise some of the most widely cited barriers to engagement with adult weight management in primary care.

2.4.1 Barriers to engagement with weight management in primary care.

As noted in Chapter 1, adult obesity remains under-treated in UK primary care, with BMI under-recorded and few patients referred for weight management interventions [16-18]. In order to improve the identification and referral of adults with obesity (co-morbid or not) in primary care, it is important in the first instance to be absolutely clear on what the barriers to engagement with weight management are in primary care.

Qualitative research has offered several possible explanations for the sub-optimal engagement with weight management by GPs and PNs, with two recent syntheses of qualitative research in this area particularly pertinent. The first, in 2015, was a meta-ethnography of patient and primary care practitioner perspectives of roles and responsibilities related to obesity [219]. The second, from 2017, was a thematic synthesis of physicians' views and experiences of discussing weight management within routine consultations [220].

In the former, a final sample of nine studies was analysed, which included six studies relating to adult obesity [221-226] and three to childhood obesity [10, 227, 228]. As well as a range of barriers from the patient perspective (including lack of resources, loss of motivation and self-respect, and lack of confidence in care options), there were a number of practitioner issues identified. These were grouped into the following five themes:

- Knowledge/education – Many practitioners were unsure of obesity care options, or doubted their effectiveness [222, 228].

- Medicalisation – Most practitioners did not view obesity as a medical problem, but rather as a social issue, with explanations for the causes of obesity 'straddling' between biomedical and socio-ecological views [221, 222]. Many GPs felt that discussing weight was only relevant in patients with co-morbidities [221, 222, 224, 228].

- Uncertainty – Despite the perceived lack of evidence to support obesity interventions, practitioners nonetheless provided services, though in a fatalistic manner [223, 228].

- Communication – the issue of obesity was avoided for fear of causing offence or affecting trust [10, 221, 222, 228]. Lack of training was regularly cited [10, 221, 223, 224].

- Blame/stigma – this theme was a culmination of the previous themes, reflecting practitioners' beliefs that patients with obesity are 'in denial' and get offended when the issue of weight is raised [10, 221, 224]. Stigmatising language was often used by practitioners to describe patients [10, 222, 223].

The author presented a model which describes an 'empowerment cycle' and a 'disempowerment cycle', representing a patient's interaction with one of two different types of practitioner. The first is empowered through the primary care system, with training and confidence in how to address obesity, in a supportive, non-judgmental manner. The sense of being supported and knowing what to expect from the primary care practitioner will, in turn, empower the patient, improving subsequent engagement with the health service [219].

The second type of practitioner is disempowered – ambivalent and ambiguous – and stands as a barrier to weight management services. They may misinterpret a patient's lack of trust or sense of being stigmatised by viewing them as 'uncooperative' or 'defensive', thus disempowering them further and making future engagement less likely [219]. The empowerment model, Henderson suggests, has the potential to improve the effectiveness of primary care in addressing obesity, if practitioners learn to recognise and work with patients to address the structural causes of their oppression [229].

In the second qualitative synthesis, Dewhurst and colleagues found sixteen studies that met inclusion criteria, four of which were from the UK [222, 224, 230, 231]. They presented four analytical themes:

- Physicians' pessimism about patients' weight loss success.

- Physicians feel hopeless and frustrated (by the lack of available and effective management options in particular)

- The dual nature of the physician-patient relationship (continuity of care increased rapport, but sensitive topics such as weight were often avoided in fear of negative reactions)

- Who should take responsibility for weight management (discussing weight was only perceived as legitimate when it was linked to co-morbidities; otherwise it was viewed as non-medical and therefore not the physician's responsibility)

The findings from these recent syntheses of qualitative literature demonstrate a range of barriers to engagement with weight management by practitioners. Many of these barriers have also been demonstrated in previous quantitative studies, including: lack of knowledge and confidence [232], pessimism [233], fear of causing offence [234], and reluctance to take responsibility [235].

In terms of solutions, the authors of the 2017 synthesis conclude that:

> ...improving training, providing clearer guidelines and placing a greater emphasis on collaboration within and between clinicians will help reduce barriers for both physicians and patients.

These and other potential strategies to improve the identification and referral of adults with co-morbid obesity will be explored in detail in Chapter 5.

2.5 Chapter summary

This chapter provided an overview of the epidemiology of adult obesity, including its heterogeneity, its causes (with a particular focus on the

relationship between obesity and socioeconomic status) and its health and economic consequences.

The chapter also explored some key UK and Scottish policy documents related to obesity (from Government and health professional groups) in order to understand the different ways in which obesity is problematized and different views on the role of primary care in adult weight management. These policy documents were then compared to selected global obesity policies including those from the WHO, the US and Australia. The chapter concluded by providing a rationale for the focus on identification and referral of adults with co-morbid obesity throughout the rest of this thesis.

The next chapter will lay out the methodological considerations of the work conducted in this PhD study, before moving onto the results chapters.

3 Methodological and theoretical considerations

3.1 Overview

This chapter addresses the main methodological and theoretical considerations encountered during this research. It discusses the philosophical assumptions of research, with particular attention to realist approaches. It also explains how the research questions outlined in Chapter 1 were generated, and describes the methodological considerations involved in deciding on the most appropriate research methods to answer each question. Finally, the chapter introduces the theoretical framework of candidacy, used to synthesise the findings of this thesis in Chapter 9.

Methodology has been described as a 'general approach to studying research topics', and method as a 'specific research technique'[236]. This chapter will focus on the former, with details of specific methods used in this project described in their relevant chapters (Phase 1 stakeholder interviews in Chapter 4, Phase 2 realist review in Chapter 5, the mixed method case study approach in Chapter 6, with details of the Phase 3 quantitative and Phase 4 qualitative elements of the case study described in Chapters 7 and 8 respectively). Figure 3-1 below serves as a reminder of how the different phases fit together.
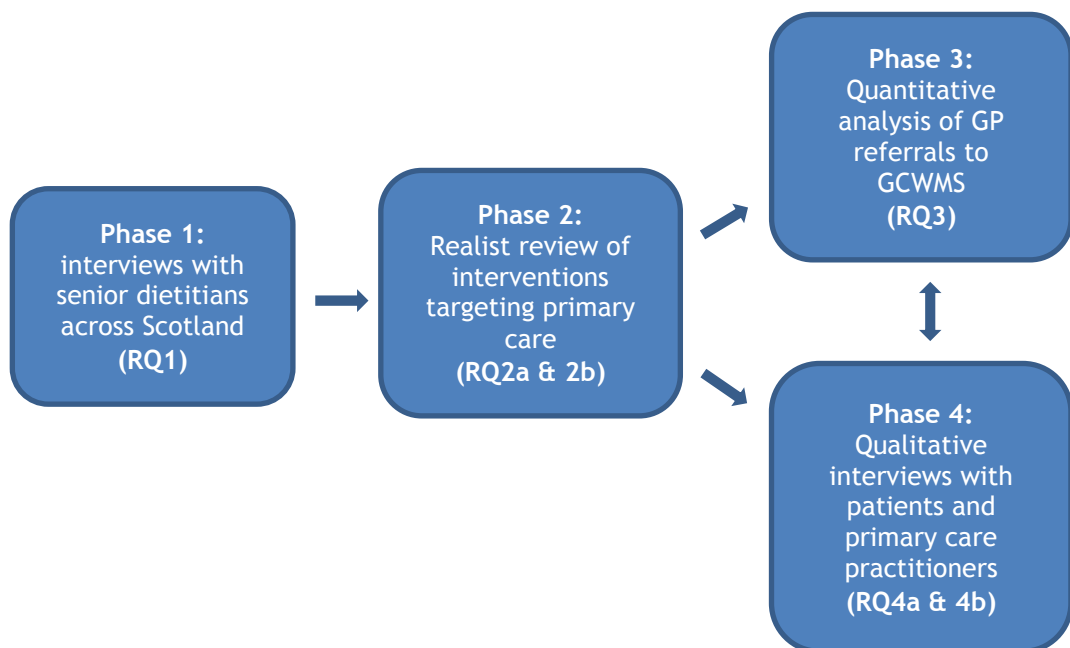
Figure 3-1: Overview of research phases and research questions

3.2 Introduction

When the idea for this project was first conceived, it was positioned as being an exploratory piece of work, aiming to understand more about the processes and complexities involved in achieving access to weight management services for adults with co-morbid obesity who presented to their GP or practice nurse. Recognising that this was an under-theorised area, with little evidence of successful interventions, it fitted neatly into the Medical Research Council's (MRC) Framework for the development and evaluation of complex interventions, widely considered to be the 'gold standard' reference for complex intervention development [24, 237].

The Framework outlines four phases in the development of complex interventions (Figure 3-2): Development, Feasibility and Piloting, Evaluation, and Implementation. The guidance points out that these phases are not linear, as demonstrated by the bi-directional arrows indicating interactions between the phases. This research sits within the 'Development' phase of this Framework, and for good reason. As the guidance highlights:

> Developing, piloting, evaluating, reporting and implementing a complex intervention can be a lengthy process. All of the stages are important, and too strong a focus on the main evaluation, to the neglect of adequate development and piloting work, or proper consideration of the practical issues of implementation, will result in weaker interventions, that are harder to evaluate, less likely to be implemented and less likely to be worth implementing. (pg 4) [237].

There is a clear acknowledgement here that failure to give adequate attention to the development aspects of an intervention can affect the quality – and ultimately, the success or failure - of that intervention. There are three main stages in the Development phase: 1) identifying the evidence, 2) identifying or developing theory, and 3) modelling process and outcomes.
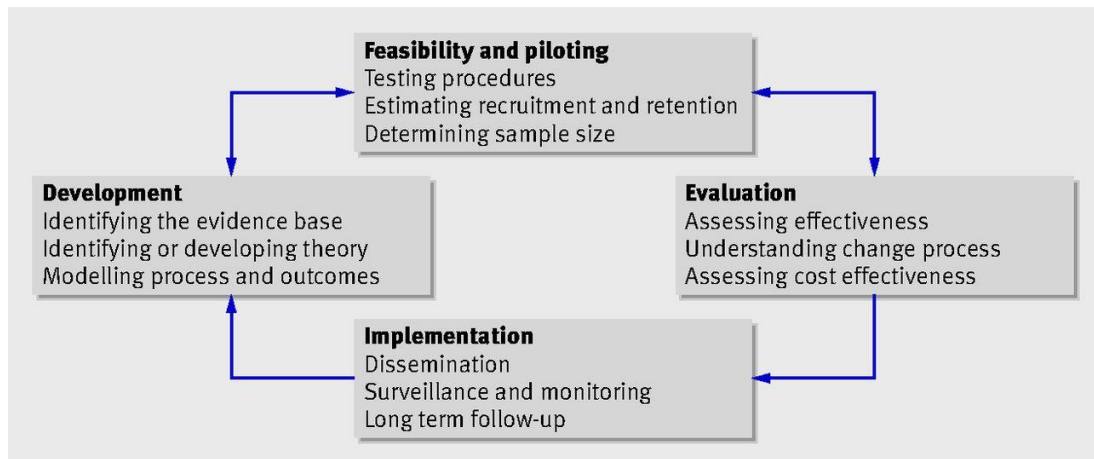
Figure 3-2: Key elements of the development and evaluation process
(Reproduced from Craig P, et al. Developing and evaluating complex interventions: the new Medical Research Council guidance. BMJ 2008;337:a1655. With permission from BMJ Publishing Group)

Each of these stages will now be considered in more detail, highlighting how this research project aimed to address them. This will set the scene for the remainder of this chapter, which will outline the methodological considerations faced in each phase of this research. The chapter will end with some reflections on my role as GP and researcher, and the impact these different roles may have had on the research process.

3.2.1 Stage 1 – Identifying the evidence base

For this first step in the development process, the MRC guidance states

> You should begin by identifying the relevant, existing evidence base, ideally by carrying out a systematic review. You may be lucky and find a recent high quality review that is relevant to your intervention, but it is more likely that you will have to conduct one yourself, and maintain and update it as the evaluation proceeds. (p.9) [237]

In the case of this research area, there were two recent high quality reviews to draw upon at the outset of my PhD (in 2013). The first was a Cochrane systematic review from 2010 which assessed the effectiveness of interventions to change the behaviour of health professionals and/or the organisation of care to promote weight reduction in overweight and obese adults (sic) [238]. The review identified six RCTs, but only one of these was set in UK primary care [239]. It found evidence of a change in clinicians' behaviours after receiving an

educational intervention (e.g. increased recording of weight), but no statistically significant difference in patient weight between intervention and control groups.

The second was a systematic evidence review for the US Preventive Services Task Force (USPSTF) from 2011, which found no trials examining the effect of primary care screening to identify overweight or obesity in adults [240]. This review did, however, have restrictive inclusion criteria (only looking at RCTs). It was updated in September 2016 as part of a different study, but again no trials were found [241].

The latter review focused on studies of screening and opportunistic intervention on obesity, but the focus of the present study – identification and referral of adults with co-morbid obesity – was broader than this, incorporating interventions that improved the referral process as well as those that improved identification. Furthermore, the notion that useful evidence related to the topic (indeed, any topic) can only be gleaned from RCTs was rejected from the outset of this project, in keeping with a realist philosophy of science and knowledge, as explained in the next section of this chapter. Acknowledging this wider view, the approach taken to evidence review in this study was a realist review, combining a systematic approach to literature searching with a realist, theory-driven, approach to synthesis. As such, the research questions related to this stage of the MRC guidance were:

RQ2a – What is the 'programme theory' of interventions targeted at primary care practitioners to improve the identification and referral of adults with co-morbid obesity?

RQ2b – What are the mechanisms at play in different components of these interventions and what are the contextual factors that enable these mechanisms to produce successful outcomes?

3.2.2 Stage 2 – Identifying or developing theory

In stage 2 of the complex intervention development process, the guidance states that:

> a vitally important early task is to develop a theoretical understanding of the likely process of change, by drawing on existing evidence and theory, and supplemented if necessary by new primary research, for example interviews with 'stakeholders', i.e. those targeted by the intervention, or involved in its development or delivery. (p.9) [237]

Identifying and developing theory was a central aim of this project - the two research questions above are related to theory identification – but the quote also asserts the importance of engagement with 'stakeholders' involved either by receiving or delivering the intervention.

In this project, three groups of 'stakeholders' were interviewed: patients (adults with obesity who had been referred to a weight management service (WMS)), practitioners (GPs or nurses who had made a referral), and weight management service leads (senior dietitians involved in planning and delivery of WMS).

All three groups would be involved in any future intervention to improve the identification and referral of adults with co-morbid obesity in primary care: patients and practitioners would be the main targets of such an intervention (with practitioners also involved in implementation) and service leads would be involved in shaping the referral process and structure of the service being referred to. All three groups may have different perspectives on the "likely process of change" of any future intervention.

The first group of stakeholders that were interviewed as part of this project were the service leads. This was partly to get a sense of the wider context of weight management services across Scotland (starting with the 'general' before moving to the 'specific'), but also to understand different views on the role of primary care in weight management and to hear different perspectives on engagement with primary care. This produced the following research question:

RQ1 – What is the role of primary care in adult weight management, from the perspective of key stakeholders involved in the planning and delivery of adult weight management services?

The second group of stakeholders interviewed for this research were patients and practitioners. First, adults with obesity who had been referred to the GCWMS were interviewed. This was part of a mixed method case study of GP

referrals to GCWMS with the aim of understanding barriers and facilitators to referral and attendance, which would again help to understand the "likely process of change" of any future intervention. The patient interviews were followed by practitioner interviews (GPs and practice nurses), recruited from referring practices. The research questions addressed were:

RQ3 – What are the patient and practice-level predictors of attendance and completion at adult weight management services after primary care referral?

RQ4a – What is the role of primary care in adult weight management, from the perspective of patients (adults with co-morbid obesity) and primary care practitioners?

RQ4b – What are the barriers and facilitators to primary care referral to, and subsequent attendance at, adult weight management services?

The rationale for the mixed method case study design is described in more detail later in this chapter but, in keeping with the MRC guidance, it was from the outset intended to help develop and refine theory related to identification and referral of adults with obesity, the focus of any future complex intervention. As such, the case study also addresses elements of stage 3 of the MRC guidance.

3.2.3 Stage 3 - Modelling process and outcomes

The third stage of the complex intervention development process relates to modelling of the processes and outcomes of the intervention. The guidance suggests that a pre-trial economic evaluation may be helpful, or that established implementation frameworks such as MOST (multiphase optimisation strategy [242]) or RE-AIM (reach, efficacy, adoption, implementation, and maintenance [243]) may be useful sources of ideas. It goes on to state that:

> It is important to begin thinking about implementation at an early stage in developing an intervention and to ask the question 'would it be possible to use this?' before embarking on a lengthy and expensive process of evaluation. You also need to ask 'by whom (national or local policy-makers, opinion leaders/formers, practitioners, patients, the public, etc.)?' and in what population or setting. Work out who needs to know about the outcome of the evaluation, and what kind of information they will require in order to implement the changes that

> might be indicated by the new evidence. Who (or what) are the
> facilitators? What (or who) are the obstacles? Why is your evidence
> likely to be persuasive? It may not be convincing if it conflicts with
> deeply entrenched values. (p.9) [237]

While no economic evaluation or formal modelling was performed in this research study, the research questions above do address several of the points raised in this quote. The case study highlights barriers and facilitators; the interviews with a range of stakeholders help to understand different values ("deeply entrenched" or otherwise); and the realist review aims to answer the question "what works, for whom, in what circumstances and why", in relation to identification and referral of adults with obesity.

In summary, this introduction has described how the research questions asked in this project map onto the different steps in the MRC guidance for the development and evaluation of complex interventions. The rest of this chapter will explain in more detail what methodological considerations were taken into account in attempting to address the research questions in each of the four phases of this work. First, however, the epistemological position of the researcher is described.

3.3 Epistemological position

Methodological decisions, such as whether to use quantitative, qualitative, or mixed methods approaches, are guided (knowingly or unknowingly) by a researcher's ontological and epistemological positions; that is, their philosophy of science/knowledge. In brief, ontology refers to beliefs about the nature of reality and epistemology refers to beliefs about the nature of knowledge, or how we understand that reality.

In the health and social sciences, where this research is situated, there has been a range of different research approaches used, each with different ontological and epistemological assumptions (see Figure 3-3 below). The two dominant paradigms, however, have been *positivism* (or objectivism) at one end of the spectrum and *interpretivism* (or subjectivism) at the other end of the spectrum. Much discussion of ontology and epistemology in health care research uses these two poles as reference points [236, 244].

1.0 ONTOLOGY: What exists in the human world that we can acquire knowledge about?

Realism: one reality exists ← → ← Relativism: multiple realities exist →

1.1 Naïve realism	1.2 Structural realism	1.3 Critical realism	1.4 Bounded relativism	1.5 Relativism
Reality can be understood using *appropriate* methods	Reality is *described* by scientific theory, but its underlying nature remains uncertain	Reality captured by broad *critical* examination	Mental constructions of reality are equal in space & time within boundaries (e.g., cultural, moral, cognitive)	Realities exist as multiple, intangible mental constructions; no reality beyond subjects

2.0 EPISTEMOLOGY: How do we create knowledge?

2.1 Objectivism	2.2 Constructionism*	2.3 Subjectivism
Meaning exists within an object: an objective reality exists in an object independent of the subject	Meaning created from interplay between the subject & object: subject *constructs* reality of object	Meaning exists within the subject: subject imposes meaning on an object

3.0 THEORETICAL PERSPECTIVE: What is the philosophical orientation of the researcher that guides their action/research?

Knowledge acquisition is deductive, 'value-free', generalizable ← → Knowledge acquisition is inductive, value-laden, contextually unique

Application: to predict

3.1 Positivism Natural science methods (posit, observe, derive logical *truths*) can be applied to the social sciences

3.2 Post-positivism Multiple methods are necessary to identify a *valid* belief because all methods are imperfect

3.3 Structuralism The source of meaning comes from the formal structure found in language & can apply to all aspects of human culture

Application: to understand

3.4 (Social) Constructivism Meaning making of reality is an activity of the individual mind

3.5 Interpretivism Natural science methods cannot apply to social science; interpretations of reality are culturally derived & historically situated

3.5a Hermeneutics Hidden meaning (of language) exists in texts, practices, events & situations, beneath apparent ones

3.5b Phenomenology The essence of human experience of phenomena is only understood when the researcher separates their own experiences

3.5c Symbolic interactionism The researcher must take the position of those researched (interaction) by sharing language & other tools (symbols)

Application: to emancipate or liberate

3.6 Critical theory Research & theory should be used to change situations (focuses on power relations, critiques assumptions & evolves)

3.6a Emancipatory The subjects of social inquiry should be empowered

3.6b Advocacy or participatory Politics & political agendas should be accounted for

3.6c Feminism The world is patriarchal & the culture it inherits is masculine

Application: to deconstruct

3.7 Post-structuralism Different languages & discourses divide the world & give it meaning

3.8 Post-modernism Truth claims are socially constructed to serve interests of particular groups, methods are equally distrusted; might not be possible to arrive at any conclusive definition of reality

Application: any or all

3.9 Pragmatism All necessary approaches should be used to understand research problem

Figure 3-3: Social science research guide to ontology, epistemology and philosophical perspectives
(Reproduced from Moon K, Blackman D: A guide to understanding social science research for natural scientists. Conservation Biology 2014, 28(5):1167-1177. With permission from Conservation Biology)

Positivism asserts that there is only one true reality (its ontology) and that we can understand that reality through observation and measurement (its epistemology). The role of the researcher is that of detached and disinterested (hence 'objective') scientist.

Interpretivists, by contrast, believe that there are multiple realities (ontology) and that truth is subjective. Knowledge is constructed through co-creation

between (subjective) researchers and participants, and different people may have different – and equally legitimate – interpretations of that knowledge (epistemology).

This characterisation of research philosophies into positivism versus interpretivism is, of course, a gross simplification. Figure 3-3 demonstrates some of the shades of grey in between, and links ontology, epistemology and philosophical perspective with research application – for instance, is the purpose of the research to *predict* (as in positivism and post-positivism), to *understand* (as in constructivism), to *emancipate* (as in critical theories such as feminism), or to *deconstruct* (as in post-structuralism or post-modernism)[245].

Following this approach, the purpose of this research was primarily to *understand*: to understand the role of primary care in adult weight management, from different stakeholders' perspectives; to understand how previous interventions have tried to improve weight management in primary care; to understand what the barriers and facilitators to referral to weight management are.

To a lesser extent, however, there was also an explanatory ambition – to *predict*, as far as this is possible (see next section), who is more likely to access weight management services, and why. As such, the philosophical perspective of this research sits between positivist (objectivism) and interpretivist (subjectivism) – this is the territory of the 'realist'.

3.3.1 Realist approaches

Realist approaches to health and social science have a long and complex lineage [246-249], with two main forms of realism being most prominent: empirical realism and critical realism [244, 246]. It is beyond the scope of this chapter to unpick the history of these two branches of realism in detail, but it is helpful to explore the key principles of the branch of realism which is applied in this research – a form of empirical realism articulated most clearly by Ray Pawson [246, 250, 251].

In his first book, 'Realistic Evaluation' (co-authored with Nick Tilley) [250], Pawson outlines three key features of realism in relation to evaluation:

- First, that it deals with the *real*. That is, that reality is stratified (ontology) and all social programmes or interventions involve interplay between individuals and institutions, between agency and structure. The products of these interactions – the realities which programmes and interventions seek to change – are not always measurable empirically (epistemology), but are nonetheless worthy of investigation.

- Second, that it should follow a *realist* methodology – a post-empiricist philosophy which includes a greater role for 'theory'.

- Third, that it should be *realistic*. Evaluation is an applied science, performed to inform the thinking of policy makers, practitioners and the public. As such, a degree of modesty is required – there is no universal 'logic of evaluation' that can be applied to all judgments; rather, evaluation is context-specific and should seek to examine the effectiveness of particular programmes targeted at specific problems.

Pawson's second book, 'Evidence-Based Policy: A Realist Perspective' [246], applies the same realist approach, used in the context of single programme evaluation above, to the synthesis of multiple programmes, using secondary data. This is one of the key reference texts for the realist review method utilised in this research.

In his third realist book, 'The Science of Evaluation'[251], Pawson helpfully charts the influences on his brand of realism (namely realist evaluation and realist review/synthesis) by describing the following seven realist principles.

1. *Generative mechanisms* – this is the realist principle that any intervention or policy (or indeed medication) has a 'mechanism of action', which can be explained by theory. As Roy Bhaskar puts it, "Theory without experiment is empty. Experiment without theory is blind." [248]

2. *Morphogenesis* – the things we study (policies, programmes, interventions) are inserted into systems which are in a state of permanent change. Interventions may induce social change but this change can never be fully anticipated or predicted, though neither is it entirely random. A central ambition of realist evaluation and synthesis is to understand these so-called 'demi-regularities'.

3. *Programme theories are rooted in practitioner wisdom*. Realist methods are theory-driven, but there are different levels of theory, ranging from the particular to the grand or high-level [252]. Pawson highlights the importance of 'common-sense theory' in helping us to understand how stakeholders respond to interventions.

4. *Middle-range theory* – these are viewed as less abstract theoretical approaches, addressing specific phenomena and concepts that can be incorporated into testable propositions or questions and inform intervention development. Merton proposes that 'middle-range theory' should produce explanations that are: "sufficiently abstract to deal with different spheres of social behaviour and social structure, so that they transcend sheer description" (p.68) [253].

5. *Knowledge can only ever be partial and hedged with uncertainty* – thus knowledge develops with the accumulation of explanation (the theories which make sense of observable regularities), rather than on the bedrock of observed facts. Pawson quotes Karl Popper here:

   The empirical basis of objective science has thus nothing 'absolute' about it. Science does not rest upon rock-bottom. It is like a building erected on piles. The piles are driven down from above into the swamp, but not down to any natural or 'given' base; and when we cease our attempts to drive our piles into a deeper layer, it is not because we have reached firm ground. We simply stop when we are satisfied that they are firm enough to carry the structure, at least for the time being. (p.94) [254]

6. *Quality of reasoning is as important as quality of data* –Pawson's argument, which he rehearses elsewhere [255] is that any form of evidence ("quantitative and qualitative, outcome and process,

measurement and gossip!") can be drawn upon to advance our theoretical understanding.

7. *Rather than choosing the most effective intervention, we should choose the best means for its targeting and implementation* – to conclude his seven realist principles, Pawson pays homage to Rossi and his Iron Law of Evaluation: "The expected value of any net impact assessment of any large scale social program is zero." The point being made here is that most interventions will only work for some of the people, some of the time, and few interventions can survive the roll-out from an initial well-resourced, well-defined and well-targeted pilot to large-scale implementation in the hands of inexperienced practitioners.

In summary, the philosophical position taken throughout this thesis is very much informed by Pawson, who echoes Donald T. Campbell [256], eminent US social scientist in whose honour the Campbell Collaboration[8] was named, by describing himself as "some kind of realist" [251].

The remainder of this chapter describes the main methodological considerations for each of the four phases of this research: stakeholder interviews (Phase 1), realist review (Phase 2), and mixed methods case study (Phases 3 and 4).

3.4 Phase 1: Stakeholder interviews

In Phase 1, stakeholder interviews were conducted with senior dietitians involved in the planning and delivery of adult weight management services across Scotland. The rationale for interviewing these stakeholders was two-fold:

1) To understand their perspectives on the role of primary care in adult weight management and engagement strategies between weight management services and primary care.

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[8] The Campbell Collaboration was set up in 1999 in recognition of the need for an organisation that would produce systematic reviews of research evidence on the effectiveness of social interventions, along similar lines to what its sibling organisation, The Cochrane Collaboration, produces in relation to health care interventions.

2) To inform the realist review, by exploring stakeholders' 'programme theory' of strategies to improve identification and referral of adults with obesity.

The main methodological considerations related to sampling, data collection, and data analysis, are now described. Ethics and confidentiality are also considered.

3.4.1 Sampling

In contrast to quantitative studies, where the purpose of sampling is to collect a representative sample from the population so that results can be generalised back to the population, sampling in qualitative studies does not aim for generalisability; rather, participants are deliberately selected to reflect particular characteristics of, or groups within, a population [257].

Three main types (and several sub-types) of sampling for qualitative research are usually described: purposive, theoretical, and convenience sampling [257-259].

In purposive, or criterion based sampling, participants are chosen because they have particular features which enable detailed exploration of the issues under investigation. Numerous sub-types of purposive sampling have been described, each with a different purpose: for instance, if outliers are of interest (extreme or deviant case sampling); if a broad range of subjects are required (maximum variation sampling), if individuals from the same subculture are the focus of investigation (homogeneous sampling), or if cases which characterise positions that are 'normal' or 'average' are of particular concern (typical case sampling) [260].

Theoretical sampling can be considered a particular type of purposive sampling in which participants are selected on the basis of their potential contribution to theory development. It is most associated with grounded theory, developed by Glaser and Strauss in 1967 as a systematic method of analysing qualitative data in order to produce theory [261]. The sampling process here is iterative, with

further sampling dependent on analysis of initial data and related emerging theoretical work.

The third approach to sampling in qualitative research is convenience sampling, whereby selection of participants is based on those who are most accessible. Although this approach is often the least costly to the researcher – in terms of time, effort and money – it is also the least rigorous [257]. In reality, there is considerable overlap between these three broad categories of sampling strategy, with many studies using combinations of each. As noted in Chapter 4, the sampling strategy for the stakeholder interviews in this study was purposive (specifically targeting weight management service leads).

3.4.2 Data collection

The main methodological considerations related to data collection were *how* to collect the data, *where* to conduct the data collection, and *what* questions to ask. With regard to the *how,* semi-structured interviews were chosen as the preferred method of data collection, as being best placed to glean the required information from stakeholders. Gillham proposes three criteria that define an interview (and semi-structured interviews in particular): first, that questions asked are 'open', allowing interviewees to determine their own answers; second, that they are interactive and responsive, allowing flexibility for clarification and exploration; and third, that there is some structure and purpose, even in more 'naturalistic' real-life settings [262]. All of these features were desirable in the present study, where the purpose was to explore the views of key stakeholders from a range of different adult weight management services across Scotland.

Other methods such as a questionnaire survey would not have provided the detail or nuance of the different contexts of adult weight management services in different parts of the country. Similarly, a focus group with several different key stakeholders from across Scotland may have allowed debate about which approaches to engagement with primary care have been most successful, but this would not have produced such in-depth information as it may have prevented stakeholders from being as honest and open about services in their area, or relationships with primary care locally [262].

In terms of *where* to conduct the interviews, this was left to the stakeholders to decide a time and venue that was most convenient for them. Of the seven interviews, four were conducted face-to-face (three at stakeholders' place of work; one at a neutral health centre) and three were conducted over the telephone. The advantages of telephone interviews are largely logistical, in terms of time and travel costs, and are outweighed by the disadvantage of the loss of non-verbal, face-to-face communication [262].

With regard to the *what* of data collection, the interviews were conducted with a topic guide (see Appendix 5) with questions about the interviewee's role, their expectations of primary care in relation to adult weight management, their experience of engagement with primary care, and what approaches they thought might be most helpful to improve identification and referral of adults with co-morbid obesity from primary care to specialist weight management services. The latter question was informed by literature on 'the realist interview' [263-265]. In this approach, a 'teacher-learner cycle' is set up (Figure 3-4 below) in which the interview subject is presented with a theory or proposition (for instance, about why some GPs refer more people to weight management than others) and is invited to comment on this in order to refine the theory or proposition.
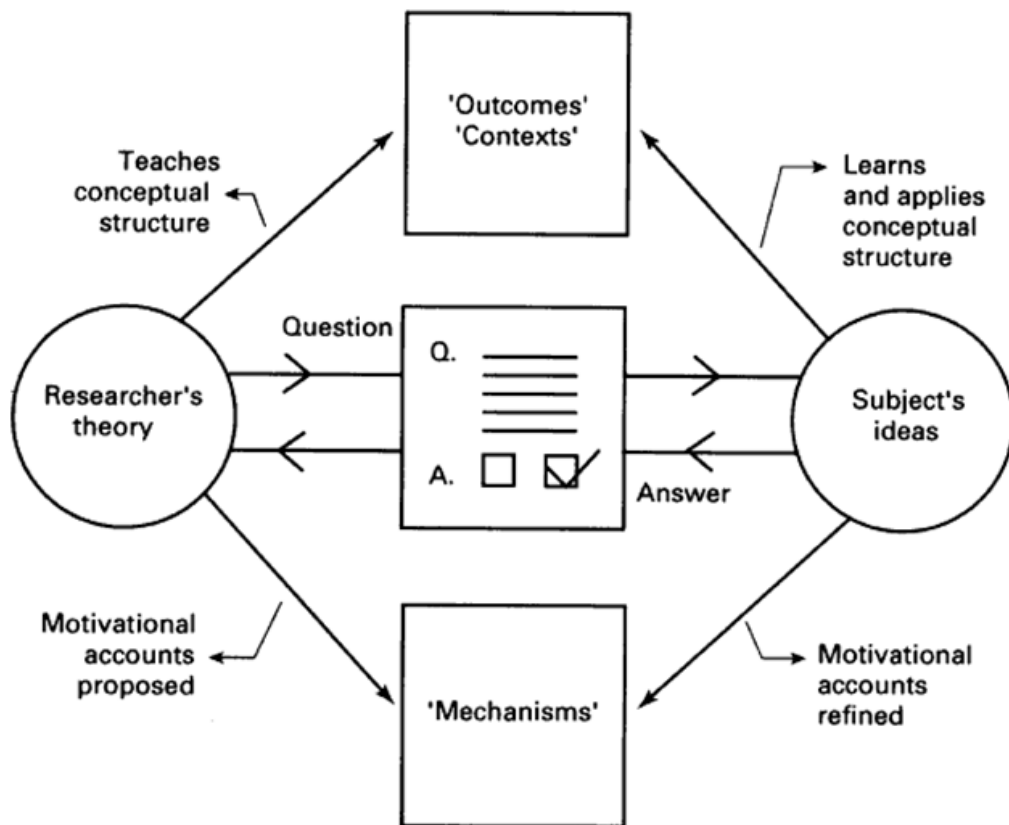
Figure 3-4: The theory-driven realist interview
(Reproduced from Pawson R. Theorizing the interview. The British Journal of Sociology 1996;47(2):295-314. With permission from John Wiley & Sons Ltd.)

Thus, interviews can be used for theory gleaning, theory refinement, or theory consolidation [263]. In the present study, the interviews were used in part to explore stakeholders' views on the role of primary care in adult weight management and their experience of engagement with primary care, but also to do some initial theory gleaning on which approaches to improving identification and referral of adults with obesity in primary care might be most fruitful (the focus of the phase two realist review).

3.4.3 Data analysis

Qualitative approaches to analysis of interview data are determined in part by the epistemological assumptions and philosophical approaches of the researcher. A distinction is often made between approaches, such as framework analysis, which are deductive (pre-defined theories, or hypotheses, are tested using the data collected) and those, such as grounded theory analysis, which are inductive (theory is the outcome of the research)[244]. Other distinctions can be made

based on how different analytic approaches address issues such as: the primary focus of analysis (e.g. discourse analysis focusses on the construction of language used in the data, policy analysis focusses on the interpretation of the data); the way data are reduced (e.g. by summarising descriptively, or by analytical categorisation); the kinds of concepts generated (i.e. the level of abstraction); and the place of the researcher in the analytic account (i.e. more or less reflexive) [266].

For analysis of the stakeholder interviews, an inductive thematic analysis approach was used [267]. This was chosen because there was no *a priori* theory or framework being applied to the interview data. A combination of computer-assisted (NVIVO) and paper-based ('one sheet of paper' or OSOP [268]) techniques were used to assist the process of analysis, described in more detail in the next chapter, which reports the results of the interviews.

3.4.4 Ethics and confidentiality

Ethics approval for the stakeholder interviews was obtained through the University of Glasgow MVLS ethics committee (Project No: 200130121). As the participants were all senior health care professionals working to a high degree of autonomy and independence, and participation was entirely voluntary, the main ethical considerations for the interviews related to informed consent, confidentiality, and data storage.

All interviewees were emailed the participant information leaflet (Appendix 6) and an approved consent form (Appendix 7) in advance of the interview. The consent form was signed by each participant at the start of each interview after providing the opportunity to ask questions or, in the case of telephone interviews, was emailed or posted to the research team prior to the interview.

Ensuring anonymity and confidentiality were particularly important for this phase of research given that the population from which participants were drawn – the world of NHS adult weight management services in Scotland – is a relatively small one. Careful consideration was given to data handling, storage, and reporting of results.

Data from interviews were handled as securely as possible, with audio recordings transcribed by experienced administrative colleagues from General Practice and Primary Care who are well versed in data confidentiality. The audio recordings were deleted after they had been used to check the accuracy of the transcripts. Each participant was given an identification number and data and identifiers were kept in separate locked filing cabinets and on password-protected computers, accessible only to members of the research team.

Anonymity was also ensured in reports and publications (e.g. the peer-reviewed publication in BMC Health Services Research [269]), with particular attention paid to the use of non-attributable quotations.

3.5 Phase 2: Realist review

In Phase 2, a realist review of interventions targeting primary care practitioners to improve the identification and referral of adults with co-morbid obesity was undertaken.

The main methodological considerations related to the rationale for choosing a realist approach, the search strategy, quality appraisal, and data analysis are now described.

3.5.1 Rationale for realist approach to literature review

A realist approach was chosen ahead of a more traditional systematic review because it is particularly well suited to the assessment of complex interventions and a mixed body of evidence, incorporating primary studies with different designs [270]. As noted at the start of this chapter, previous systematic reviews in the area of adult weight management in primary care only looked at RCTs [238, 240, 241], but not all interventions are RCTs and this restriction criterion is likely to exclude a considerable body of potentially useful information [255].

Realist review, or synthesis (the terms are used synonymously), is explicitly theory-driven, recognising that it may be more fruitful to consider underlying programme theories about how and why a particular programme or intervention is successful (or not) [271]. It does this by applying a realist philosophy (described earlier in this chapter) and focussing, not on the intervention itself,

but on the mechanisms (M) that lead to successful – or unsuccessful - outcomes (O) in different contexts (C).

It is expected that a realist review will produce a description of context-mechanism-outcome (CMO) configurations, explore patterns among these CMO configurations, and develop and test one or more middle-range theories that potentially explain how and why these configurations relate to each other [271].

The lack of theoretically-informed work related to identification and referral of adults with obesity in primary care provided a further rationale for choosing a realist approach. Of course, there are other theory-driven approaches to literature synthesis, such as narrative synthesis [272], meta-ethnography [273, 274], critical interpretive synthesis [19], meta-synthesis [275] and metastudy [276], each with its relative strengths and limitations [277]. However, these other approaches would not have helped me to unpick mechanisms or the influence of context on the interventions of interest in the same way, and one requires specialist software [275].

Like realist reviews, many of the other theory-driven approaches are difficult and time-consuming [19, 272, 274, 276], but one practical advantage of a realist approach, particularly for less experienced researchers, is the growing network of support for realist researchers through groups such as the RAMESES (Realist And Meta-narrative Evidence Syntheses: Evolving Standards) email list (with accompanying online resources [278]) and the Centre for Advancement in Realist Evaluation and Synthesis (CARES) at the University of Liverpool.

3.5.2 Search strategy

The identification of relevant studies has been described as "the most fundamental challenge" for systematic reviewers [279, 280], requiring skills in information retrieval that are not usually taught to researchers [281]. This is particularly so in the case of realist reviews where researchers are not only identifying relevant studies, but are also encouraged to systematically search for relevant theories [282].

When the realist review in the present study began, there were no published studies detailing search methods for the systematic identification of theory [282]. Furthermore, as outlined in the published protocol paper for this realist review [283], it was decided from the outset to search for intervention studies rather than searching for candidate programme theories. The rationale for this was two-fold:

1. The extent of primary research in the area was thought to be limited (based on the low yield from previous reviews [238, 240]), so it was not clear what sort of intervention strategies would be found;

2. It was anticipated that there would be considerable heterogeneity in the interventions involved, based on similar research into interventions targeted at primary care practitioners to improve identification and referral in sensitive areas - in this case intimate partner violence screening [284] - that there were a number of different potential intervention components (e.g. effective protocols, ongoing training, feedback, improving access to support), which may in turn have different mechanisms underpinning them (e.g. practitioner self-efficacy, trust and confidence in the service, accepting responsibility).

Details of the search strategy are described in Chapter 5, though it is worth noting that a more comprehensive approach was adopted at each stage of the review process than is often associated with realist reviews:

- The search strategy was developed in collaboration with the subject librarian of the University of Glasgow, based on the strategy used by a previous Cochrane systematic review [238], but without search terms for study design (to avoid exclusion on the basis of design) and with a wider range of databases;

- Double screening (i.e. independent assessment by two members of the review team) was done at title, abstract and full paper levels, with any disagreements over the eligibility of studies being resolved through discussion with a third reviewer.

The search was initially carried out to include all publications up to and including May 2014 (from 2004) and was subsequently updated to April 2017. A further update was not deemed necessary, as the aim was to develop an explanatory theory of identification and referral of adults with co-morbid obesity in primary care, and further searching was unlikely to add any new insights to this. Indeed, the additional studies that were included in the review following the updated search reinforced the analysis of the data to that point, rather than adding anything new.

3.5.3 Quality appraisal

The process of quality appraisal in a realist review is different to that from a traditional systematic review. In realist synthesis, studies are assessed based on two criteria: relevance and rigour. Relevance relates to the extent to which the study contributes to theory building and/or testing, e.g. how close is the paper to your postulated programme theory? Rigour relates in part to the research process – that is, whether the methods used to generate the relevant data are credible and trustworthy – but also to the detail provided, i.e. how rich is the description of context and mechanism? However, in order to have a clearer idea of the quality of the included literature, formal quality assessment was also carried out, as described in Chapter 5.

3.5.4 Data analysis

Realist analysis sees reality as comprising multiple levels and layers of open systems, each interacting with the others, and with causation operating both up and down the levels of systems through implementation chains [246]. Programmes or interventions operate in and through these existing systems. Complex health interventions often have long implementation chains, involving funders, policy bodies, research teams, primary care staff and local communities [246].

The circumstances in which practitioner interventions generate improved health and health service utilisation outcomes will, therefore, comprise interacting influences at national, regional and local levels. At each level, these influences include political, economic, social and cultural factors. For example, the

potential for a GP consultation to support an adult with obesity in an area of socio-economic deprivation will be affected by the food environment, transport infrastructure, and other aspects of the local community, as well as individual, practitioner and practice factors.

These different levels can be represented as micro, meso, and macro [285], or in Pawson's terms, individual, interpersonal, institutional and infrastructural [246]. Figure 3-5 below illustrates these four levels and how the intervention is placed within them.
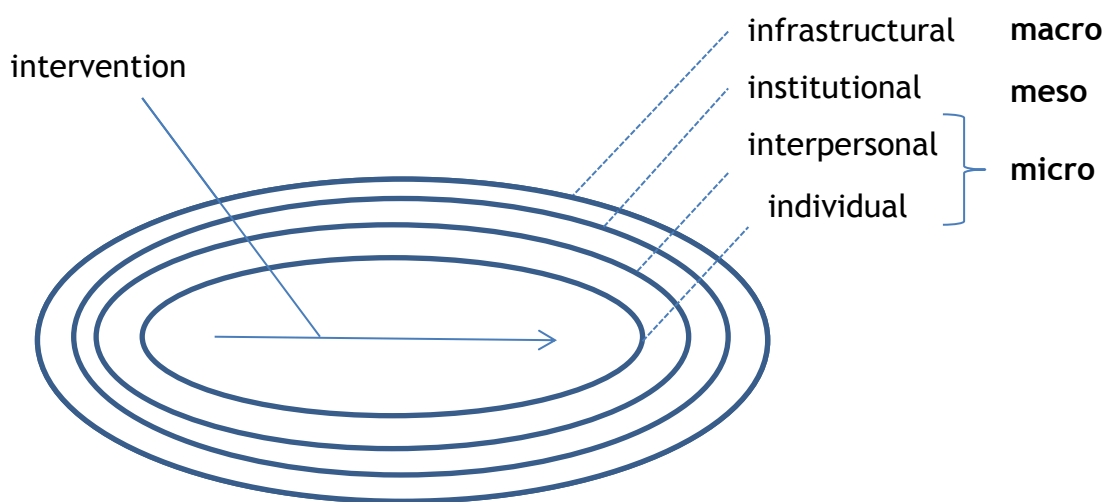
Figure 3-5: Levels of intervention context, adapted from Pawson

In realist reviews, these four levels can all be considered as important 'context' in the 'Context-Mechanism-Outcome' (CMO) configuration, which is the heuristic device at the heart of realist analysis. For the purposes of this review, these levels are considered as follows:

- **Micro (individual/interpersonal)** – factors influencing primary care practitioner (PCP)/patient interaction, including PCP and patient characteristics

- **Meso (institutional)** – practice factors and local weight management service factors, including structural and process issues

- **Macro (infrastructural)** – wider environmental factors, such as prevalence of obesity, socio-economic circumstances, food and exercise environments

The outcomes at the micro and meso levels may become the new context (positive or negative) for the macro level, and thus influence outcomes at this level. This idea of 'linked CMOs', where the outcome of one CMO configuration becomes the context for another, has been articulated most clearly by Jagosh et al in their review of participatory research partnerships [286].

The process of data extraction and the different steps of analysis are described in the Methods section of Chapter 5. However, it is worth noting here two final methodological challenges related to data analysis and synthesis in the Phase 2 realist review of this thesis. The first was the lack of detail - on context and mechanism in particular – in many of the included papers. Pawson describes this as "one of the biggest drawbacks of all to realist ambitions" and goes on to identify the cause of the problem as being:

> …the journal requirements in many a field to publish in three to four thousand words. Little wonder that realist contributions fail to find room for all that occurs within the black box and in the contextual surrounds of an intervention. (p.14) [251].

The second challenge was a familiar one for realist researchers – how to operationalise the notion of 'context' and 'mechanism' and, in some cases, how to differentiate between them [287-289]. In Pawson and Tilley's seminal work, they conceptualised mechanisms (in relation to individual-level social programmes or interventions) as being the combination of 'resources' and 'reasoning' – that is, the cognitive or emotional response of individuals to an intervention's resources – but Pawson and Tilley do not always present mechanisms in this way [250]. Mechanisms will only 'fire' in certain contexts [250, 290, 291].

The approach taken in this review, however, followed that outlined by Dalkin and colleagues, which clarified two aspects of the above CMO characterisation [292]. First, they urge realist researchers to disaggregate resources and

reasoning, and second, to consider a continuum of activation, rather than an on/off reasoning.

3.6 Phases 3 and 4: Mixed methods case study

Methodological considerations will be described in relation to both Phase 3 (the quantitative phase) and Phase 4 (the qualitative phase) of the mixed methods case study, as well as the use of the theoretical framework of candidacy to synthesis the findings (presented in Chapter 9). First, however, the rationale behind using a case study approach – and the use of mixed methods within this case study – will be outlined.

3.6.1 Rationale for mixed methods case study design

The use of the term 'case study' in the health and social research literature is contentious, with different authors describing the term variously as a method [293], a strategy [294], and a design [295]. Two of the key advocates of case study in social research are Stake and Yin. In his book 'The art of case study research', Stake asserts that:

> A case study is expected to catch the complexity of a single case …
> Case study is the study of the particularity and complexity of a single case, coming to understand its activity within important circumstances. (p. xi) [296]

He sets out three main types of case study:

- Intrinsic: "if the study is undertaken because, first and last, one wants better understanding of this particular case";

- Instrumental: "if a particular case is examined mainly to provide insight into an issue or to redraw a generalization"; and

- multiple or collective, when "a number of cases may be studied jointly in order to investigate a phenomenon, population or general condition".[296]

Yin is perhaps the most prolific of writers on case study methods [297-299]. In his key text 'Case study research: design and methods'[297], he describes four basic case study designs along two dichotomous dimensions:

- single or multiple case; and

- holistic or embedded.

Yin gives five possible rationales for studying a single case – that it is critical (i.e. able to test a theory), extreme (i.e. unique), typical (i.e. commonplace), revelatory (i.e. analyses a phenomenon previously inaccessible to inquiry) or longitudinal [297]. Yin's distinction between holistic and embedded relates to whether the focus is on an overall study of the case, or selected units within it. In contrast, Stake's two types of single case study (intrinsic or instrumental) relate to the purpose of the study.

In a critical review of the concept of case study research, Tight suggests that much of the remainder of the key texts by both Yin and Stake could readily be applied to other qualitative, and even some quantitative, forms of research [300]. He summarises the main concerns about case study research as pertaining to generalisation, reliability, validity and theory (again, these could apply to qualitative research in general), and argues that the essence of case study is:

> ...the detailed examination of a small sample – at its extreme a single example – of an item of interest, and typically also from a particular perspective. [300]

Picking up on the fundamental problem that "almost anything can serve as a case"[294], Tight argues that we should instead call this kind of research what it is – "a small sample, in-depth study" or "a detailed examination of"[300]. It is easy to sympathise with Tight's position, particularly in regard to the vagueness of what constitutes a 'case'. For instance, using Stake and Yin's terminology, the present case study could be described as:

i)   An intrinsic single case study (with the 'case' being the GCWMS), which is unique (the GCWMS is unlike any other adult weight

management service in Scotland, in terms of its size, history, degree of funding and extent of evaluation); or

ii) An instrumental multiple case study (with the 'case' being the interaction between primary care practitioners and adults with obesity), which is critical (testing the theory of candidacy).

My preference, however, is to stick with the term 'case study' and call it a case study of access to adult weight management. Indeed, the acronym of the study that was used for the purposes of recruitment was ATTAIN; short for "**A**ccess **t**o Weigh**t** M**a**nagement **in** Primary Care"

The use of multiple methods, or mixed methods – typically combining quantitative and qualitative approaches – has increased considerably in recent years. It is now well recognised that quantitative and qualitative methods have different strengths and limitations, and that their use alone is insufficient to address the complexity of many of today's most pressing health and social problems. There is more insight to be gained from their use together than from using either approach on its own [301].

Of particular relevance to the present case study, Dixon-Woods and colleagues asserted that:

> Policy-makers seeking to understand barriers to access to health care will need to draw on qualitative evidence… as well as quantitative evidence. [302]

As shown in Figure 3-6 below, the two phases of this case study are complementary, with the quantitative phase informing the qualitative phase, and the qualitative phase helping to explain – using the theoretical framework of candidacy - the results of the quantitative phase.

	Practice deprivation rank		
Referral Rate	Low	Medium	High
Low	1	2	4
Medium	1	3	3
High	3	1	2
Total	5	6	9

QUANT PHASE:
Analysis of GP referrals

Analyse predictors of attendance and completion

QUAL PHASE:
Interviews with patients and practitioners

Explore barriers to access

THEORY:
Candidacy

Explain results from Quant phase
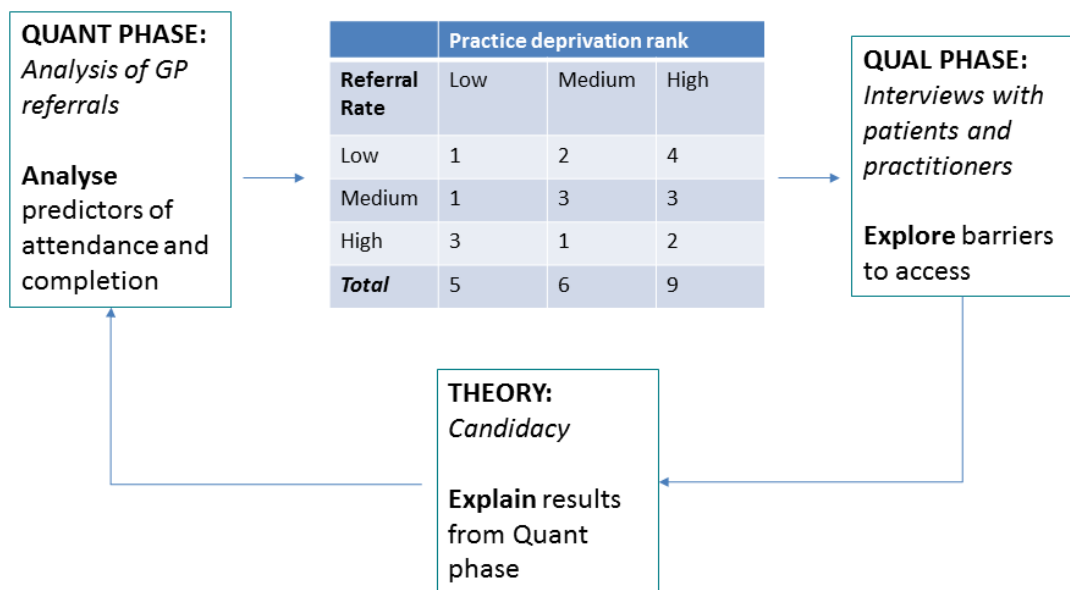
Figure 3-6: Mixed methods case study design

The first stage (Phase 3) of this case study involved analysis of GP referrals into the GCWMS. The purpose of this analysis was two-fold:

1) To analyse predictors of attendance and completion at the service, looking at individual patient and practice-level factors; and

2) To develop a 3x3 sampling frame for patient interviews, recruiting from practices in NHS Greater Glasgow & Clyde based on low-, medium- and high-referral rate and low-, medium- and high deprivation status (practices can be ranked based on the percentage of registered patients in the top 15% of the Scottish Index of Multiple Deprivation).

The rationale for this sampling frame is that it allows for exploration of so-called "deviant cases" [303]. For instance, given that the prevalence of obesity is higher in more deprived areas (as described in Chapter 2), one might expect referral rates from practices in more deprived areas to be higher also, so cases that do not fit this pattern (e.g. high deprivation but low referral rate, or low deprivation and high referral rate) may be particularly illuminating.

The methodological considerations of Phase 3 will now be described.

3.6.2 Phase 3: Quantitative analysis of GP referrals

This was an observational cross-sectional study of routinely collected data. As with any secondary data analysis such as this, the quality and validity of the findings are only as good as the quality of the original data. The original data in this case is collected by GCWMS, and is based partly on the information received at the point of GP referral, via an electronic system called SCI (Scottish Care Information) Gateway, and partly on information recorded by the service itself, such as attendance and weight loss at the service [304].

The main outcome variables of interest were referral, attendance (defined as attending at least one session), and 'completion' (defined as attendance at 4 or more sessions, based on a definition used in a previous published study of the GCWMS [305]). We can be confident in the reliability and consistency of these variables. Similarly, the patient demographics of age, gender and SES (based on postcode) are pre-populated at the point of SCI Gateway referral and likely to be accurate for the purposes of routine care.

One variable of interest that did not appear to be consistently recorded, however, was co-morbidities. This was because the data on co-morbidities was taken from the electronic GP referral itself, where there are a number of checkboxes to choose from. Eligibility for the service during the period of time that this data was collected (Chapter 6 describes the reforms to the service, including changing eligibility, which took place between 2015 and 2017) were as follows:

- BMI >30 kg/m^2 with weight-related co-morbidity;
  OR
- BMI >35 kg/m^2 without co-morbidity

After data cleaning, the percentages of those referred that had any of the defined weight-related co-morbidities were as follows:

- Diabetes = 18.7%
- Hypertension = 15.1%
- Previous Coronary Heart Disease = 10.2%
- Sleep apnoea = 2.1%
- Chronic Obstructive Pulmonary Disease = 1.8%
- Osteoarthritis = 0%

Even a cursory inspection of these figures casts doubt on their veracity (e.g. No patients with osteoarthritis is implausible), but in order to assess whether those with higher BMIs (35 and above) were less likely to have a co-morbidity recorded (as this was not necessary to be eligible), a simple cross-tabulation of co-morbidity count (0, 1, ≥2) was performed, confirming that those with a BMI of 30-35 kg/m^2 were more likely to have a co-morbidity recorded, compared to those with a BMI of 35 kg/m^2 or greater. As a result, it was decided not to include co-morbidity data in any of the subsequent analyses.

The practice variables used in this study were collected from a number of different sources, including:

- Training practice status, from the West Scotland GP training website [306].

- Practice list size, from Information Services Division (ISD) Scotland [307].

- QOF achievement data, from the ISD website [308].

- Distance from the nearest weight management service centre, calculated using GPS mapping software using practice postcode and the postcodes of the 20 weight management service satellite clinics that were in operation during the referral period (see Chapter 6 for more detail on GCWMS).

These data sources can be expected to be reasonably accurate at the time, although they are subject to change year on year.

As for other methodological considerations related to Phase 3, the statistical techniques used are described in more detail in Chapter 7. Descriptive statistics examined how referral, attendance and completion varied by patient and practice characteristics, and multi-level logistic regression models were created in order to account for the clustering of patients within practices.

The methodological considerations of Phase 4 will now be described.

3.6.3 Phase 4: Qualitative interviews with patients and practitioners

As with the Phase 1 stakeholder interviews, the main methodological considerations for Phase 4, the second stage of the mixed methods case study, related to sampling, recruitment, data collection, data analysis, and ethics.

The 3x3 sampling frame is described above and shown in Table 3-1 below.

Table 3-1: 3x3 sampling frame for Phase 4 interviews

	Practice Deprivation Rank (based on % of population in 15% most deprived postcode data zones)		
Referral Rate (per 1000 pop)	Low (<15%)	Medium (15-40%)	High (>40%)
Low (<5)	1	1	5
Medium (5-10)	1	2	2
High (>10)	3	2	3
Total	*5*	*5*	*10*

The sampling frame shows an indicative number of patients in each cell that it was hoped could be recruited. For instance, in the low referral and high deprivation cell there was an approximate target of 5 patients. The higher number of patients in the high deprivation column (n=10) reflects in part the demographics of the catchment area, as discussed further in Chapter 6. This approach to sampling could best be described as purposive.

There was one small hurdle encountered in relation to recruitment. In the original protocol for this phase of the study, after interviewing patients and practitioners from referring practices, the plan was to conduct a focus group with 6 to 8 practitioners from practices that had *never* referred a patient to the service. However, from the available data, it was not possible to identify practitioners that had not made any referrals to the service (there were no practices that had not referred any patients and the referrals were not broken down by practitioner), so a minor amendment was made to the protocol after consulting the R&D team and ethics committee and practitioners that had referred *very few* patients were approached. Furthermore, the practicalities of organising a focus group of such practitioners were considered to be too challenging given the potential sensitivity of being viewed by your peers as not

doing something that you perhaps should be, so interviews were planned instead.

One final consideration with regard to sampling was the importance placed on trying to recruit patients and practitioners from the same practice, rather than two completely separate samples of patients and practitioners. The rationale for this approach was that this might shed more light on the referral process itself, and characteristics of low, medium and high referring practices in particular, by hearing perspectives from both patients that had been referred and practitioners who had made the referral. Even if it was not necessarily the practitioner that had made the referral for that particular patient, they would be able to comment on organisational and cultural aspects of the practice that may influence referral rates or engagement with adult weight management.

With regard to data collection, there were similar methodological considerations for these interviews as there were with the Phase 1 interviews, in terms of *how* to collect the data, *where* to conduct the data collection, and *what* questions to ask. Semi-structured interviews, with an initial narrative component (e.g. for patients: "I'd like to start by asking about your story – how were you referred to the weight management service?"), were chosen as the preferred means of eliciting the views and experiences of participants. These were conducted at a time and venue of the participant's choosing: for patients, this was usually in their home; for practitioners, this was usually in their practice. Topic guides were used (Appendix 8).

As with the Phase 1 interviews, an inductive thematic approach to data analysis [267] was used in the patient and practitioner interviews reported in Chapter 7. The details of this approach are described in that chapter.

However, for the synthesis of thesis findings in Chapter 9, the theoretical constructs of candidacy theory (see next section) were also applied to the interview transcripts, using a framework analysis approach [309]. This approach is particularly suited to the use of a predefined theory in order to gain a deeper understanding of a particular phenomenon [303, 309].

Finally, there were a number of ethical considerations encountered during this mixed methods case study. First, in relation to recruitment, participants were offered £20 gift vouchers (for patients) or £50 vouchers (for practitioners) as a thank you for taking part in interviews. Ethical concerns have, however, been raised by many researchers that such financial incentives could provide undue inducement, be exploitative, or bias recruitment (e.g. if people on low incomes are more likely to take part) [310, 311]. A Cochrane systematic review [312] found some evidence that financial incentives to improve recruitment do make a difference [313]. Furthermore, the NHS National Institute for Health Research (NIHR) INVOLVE group recommends recognition of public involvement in this way [314].

Second, and similar to the Phase 1 stakeholder interviews, informed consent was an important consideration. Participation was entirely voluntary, and participants were given time to read over information leaflets and consent forms in advance of the interview. Patients were also asked if they were happy for the researcher (DB) to contact their practice (to recruit for practitioner interviews) and if they were happy for data held and maintained by GCWMS to be provided to the research team (i.e. information on co-morbidities and outcomes in the service). Ethics approval for the ATTAIN mixed method case study was obtained through the West of Scotland Research Ethics Committee 5 (Appendix 9).

Lastly, as in Phase 1, care was taken in relation to data handling, storage, and reporting of results, with particular attention paid to the use of non-attributable quotations to ensure confidentiality. Consent for anonymised data to be archived and used in future research was also given.

The final part of this section on the methodological and theoretical considerations related to the Phases 3 and 4 case study is about the use of the theoretical framework of candidacy, as shown in Figure 3-7.

3.6.4 The theoretical framework of candidacy

The term 'candidacy' was first used in health research by Davison et al (1991) in the context of heart disease to refer to coronary 'candidates'; those people that

are recognised (at a socio-cultural level) as being most 'at risk' of heart disease [315].

More recently, Dixon-Woods and colleagues (2005, 2006) described candidacy - in the context of access to health care - as the ways in which people's eligibility for medical attention and intervention is jointly negotiated between individuals and health services [19, 316]. This includes the role of health professionals in acknowledging, or not, someone's "right" to be supported and referred and how prior encounters with health services influence patients' future help-seeking behaviour and engagement with health services.

Figure 3-7 below depicts the different stages in the candidacy process, as described by Mackenzie et al, who applied candidacy to literature on public sector access [317].

In this project, candidacy was used at different stages to inform thinking around access to weight management services: in the Phase 2 realist review, candidacy was one of several 'middle-range' theories considered as a 'best fit' for theorising the process of identification and referral of adults with obesity; in the mixed methods case study (Phases 3 and 4) it was used to aid the development of the interview topic guide; and in Chapter 9, the findings from all four phases of research were synthesised with a view to assessing the utility of candidacy in understanding access to adult weight management services. A critique of candidacy is provided in Chapter 9 and an expanded model is proposed.
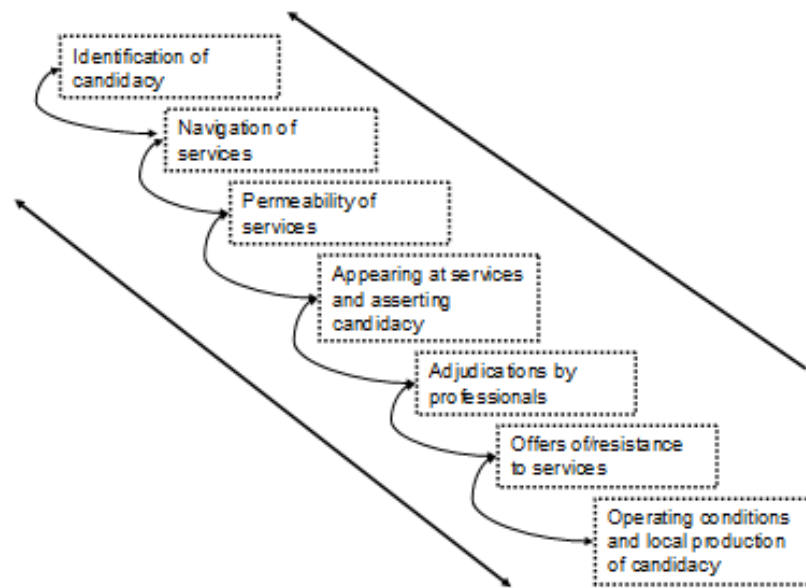
Figure 3-7: Negotiating the candidacy journey for health services - an extrapolation from Dixon-Woods et al. 2006
(Reproduced from Mackenzie et al. Is 'Candidacy' a Useful Concept for Understanding Journeys through Public Services? A Critical Interpretive Literature Synthesis. *Social Policy & Administration* **2013, 47(7):806-825. With permission from John Wiley & Sons Ltd.)**

The impact of co-morbidity on candidacy was also explored, as it has been shown in different populations that some co-morbidities, such as depression, can reduce a person's candidacy [318].

3.7 Reflexivity

Reflexivity is a key aspect of qualitative research [319-321]. The individual biography of the qualitative researcher (including characteristics such as gender, occupation and social background) is recognised to shape a research project, from its methodological and theoretical underpinnings to the final analysis [320, 322]. In this section I reflect on the influence of my own biography on the qualitative interviews that I conducted in Phases 1 and 4. In particular, I consider: 1) the effect of my dual role as both researcher and general practitioner; and 2) the impact of my background as a white, middle class, 'normal weight' male in my mid-30s.

Firstly, in regard to my role as both researcher and GP, I believe this was not as significant an issue as it would have been had I been interviewing any of the patients in my own practice [323]. The patients I interviewed were recruited from the GCWMS and I had not met any of them previously in a clinical capacity.

For the patient interviews, I introduced myself as a researcher from General Practice & Primary Care at the University of Glasgow and did not say that I was a GP unless I was asked, as I did not want to influence what they might say in relation to the treatment that they had received at their own practice. I was not asked for any clinical advice during any of the interviews, but if I had been, I would have directed the patients to their own GP.

In contrast, for the stakeholder interviews, the recruitment email that was sent out stated "I am an academic GP from the University of Glasgow", so the senior dietitians that I interviewed were aware that I was also a GP. It is difficult to say to what extent this influenced the interviews; they may have felt more able to talk openly and critically of GPs if they did not know that I was a GP, but equally they may have found that my 'insider' perspective allowed for a more honest discussion.

Similarly, the practitioners that I interviewed were also aware that I was a GP. On balance, I feel this was an advantage, particularly with regard to the recruitment process itself. Having interviewed 20 patients in the first stage of the Phase 4 qualitative interviews, the aim was to then recruit practitioners from the practices that those 20 patients were registered at. The first attempt at recruitment of practitioners was by invitation letter (Appendix 10), but ethical approval was given for this to be followed up by telephone contact if no response had been received within ten days. Only a small number of practitioners (usually practice nurses) responded to the invitation letter, so several practices received telephone contact. I believe (for it is impossible to verify) that my position as GP-researcher helped me to recruit practitioners for at least three reasons (which have parallels with the candidacy constructs shown in Figure 3-7). i) I was able to *navigate* the general practice system by knowing, for instance, when the best time of day to call was (usually at the end of the morning or afternoon surgeries); ii) I was able to *assert* my case for a call-back from a GP or practice nurse when speaking to receptionists (by introducing myself as a GP-researcher); and iii) I was possibly more likely to be *offered* an interview by a practitioner as I was able to make the case, as a fellow practitioner, of why this research might be of interest to them, and was able to empathise with how busy they were and offer flexibility in terms of interview time and location. In this way, 16 practitioners out of a target of 19 practices

(two patients were registered with the same GP) were successfully recruited; no mean feat considering the well-recognised challenges of engaging GPs in research [324].

As well as my professional role, further aspects of my background that have the potential to influence the interpersonal interaction that is a research interview are characteristics such as age, gender, ethnicity, SES, and, particularly important for this study, BMI status [319]. The latter characteristic – BMI status – was perhaps what I was most aware of during the Phase 4 patient interviews. Recognising that obesity stigmatisation and weight bias are widespread in society (and even among obesity researchers [170]), I did not want to come across in any way as judgmental when discussing the sensitive issue of weight and people's weight histories. Perhaps counterintuitively, a cross-sectional survey conducted in 2012 found that patients with obesity were less likely to report feeling judged by a 'normal BMI' practitioner compared to a practitioner with obesity [325]. I hope that with my clinical background as a GP, which involves considerable attention to communicating in a person-centred, non-judgmental way, I was able to put interview participants at ease and establish some degree of trust and rapport. Indeed, there was only one reference to my 'normal BMI' status during the interviews, when a patient said jokingly, "I'm of a generation that thinks people should be fattened up. I mean, you are not exactly in the overweight stage."

The issue of gender congruence (or incongruence) in interview dynamics has received substantial attention in the social science literature [326, 327]. It is likely that men and women may respond differently depending on the gender of the interviewer, which can be either helpful or unhelpful depending on the research topic and context; on the one hand, for instance, gender congruence may allow some forms of reciprocity but on the other hand it may encourage the enactment of idealised cultural notions of masculinity or femininity [319, 327, 328].

Other axes of variation such as age, ethnicity, SES, sexuality, and disability may also influence the interview interaction. Given my (relatively privileged) position as a white, middle class, 'normal weight' male in my mid-30s, with no obvious health problems, it is possible that some people may find it easier to relate to

me (and vice versa) than others; the majority of patient interviews were with women with co-morbid obesity on low incomes. These characteristics on their own are often associated with relative disadvantage – 'intersectionality' describes the complex inter-relationship of these different axes of variation, and the systems of oppression that perpetuate that disadvantage (e.g. sexism, classism, ableism) [329]. I will return to a discussion of intersectionality in Chapter 9, but introduce it here to demonstrate my awareness of these axes of variation throughout the research process. In an attempt to enhance reflexivity during this PhD, I kept a research diary [330, 331], which I used mostly for writing reflective notes immediately after qualitative interviews (often in the car park or on the train home).

Finally, I have spent considerable time reflecting on the tensions related to obesity that I have become familiar with throughout the course of my PhD fellowship; notably, as described in Chapter 2, the contrasting views of obesity as either a serious public health issue (or even a disease) on one side [138, 139], and an over-medicalised, stigmatised embodiment of diversity on the other side [140, 141].

To make clear my own assumptions, my personal position is somewhere between these two poles: I believe that obesity is complex and that adults with obesity are a heterogeneous group, with some people more likely to experience health problems as a result of their obesity than others, though most are likely to experience some degree of weight stigma and discrimination. Therefore, at the population level, I believe that obesity is a serious public health issue requiring cross-sectoral interventions, but at the individual level, I believe that the negative effects of weight stigma have not received enough critical attention.

3.8 Chapter summary

This chapter has addressed the main methodological and theoretical considerations encountered during this research. It has described the rationale behind the methods used in this thesis, along with potential strengths and weaknesses. Multiple methods have been used, including qualitative interviews with key stakeholders (Phase 1), a realist review (Phase 2), and a mixed methods case study of access to GCWMS, involving quantitative analysis of GP referrals

(Phase 3) and qualitative analysis of interviews with patients and primary care practitioners (Phase 4). This approach has allowed an in-depth exploration of the role of primary care in adult weight management and issues related to access of weight management services, culminating in the creation of an expanded conceptual model of candidacy. Results and discussion are given in Chapters 4 to 8.

4 Results 1: Qualitative interviews with senior dietitians

4.1 Overview

As noted in chapter 1, the role of primary care in adult weight management is a contested area, with different views held by different stakeholders. In this chapter, the views of those involved in the planning and delivery of weight management services across Scotland are explored. The research question being addressed in Phase 1 is:

RQ1 – What is the role of primary care in adult weight management, from the perspective of key stakeholders involved in the planning and delivery of adult weight management services?

4.2 Rationale

Previous research has explored the barriers to engagement with weight management from the perspective of primary care practitioners. This identified: lack of time in the consultation [332]; lack of knowledge and lack of confidence in discussing weight [333]; perceptions of poor outcomes of interventions [333]; fear of causing offence [334]; and a belief that individuals are responsible for obesity and it is not a medical problem [17]. There has, however, been a paucity of research exploring the views of those senior professionals – usually dietitians by background – involved in the strategic planning and delivery of adult weight management services [335].   In particular, understanding their views on the role of primary care and how they have engaged with primary care practitioners may help us improve communication and referrals between services, and ultimately improve adult weight management.

The recent BWeL (Brief intervention for Weight Loss) study showed that a brief intervention by GPs, offering referral to a local weight management service, was both acceptable and effective [241]. The authors argued that if NHS weight management services were resourced to the same extent as smoking cessation services, then this would increase the impact that primary care can have on population obesity levels [336]. The 'change fatigue' that referring practitioners

experience when services are constantly changing would be less of an issue [337], and access to weight management services would improve.

The NHS in Scotland is publicly funded (largely through taxation) and there are 14 regional NHS Health Boards that are responsible for the delivery of all frontline health care services, including adult weight management. In theory, NHS weight management services in Scotland are based around a comprehensive tiered approach, with Tier 1 representing community-based interventions such as walking groups or cooking classes, Tier 2 lifestyle interventions delivered in the community, Tier 3 specialist multi-disciplinary services (e.g. including physiotherapy and psychology) and Tier 4 bariatric surgery [338].

In practice, however, provision of weight management services is patchy and highly variable. A recent national survey of weight management provision in the 11 NHS health boards of mainland Scotland identified wide variation in the provision and access to services; only four health boards offered services for those with a BMI of 25-30 kg/m^2 and six health boards did not have both Tier 2 and Tier 3 services [339]. Some of the smaller health boards, such as the Orkney and Shetland Islands, do not have their own standalone WMS, instead referring patients to one of the larger, mainland health boards. There is also variation in referral pathways to Tier 2 and 3 services, with some accepting self-referrals and others requiring GP referral. Tier 2 and 3 services are held in different health board locations across Scotland, including hospitals and health centres. This suggests a fluidity to the range of services and models available nationally which then have to interact with primary care, and vice versa.

4.3 Aim of this chapter

The aim of this chapter is to present the results of Phase 1 stakeholder interviews. The aim of the interviews was to explore adult WMS stakeholders' views on the role of primary care in adult weight management and their experience of engaging with GPs and practice nurses.

4.4 Methods

A qualitative approach was used, with semi-structured interviews chosen as the best approach for exploring the views and experiences of a purposive sample of key stakeholders. Ethics approval was obtained through the University of Glasgow MVLS ethics committee [Project No: 200130121] in May 2014 (Appendix 9).

4.4.1 Recruitment

Recruitment was facilitated by a known contact at NHS Health Scotland, using email. NHS Health Scotland is a special health board in Scotland that leads on health improvement. This contact agreed to forward an invitation email from the lead researcher (DB) to senior staff involved in adult weight management in all 14 Health Boards in Scotland explaining the nature and purpose of the research. The stakeholders that responded were from 7 of the 8 largest Health Boards, representing approximately 80% of the Scottish population. Thus, sampling was partly pragmatic, in that these were the contacts that replied to the email invitation. However, these were also the Board areas with their own weight management services; as described in the introduction, the remaining Boards were either too small to have their own services or did not provide the full range of WMS.

4.4.2 Data collection

Seven interviews were conducted with nine stakeholders between May and September 2014. Four interviews were conducted face-to-face and three were conducted over the telephone. Two were conducted with two participants each in small group interviews. The face-to-face interviews were held at venues arranged by the interviewees themselves, usually at their place of work. DB conducted all interviews, but SM, an experienced qualitative researcher, was also present for the first three interviews, to ensure all topics were covered and to provide feedback to DB. SM and DB discussed initial reflections after each interview and this informed small changes to the interview topic guide (see Appendix 8). The topic guide included questions about the interviewee's views on the role of primary care in adult weight management and their experience of engagement with primary care. It was influenced by Pawson's idea of the

'realist interview' [264], as the interviews also informed the realist review process (Chapter 5). Interviews lasted between 49 and 82 minutes, average 63.

4.5 Data analysis

Interviews were recorded, with permission, and transcribed verbatim. The transcriptions were then thoroughly checked for inconsistencies against the recordings and anonymised. Each interviewee was given a unique code (e.g. F1 = the first female interviewee) to allow anonymization and the transcripts were checked again for any other identifying features, which were then altered. Analysis was done using NVIVO qualitative data analysis software.

The analysis process involved three steps, as described by Ziebland and McPherson [268]. The first step was coding. Initially, two transcripts were read closely and coded by the lead research (DB), and his primary (COD) and secondary (SM) supervisors. Coding clinics with DB, COD and SM were then held to review the codes for each of these transcripts and to agree on a coding framework. Subsequent transcripts were coded by DB according to this framework, with a further coding clinic to check the consistency of this coding.

The second step involved summarising the codes using the 'OSOP' ('one sheet of paper') method [268]. All the data contained within each main code was gathered in a report, reviewed and all the themes identified summarised on the eponymous sheet of paper (sometimes extending to two!). For instance, for the code of 'Role of primary care' there were a number of different themes and issues, including concerns about lack of time, about unrealistic expectations, and about changing responsibilities. Each of these was noted on the OSOP, with the respondent's region written next to them, so that the completed OSOP had a summary of all the issues raised within that code. This was conducted by DB, with additional verification and checking conducted by COD.

The third step aimed to answer the question, "what is going on in the data?" by drawing out 'higher level' explanations or links between the issues. This is a necessarily interpretive stage, drawing on the researcher's personal experience and knowledge of relevant literature. This overall approach to analysis fits with

the description of inductive thematic analysis by Braun and Clarke [267]. These steps were led by DB in discussion with SM and COD.

4.6 Results

4.6.1 Interviewee characteristics

The nine interviewees all held senior positions related to weight management within their respective health boards. Most were either service leads, or were involved in policy, strategy, and service development for Tier 2 and/or 3 services. Each interviewee has been given an identifying code (e.g. M1 is the first male interviewee) and Table 4-1 provides the anonymised Health Board Region where each interviewee is based, with a general description of the Region and an indication of whether Tier 2 and Tier 3 services are available and what the referral pathways into the service are (e.g. GP or self-referral).

Table 4-1: Stakeholder characteristics

Interviewee code	Health Board Region	Description of Health Board Region	Adult weight management tiers and referral pathways
M1* F1	A	Large†, Urban	2 – GP referral 3 – GP referral
F2	B	Medium, Mixed Rural/Urban	2 – Self-referral 3 – no service
F3	C	Medium, Mixed Rural/Urban	2 – Mostly self-referral 3 – GP referral
F4	D	Medium, mostly Rural	2 – Mostly self-referral 3 – Pilot service (both)
F5	E	Large, Urban	2 – GP or secondary care referral 3 – GP or secondary care referral
M2 F6	F	Large, Urban	2 – Self-referral 3 – GP referral
F7	G	Medium, mostly Rural	2 – Dietetics or self-referral 3 – GP or secondary care referral

* M=male; F=female

† Large is >600,000 population; Medium is 300-600,000 (mid-2014 estimates)

Thematic analysis identified four overarching themes, each with three sub-themes. The key themes and sub-themes are summarised in Table 4-2. The first theme is about stakeholders' explanatory models of obesity as interpreted from the interview data. These are likely to shape their views on the role of the health service, and primary care in particular, in adult weight management. The second theme is about issues related to the different weight management services they operate under, which have implications for interactions with primary care. The third theme relates to their views of the role of primary care in adult weight management. Finally, their experience of communication with primary care is the fourth theme. These four themes will be described in turn, along with their sub-themes, before a discussion setting these findings in the context of other literature.

Table 4-2: Results of thematic analysis

Main theme	Sub-theme
Explanatory models of obesity	*Obesogenic environments versus Individual responsibility* *Normalisation versus Stigmatisation* *Medicalisation versus Non-medicalisation*
Weight management service	*Mainstream versus Insecure funding* *Medical versus Social model* *Access versus Capacity*
Role of primary care	*Referral versus Signposting* *GP versus Practice nurse* *Practice versus Community level*
Communication with primary care	*Local versus Centralised models* *Weight loss versus Wellbeing messages* *Engagement versus Resistance*

4.6.2 Explanatory models of obesity

Stakeholders were asked, either directly or indirectly, about their views on the causes and consequences of obesity, and potential solutions. They expressed a range of views, encompassing both individual-level factors and systemic factors, often contradicting themselves on obesity causes and solutions. This identified three tensions: obesogenic environments versus individual responsibility; normalisation versus stigmatisation; and medicalisation versus non-medicalisation.

Obesogenic environments versus Individual responsibility

All of the stakeholders recognised the importance of wider socio-economic and cultural factors in the aetiology of obesity:

> It's obesogenic environments… it's a chronic condition. (F5)

> [We've] engineered physical activity out of our lives and energy density in. (M2)

At the same time, however, there was a tendency by some to place the response to obesity at the level of an individual's responsibility:

> And there's the whole thing of people will say to me, 'it's okay for you, you can eat what you like'. I say, 'well I can't eat what I like – if I ate what I like, I'd be 15 stone'. You know, it's, I don't have a secret here, I make a decision to look after myself, and I think that whole thing of people not investing in themselves is what we're seeing. (F6)

> People will make excuses. You know that, you know, so they'll initially say that they are interested and then they would make excuses maybe because the venue is not suitable or because the time is not suitable or because they are going on holiday. (F4)

This is in keeping with previous literature around health professionals' attitudes to behaviour change, where they recognise the so-called 'upstream' determinants of health and health behaviours, but tend to focus on 'downstream' solutions – a phenomenon that has been termed 'lifestyle drift', in relation to public health policy and interventions more generally [340].

Normalisation versus Stigmatisation

Another tension expressed by the stakeholders related to the extent to which overweight and obesity has become so prevalent as to be normalised and therefore not really viewed as a problem.

> People don't seem to recognise that they are overweight because so much of the, percentage of the population is overweight now that people more see it as being the norm so they are not really recognising that in actual fact they are overweight. (F4)

This normalisation was viewed as a negative thing, contributing to rising NHS expenditure, as the following exchange between two stakeholders in Health Board region A demonstrates:

> 60% is overweight, it's becoming normal to be overweight and I think if someone, if a man has got a BMI of 28 that's just, is that normal? It's not, but is that but I think that's going to be about social norms. About if you have got somebody else in your social group who if everybody has got a BMI or are overweight then that's actually acceptable, you know, within that social group…. It's almost as if, you know, that's not helping with addressing it. (M1)

> And it's not helping the fact that we have to adapt our NHS for the increasing number of overweight people like we have had to purchase special chairs and now ambulances and now theatre operating tables and now our ante-natal service for obesity, you know, it's just an increase in pressure that we've adapted to. (F1)

On the other hand, when overweight and obesity is not accepted as normal, but rather viewed as abnormal, even deviant, then this too is unhelpful, resulting in stigma, shame and mental health distress. A few of the stakeholders recognised the stigmatising way that people with obesity are portrayed, particularly in the media, and felt that this was a neglected area of many weight management services.

> And also I think a lot of them they just tend to focus on lifestyle and they don't, there is hardly any mention of the impact of, on health, of what it must be to live in a larger body and be discriminated against all the time. There seems to be no recognition of the impact that that has on people. And yet nearly every, that's weight, everything you see in the paper, it's every picture of somebody who is large is, you know, without the head on and they always make them look, you know, slovenly and not dressed properly. (F7)

However, other stakeholders used what might be considered stigmatising or victim blaming language.

> You get into a state, when you're overweight, of allowing this to become your life, and you can really justify it to yourself, about why this is happening. You feel a victim and there's nothing you can do about it. (F6)

For primary care practitioners, then, there is a balancing act in consultations with adults with obesity between making explicit the well-established risks of

excess weight and yet not adding to the sense of discrimination that many will feel. Some of the stakeholders recognised this tension for GPs and felt that they were in a difficult situation.

> I feel quite bad for GPs, because I think they're damned if they do; they're damned if they don't, right? So, if someone who's overweight goes in to see the GP with an issue and the GP raises the issue of their weight, they'll say, 'that's it, nobody's actually listening to me – every time I go in, it's always about my weight.' And then, if they don't raise the issue of weight, 'GPs are not bothering about weight management.' So, I do feel that they're in a very tricky situation. (F6)

Medicalisation versus Non-medicalisation

The final theme in this section is related to the previous two and concerns the extent to which the stakeholders viewed obesity as a medical problem, requiring medical solutions. Once again, there was a tension evident here between, on the one hand, the need to engage with medical practitioners because of the medical consequences of obesity and the placement of weight management services within the NHS and, on the other hand, the recognition that the health behaviours (i.e. poor diets and physical inactivity) driving obesity take place in people's homes and communities and are shaped by wider socio-cultural and material factors [341], and that solutions should be formulated at these levels too.

Different stakeholders held different views along this spectrum, which often reflected the approach taken by their WMS. For instance, this stakeholder from Health Board region F believed in a non-medical, community-based approach.

> We could not deliver that, in the NHS, in the models that we've got. I mean, you have to start delivering it in the community – I believe that this is the way it needs to be, and it becomes... it takes away the medical model from it, and people are just going along. (F6)

In contrast, the stakeholders quoted below were operating in a more medicalised service, where obesity was considered a chronic condition and patients were viewed as becoming dependent on the service.

> ...it's a long term condition and we really need to treat it as that instead of a quick fix and supporting self-management rather than 'come to the dietitian and she'll cure all your ills'. You know. (F1)

> I mean it's interesting we maybe had a six week programme, a three month programme and we've now, five years ago, but now we have a year programme and there's people they don't want to leave at the end of it. (M1)

This first section on stakeholders' explanatory models of obesity has highlighted some of the key tensions inherent in adult weight management. It is important to consider these explanatory models as it is likely that they will have shaped (or will begin to shape) the underpinning philosophies of the services that the different stakeholders are engaged with. These were, after all, key players in the strategic development of their services and there are clear differences between the services in their approaches, e.g. community-based, using local authority staff versus hospital-based, medical models, or a focus on compassion and reducing stigma, not worrying about weight per se. These differences will be considered in the following section.

4.6.3 Weight management service

The nine stakeholders interviewed were working in seven different Health Boards, with different approaches to adult weight management. All seven services were undergoing processes of change at the time of the interviews, ranging from piloting new approaches, developing new strategies, to more radical changes in direction (see Chapter 6 for discussion of the restructuring of the GCWMS that took place during the period of this study).

The one feature that was consistent across most of the services was the struggle they had to secure funding. The issue of funding is the first of three main themes in this section, each of which is expressed in terms of a tension that was evident in the data.

Mainstream versus Insecure funding

In every interview there was a story of a struggle to make the case for funding for adult weight management services and to justify the continuation, or mainstreaming, of that funding. The following quotes provide a sense of the financial challenges faced.

> We know for a fact that we will not have any physio input without funding, we won't have any psychological input without funding and even simple things like venues and resources we are fairly limited for that as well. (F2)

> You know we're about to launch [Tier 2 service] and the funding finishes next March and we are thinking, oh, but we run the risk of if we don't launch it and we don't get demand for it we'll never get the pressure to fund it long term. (F1)

> ...my effort to get an NHS board to invest in adult weight management was, em, unsuccessful let's say. (F3)

This struggle for funding of weight management was also reflected by a number of stakeholders in their descriptions of the shifting workloads among dietitians. Despite the rising prevalence of overweight and obesity, and the co-morbidities associated with it, the actual time spent on weight management by dietitians had decreased in recent years, not increased.

> ...it's the same issue that's happened with myself, in dietetics, where, now, only a fifth of our work is weight management, whereas maybe, over the years, it had been 60%, 50%. (F6)

A number of stakeholders gave their views on why it was so hard to secure funding, which can be summed up as a lack of a coherent – and powerful – voice lobbying for resources.

> I find it all quite frustrating to be honest because I think it's going back to, you know, what I was speaking about and the fact it needs a very sort of cohesive group with somebody who has clout at the top and is able to get the argument for more resources to be put into weight management. (F4)

It was suggested by a couple of stakeholders that this was because there was no medical specialty taking the lead on weight management, or no managed clinical network for obesity. Dietitians were doing most of the work on weight management but they do not have the same clinical, or more importantly, political 'clout' as doctors.

One of the main drivers for recent changes across all services was the National Planning Forum (NPF)'s new guidance on bariatric surgery, sent to all NHS Scotland Health Boards in July 2012 [338]. The guidance is described in more

detail in Chapter 6, but one of the main recommendations was for a change in eligibility criteria for bariatric surgery, focusing on individuals aged between 18-44 with a BMI of 35-40 kg/m^2 and recent (less than 5 years) onset of Type 2 diabetes (Priority group 1). Alongside the change in criteria, there was also a call for an increase in the number of bariatric operations performed (the NPF guidance identified a requirement for an increase in NHS Greater Glasgow and Clyde from 40 bariatric surgical interventions to 108 per annum), but without any additional national funding [338]. The NPF directive was considered by some of the stakeholders interviewed in the present study to be a 'top-down' driver of reform, and not necessarily the best use of limited resources.

> From an adult weight management point of view the only additional resource that has come through is from the introduction of the Counterweight which is, from memory, I think was only for a couple of years and any other developments have been on the back of short term funding... However what the organisation has undertaken to do is invest in bariatric surgery. (F3)

The stock-taking prompted by the NPF review was, however, welcomed by some, as it opened up an opportunity to discuss funding.

> ...it meant we could look at how we spend our money and it could, it meant we could engage with the planners and the senior management team within [Health Board G] to get their support to re-shape services. (F7)

> ...what the resource allowed us to do was to re-focus on what the ideal situation was at tier three and so that involved us investing in physiotherapy, investing in clinical psychology. (F3)

It could be argued that the drive to shift resources towards Tier 4 bariatric surgery (a highly technical medical intervention) and, as a result, away from Tiers 2 and 3, reflects the tension between the medical model of weight management and a more social model.

Medical versus Social model

A further tension that was evident in most of the interviews was between applying a medical or social model to the management of obesity. This is in keeping with the at times contradictory explanatory models of obesity causation highlighted earlier. On the one hand, stakeholders recognised that the scale of

overweight and obesity (affecting two-thirds of the adult population) is such that wider population measures need to be taken, but on the other hand the approaches used by the services were individually-focussed, treating obesity as a chronic disease. There was a tension here too between a desire to make the service available to as many people as possible and recognition that there was not enough capacity to support the potential numbers of eligible patients.

One Health Board in particular adopted a radically different model of weight management, following the principles of the *Health at every size (HAES)* movement [342], with a focus on wellbeing rather than weight loss *per se*.

> In [Health Board G] we take a particular approach to weight management which isn't about weight loss. In fact, we particularly, we try to get people to stop focussing on weight loss as a goal and look at health gain. So what is it about, the question we ask people, we say to people, 'what is it about weight loss that's important to you? And let's work on that.' So it might be that 'I want to play with my grandchildren', 'I want to feel better about myself', 'I want to get my diabetes under control', 'I want to develop a better relationship with food', you know. So that's what we focus on. (F7)

This represents a significant change of approach compared to all the other Health Boards in Scotland. In some ways, it is the closest to a social model of obesity, with a focus on supporting patients *in their context* and challenging potentially stigmatising societal attitudes to obesity. For instance, at the end of their programme they offer training for a 'buddy' (of the patient's choosing) to help the patient to sustain health behaviour changes. They found that this was far more likely to be a friend or family member than a health professional, as they had thought it might be.

There is much to commend about this approach, but it does present several challenges – both for funders and evaluators of the service and for engagement with primary care. Most weight management services are judged on their ability to support patients to lose weight, as it is weight loss, not changes in eating habits or improved self-esteem, that is associated with a range of health benefits and potential cost savings to the NHS of health conditions averted, postponed or ameliorated. That is not to say that other outcomes, such as improved mental wellbeing, are not important, but simply that if a WMS is not effective at 'weight management' then it is hard to justify its funding.

From the perspective of a GP referring into the service, the lack of focus on weight – indeed, the lack of weight as a criterion for referral – could represent a significant mixed message:

> Because of the approach we take [focus on health behaviours, not weight] we don't want GPs to tell people to lose weight all the time. (F7)

Despite these limitations, one strength of the HAES approach is its focus on challenging size discrimination. As the stakeholder from Health Board G put it:

> There's a societal pressure for thinness and... there is size discrimination, but that's not right and so these are ways in which you might be able to deal with that. (F7)

A more medical model is not only potentially stigmatising, but also has the potential to exclude, as it is based on tight – clinical – criteria. For instance, people with mental health problems or learning disabilities may be particularly poorly managed, or excluded altogether.

The new NPF guidance on bariatric surgery arguably reflects this move towards a medical model, particularly as the requirement for an increase in surgical activity without any additional funding results in other aspects of adult weight management receiving funding cuts. The new eligibility criteria are more restrictive also, effectively excluding anyone aged 45 and over, or anyone with a BMI > 50 (Priority group 1 is BMI 35-40 kg/m^2, priority group 2 is BMI 40-50 kg/m^2) [338]; a change which is likely to disappoint many patients and practitioners alike. Indeed, the expectation (on the part of patients and their GPs) of a referral resulting in consideration for bariatric surgery represented one of the biggest challenges faced by weight management services, according to most of the stakeholders.

> It's very difficult to say to somebody 'I think you should go to [lifestyle weight management programme], for example, when they are dead set on wanting surgery. (F2)

> We had a huge waiting list [for bariatric surgery] in [Health Board region G] and then the criteria changed and so all the people on the waiting list weren't going to meet this criteria... (F7)

> Bariatric surgery is not the answer. Patients think it is, but they have no concept of what this will do to your life – this is life-changing. (F6)

The above quotes reflect both the unease that stakeholders felt about bariatric surgery – the most extreme form of the medical model for weight management – but also the challenges of being the gatekeeper to this highly restricted and yet much sought after procedure. The additional workload created by this role is evident in the exchange below.

> I think this is the service that has caused us the greatest number of complaints I've ever had to deal with in the health service. (F1)

> 99% of them [complaints] have some link to bariatric surgery. (M1)

The third tension was between a desire to make the service available to as many people as possible (i.e. widening access) and recognition that there was not enough capacity to support the potential numbers of eligible patients.

Access versus Capacity

Most stakeholders expressed concerns about access, which were intertwined with concerns about the capacity of the service to cope, as noted above.

> When we set it up there was a lot of people around the table saying 'we don't want to promote this heavily because we think we are going to be inundated.' We've not been... (F2)

> We hadn't actually gone out to GPs and said, 'send us all your really overweight people', because we were worried that would be overwhelming. (F6)

Several approaches to the access versus capacity dilemma were described. Perhaps the most common approach, which all weight management services employed to varying degrees, was the use of group sessions rather than one-to-one sessions for most of their weight management classes.

> What has taken a lot of time to get engagement from our own, our own colleagues to do, is to apply a group approach because previous to that it was a one to one approach. They were able to show if nothing else from that is that on the basis of that one to one approach all they could address is 0.5% of need. A group approach we are now up to expecting to be able to address 2% of the need. (F3)

Another approach to improving access within the limitations of resource and capacity constraints was to work with local authorities or with businesses to make use of their resources.

> In [Health Board Region F] we decided what we were going to do was we were going to upscale leisure colleagues, to deliver on our behalf. (F6)

Further considerations related to improving access to weight management services can be thought of in terms of both structure (e.g. location and timing) and process (e.g. self-referral or GP referral). Taking structural considerations first, it was clear that considerable thought had gone into the location and timing of courses run by different weight management services, though often decisions came down to practical and financial factors.

> What we have tried to do is put, to set them [Tier 2 weight management classes] up in areas where we know people might not necessarily be able to travel long distances and transport costs might be an issue and rather than setting them up in the, sort of, the more central areas what we've found, because it's a pilot and because you know funding is very tight, we've found for example in [one area] that we've only been able to provide one venue and that's quite simply because the cost for that venue is okay because the staff who are providing it are there on site and they are not travelling out to somewhere so there's limitations within, with what we can actually do. (F2)
>
> You know there is a demand for evening classes which, you know, obviously has an effect as well because again we are working with one full time post for the city, one full time post for the [rural areas]. There's only a certain number of evening, early evening sessions that they can do and a lot of people are after the early evening sessions. (F4)

The process factors related to access were mostly about the difference between allowing patients to self-refer and having GPs as the gatekeeper to referral. The quote below reflects one stakeholder's experience of the transition from GP referral to self-referral for their Tier 2 WMS.

> When we started [Tier 2 programme] we were actually reliant on getting referrals in from the GPs and other health professionals in order to get the sessions up and running but all the time we were kind of thinking what we actually want is people to self-refer into the programme so in the initial year of [Tier 2 programme] running we

> had about 20% of the people who took part in the programme self-referred in whereas I have just done the figures for 2013/14 and that's 95% of the people who referred in, or who came into the programme, self-referred. (F4)

This tension between self-referral and GP referral is explored further in the next section.

4.6.4 Role of primary care

Stakeholders expressed tensions about the role of primary care in adult weight management in three areas: *what* primary care should be doing, *who* should be doing it, and *where* this activity should fit in with wider weight management policy. These are presented in turn.

What? – Referral versus Signposting

The first tension articulated by the stakeholders in relation to the role of primary care was about what the actual content of the role should be. There was general agreement that primary care, on the whole, was not well placed to be *delivering* weight management interventions wholesale (i.e. structured courses of dietary advice, physical activity, psychological support, monitoring, etc.), but that its focus should be on linking with specialist weight management services, as these quotes demonstrate.

> What you [GPs] have to do is get them here, get them here, and that's what your main role is. (F5)

> The feedback that I got was that the GPs would be happier and the practices would be happier if there was something to refer patients into rather than them being trained to deliver it themselves. (F4)

> What they [GPs] want is they want a simple pathway so they can sign people or refer people to it. (F7)

Of course, as noted previously, there are still some parts of the country where delivery of weight management does take place in primary care, where Counterweight (introduced in Chapter 2) was taken up and sustained. The stakeholders in this sample described some difficult experiences with Counterweight.

> …we had put a lot of effort and some resource into engaging with GP
> practices to take on Counterweight and, and you know get the
> dietitians involved, and to be honest it just, either people weren't
> interested or it was unsustainable, you know. (F7)

> …previously we have tried to implement weight management,
> evidence based programmes [Counterweight] through training practice
> nurses and GPs and it has fallen on very stony ground. (F1)

> I think probably we have a few practices that have stocks of the
> leaflets from that trial that we did and they will probably use them
> sort of an ad-hoc basis with patients but it [Counterweight] is not
> officially running or being offered in [Health Board D] no. (F4)

The real tension was between a focus on signposting of patients to services versus formal referral. On the face of it, this may seem like a small difference, as there is not a huge jump between signposting and referral – they both involve linking patients with another service. For the stakeholders, however, these two approaches reflected differing attitudes to responsibility and risk. For those that advocated signposting, responsibility rests very much with the patient. Once the patient has been told about a service and how to access it, it is up to them to actually pick up the phone and make contact. It is argued that this approach demonstrates more motivation, more active agency, than the more passive approach of *being referred*, something you have done to you.

> I do think it should be, the onus should be on the person to think
> 'right okay, that's for me and I'm going to phone up about it and book
> myself onto a place' rather than involving more paperwork, etc., etc.,
> of a sort of formal referral going in. (F4)

In contrast, those stakeholders who advocated the use of GP referral felt that this served an important 'gatekeeper' function, selecting those patients who may have most to gain from, or who may be most 'appropriate' for, a weight management intervention.

> The model of care that we are providing in Tier two is, the gateway is
> the GP, so the GP will have identified with the patient and assessed
> their willingness, readiness to change. (F1)

Furthermore, they highlighted the role of the GP in managing risk related to the referral, as this quote shows:

> So we got agreement from all the clinical leads that this question could be put on SCI gateway which runs through the benefits of this, undertaking physical activity, outweigh the risks involved and there's a big exclusion list and we got sign up that that is now on SCI gateway, so that gives us assurance 'well the GP has done that risk assessment'… so the GP is saying yes so that gives us, well we can move ahead with our physical activity so I think that's really important. (M1)

Thus, some stakeholders saw a clear role for GPs in risk assessment prior to referral. Others, though, felt that practice nurses were in a better position to engage with patients about weight management, as the next section demonstrates.

Who? - GP versus Practice nurse

The second tension was around primary care practitioner role remit and responsibility. There was a split in opinion here, with some of the stakeholders valuing the role of the GP, while others felt that practice nurses were much more supportive of, and better placed to engage with, weight management.

> I think practice nurses think they have got more of a role in weight management in the talking to people and supporting people with their weight. I think in a traditional model a lot of the time might be that people come to see the practice nurse to get weighed because they know they have got a good set of scales. (F7)

> I think it should be a routine part of care that there is a set of scales that you go on if you are coming to be treated for your blood pressure and you're overweight, or your diabetes and you are overweight. Or your asthma and you are overweight, you know, it's, practice nurses are in that routine and it's part of their care but I'm not sure if the GP would always do that. (F1)

As well as highlighting the tension around role responsibilities between GPs and practice nurses, it also highlighted another issue, that of raising the issue of weight in the first place. The view above sits very much within the "every health care encounter is a health improvement opportunity" school of thought, where discussion of health behaviours – even if unrelated to the patient's presenting problem – is to be encouraged, indeed normalised.

Where? - Practice versus Community level

This theme has some overlap with previous themes (the referral versus signposting in particular) and relates to the extent to which stakeholders believe that primary care could be a 'hub' of weight management activity (as in the counterweight model), or more of a peripheral player. It also relates to the extent to which general practices should be engaging with other community activities and services related to weight management, in the view of the stakeholders.

> …part of this coming through that not to medicalise their weight problem too that there are other things that the patient should perhaps be given, steered into and, you know, I suppose that's part of what our health and social care partnerships are about, trying to encourage more access to physical activity, healthier eating… and I think more and more general practitioners are trying to be, well part of the process and philosophy is to try and encourage those communities in the health centre so that there is more and more information available there that the patient can be, not directed, but you know, give them a steer towards and I think there is more of that going on now. (F1)

The above quote reflects this tension and suggests that practices should be looking beyond their responsibilities to individual patients and be thinking more about their place within communities.

4.6.5 Communication with primary care

This section is about the stakeholders' experiences of working with primary care and how they communicate with GPs and practice nurses. The coding under this section was again framed as a series of tensions. First, there was a tension related to the *approach* taken to communication with primary care, between locally adapted versus more centralised models. Second, related to the *message* being communicated to primary care practitioners, there was a tension between stressing the importance of weight loss versus more holistic healthy living messages. Finally, there was an evident tension around the GP *responses* to attempts by weight management services at engagement with primary care. The difference between engagement and resistance from GPs would often depend on attitudes to another tension: that between primary (medical) care and public health.

Local versus Centralised models

Stakeholders described a range of different methods of engagement with primary care, using different communication strategies. These could be broadly categorised as either local or centralised models of communication. The local models tended to use more personal approaches to communication, such as face-to-face meetings with general practitioners and practice nurses.

> We are starting to do like raising awareness sessions and just talking to some of the practice nurses in [Health Board region B], you know they are quite interested in getting involved. (F2)

In contrast, the more centralised models used more impersonal approaches such as various forms of electronic communication – email, website, intranet, or electronic newsletter. Of course, it is possible to use electronic communication in a personalised way – for instance, by providing practice-specific feedback by email – but this did not happen very often.

Most services used a mixed model, with both central (impersonal) and local (personal) approaches.

> Each time the service moved out to a different [area] every practice was emailed and lettered with the referrals, information over here, and we also invited them to come here, or asked them if they'd like someone to come to the practice, and we've been to many practices. (F5)

There was a sense that those services that had a previous history of working closely with practices benefitted from this improved relationship.

> What's interesting is that where there has been long term sort of work between the local authorities and the GPs and practice nurses in the area they are getting much better referrals coming through. So where there is already a partnership, a relationship built up, they are getting, you know, they are getting frequent referrals coming through. In the areas where that's not as well established then you can kind of see the difference. (F2)

Method of communication was a key consideration. The more personal forms of communication were preferred by some, as the following quotes demonstrate.

> It's very difficult sometimes to have a relationship with people if you have never actually met them, or the first time you are on the phone is to say 'no I'm sorry this patient doesn't meet our criteria for the weight management service'. (F1)

> I still I think a lot of it is down to the communication aspect again and so I think that doing more face to face communication with people and raising awareness, so whether it's, you know, attending whatever kind of meetings so that you can have more of a conversation about it would be helpful from that point of view because I think, I do think, you know, email, etc. has its place and it is very useful but I don't think anything, you know, kind of compares to face to face. (F4)

Weight loss versus Wellbeing messages

The second tension related to communication with primary care is about the *message* being delivered by primary care practitioners to their patients. In other words, it is about how practitioners are 'selling' the service to patients and what implications this has for patient expectations of the WMS. This was a tension felt most acutely by the service in Health Board Region G, which had adopted a *Health at every size* approach to weight management, rather than a focus only on weight loss.

> We are now in the position to go and have a few more discussions with GPs because really what we don't want is - because of the approach we take - we don't want GPs to tell people to lose weight all the time. (F7)

A key aspect of this tension is about shaping GP expectations of the service, by providing them with information about what is considered a good result. For the majority of services where weight loss was the ultimate goal (rather than wellbeing more generally), it was important to make referring practitioners aware of what a realistic weight loss outcome from the service would look like.

> ...in all our discharges we put on, 'five kilogram weight [loss]', and we reference SIGN, and 'this is considered successful and a clinical improvement.' And, we put it in every bit of our literature that we can, because that is an education to our referrers. (F5)

> What I've done is two years ago I put out a newsletter, just a one side of an A4 sheet, around GP practices to the GPs, the practice nurses, practice managers, to community pharmacists to the other AHP professions just to let them know briefly, briefly about [Tier 2 service], what it was and to give just a brief outline of the outcomes

that we were getting so the fact that sort of 80% of people will attend five or more sessions that the main weight loss is 3kgs and to give some actual quotes from people who have attended the sessions. (F4)

Engagement versus Resistance

This theme relates to stakeholders' experiences of responses to their attempts at primary care engagement. When asked about previous contact with primary care, the following exchange between two stakeholders in Health Board Region A gives a sense of the challenge:

> I think it's so variable. You know I think some of our lead GPs have been fantastic at opening the gates for us. (F1)

> But then you get other GPs who say 'well I'm not doing weight management until you give me money', so it's 'give me money'. (M1)

Other stakeholders also described the highly variable nature of GP engagement with weight management.

> There's a lot of resistance to the service, and I do think there are areas where many GPs feel it's a very successful service, and there's others that really don't, and some, when they do come to our, anything that we offer, I think they change completely in their views of what is a success, for example. (F5)

Responses to more proactive methods of GP engagement by different weight management services have also been mixed. One respondent described the challenge of getting a GP representative on a weight management group. Others described poor turnout by GPs at awareness-raising or training events that had been organised.

The main explanation offered by stakeholders for the resistance to primary care engagement with weight management is that GPs do not see it as part of their role. It is not their responsibility.

> Many many people in primary care... didn't see weight management as their business. (F5)

Another proposed explanation for the lack of engagement can be described as 'change fatigue' – the idea that frequent changes to weight management

services, in part due to short-term funding, means it is hard for GPs and PNs to keep up with what services are currently available, resulting in a general sense of apathy towards these services.

4.7 Discussion

4.7.1 Summary of main findings

This chapter presents the results of seven semi-structured qualitative interviews with nine key stakeholders who held senior positions related to weight management in seven of the eight largest Health Boards in Scotland.

The results highlight a number of challenges that health authorities face when planning and managing adult weight management services, and when considering the interface between primary care (the main source of referrals to most weight management services in Scotland) and the WMS. Perhaps the most pressing challenge for the weight management services is insecurity of funding, due in part to a lack of a powerful lobbying voice for more resources. These funding issues can, in turn, result in changes to available services, making it difficult for primary care practitioners to keep abreast of what is available and fostering a degree of apathy towards these services – what has been described as 'change fatigue' [337].

Other challenges relate to tensions within general practice – notably around the extent to which obesity is considered a medical versus a social problem, but also related to role responsibilities of GPs versus practice nurses. These tensions are compounded by sub-optimal communication between adult weight management services and primary care. There were mixed messages at times (e.g. weight loss versus wellbeing) and inconsistent attempts at building relationships between the services. This may reflect the recognised challenges of dealing with a condition such as obesity, combining an individual, often medicalised approach within primary care consultations with the wider considerations of providing a more holistic, community-based service [343, 344].

4.7.2 Comparison with other literature

There have only been a small number of previous studies that have explored the views of those involved in planning and providing weight management services about the interface with primary care. Indeed, most of the research on barriers to engagement with weight management has only involved GPs and practice nurses [17, 332-334, 345].

Researchers from the Counterweight Programme conducted a focus group study with seven weight management advisers, presented alongside qualitative interviews with patients and practitioners [186]. In keeping with the findings from these Phase 1 interviews, they reported that engagement with primary care staff was influenced not just by practitioners' beliefs and attitudes and practice-level factors, but also by the way in which the service was initiated and implemented [186].

Another UK-based study compared beliefs among overweight adults, health professionals and policy makers about the causes of obesity and interventions to reduce it [223]. The health professionals group included five dietitians and the policy makers included nine individuals from a range of UK government and non-government organisations concerned with weight management (e.g. public health staff and primary care leaders). Considering different ways of 'framing' obesity (i.e. a cultural set of meanings which give a cause, effect and response to a problem [346, 347]), the study found that health professionals held a view of obesity which straddled both biomedical and socio-ecological understandings whereas policymakers were more likely to focus on the socio-ecological [223]. These explanatory models have been framed in the present study as medicalisation (biomedical) versus non-medicalisation and obesogenic environments (socio-ecological) versus individual responsibility.

With regard to the health service response, the view from health professionals in the study by Greener et al was summarised as:

> A lack of health service capacity was considered a major obstacle in assisting people to manage their weight. In addition, a lack of appropriate training and trained staff in primary care, poor

> communication and coordination of health services were mentioned
> repeatedly by respondents

Similarly, the policy makers interviewed also identified room for improvement in the health service response to obesity, though a lack of clear evidence supporting interventions was noted [223].

Although not specifically related to primary care, qualitative research from the US found differences in the explanatory models of childhood obesity among policymakers at varying levels of government, with a range of views on the causes of, responsibilities for, and solutions to, childhood obesity [348]. In keeping with the findings from the present study, lack of funding for obesity-related initiatives was a common theme.

A potential explanation for differences in views regarding obesity was explored in another US study, which looked at attitudes towards childhood obesity policy among state policy makers who serve on public health committees [349]. In general, policy makers from states where a high number of childhood obesity policies had been enacted perceived obesity as an issue of moderate to high importance to the public, whereas legislators in low-legislation states were uncertain of the importance of the issue to their constituents [349].

4.7.3 Strengths and limitations

The main strength of Phase 1 is that it is the first qualitative interview study exploring the views of key stakeholders involved in the planning and delivery of adult weight management services about the role of primary care in adult weight management. The findings help us understand the marked variation in engagement with adult weight management in primary care. In particular, communication with primary care was seen as very important, with those services that had a previous history of working closely with practices benefitting from this improved relationship.

The main limitation of this qualitative study is its small sample, which was recruited pragmatically, so findings may be biased by self-selection. The recruitment strategy was to ask for service leads involved in the strategic delivery of adult weight management services to volunteer to be interviewed; 7

of the 8 largest health boards in Scotland took part and, in all cases, the service lead was a dietitian. While it is possible that other health professionals may be involved at a similar level of service delivery and, arguably, would have brought a different perspective to the study, it does seem to indicate a clear role for dietitians in the strategic delivery of such services. Furthermore, participant validation was not obtained following analysis due to limited time and resources; this would have strengthened the reliability and validity of the findings [350].

A further limitation is that, although the recognition and management of adults with co-morbid obesity is of principle interest in this thesis, the stakeholder interviewees tended to talk about obesity in general. However, there is unlikely to be any significant divergence in the views obtained if the focus had been on co-morbid obesity.

Finally, it is important to note that GPs are not involved in commissioning adult weight management services in Scotland (there is no so-called 'purchaser-provider split' [351]), so relationships between frontline clinicians and weight management service providers may be different in other parts of the UK and elsewhere.

4.8 Chapter summary

This chapter presented the results of Phase 1 stakeholder interviews, exploring their views on the role of primary care in adult weight management and their experience of engaging with GPs and practice nurses.

A series of tensions were described in relation to explanatory models of obesity, issues within WMS themselves, the role of primary care, and communication with primary care specifically. Two findings from this chapter are particularly pertinent to the next chapter: first, that weight management services need to secure mainstream funding in order to develop long-term, sustainable strategies of engagement and service delivery; and second, that good communication with primary care is key, as those WMS that had a previous history of working closely with practices benefitted from this improved relationship. The findings from this chapter suggest that too much time is spent fire-fighting the implications of short-term funding rather than building relationships with practitioners who can

help engage with and refer those who would most benefit from the services on offer.

The next chapter presents findings from a realist review of interventions targeting primary care to improve the identification and referral of adults with co-morbid obesity.

5 Results 2: Realist review

5.1 Overview

This chapter presents the findings from Phase 2 of this project; a realist review of interventions to improve the identification and referral of adults with co-morbid obesity in primary care. The rationale for the focus of this review, and the choice of realist methodology, has been explained in the Methodology chapter. The research questions addressed in Phase 2 are:

RQ2a – What is the 'programme theory' of interventions targeted at primary care practitioners to improve the identification and referral of adults with co-morbid obesity?

RQ2b – What are the mechanisms at play in different components of these interventions and what are the contextual factors that enable these mechanisms to produce successful outcomes?

The overarching aim of a realist review or synthesis is to answer the question "What works, for whom, in what circumstances, how and why?" [250, 352]. The extent to which it is possible to answer this question depends on a number of factors, including the quality and breadth of the available evidence, how the review has been framed and focussed, the disciplinary expertise of the review team, as well as more practical considerations such as the time available to complete the review.

As noted in the Methodology chapter, a realist review starts with an initial (or rough) 'programme theory' then collects evidence to test that theory, often drawing on substantive pre-existing theory, to produce a refined programme theory. The heuristic device used in realist reviews is the 'Context-Mechanism-Outcome (CMO) configuration'. There are a number of suggested steps involved in this process, which has an inherently iterative nature. These steps will be described in detail in the Methods section of this chapter, before presenting the review findings.

The Results section of this chapter will begin with a description of the 30 included intervention studies. The studies will then be broken down into their component parts – that is, the intervention 'strategies' they used. A more detailed analysis and synthesis of CMO configurations, based around different intervention strategies will then be presented.

5.2 Aim of this chapter

The aim of this chapter is to present the results of the realist review. The intention is to draw out key theoretical understandings about the realist question 'what works, for whom, in what circumstances, how and why' with regard to interventions targeted at primary care practitioners to improve the identification and referral of adults with co-morbid obesity.

5.3 Methods

This section outlines the approach taken to this realist review. An adaptation of Pawson's stages of a realist review is shown in Figure 5-1, below.
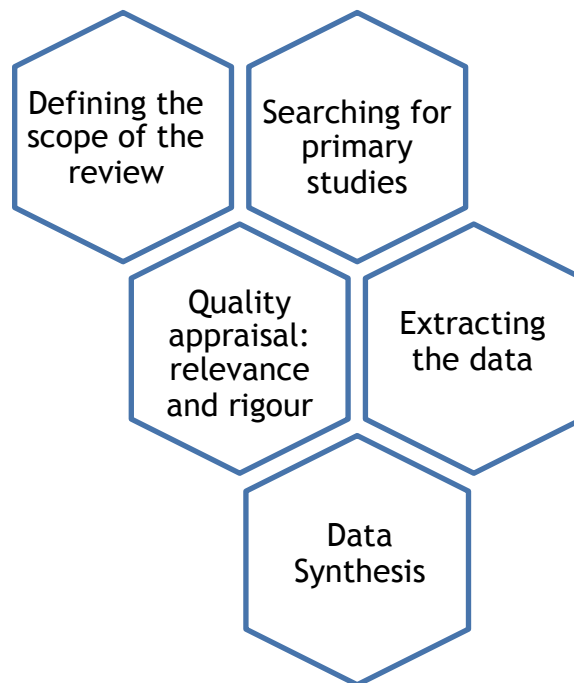
Figure 5-1: Stages of a Realist Review, adapted from Pawson [246]

The five stages are presented in a non-linear fashion as parts of the process may be iterative. The protocol for this realist synthesis was registered with the International Prospective Register of Systematic Reviews (PROSPERO) database [Ref: CRD42014009391] and published in Systematic Reviews [283] (Appendix 1).

The five main stages of the review – defining the scope of the review; searching for primary studies; quality appraisal; data extraction and synthesis – will now be described in turn.

5.3.1 Defining the scope of the review

An important reference point for this review was a Cochrane systematic review from 2010, which looked at interventions targeted at primary care practitioners to improve weight management [238]. This yielded a small number of included studies and little evidence of effective interventions.

However, in recognition of the time that had passed since this review was carried out, it was considered worthwhile to both update this review and apply a realist approach to the resulting literature. The rationale for using a realist approach is provided more fully in Chapter 3, but an important aspect was the wider scope of realist reviews (accepting evidence from a range of study types, both quantitative and qualitative), regarded as particularly suited to synthesis of a mixed body of evidence [22].

The focus of this review was on interventions that improved the *identification* and *referral* of adults with obesity in primary care, rather than on primary care-based weight management programmes *per se*. This was because of the increasing evidence that primary care practitioners – GPs and practice nurses – do not have the time, training, or desire to implement weight management programmes themselves [17, 332, 333]. Similarly, the expectation from policy makers and health planners is that the main role of primary care in weight management should be around identification and signposting or referral to other services [7, 353].

The influence of weight-related co-morbidities on the discussion of weight in primary care was of particular interest in this review from the outset. As noted

in Chapter 2, not all adults with obesity will have adverse health outcomes related to their increased BMI and many practitioners are wary of medicalising people who are overweight but otherwise healthy. Therefore, it is reasonable to assume that GPs and practice nurses may find it easier to discuss weight (and weight management) with adults who have established weight-related co-morbidities, such as diabetes, hypertension, or osteoarthritis. Indeed, one might argue that primary care practitioners have a duty of care to discuss weight management with such individuals.

5.3.1.1 Identifying candidate programme (and formal) theories

Unlike other realist reviews, which begin with an outline of an initial 'rough' programme theory, a decision was made to start by searching the literature for intervention studies in the first instance, and then to think about putative programme theories. The rationale for this was in part related to the paucity of studies in the original Cochrane review, and concern therefore that there may still be a very limited pool of studies relevant for this review, and in part related to the predicted heterogeneity of included studies, and a recognition therefore that there may be several programme theories at play.

However, a number of formal or substantive theories pertinent to this area of enquiry were identified - from psychology, sociology, and implementation science - through a two-stage process: (i) background reading and expert opinion and (ii) stakeholder interviews.

Background reading was ongoing for some time prior to the drafting of the proposal for the funding of this project. Expert opinion was sought in the form of project supervisors, an advisory panel of academics, and presentation of research plans at interdisciplinary meetings and national conferences.

Stakeholder interviews, described in Chapter 4, were conducted with health care professionals across Scotland responsible for planning and delivering weight management services that receive referrals from primary care. We sought the views of these professionals on how they engaged with primary care practitioners, what they thought the barriers to identification and referral are and what they considered to be the most effective methods for increasing

appropriate referrals. While few interviewees mentioned specific theories, several did draw attention to factors that influenced the referral process at different levels (for example interpersonal versus institutional) and some were mindful of individually-focused behaviour change theories.

This process identified three overlapping levels, within which potentially relevant theoretical models are situated:

1) Individual-level theories of practitioner behaviour change (for example Theoretical Domains Framework [354, 355], Behaviour Change Wheel [356]).

2) Interpersonal-level theories of doctor-patient interaction (for example candidacy theory [19], theories of stigma [357], and shame [358]).

3) Institutional or system-level theories of implementation (for example diffusion of innovations [359], Normalisation Process Theory [360], PARiHS (Promoting Action on Research Implementation in Health Services) framework [361]).

This is a somewhat artificial categorisation of theories, as almost all of them operate to a greater or lesser extent across all three levels. For instance, candidacy theory, which was ultimately used as the 'best fit' theory for understanding the process of identification and referral in this context, is particularly strong at the interpersonal level but has some explanatory utility at the individual and institutional levels also.

5.3.2 Searching for primary studies

The search strategy was based on the Cochrane review search terms [238], but with two key amendments. First, search terms for study type (e.g. RCT) were removed to ensure that a wider range of interventions and approaches were included. Second, the timeframe used and the databases searched were changed to widen the scale of the search. The process of developing the search strategy for this review was done in collaboration with the subject librarian of the University of Glasgow.

The full search strategy can be found in Appendix 11 but a summary of the search strategy is in Table 5-1 below.

Table 5-1: Summary of search strategy

Search terms used	Based around three concepts: obesity/weight loss; primary care; and practitioner behaviour change (range of terms including training, protocol, referral, feedback, computer, etc.)
Databases searched	Medline, CINAHL, EMBASE, PsychINFO, Web of Science, Science Direct
Timeframe	Year 2004 to May 2014 (then updated April 2017)
Inclusion criteria	Studies targeting primary care practitioners to improve the management of Adults with obesity
Exclusions	Children Non-English language No exclusions were set based on study type

5.3.3 Screening process

The process adopted for selecting included articles was made as reproducible as possible by setting clear criteria for inclusion or exclusion at title, abstract and full paper screening levels. The process was made easier by the use of web-based systematic review software DistillerSR (Evidence Partners, Ottawa, Canada)

Two reviewers were involved at each stage, with conflicts discussed by a third. DB reviewed all articles at each stage. The role of 'second reviewer' was divided between SM and COD, with each doing half of the articles.

The search of all six databases was conducted in May 2014 and updated in April 2017. In total, there were 4483 articles retrieved. Removal of duplicates left 4232 articles for title screening. The PRISMA flow chart of included papers is shown in Figure 5-2 below.
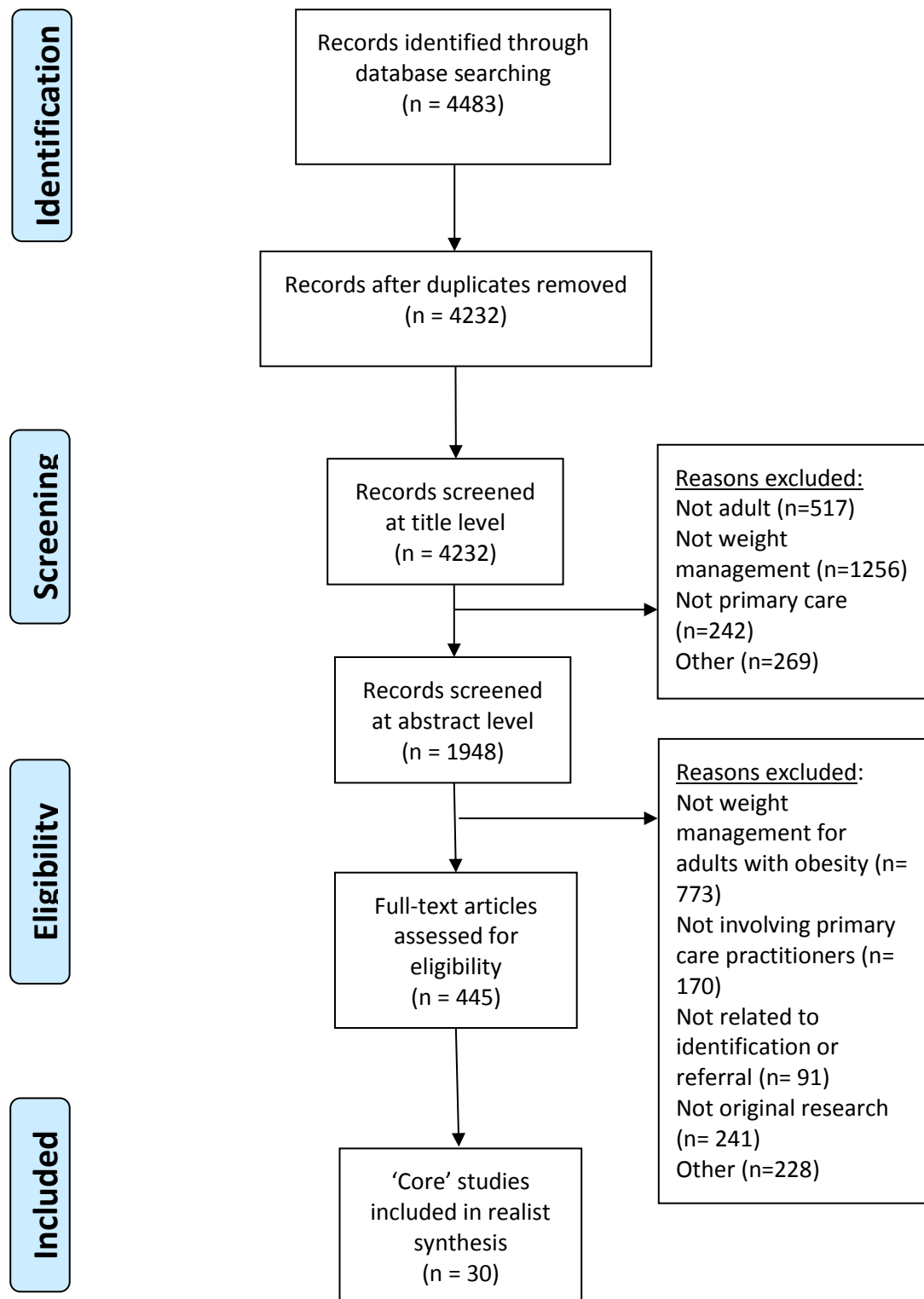
Figure 5-2: PRISMA flow chart of included papers

Title screening

The question used for title screening was: "Could this be about adult weight management in primary care?"

2284 articles were excluded at this level. The reasons for exclusion are given in Figure 5-2 for 2015 of the excluded articles. For the remaining 269 articles, there was disagreement on the reason for exclusion, but reviewers agreed the article should be excluded, so consensus was not sought on specifying the reason.

Abstract screening

The question asked at the abstract screening level was "Could this article provide useful information about the identification and referral of adults with obesity in primary care?"

There were 1503 articles excluded at abstract level. Again, reasons for exclusion are given for most of the excluded studies (n=1275), with a further 228 being excluded for several reasons. This left 445 articles for full paper screening.

Full paper screening

The question asked at the full paper screening level was "Is this paper for inclusion?" and the potential responses were: Yes, include / No, exclude / Yes, may be useful

The 445 articles were sorted as follows: 233 excluded quickly (most commonly due to no or insufficient mention of identification and referral), 70 included for further consideration, and 142 considered potentially useful in developing the later programme theory. This third category included studies such as cross-sectional surveys of practitioner weight bias, or qualitative studies of patient and practitioner views on obesity.

From the 70 included for further consideration, there were 21 'core' papers that reported intervention studies, where at least part of the intervention was

targeted at primary care practitioners. The search update in April 2017 produced a further 9 'core' papers, resulting in a total of 30 included studies.

5.3.4 Quality appraisal

As noted in Chapter 3, the process of quality appraisal in a realist review is different to that from a traditional systematic review, with studies assessed principally on their relevance (to theory building and/or testing) and rigour (in terms of both reliability of methods and richness of description). However, a formal quality assessment was also carried out.

A number of quality appraisal tools were considered before ultimately choosing the Downs and Black checklist, a validated tool which assesses methodological quality of randomised and non-randomised intervention studies [362]. In keeping with another recent review [363], we found that this checklist included items of questionable importance in the context of implementation studies, so it was adapted by excluding certain questions (e.g. about blinding). Studies were graded as 'good', 'fair' or 'poor', in terms of methodological rigour, based on their score. A score of >14 out of 23 was considered good, 10 to 14 was fair, and <10 was poor.

5.3.5 Data extraction and data synthesis

As described in Chapter 3, realist analysis sees reality as comprising multiple levels (e.g. micro, meso and macro), each interacting with the others. These levels are important 'contexts' in the 'Context-Mechanism-Outcome' (CMO) configuration, the heuristic device at the heart of realist analysis.

A pre-piloted data extraction form (Appendix 12) was used to extract data on study characteristics (e.g. design, recruitment) and participant characteristics (i.e. patients and practitioners) as well as detailed information on the intervention, outcomes, context and any suggestion of mechanisms. This information was generally found in the methods, results and discussion sections of included papers.

In the first stage of analysis, each included study was broken down into its component parts, based on intervention strategies used (e.g. tools, training,

audit/feedback, or networks). Outcomes were charted for each study, based on the final desired outcomes, such as identification of obesity, recording of BMI, and referral to a weight management service, as well as more proximal outcomes. Examples include markers of practitioner behaviour change (e.g. self-efficacy) or system-level outcomes (e.g. improved communication between weight management service and practitioners) that make the final desired outcomes more probable. Important contextual factors at micro, meso and macro levels were also recorded.

The second stage of analysis involved identifying CMO configurations within each study, describing how contextual factors interact with mechanisms to produce different outcomes. It was possible to identify some 'linked CMOs', where interventions had implementation chains, with each link in the chain having its own CMO configuration; for example, if identification of obesity was made possible because of prior recording.

The third stage involved exploring patterns within these CMO configurations. Potential mechanisms were compared across different studies and intervention strategies to assess if they were consistent in producing similar outcomes. For instance, would an electronic pop-up reminding a practitioner to record BMI work through a similar mechanism as having a BMI chart on the consulting room wall?

The final stage of analysis involved configuring these demi-regularities into a coherent and plausible 'refined' programme theory, drawing on the formal theories previously identified. As familiarity with the data increased, a shortlist of the most apposite theories from the initial scoping search was determined and the empirical data was used to test and refine the 'best fit' theory, candidacy theory. An expanded model of candidacy theory encompassing individual, interpersonal, and institutional/systems-level components was produced and is presented in Chapter 9. Each stage of analysis was led by DB with discussion and agreement with SM and COD at regular meetings throughout the process.

5.4 Results

5.4.1 Summary of included studies

Table 5-2 gives a summary of the included studies (n=30).

Table 5-2: Summary of included studies

COUNTRY OF ORIGIN	YEAR OF PUBLICATION	STUDY DESIGN	QUALITY APPRAISAL
Australia (n=1) Israel (n=1) UK (n=5) USA (n=23)	2004 (n=2) 2005 (n=1) 2006 (n=1) 2007 (n=1) 2008 (n=6) 2009 (n=1) 2010 (n=3) 2011 (n=1) 2013 (n=6) 2014 (n=1) 2015 (n=4) 2016 (n=2) 2017 (n=1)	RCT (n=5) Non-randomised controlled trial (n=5) Pre-post test design (n=11) Mixed methods (n=2) Quality improvement study (n=6) Process evaluation, (n=1)	Good (n=10) Fair (n=9) Poor (n=11)

Most of the studies were from the USA (n=23) and the UK (n=5), with one each from Australia and Israel. There was a spread of publication dates across the thirteen year time frame.

Study designs varied, with pre-post (also known as before-and-after) studies being most common (n=11), followed by quality improvement studies (n=6). There were 5 RCTs and 5 non-randomised controlled trials. Ten studies were rated as 'good', nine as 'fair' and eleven as 'poor'.

A more detailed summary of the individual studies is in Appendix 13, where studies are described by Author, Location, Study design, Aim of the study, Participants and Main Outcome.

Although the focus of this review was on interventions targeted at primary care practitioners, very few of the 30 included studies provided detailed information on practitioner characteristics, such as age [364] and gender [365]. Most of the

practitioners involved were primary care/family medicine doctors, although six studies also included nurses or other allied health professionals [365-370].

As shown in Appendix 13, seven of the studies did not report any patient characteristics [210, 367, 371-375]. A further four studies did report on age and gender, but did not provide any information on socio-economic status (SES) or ethnicity [16, 376-378]. The remaining studies were more likely to include ethnicity data than data on SES and those that had both often used a proxy of individual SES such as education or insurance status, rather than a more multi-dimensional marker of SES (including both individual and area-based measures) such as the Index of Multiple Deprivation (IMD) [379].

Similarly, only 12 of the 30 studies (40%) contained any information about patient co-morbidities [16, 364, 367, 368, 370, 376-378, 380-383]. Diabetes was recorded in all twelve of these, with hypertension in ten, CHD in nine, arthritis in six, and depression in five.

The number of participants in each study also varied considerably. The total number of patients in all studies combined was 124,872, though more than half of this total (n=85,472) came from just two studies [366, 370]. The smallest study included just 87 patients [384]. There were more females than males in every study that reported this data. The mean BMI was >30 in 15 of the 17 studies that reported this.

There were a range of outcomes measured in the 30 studies, although most included at least one of the key outcomes of interest to this review, namely:

- discussion of weight (including lifestyle advice) [16, 210, 365, 366, 370-372, 374-376, 383, 385-390];

- measuring and recording of weight and/or BMI [364-367, 370, 374, 377, 378, 380, 383, 389, 391]; and

- referral to weight management services (WMS) [241, 364, 366-370, 374, 375, 377, 380, 381, 384, 387, 390].

Although weight loss was not a key outcome of interest in this review, changes in weight were reported in 11 of the included studies [16, 241, 368, 370, 378, 381-384, 386, 390], and weight outcomes were made available on contacting the lead author of one further included study [366].

5.4.2 Intervention types

There are different ways to categorise interventions that attempt to change practitioner behaviour. For instance, the Cochrane Effective Practice and Organisation of Care (EPOC) Group [392] divide interventions into those that are educational, behavioural, financial, regulatory or organisational. The intervention strategies adopted in the included studies in this review did not, however, fit neatly into the EPOC categorisation for two reasons. First, most of the studies used multiple interventions strategies (e.g. a combination of educational, behavioural and organisational approaches). Second, the EPOC categorisations are too broad in this case and do not adequately reflect the different strategies, which could be more accurately categorised as follows:

1. Training

2. Tools/resources to improve identification of obesity

3. Tools/resources to improve ease of referral

4. Audit/feedback

5. Working in networks/Quality circles

6. Other strategy

Table 5-3 provides an overview of the 30 included studies based on the above categorisation. Most of the studies were complex interventions, involving two or more intervention strategies and operating at different levels (micro, meso and macro).

For the purposes of this review, these broad intervention strategies were further unpacked to uncover their component parts, as this allowed us to explore how each component part may (or may not) lead to the outcomes in question.

Table 5-3: Summary of included studies by Intervention strategy

Intervention strategy	Studies where this was main focus	Main outcomes measured	Other studies that included this strategy
Training	[373, 384, 388]	GP self-efficacy **Patient report of Physician use of 5As (Assess, Advise, Agree, Assist, Arrange)** Change in weight/BMI	[16, 241, 365, 367, 371, 372, 375, 382, 383]
Tools/resources to improve identification of obesity	[210, 364, 377, 378, 380, 385, 386, 389, 391]	**Recording of BMI Diagnosis of Obesity Referral to WMS and uptake** Change in weight/BMI	[16, 241, 365-367, 370, 372, 381]
Tools/resources to improve ease of referral	[368, 369, 376, 390]	**Referral to WMS** Uptake of WMS Change in weight/BMI	[241, 366, 370, 381, 387]
Audit/feedback	[371]	**Recording of BMI, Obesity diagnosis** and weight management plan	[16, 367, 370, 372, 375, 381-383]
Working in networks/Quality circles	[374]	**Recording of BMI Diagnosis of Obesity Referral to WMS**	[371, 375]

Key outcomes of interest in bold

1) Training

Lack of training is often cited as one of the main barriers to primary care practitioners engaging with weight management [393]. Training practitioners to give brief advice has been shown to improve smoking cessation outcomes [394], so there is a good rationale for including training as part of a weight management intervention. Table 5-4 shows those studies that used a training component, giving more detail on the participants, the training content, delivery and duration, use of theory and main outcomes reported.

There was considerable heterogeneity within these studies, in terms of participants, training content, delivery and duration, use of theory and outcomes measured. In terms of participants, most studies with training components involved primary care physicians [371, 373, 375, 381, 383, 384, 388], but one involved nurses [16].

In terms of training content, most of the interventions aimed to increase participants' knowledge, skills, and attitudes related to obesity, usually involving identification/screening and brief intervention, which would include signposting or referral to other services. Two of the studies used the 5As framework of assess, advise, agree, assist, and arrange, while others incorporated guidelines for primary care practitioners into their training content.

The delivery and duration of training varied markedly. Most studies involved group training sessions rather than individual training, but this ranged from a few hours' worth of training contact, to several days, spread out over a period of months.

Almost all of the studies described theoretical underpinning of their training, whether related to the content (e.g. 5As framework or motivational interviewing) or the approach (adult learning theory, organisational learning).

In terms of outcomes, most of the studies that involved a training component included at least one of the key outcomes of interest for this review. It is difficult, however, to make strong assertions about the extent to which the outcomes presented in Table 5-4 are related to the training component per se, as most of the studies also involved additional intervention strategies. The three studies that only involved training [373, 384, 388] reported increases in self-efficacy to treat obesity [373], and improvements in the quality (though not the rate) of obesity counselling with an increase in referrals to weight management support [384, 388].

   2) **Tools/Resources to improve identification of obesity**

There were 8 studies in which tools or resources to improve the identification of obesity were the main intervention strategy and a further 10 studies where such tools were also used in combination with other approaches (Table 5-5). These will now be summarised, moving from relatively simple tools/resources to more complex ones.

Perhaps the simplest tool reported was a laminated BMI chart [391]. The study by Muo et al [377] also involved BMI charts placed in consulting rooms, but in addition they used a BMI chart reminder stamped into patients' notes. Barnes et al [367] also used a BMI chart hung above each scale as a visual reminder for nursing staff to measure weight and calculate BMI, with charts also available in the waiting room. Shungu et al adopted a similar approach [389], with a brightly-coloured reminder card attached to the front of notes prior to the consultation. An alternative was the desk-top flipchart reported by Laws et al in Counterweight [16].

The relocation of scales to private locations and placement of working stadiometers conducive to work flow were found to facilitate BMI screening in the study by Erickson et al [372].

The most common tool used was an automatic BMI calculator integrated into the electronic medical record (EMR), which featured in six studies [364, 366, 369, 372, 378, 380]. This was accompanied by a pop-up reminder to recommend lifestyle modification for all adult patients with a BMI >25 kg/m^2 in the study reported by O'Grady et al [378] and electronic eligibility reminders based on age >17 years and BMI >30 kg/m^2 in the Take Charge Lite (TCL) study [369] and eLINKS study [376].

Several studies included a more labour-intensive component, with the additional resource being staff time. Examples of this ranged from the creation of an electronic registry of patients with obesity (based on information collected during telephone counselling)[381]; the manual calculation of BMI by a member of staff, which was then entered into the patient's EMR [364]; members of the research team manually adding obesity to the problem list [385]; or a member of staff (e.g. nurse or rooming assistant) measuring a patient's height and weight prior to the medical consultation [241, 365].

The most complex computer-based intervention was in the paper by Christian et al [386] which involved the computer's expert system generating a "four- to five-page individualized, tailored report that provided feedback addressing participant-identified barriers to improving their physical activity and diet".

Few papers cited any formal theory related to the use of tools/resources to improve identification of obesity, though most did cite some previous research evidence supporting their use. The United States Preventive Services Task Force (USPSTF) guidelines and the 5As framework were referenced in several papers.

In terms of outcomes, most of the studies reported positive outcomes, although some were mixed [365-367, 370, 377, 389] and one showed no significant difference (in weight) [378]. Three studies only reported weight loss, with no information on rates of weight discussion, documenting of obesity, or referral [378, 381, 386].

In the 8 studies where tools to improve identification of adults with obesity were the focus, there were statistically significant increases in recording of BMI in patients' charts [391], documentation of obesity [364, 377, 380, 389], advice [385], and referral to other sources of support [364, 380].

Similarly, in the remaining studies, there were statistically significant increases in recording of BMI in patient's charts [367], documentation of obesity [366], advice [16, 365, 376], and referral to other sources of support [241, 369, 376].

One study used a measure called KBS (Knowledge, Behaviour, Status) rating to assess the extent to which a clinical obesity guideline had been incorporated into routine practice [372]. Knowledge refers to "knowledge related to the content of the clinical obesity guideline," (with outcomes ranging from "no knowledge" to "superior knowledge"). Behaviour refers to the "implementation of the clinical obesity guideline," ("never implementing" to "consistent implementation"). Status refers to the "adoption of the clinical obesity guideline" (a continuum from "no adoption (extreme signs/symptoms)" to "generalized adoption (no signs/symptoms)." On a scale of 1–5 (1 = low/neg; 5 = high/pos), the average KBS ratings across partner organisations increased over two points from baseline to 3 years follow-up [372].

As noted in Chapter 3, interventions do not happen in isolation and it can be hard to attribute the success of an outcome to a particular component. This counterfactual logic (e.g. would X outcome have occurred if Y event had not taken place?) is cited in several of the papers, for example:

> During the time period, a large amount of information in both the lay press and medical literature was disseminated concerning obesity. Thus, physician awareness of the obesity epidemic probably increased. Whether the increased awareness contributed to improved documentation and treatment cannot be determined by this study. [Bordowitz, 2007 [380]]

Context is crucial, as reported in three studies with EMR reminders: two that worked (Bordowitz, 2007 [380] and Schriefer, 2009 [364]) and one that didn't work so well (Shungu, 2015 [389]) as demonstrated by this excerpt from the latter:

> Our study did not support the hypothesis that reminder cards improve rates of counselling documentation or coding of counselling regarding obesity. These results differ from those of Bordowitz et al (2007) and Schriefer et al (2009), who both found that EMR auto-population of BMI resulted in increased prevalence of documented obesity treatment plans. Again, a possible explanation for this difference is that the intervention in those studies was the introduction of an EMR auto-populated BMI, whereas our practice had auto-populated BMI for several years prior to our study and used physical reminder cards as the intervention. Linking assessment of obesity to an EMR-generated smart set, which includes assessment of dietary counselling, is one solution to improve provider rates of documenting dietary counselling. [Shungu, 2015 [389]]

In the example above, the context in the unsuccessful (more recent) study was one in which EMR auto-population of BMI had been in place in the practice for several years and the intervention was a reminder card; in the two successful (older) studies cited, however, the BMI auto-population was introduced as part of the intervention itself. As well as different contexts, the timing of the introduction of the intervention may have had a bearing on its uptake also.

The next strategy to be considered is that of tools/resources to improve ease of referral.

3) Tools/Resources to improve ease of referral

The third intervention strategy was tools and resources to improve ease of referrals. There were 2 studies (4 papers) which used such tools and resources as their main intervention strategy and a further 4 which incorporated them as part of a wider intervention. Details of the studies and description of the tools used can be found in Table 5-6 below.

The four papers which used tools/resources to improve ease of referral referred to two intervention studies -Take Charge Lite (TCL) [368, 369] and eLinkS [376, 390]. TCL included BMI calculation and electronic reminders, as described above, but also the use of a single computer keystroke to print a TCL prescription that was accompanied by a letter describing the free weight management programme, with the telephone number to call to schedule an appointment. This resulted in an increase in referral from 5% at baseline to around 20%. In eLinkS, the EMR was again used as the platform for the intervention by making it fast and easy to refer patients to intensive counselling outside the office; but there was an additional focus on establishing bidirectional communication between practices and community weight loss counsellors, with participants given the choice of group classes offered through a commercial weight loss programme (Weight Watchers); individual telephone weight loss counselling; computer- based counselling; or usual care. Although statistical differences were not reported, eLinkS also found an increase in the percentage of patients with obesity who received advice and referral.

The other 4 studies involved a database of community programmes and a health behaviour prescription pad [387], reminders with tailored management recommendations and a weight management screen including referral options [366], the provision of a complete list of local services and referral pathways [370], and an additional member of staff (from the research team) who ensured that patients who agreed to referral left the practice with an appointment [241]. As with the other studies, outcomes from these 4 papers were generally positive, with the exception of the Goodfellow study, which found practitioner self-reported increases in knowledge, confidence and skills related to weight management, but no significant differences in the proportion of patients offered a weight management programme [370].

4) Audit/feedback

The fourth intervention strategy to consider was audit and feedback. Again, this is well recognised in the literature as being an important driver of practitioner behaviour change [395].

Table 5-7 provides a description of the studies that incorporated an audit/feedback strategy, including the participants, use of theory, and main outcomes measured in each study.

There were seven studies that used audit and feedback as part of a multi-component intervention, though only one where it was the main strategy used [371]. Different approaches were adopted, with some studies – for instance, the Counterweight study [16, 382] and Schuster et al [383] – providing only a one-off feedback of baseline performance related to current levels of obesity screening and intervention. The other studies provided repeated feedback, ranging in frequency from weekly communications, with an audit after 3 weeks [367] to monthly audits [371, 375, 381] to quarterly [372].

The content of the feedback and person delivering it also varied; for instance, Ely et al used written feedback reports which included reminders of obesity care recommendations as well as patient-specific information on barriers and facilitators to weight loss [381]. In contrast, the study by Aspy et al used practice enhancement assistants who worked closely with the practice team (nurses and medical assistants) to modify office routines, forms, and computer templates, and help each team identify community resources [371].

Use of theory was more prominent in these studies, with Plan-do-study-act (PDSA) cycles used in two of the studies [371, 375] and the Theory of Planned Behaviour underpinning the Barnes et al study [367].

Most of the included studies that used audit and feedback as an intervention strategy reported positive outcomes. These included increases in lifestyle interventions [16, 371], increased recording of obesity management [367, 383], improved adherence to obesity guidelines [372] and weight loss [381, 382].

5) Networks/Quality Circles

The fifth intervention strategy considered in this review is the use of networks or quality circles. Table 5-8 below provides more detail on the 6 papers (related to 4 studies) that used this approach. In the paper by Sinfield et al (and the related paper by Gunther [231]), a form of quality circle called a facilitated implementation group was the main strategy used [374]. Two such groups explored the use of tailoring to improve adherence to NICE guidelines on adult obesity in primary care. Tailoring involved two key steps. The first involved investigation of context and barriers to change; the second step involved the selection of intervention methods chosen to address the barriers identified. It could be argued that these papers do not provide empirical evidence of an intervention to improve identification and referral of adults with obesity, as they do not report outcomes. However, they do provide invaluable insights into the mechanisms involved and potentially supportive or constraining barriers, which resonated strongly with other findings from this review, presented in the next section.

The three other studies used slightly different approaches to quality circles. In the Counterweight study [16, 382], weight management advisers (all registered dietitians) provided regular peer support, once or twice each month, to practice nurses until they achieved competency and confidence. This mentoring process usually took 6 months, and also contained elements of training and audit/feedback strategies.

In the study by Aspy and colleagues [371], there was a practice enhancement assistant who met with the three clinician teams in each cluster and the principal investigator on three occasions (at 2, 4, and 6 months) to review progress and share ideas. These meetings were multi-disciplinary, with clinicians, nurses or medical assistants, and office managers from each practice taking part. Finally, in the Combating Obesity at Community Health Centres (COACH) study [375], the quality circle (or Quality improvement collaborative) involved learning sessions, a website for evaluation, and conference calls for knowledge sharing.

In terms of use of theory, both the Aspy and Wilkes studies [371, 375] used quality improvement tools (e.g. PDSA cycles). The Counterweight study [16, 382] referred to learning theories and theories of innovation, and the Sinfield study [374] did not refer to any formal theory but did cite a systematic review of RCTs which found that tailored interventions were more effective than no intervention or dissemination of guidelines and educational materials alone [396].

The studies that used quality circles generally reported positive outcomes, although most were multi-component making it hard to discern which of the components was most effective. As noted above, the study in which quality circles were the main strategy did not report outcomes related to identification and referral [374], but was kept in the review for its theoretical utility.

6) Other interventions

Several studies used other intervention strategies over and above the five outlined here. For instance, patient education/information materials were provided in a number of studies [16, 210, 366, 367, 370, 372, 378, 381, 382, 386, 387]. Examples included: BMI brochures, patient action plan template, food/activity logs, portion control plates/handouts, home exercise routines, calorie counters, community resource brochures, and food and fat models.

On the face of it, these resources may not obviously relate to improving practitioner identification and referral of adults with obesity, but as one paper put it, these resources helped to "minimize concerns regarding lack of time" for providers [367]. This in turn may make providers feel more able to initiate a discussion around weight management. Similarly, the provision of a one-page *Your Weight and Health Profile* form, recommended by the NIH [397], aimed "to enhance [practitioners'] ability to quickly assess readiness to lose weight", which in turn could make referral more likely, or more appropriate [367].

Incentives were cited in a few studies, including incentives to take part in training initiatives (e.g. by providing Continuing Professional Development accreditation)[373], incentives (e.g. gift certificates) for referring the most patients [375] or the incentive of financial reimbursement for the diagnosis of obesity as a medical condition (in the US) [389].

A further strategy used in at least two studies [370, 372] was the use of a designated lead responsible for implementation of the intervention in the practice. Very little detail is provided on this leadership role in the Erickson paper [372], but the Goodfellow paper describes the lead being well supported (monthly telephone calls), working closely with the research team to improve their knowledge and identifying additional resources and tools [370].

Finally, two other strategies were used in one study each. These were the use of employee wellness initiatives or worksite wellness policies [372] and the use of external accountability by implementing planned follow-up [241]. There is an evidence base for both these approaches, as previous studies – not specifically related to identification and referral of obesity - have used them. For instance, in the Promoting Health by Self Experience (PHASE) study [398], Shai et al looked at change in practitioners' preventative health advice (related to smoking, obesity, and alcohol) after receiving their own lifestyle intervention – the so-called 'halo effect' [399, 400]. Similarly, external accountability has been shown to be an important component of behavioural programmes [401].

Summary

In summary then, the 30 included papers in this realist review can all be considered as complex interventions, involving multiple intervention strategies and usually operating at multiple levels (to use Pawson's formulation, most studies incorporated individual-, interpersonal- and institutional-level components). The included interventions have been broken down and grouped into their different strategies.

The next step – developing the realist approach– is to hypothesise and then test (as far as possible) how the outcomes of interest are achieved; that is, what are the underlying mechanisms that produce the outcomes and what are the contextual barriers and facilitators to the operation of these mechanisms. As far as possible, the intervention strategies identified thus far will be used to facilitate understanding of mechanisms within each strategy, but it is important to note at this point that the same mechanisms may be involved in different intervention strategies (e.g. in both tools, audit/feedback and networks).

Table 5-4: Studies that included training components

Author (year)	Participants	Training content	Delivery and Duration	Use of Theory	Main Outcome(s)
Studies where training was main focus					
Katz [373] (2005)	29 doctors	Interactive, 12 clinical and psychological lectures, delivered by 'experts'.	2 lectures per session, followed by workshop and panel discussion (5pm – 9pm). Held monthly over 6 months.	Self-efficacy [402]. Social cognitive theory [403]. Transtheoretical model of behaviour change [404].	Self-reported **increases in self-efficacy** to treat obesity.
Jay [384, 388] (2010 and 2013)	23 resident physicians	Based on the 5As (assess, advise, agree, assist, and arrange) multiple active instructional methods including case studies, role-playing, standardized patients for counselling practice, and faculty-facilitated videotape review of residents counselling their own patients.	5-h multimodal longitudinal obesity curriculum given over three weekly sessions.	Skills such as behavioural assessment, goal setting, and motivational interviewing were stressed. 5As framework [405].	Small but significant effects of the intervention on **quality of counselling** but not on the rate of counselling. **Mean Weight loss** of 1.53kg (SD 3.72) in intervention group compared to 0.30kg (SD 3.60) weight gain in control. **Referrals:** 21 (45.7%) in intervention group versus 11 (26.8%) in control.
Other studies that included training component					
Laws [16] and Ross [382] (2004 and 2008)	58 practices received training in intervention arm – all practice nurses	Training focused on using a structured approach to care and topics covered included patient screening and assessment, principles of healthy eating and energy balance, dietary	6–8 hour training programme for PNs. Training manuals were provided to support formal workshops. Guidance was also provided on the use of	Adult learning theory [406]	91% received one of the **core lifestyle interventions** in the first 12 months. 34% achieved a clinically meaningful **weight loss of 5%** or more of initial weight.

Author (year)	Participants	Training content	Delivery and Duration	Use of Theory	Main Outcome(s)
		approaches to weight management, physical activity guidelines, behaviour change strategies, pharmacotherapy, patient monitoring and ethical considerations.	Counterweight Programme patient education materials. A variety of teaching methods were used, including problem based learning through case studies, group discussion and practical exercises.		
Aspy [371] (2008)	10 clinicians	Five evidence-based training modules were developed by content experts in: motivational interviewing, weight loss, exercise, smoking cessation, and reduction of risky alcohol use. Each module included five components: (1) a pre-test; (2) general information on the topic; (3) screening methods, and recommended brief and very brief interventions; (4) role-play scenarios; and (5) a post-test.	The training took place in a location convenient to all three clinicians within a cluster, usually a hospital or clinician's office, and required about 2 hours for completion. The motivational-interviewing workshop was conducted at the beginning of the project.	Stages of change [404]. RE-AIM model [407]. Plan-do-study-act (PDSA) cycles [408].	**Increase in screening** for diet (25.8% to 69.0%) and physical activity (0% to 23.6%). **Increase in brief intervention** for diet (2.9% to 21.3%) and physical inactivity (2.9 to 21.0%).
Schuster [383] (2008)	21 physicians took part, working in 5 offices	Academic detailing – "Academic detailing is a successful tool for improving clinician outcomes. A peer, often with clinical skills and perceived as being academically credible, joins a small group of clinicians in a collegial and	Few details provided: "focused academic detailing of the [national] guidelines, showing the physicians their own patient outcome data, and introducing minor systems	Academic detailing [409]	**Increase in recording** of obesity management in patient records: Intervention group: 2.4% to 9.2% (p=0.001). Enhanced intervention group: 3.9% to 15.6% (p-0.002). **Increase in % physicians**

Author (year)	Participants	Training content	Delivery and Duration	Use of Theory	Main Outcome(s)
		professional environment, reviews their clinical performance and advises them on mechanisms to improve their outcomes" [409].	innovations in the primary care office setting".		**"comfortable"** discussing obesity from 53% at baseline to 100% at 12 months (p=0.041).
Christian [386](2011)	2 community health centres 263 patients	Content included opportunities to reduce patient risk through lifestyle change, and how physicians would use these patient lifestyle change goal sheets to provide brief motivational interviewing counselling to help patients make changes in dietary and physical activity behaviours. Physician training also briefly covered the basics of the other behaviour change theories used to design the intervention.	3-hour training session.	The design of intervention feedback and content was based on four motivational theories: the Transtheoretical Model of Change [410], motivational interviewing [411], social-cognitive theory [403], and decision making [412].	**Significantly more** patients in the intervention group **lost ≥5%** of their body weight at 12 months than controls (26.3% vs 8.5%; odds ratio=3.86; *P*<0.01).
Wilkes [375](2013)	5 practices	Content included examples of Best Practices in weight management (e.g. Diabetes Prevention Programme [413]); Review of Plan- Do- Study- Act (PDSA) Methodology; Motivational Interviewing; and Small Group Breakout Sessions to identify missing elements in current weight management programmes.	Three in-person learning sessions took place in Chicago over the course of two years.	Incorporated principles from Community Based Participatory Research (CBPR) methodology [414].	Qualitative evaluation. Participants reported **improved ability to identify** overweight patients in need of weight management. Three of the five teams reported an increasing ability over time to engage their providers in order to **increase referrals** to the weight management programme.
Erickson [372](2014)	10 administrators	Partners learned about the obesity guideline (the Institute for	A public health nurse (PHN) practice facilitator led	5As framework [416] and motivational	On a scale of 1–5 (1 = low/neg; 5 = high/pos), the average Knowledge

Author (year)	Participants	Training content	Delivery and Duration	Use of Theory	Main Outcome(s)
	and 29 clinicians from 10 partner sites	Clinical Systems Improvement (ICSI) Prevention and Management of Obesity for Adults Guideline [415]), organizational readiness to change, quality improvement strategies, adaptive leadership, patient-centred and patient-empowering conversational style and spirit (motivational interviewing), as well as how to develop an action plan with measurable aims.	partners in a learning collaborative utilizing face-to-face and web-based interactive trainings.	interviewing [411].	Behaviour Status (KBS) ratings across partner orgs **increased over two points** from baseline to 3 years follow-up.
Barnes [367](2015)	Staff at a large primary care centre	The intervention included education for both clinical support staff and primary care providers. The clinical support staff participated in a training session on the measurement, calculation and documentation of BMI. This training occurred with the support of the nurse manager and aimed to standardize the procedure for height and weight measurement, as well as calculation and documentation of BMI in the patient record. The educational component of phase 2 for providers was designed to target previously identified barriers to obesity management. Barriers and	No detail provided.	The theory of planned behaviour (TPB) [417].	There was no routine documentation of BMI prior to the PHAT-G intervention. From time 1 (phase 1) to time 2 (phase 3), overall **BMI documentation increased** by 13%, which was significant ($P < 0.01$). **Documentation rate of weight loss plan** increased from 2 to 6 from time 1 to time 2 (NS).

Author (year)	Participants	Training content	Delivery and Duration	Use of Theory	Main Outcome(s)
		lack of knowledge related to treatment efficacy were addressed during the provider education session. Providers were given the opportunity to discuss their frustration with previous attempts to manage obesity during the question and answer time following the education session.			
Steglitz [365](2015)	12 clinicians from a Federally Qualified Health Centre (FQHC).	A single training session that introduced clinic staff to the content of the new obesity management form, its location in the electronic health record (EHR), and details of the new protocol.	No detail provided.	5As framework [416].	Clinicians self-reported that their practice of assessing physical activity, diet, and obesity-related medical conditions **increased** after the addition of the obesity intake protocol and weight mx form. Although their attitudes about treating obesity showed **no significant change**, clinicians also reported that the new protocol and EHR form made it **easier to identify obese patients** and **increased their confidence** about managing obesity.
Goodfellow [370] (2016)	12 intervention practices (16 control)

17,728 intervention patients (32,079 | Training began with a summary of the guidelines for professionals. Training addressed the issue of sensitively raising and discussing weight with patients. Training in waist measurement was provided with a live demonstration and | Group training to practice teams (GPs, practice nurses and health care assistants), including a presentation, discussion and provision of the resources (patient booklets, BMI charts, | The authors did not draw on behavioural theory, relying instead on their own ideas on the strategies most suited to address the determinants, a | Self-reported **increases in confidence, knowledge and skills** related to weight management, with respondents feeling better able to manage obese/overweight patients. However, there were **no significant differences** in the proportion of |

Author (year)	Participants	Training content	Delivery and Duration	Use of Theory	Main Outcome(s)
	control)	explanation of the relationship of waist circumference to health risks. Training was given on how to assess patients' readiness to change their lifestyle and how to calculate energy requirements [418]. Professionals were also provided with example scripts to use in raising and discussing weight with patients. They were also given a prescriptive weight loss plan for patients because professionals felt that they did not always have sufficient knowledge or skill to advise patients on changes to diet.	calories and portions leaflets, posters, information on referral pathways) was delivered by a registered dietitian.

The training lasted around 1 hour. | process informed by the development of the Tailored implementation for chronic diseases (TICD) checklist [419]. | patients offered a weight management programme between the control and intervention practices (15.1% in the control practices, 13.2% in the intervention practices, p=0.53). |
| Aveyard [241](2016) | 137 primary care physicians at 57 practices from across the south of England | The modules covered the rationale of the trial, the medical benefits of weight loss, and the mechanics of running the trial, but mostly consisted of filmed consultations with commentary to help physicians assimilate the skills necessary to deliver both interventions with confidence. The course also trained physicians to handle difficult situations that might arise in consultations and what to do in follow-up consultations. Fidelity was | Participating physicians received a 90 minute online course. | No formal theory cited, but the design of the intervention was informed by evidence that an offer of help to change is more motivating than advice to do so [420], by results of a trial of brief interventions for smoking cessation that showed that uptake is higher when the referral is enacted by | As a result of the support intervention, 722 (77%) of 940 participants accepted referral to the weight management programme and 379 (40%) attended an appointment, compared with 82 (9%) participants who were allocated the advice intervention. |

Author (year)	Participants	Training content	Delivery and Duration	Use of Theory	Main Outcome(s)
		assessed by recording randomly selected consultations (i.e. consultations in which the randomisation card included a request to record). After each physician's session, the researcher listened to the recording and assessed whether key aspects of the intervention were delivered as intended. Feedback was provided to physicians where necessary to improve fidelity.		the system rather than leaving patients to instigate it [421], and by evidence that external accountability is an important component of behavioural programmes [401]; physicians were trained to ask the participant to return in 4 weeks to assess their progress.	

NS= Not significant

Table 5-5: Studies that used tools/resources to improve identification of obesity

Author (year)	Participants	Description of Tool/Resource used	Use of Theory	Main Outcome(s)
Studies in which tools/resources to improve identification of obesity were main strategy				
Lemay [391](2004)	276 patients	The intervention consisted of posting prominent (2 feet by 3 feet), multi-coloured, laminated BMI tables in the exam rooms of one of the study site's three primary health care teams.	No formal theory cited, but authors suggest that inclusion of BMI calculations on the problem list of in progress notes may prompt provider to discuss weight management.	**Increased recording of BMI** in patient's chart (49% vs 17%, p=0.0001).
Bordowitz [380](2007)	10 attending physicians, 18 family medicine residents, and approximately 120 medical students who saw patients in the health centres.	In November 2003, an EMR was introduced in the two health centres. A feature of this particular EMR was an automatic calculation of BMI The BMI was automatically calculated when height and weight were entered and displayed in the vital signs section of the chart. The feature was not emphasized to providers, and there was no formal training about the BMI feature.	No formal theory cited, but authors cite studies showing that EMR reminders improve patient obtainment of preventive services such as screening and immunisations [422, 423], and improve physician compliance with clinical guidelines [424, 425].	**Increased documentation of obesity from 31% to 71%** (prevalence ratio =2.30, 95% CI= 1.44–3.68). Documentation of treatment of obese patients also improved, from 35% to 59%, (PR=1.84, 95% CI=1.19–2.86).
Schriefer [364](2009)	37 physicians 846 patients	When a patient came for an office visit with a physician on an intervention group team, clinic staff obtained the patient's weight and height and computed the BMI from a calculation table that was provided by the researchers. The staff member then entered the height, weight, and BMI into the patient's	USPSTF cited [108]. No reference to formal theory, but the authors do cite evidence that chart prompts for	Obese patients of physicians who had a BMI charts prompt in their medical records were **significantly more likely** than obese patients of physicians

Author (year)	Participants	Description of Tool/Resource used	Use of Theory	Main Outcome(s)
		electronic medical record. When the physician saw the patient, a computerised BMI appeared with other vital signs in the medical record.	physicians have proven to be effective for increasing the likelihood that physicians provide patients with preventive services, including immunizations and smoking cessation services [426-428].	who did not receive a BMI chart prompt to receive a diagnosis of obesity (16.6% vs 10.7%; p=0.016), and to receive a referral for diet treatment (14.0% vs 7.3%; p=0.002) and exercise (12.1% vs 7.1%; p=0.016).
Christian [386](2011)	2 community health centres 263 patients	Computer-based assessment of their motivational readiness to increase physical activity and make dietary changes just before a usual care visit. Then, computer's expert system generated a four- to five-page individualized, tailored report that provided feedback addressing participant-identified barriers to improving their physical activity and diet.	The design of intervention feedback and content was based on four motivational theories: the Transtheoretical Model of Change [410], motivational interviewing [411], social-cognitive theory [403], and decision making [412].	**Significantly more** patients in the intervention group **lost ≥5% of their body weight** at 12 months than controls (26.3% vs 8.5%; odds ratio=3.86; *P*<0.01).
Banerjee [385](2013)	51 providers (39 residents, 9 faculty members, and 3 physician assistants) 497 patients	The research team manually added obesity to the problem list of those 422 patients randomized to receive the intervention.	No formal theory cited. The USPSTF recommendations are referenced [199], as well as a study showing that physicians were more likely to address obesity with patients for whom the physician recorded	During the 5-month follow-up, **obesity was addressed** for 38 of 258 (14.7%) patients in the intervention group, compared with 11 of 239 (4.6%) patients in the control group (*P*<.001).

Author (year)	Participants	Description of Tool/Resource used	Use of Theory	Main Outcome(s)
			obesity on the problem list than those patients who were identified as obese when they did not add obesity on the problem list during that visit [429].	
Muo [377] (2013)	30 residents and 14 internists 406 patients	A BMI chart reminder, which contained sections for weight, height and BMI, was stamped on all progress notes beginning on 1 July 2009. Following measurement of patients' height and weight at each visit, nursing staff completed height and weight sections of the BMI stamp. The BMI section was left blank to prompt physicians to calculate and record BMI. To acclimatise the providers to the location of BMI charts, coloured BMI charts were placed in conspicuous places in all examination rooms a few months before the implementation of the BMI chart reminders.	No formal theory cited.	**Significant increase** in the proportion of charts with **documented BMI** (2.5 vs 5%, P < 0.04). No difference in the rate of physician **documented weight-management plan** before and during the intervention (9.1 vs 9.8%, P = 0.75).
O'Grady [378](2013)	No info on practitioners 1600 patients	An automated clinical reminder for the clinician to recommend lifestyle modification for all adult patients with a BMI >25 kg/m^2 was added to the GDMS (Generic Disease Management System). A printed copy of the recommendations, including this reminder, was given to the patient.	No formal theory cited, though the authors state that automated clinical reminders are beneficial for improving screening uptake [430, 431] and have had some positive outcomes in diabetes and asthma management [432, 433].	The mean (± SD) change in weight was -0.51 (± 9.83) kg in the clinical reminder group, which did **not significantly differ** from the -0.35 (± 9.40) kg change in the controls (*P = 0*.64). Physician diagnoses of obesity or hyperlipidaemia were associated with weight loss, suggesting that formally noting these diagnoses contributes to

Author (year)	Participants	Description of Tool/Resource used	Use of Theory	Main Outcome(s)
				successful weight loss.
Shungu [389] (2015)	17 physicians (7 attending and 10 resident physicians) 490 patients	The intervention consisted of a brightly coloured, business-sized card being attached to the front of each billing encounter sheet by the MA prior to the encounter for all adult patients. Each reminder card included the following four questions: (1) What is your patient's BMI? (2) Did you document obesity? (3) Did you counsel on diet and exercise? and (4) Did you document counselling on diet and exercise?	No formal cited, but authors reference studies showing that documentation of obesity is important for primary care physicians for multiple reasons. Physicians are much more likely to address obesity if it is already recorded as a problem in the patient's chart [385, 429].	**Increase in assessment of obesity** and morbid obesity, defined as clicking on obesity or morbid obesity as an active problem in the problem list in the EMR chart for the patient, 42.5% vs 28.0% (p=0.006) **but no difference in dietary counselling.**
Sturgiss [210] (2017)	12 GPs, from 5 different general practices, 1 rural and 4 urban No patient data reported	The programme consisted of a GP handbook, patient workbook and computer template [434]. The GPs were not offered any training beyond the written handbook as in earlier qualitative work GPs stated they did not want a programme that required additional training.	5As framework is cited [435]. Also, social cognitive theory [402].	**Increase in GPs' confidence and self-efficacy** (based on self-reported survey using a four-point Likert scale).
Other studies in which tools/resources to improve identification of obesity were used				
Laws [16] (2004)	58 practices 1256 patients	To prompt GP involvement, a desk-top flip chart was provided which included a range of tools to assist in patient screening and motivation.	The authors state that "The use of external stimuli to prompt changes in clinician behaviour has been	91% received one of the core lifestyle interventions in the first 12 months. 34% achieved a clinical meaningful weight loss of 5% or

Author (year)	Participants	Description of Tool/Resource used	Use of Theory	Main Outcome(s)
			shown to be effective [436, 437] and is consistent with learning theory", without specifying any learning theories.	more.
Clark [369] (2008)	7 primary care providers 2528 patients	Electronic review of medical records was used to determine age and body mass index (BMI) eligibility. BMI eligibility can be determined by 1) recorded BMI that may exist in the medical record from the most recent PCP visit, or 2) calculated BMI that used most recent weight and height to determine BMI. A positive screen (i.e. age greater than 17 and BMI 30 or more) resulted in an electronic eligibility reminder that PCPs saw at the time they were writing all other orders (prescription, referral, and procedure orders were carried out electronically). Reminders stated that some patients may not be appropriate for the programme, including pregnant women and those with serious mental illness.	Cite USPSTF guidelines [199] and 5As approach [438, 439]. Also draws on the RE-AIM framework in terms of evaluating reach and considering implementation [243, 440].	**Increase in referral** from 5% at baseline to around 20% Of those screened positive for OW/obesity, 5,034 (40.3%) received a TCL referral from their PCP.
Krist [376] (2008)	9 practices 5679 patients	Electronic linkage system - Utilizing the electronic medical record (EMR) as a platform, eLinkS was designed to (1) help clinicians systematically perform elements of the 5A's that are feasible in busy practice settings (i.e. asking about health behaviours, offering brief advice, and agreeing on next steps); (2) make it fast and easy to refer patients to intensive counselling outside the office; and (3) establish bidirectional communication between practices and community counsellors.	5As framework [416]. USPSTF guidelines are cited [199].	The % of patients with unhealthy behaviours who received intensive counselling through eLinkS (10%) exceeds practice norms. Advice given to 17% of obese patients – 12% of obese patients received a referral.

Author (year)	Participants	Description of Tool/Resource used	Use of Theory	Main Outcome(s)
Ely [381] (2008)	3 practices – no detail on practitioners	An electronic registry of obese patients was created with regular updates to physicians on patient motivation for weight loss, and obesity care recommendations for the next office visit. This registry information was in part derived from information collected during the telephone counselling sessions and included participant name, contact information, readiness to change regarding weight loss behaviour, weight loss attempts, methods employed in weight loss attempts, and facilitators and barriers to weight loss. The registry was updated monthly during the study.	Chronic Care Model [441].	Day 180 mean (SD) weight change for the active and control arms, respectively, was −9.4 (10.3) pounds and −2.1 (10.7) pounds (P = 0.01 for difference).
Erickson [372] (2014)	10 Administrators and 29 clinicians from 10 partner sites No patient data	Partner organizations incorporated system-level interventions such as the following into quarterly action plans: • Relocation of scales to private locations and placement of working stadiometers conducive to work flow to facilitate body mass index (BMI) screening, • Addition of prompts and reminders to the medical record system, • Development of electronic tracking systems for panel or population management.	5As framework [416]. Also cites USPSTF [442] and Institute for Clinical Systems Improvement (ICSI) Prevention and Management of Obesity for Adults Guideline [415].	On a scale of 1–5 (1 = low/neg; 5 = high/pos), the average Knowledge Behaviour Status (KBS) ratings across partner orgs **increased over two points** from baseline to 3 years follow-up.
Steglitz [365] (2015)	12 clinicians 6960 patients	The nurse or medical assistant (MA) identified obese patients by entering height and weight data at intake. According to the new obesity management protocol, after rooming the patient, the nurse or MA helped him or her to complete an English or Spanish hardcopy version of a behaviour change goal checklist prior to the clinician's arrival. The clinician then discussed weight management with the patient while checking off on the EHR form the goals that the patient endorsed on the hardcopy version of the checklist. The endorsed goals auto-populated under the Health Goals section of the form and remained there	5As framework [416].	Clinicians self-reported that their **practice of assessing** physical activity, diet, and obesity-related medical conditions **increased** after, as compared to before, the addition of the obesity intake protocol and weight management form. Although their attitudes about treating

Author (year)	Participants	Description of Tool/Resource used	Use of Theory	Main Outcome(s)
		to be reviewed in future visits.		obesity showed **no significant change**, clinicians also reported that the new protocol and EHR form made it easier to identify obese patients and **increased their confidence** about managing obesity.
Baer [366] (2015)	12 practices 14779 patients	**Reminders to measure height and weight**. Whenever a patient had no measurement of height in the EHR or no measurement of weight entered in the EHR within the past year, a reminder appeared on the summary screen, asking the provider to enter a height and/or weight for the patient. The EHR automatically calculated BMI from patients' most recent height and weight entries; therefore, any patient with both height and weight entered should have a BMI value in the EHR. **An alert asking providers whether they want to add overweight or obesity to the problem list**, for patients with BMI 25–29.9 or ≥30 kg/m^2, respectively. The alert appeared as a ''pop-up'' screen, and the provider had the option to add overweight or obesity or to dismiss the alert. This alert was added to an existing clinical alerting system, introduced in May 2010, which was designed to improve the completeness of electronic problem list documentation for 17 other conditions [443, 444].	Several guidelines cited including USPSTF [199], National Institutes of Health (NIH) [445, 446], and American College of Physicians (ACP) [447]. Also cite numerous studies showing under-identification of overweight and obesity in primary care [233, 448-451].	**Increase in recording** of overweight/obesity on problem list, from 36% to 71%, compared to 16% to 8% in control group (p<0.0001). **No significant differences** in weight loss meds or nutrition counselling among pts with BMI>27.
Barnes [367] (2015)	1 primary care centre 100 patient	**Reminder system:** A BMI chart was hung above each scale as a visual reminder for the nursing staff to measure, calculate and document BMI. Charts to calculate BMI were also available in the waiting room, nurses' stations and patient care rooms to	The theory of planned behaviour (TPB) [417].	There was no routine documentation of BMI prior to the PHAT-G intervention. From time 1 (phase 1) to time 2

Author (year)	Participants	Description of Tool/Resource used	Use of Theory	Main Outcome(s)
	records	increase the visual reminder effect on behaviour. One of the tools available was a treatment algorithm based on the clinical practice guideline recommendations. This treatment algorithm was displayed in patient care rooms as a reminder and a resource to both clinical staff and providers.		(phase 3), overall **BMI documentation increased** by 13%, which was significant ($P < 0.01$). Documentation rate of weight loss plan increased from 2 to 6 from time 1 to time 2 (NS).
Aveyard [241] (2016)	137 primary care physicians at 57 practices from across the south of England	People who consented and were eligible to participate were handed a randomisation envelope to give to the general practitioner (GP), which included an appended record of the patient's height, weight, and BMI.	No formal theory cited, but the design of the intervention was informed by evidence that an offer of help to change is more motivating than advice to do so [420], by results of a trial of brief interventions for smoking cessation that showed that uptake is higher when the referral is enacted by the system rather than leaving patients to instigate it [421], and by evidence that external accountability is an important component of behavioural programmes [401]; physicians were	As a result of the support intervention, 722 (77%) of 940 participants accepted referral to the weight management programme and 379 (40%) attended an appointment, compared with 82 (9%) participants who were allocated the advice intervention.

Author (year)	Participants	Description of Tool/Resource used	Use of Theory	Main Outcome(s)
			trained to ask the participant to return in 4 weeks to assess their progress.	
Goodfellow [370] (2016)	12 intervention practices (16 control) 17,728 intervention patients (32,079 control)	A poster and associated patient leaflet were provided to help professionals inform patients of the benefits of losing 5–10 % of their weight and to increase patient motivation through showing the benefits of a modest weight loss. Additional posters were also provided in paper and electronic format, including a poster to encourage patients to speak to a professional about their weight, plus BMI charts, and dietary guidance. Posters for consulting rooms containing information on how to measure waist circumference were given as a visual reminder.	The authors did not draw on behavioural theory, relying instead on their own ideas on the strategies most suited to address the determinants, a process informed by the development of the TICD checklist [419].	Self-reported **increases in confidence, knowledge and skills** related to weight management, with respondents feeling better able to manage obese/overweight patients. However, there were **no significant differences** in the proportion of patients offered a weight management programme between the control and intervention practices (15.1% in the control practices, 13.2% in the intervention practices, p=0.53)

NS= Not significant

Table 5-6: Studies that used tools or additional resources to improve ease of referral

Author (year)	Participants	Description of Tool/Resource used	Use of Theory	Main Outcome(s)
		Studies in which tools/resources to improve ease of referral were main strategy		
Clark [369] (2008) And Clark [368] (2010)	7 primary care providers 2528 patients Five community health centres 12,487 patients	Electronic review of medical records was used to determine age and body mass index (BMI) eligibility. BMI eligibility can be determined by 1) recorded BMI that may exist in the medical record from the most recent PCP visit, or 2) calculated BMI that uses most recent weight and height to determine BMI. A positive screen (i.e. age greater than 17 and BMI 30 or more) resulted in an electronic eligibility reminder that PCPs saw at the time they were writing all other orders (prescription, referral, and procedure orders are carried out electronically). Reminders stated that some patients may not be appropriate for the programme, including pregnant women and those with serious mental illness. A single computer keystroke by the PCP led to the printing of a Take Charge Lite (TCL) prescription that was accompanied by a letter describing the free programme. The TCL prescription gave the telephone number to call to schedule a TCL appointment.	Cite USPSTF guidelines [199] and 5As approach [438, 439]. Also draws on the RE-AIM framework in terms of evaluating reach and considering implementation [243, 440].	**Increase in referral** from 5% at baseline to around 20% Of those screened positive for OW/obesity, 5,034 (40.3%) received a TCL referral from their PCP.
Krist [376] (2008)	9 practices 5679 patients	Electronic linkage system - Utilizing the electronic medical record (EMR) as a platform, eLinkS was designed to (1) help clinicians systematically perform elements of the 5A's that are feasible in busy practice settings (i.e., asking about health behaviours, offering brief advice, and agreeing on next steps); (2) make it fast and easy to refer patients to intensive counselling outside the office; and (3) establish bidirectional communication between practices and community counsellors.	5As framework [439] . USPSTF (2003) guidelines are cited [199].	The % of patients with unhealthy behaviours who received intensive counselling through eLinkS (10%) **exceeds practice norms**. Advice given to 17% of obese patients – 12% of obese patients received a referral.

Author (year)	Participants	Description of Tool/Resource used	Use of Theory	Main Outcome(s)
Wilson [390] (2010) – related to Krist [376]	9 practices 146 patients	As above, but this paper focused on patients referred for weight loss. Patients could select from: group classes offered through a commercial weight loss programme (Weight Watchers); individual telephone weight loss counselling); computer- based counselling; or usual care, which consisted of any alternative the patient and clinician decided to pursue (e.g., counselling by the clinician or a decision not to address overweight).	5As framework [439].	**Group counselling**: stat sig reductions in weight (3.5kg, p<0.001) **Telephone counselling:** reduction in mean body weight (2.0kg, p=0.037) **Usual care:** Small non-sig reductions in body weight (0.30kg).
Other studies in which tools/resources to improve ease of referral were used				
Flocke [387] (2006)	7 practices	(1) A web-based health behaviour change resource including a database of community programmes and patient education materials, and (2) a health behaviour prescription pad.	5As framework [439]. Authors also cite evidence that clinicians are often unaware of community-based resources to which patients can be referred [452, 453] and lack mechanisms to efficiently direct patients to known resources.	**Increased rates of discussion** of diet (25.7% vs 20.2%), exercise (27.8% vs 16.9%), and **weight management (**23.2% vs 16.3%, OR 1.57 (1.35-1.81), p<0.001). **Increased recommendation** to consider looking into community programmes.
Ely [381] (2008)	3 practices – no detail on practitioners	An electronic registry of obese patients was created with regular updates to physicians on patient motivation for weight loss, and obesity care recommendations for the next office visit. This registry information was in part derived from information collected	Chronic Care Model [441].	Day 180 mean (SD) weight change for the active and control arms, respectively, was −9.4 (10.3) pounds and −2.1

Author (year)	Participants	Description of Tool/Resource used	Use of Theory	Main Outcome(s)
		during the telephone counselling sessions and included participant name, contact information, readiness to change regarding weight loss behaviour, weight loss attempts, methods employed in weight loss attempts, and facilitators and barriers to weight loss. The registry was updated monthly during the study. At the time of each registry update, physicians were sent feedback reports of patient progress and office visit recommendations. **Decision Support.** Physicians were provided NIH obesity guidelines and regular updates based on electronic registry information. These updates included guideline-based obesity care recommendations and feedback on patient progress with weight loss behaviour change.		(10.7) pounds (*P* = 0.01 for difference).
Baer [366] (2015)	12 practices 14779 patients	**Reminders with tailored management recommendations**, based on patients' BMI and other risk factors (e.g. hypertension, hyperlipidaemia, type 2 diabetes) included on the problem list or identified from medications or laboratory results. For each patient with BMI ≥25, one reminder appeared on the summary screen with a recommendation that was based on the NIH guidelines [446] **A Weight Management screen with several features**, including tools to help providers assess patients' motivation to lose weight, calculate and set a 6-month weight loss goal, refer patients to other resources (e.g. nutritionist or medically monitored weight loss programme), and access more information.	Several guidelines cited including USPSTF [199], National Institutes of Health (NIH) [445, 446], and American College of Physicians (ACP) [447]. Also cite numerous studies showing under-identification of overweight and obesity in primary care [233, 448-451].	**Increase in recording** of overweight/obesity on problem list, from 36% to 71%, compared to 16% to 8% in control group (p<0.0001). **No significant differences** in weight loss meds or nutrition counselling among pts with BMI>27.
Goodfellow [370]	12 intervention practices (16 control)	At the time of the study, there were various community programmes to improve health and assist weight loss, some of which were available for patients to self-refer into, whilst others	The authors did not draw on behavioural theory, relying instead on their	Self-reported **increases in confidence, knowledge and skills** related to weight

Author (year)	Participants	Description of Tool/Resource used	Use of Theory	Main Outcome(s)
(2016)	17,728 intervention patients (32,079 control)	required a referral from a professional. Many professionals were not aware of the variety of services available or how to refer patients to them. During the intervention, professionals were asked to list all of the local services they were aware of. After visiting practices, the research team also searched for additional referral options, and then provided teams with a complete list of local services and referral pathways.	own ideas on the strategies most suited to address the determinants, a process informed by the development of the TICD checklist [419].	management, with respondents feeling better able to manage obese/overweight patients. However, there were **no significant differences** in the proportion of patients offered a weight management programme between the control and intervention practices (15.1% in the control practices, 13.2% in the intervention practices, p=0.53).
Aveyard [241] (2016)	137 primary care physicians at 57 practices from across the south of England	Study staff ensured that patients who agreed to referral left the practice with an appointment.	No formal theory cited, but the design of the intervention was informed by evidence that an offer of help to change is more motivating than advice to do so [420], by results of a trial of brief interventions for smoking cessation that showed that uptake is higher when the referral is enacted by the system rather than leaving patients to instigate it [421], and by evidence	As a result of the support intervention, 722 (77%) of 940 participants accepted referral to the weight management programme and 379 (40%) attended an appointment, compared with 82 (9%) participants who were allocated the advice intervention.

Author (year)	Participants	Description of Tool/Resource used	Use of Theory	Main Outcome(s)
			that external accountability is an important component of behavioural programmes [401]; physicians were trained to ask the participant to return in 4 weeks to assess their progress.	

Table 5-7: Studies using Audit/Feedback

Author (year)	Participants	Description of Audit/Feedback approach	Use of Theory	Main Outcome(s)
		Studies in which audit/feedback was main strategy		
Aspy [371] (2008)	10 clinicians	**Facilitation** One practice-enhancement assistant was assigned to each geographic cluster of clinicians. Each practice-enhancement assistant worked with three clinician–office staff teams in a single geographic cluster to implement the new screening and intervention methods using PDSA quality-improvement cycles, a skill they had developed in prior projects. The practice-enhancement assistants also performed monthly chart audits to provide feedback to the clinicians on their progress. To ensure data accuracy, all practice-enhancement assistants audited the same set of training charts and discussed any differences until agreement was 100%. The practice-enhancement assistants worked closely with the nurses and medical assistants to modify office routines, forms, and computer templates; they helped each team identify community resources; and they helped the team find or develop patient education materials.	Stages of change [404] RE-AIM model [407] Plan-do-study-act (PDSA) cycles [408].	**Increase in screening** for diet (25.8% to 69.0%) and physical activity (0% to 23.6%) **Increase in brief intervention** for diet (2.9% to 21.3%) and physical inactivity (2.9 to 21.0%).
		Other studies in which audit/feedback was used		
Laws [16] (2004) And Ross [382] (2008)	58 practices 1256 patients	A 1 h workshop was conducted with GPs and PNs in each practice to feedback the audit results, to discuss the treatment pathway and to set priorities for implementation. By highlighting the burden of obesity in each practice and the current levels of screening and intervention, it was hoped that GPs would support the implementation of a more consistent and structured approach to	Adult learning theory [406]. The authors also cite evidence that feedback of audit results related to	91% received one of the core lifestyle interventions in the first 12 months. 34% achieved a clinically meaningful weight loss of 5% or more of initial weight.

Author (year)	Participants	Description of Audit/Feedback approach	Use of Theory	Main Outcome(s)
		weight management in the practice. The main role of the GP was to identify suitable patients for weight management intervention during routine clinical practice and to refer on to the PNs. This involved raising weight as an issue with appropriate patients and possibly discussing the benefits of a 5–10% weight loss.	current clinical practice can help to change future practice [454].	
Ely [381] (2008)	3 practices – no detail on practitioners	An electronic registry of obese patients was created with regular updates to physicians on patient motivation for weight loss, and obesity care recommendations for the next office visit. This registry information was in part derived from information collected during the telephone counselling sessions and included participant name, contact information, readiness to change regarding weight loss behaviour, weight loss attempts, methods employed in weight loss attempts, and facilitators and barriers to weight loss. The registry was updated monthly during the study. At the time of each registry update, physicians were sent feedback reports of patient progress and office visit recommendations.	Chronic Care Model [441].	Day 180 mean (SD) weight change for the active and control arms, respectively, was −9.4 (10.3) pounds and −2.1 (10.7) pounds (*P* = 0.01 for difference).
Schuster [383] (2008)	21 physicians 641 patients	Physicians presented with information (feedback) on outcomes.	No formal theory cited.	**Increase in recording** of obesity management in patient records: Intervention group: 2.4% to 9.2% (p=0.001).Enhanced intervention group: 3.9% to 15.6% (p-0.002). **Increase in % physicians "comfortable"** discussing obesity from 53% at baseline to 100% at 12 months (p=0.041).
Wilkes [375] (2013)	5 health centres	Teams learned to implement the Quality Improvement (QI) model, which instituted rapid cycles of change (Plan- Do- Study- Act) framework. To track health centre QI project implementation and	QI approaches, e.g. PDSA cycles [455].	Participants reported **improved ability to identify overweight patients** in need of weight

Author (year)	Participants	Description of Audit/Feedback approach	Use of Theory	Main Outcome(s)
	No patient data	facilitate peer- learning across sites, a password-protected website was developed and refined based on participant feedback. Teams were asked to enter monthly updates on the website to document their experience and progress implementing rapid cycle QI within their weight management programmes. Monthly conference calls facilitated sharing experience across practice sites regarding QI implementation, challenges and successes.		management. Three of the five teams reported an **increasing ability over time to engage their providers** in order to increase referrals to the weight management programme.
Barnes [367] (2015)	1 primary care centre 100 patient records	Once every week, the project director communicated with the clinical staff and providers regarding the project objectives. This reminder communication occurred through a card in their clinic mailbox. Audit and feedback results were communicated as part of the reminders via email at the mid-point of the 6-week implementation phase.	The theory of planned behaviour (TPB) [417].	There was no routine documentation of BMI prior to the PHAT-G intervention. From time 1 (phase 1) to time 2 (phase 3), overall **BMI documentation increased** by 13%, which was significant ($P < 0.01$). Documentation rate of weight loss plan increased from 2 to 6 from time 1 to time 2 (NS).
Erickson [372] (2014)	29 clinicians and 10 administrators and from 10 partner sites No patient data	The consultants held conference calls and webinars to provide follow-up and support, and to conduct evaluation. Following the initial 12-month intervention, the PHN practice facilitator met quarterly with each partner organization to assess action plan progress and barriers to success, and to offer guidance and resources supportive of guideline implementation. The PHN practice facilitator applied the 5As framework to her system-level facilitation activities.	5As framework [416] and motivational interviewing [411].	On a scale of 1–5 (1 = low/neg; 5 = high/pos), the **average Knowledge Behaviour Status (KBS) ratings** across partner orgs **increased** over two points from baseline to 3 years follow-up.

NS= Not significant

Table 5-8: Studies that used Networks or Quality circles

Author (year)	Participants	Description of Network/Quality circle approach	Use of Theory	Main Outcome(s)
		Studies in which networks/quality circles were main strategy		
Sinfield [374] (2013)	Two implementa-tion groups with 12 people in each (6 clinicians)	Two facilitated implementation groups explored tailoring to improve adherence to NICE guidelines on adult obesity in primary care. Tailoring involved two key steps. The first involved investigation of context and the prevailing barriers to change in which a variety of methods may be used with professionals and patients including: interviews, focus groups, questionnaires and observation. The second step involved the selection of intervention methods chosen to account for the barriers identified.	No formal theory, but literature on implementation barriers was cited [456]. A systematic review of randomised controlled trials found that tailored interventions were more effective than no intervention or to dissemination of guidelines and educational materials alone [396].	Identification of barriers and facilitators to weight management in primary care.
		Other studies in which networks/quality circles were used		
Laws [16] (2004) And Ross [382] (2008)	56 practices	Weight management advisers, all registered dietitians with specialist postgraduate training and experience in obesity management, led and facilitated implementation of the programme. They offered expertise in obesity management and provided protocols and training materials for practice staff and patient education materials. Peer support in the practices was provided once or twice each month by the weight management adviser until practice nurses achieved competency and confidence.	Adult learning theory [406].	Mean weight change in those who attended and had data at 12 months (n = 642) was –3.0 kg (95% CI = –3.5 to –2.4 kg) and at 24 months (n = 357) was –2.3 kg (95% CI = –3.2 to –1.4 kg).

Author (year)	Participants	Description of Network/Quality circle approach	Use of Theory	Main Outcome(s)
		Mentoring usually took 6 months. Subsequent visits by weight management advisers were to assist with auditing outcomes, provision of materials (for example, information leaflets), and training of new staff members.		
Aspy [371] (2008)	10 clinicians	Quality Circle: During each cycle, the three clinician teams in each cluster met three times (at 2, 4, and 6 months) with their practice enhancement assistant and the principal investigator to review progress and share ideas. Performance data were shared, and specific techniques were described and discussed. The clinician, a nurse or medical assistant, and an office manager from each practice generally participated in these meetings.	Stages of change [404] RE-AIM model [407] Plan-do-study-act (PDSA) cycles [408].	**Increase in screening** for diet (25.8% to 69.0%) and physical activity (0% to 23.6%) **Increase in brief intervention** for diet (2.9% to 21.3%) and physical inactivity (2.9 to 21.0%).
Wilkes [375] (2013)	5 health centres No patient data	Combating Obesity at Community Health Centres (COACH) Quality improvement collaborative – learning sessions (PDSA methods and one based on Diabetes Prevention Programme); website for evaluation; conference calls for knowledge sharing. Supported by financial resources and evidence-based tools to implement this QIC.	QI approaches, e.g. PDSA cycles [455].	Participants reported improved ability to identify overweight patients in need of weight management. Three of the five teams reported an increasing ability over time to engage their providers in order to increase referrals to the weight management programme.

5.5 Development of programme theory

Realist reviews may be considered, broadly speaking, as either theory building or theory testing [457]. The current review is relatively broad, and was conducted in an under-theorised area and is, therefore, more of the 'theory-building' type. As such, an initial programme theory was not constructed in detail at the outset. The rationale for this was in part due to uncertainty as to the number and heterogeneity of relevant interventions in the literature [283].

However, the focus was always on the role of primary care in the identification and referral of individuals with obesity, who may benefit from weight management support. In its simplest form, therefore, the early 'rough' programme theory (shown in Figure 5-3) can be thought of as a process with five basic steps (though note that the steps will not always follow sequentially, e.g. measurement of weight may come before discussion of weight):

Figure 5-3: Initial 'rough' programme theory

Taking each step in turn, the first step is for a patient with obesity to attend the practice to see either the practice nurse or GP. Patients attend for many different reasons and this 'reason for attendance' will influence the next step in the chain. For instance, if someone attends for a same-day appointment for assessment of an acute problem, such as pain or infection, it may be entirely inappropriate to 'identify weight as a health concern', unless the patient's excess weight has directly contributed to the acute presenting problem.

Similarly, most patients with obesity who attend the practice will not be attending specifically to discuss their weight. Thus, while this is an important first step in the process of identification and referral, it is harder to influence

attendance as part of an intervention and was, indeed, rarely measured in the included interventions studies.

Once a patient has attended, the next step is identification of weight as a health concern. This may be done by the patient themselves, or by the primary care practitioner. This is a necessary, though not sufficient, precursor to discussion of weight in the consultation, as there may be occasions when a practitioner has identified a patient as being overweight or obese, but does not feel able to discuss it at that particular moment, for various reasons. As such, this step is also difficult to influence and harder still to measure as an outcome, especially when such identification is rarely recorded in patients' notes.

Therefore, it is the next 3 steps which represent the main outcomes of particular interest in this review:

1. **Discussion of weight**

2. **Recording of weight/BMI**

3. **Referral to WMS offered/accepted**

In order to further develop this early programme theory, the next step involved the generation of so-called 'If-Then' statements, to consider potentially important contexts and mechanisms that might lead to the outcomes of interest.

5.5.1 If-Then Statements

If-Then statements have been used in realist reviews as a useful framing of CMO configurations [458]. They have been expanded to 'If-Then-Because' statements to represent (broadly) elements of Context, Outcome and Mechanism respectively.

The statements were developed as the review progressed and familiarity with data increased, but before formal data extraction was complete. As such, they should be viewed as a series of hypotheses, which could then be tested against empirical data from the intervention studies and accompanying papers. This process was an iterative one, based on individual thinking, reflection on the

potential mechanisms identified during data extraction, and on discussion with colleagues (supervisors and fellow realist researchers at the Centre for Advancement of Realist Evaluation and Syntheses, at the University of Liverpool), drawing upon existing knowledge and clinical experience.

Three tables of 'If-Then-Because' statements are presented; one table for each of the three main outcomes of interest. The first column in each table represents the most pertinent 'level' of context. These levels of context are focused at practitioner and interpersonal levels (micro) and the institutional level (meso), with only brief consideration of the wider environment factors (the macro level) as per Figure 3-5.

Table 5-9: If-Then-Because statements for discussion of weight

Level	If	Then	Because
Individual (patient and practitioner)	Patients have weight-related co-morbidities	Discussion of weight is more likely	Patients and practitioners may feel it is a legitimate (medical) reason to talk about their weight
Individual (practitioner)	Practitioners receive training on the health risks associated with obesity	Discussion of weight is more likely	Practitioners have more knowledge of the risks
	Practitioners receive training on how to raise the issue of weight sensitively	Discussion of weight is more likely	Practitioners feel more confident in raising the issue of weight
Interpersonal	Practitioners are challenged to think about size/weight discrimination	Discussion of weight is more likely to be done in a supportive, non-judgmental way	Practitioners have reflected on their own attitudes and assumptions
	Practitioners are overweight/obese themselves	Discussion of weight is more likely	Practitioners feel they can empathise more effectively with patients
Institutional	Practitioners feel they have the support of other practice staff	Discussion of weight is more likely	Weight management is valued as a priority
Infrastructural	Practitioners are reimbursed for preventive health care	Discussion of weight is more likely	There is a financial incentive

Table 5-10: If-Then-Because statements for recording of weight

Level	If	Then	Because
Individual (patient)	Patients want support with weight loss	Recording of weight/BMI is more likely	There is motivation for weight monitoring
Individual (practitioner)	Scales are present in all consulting rooms	Recording of weight/BMI is more likely	There is increased awareness
Interpersonal	BMI charts are visible to patients in waiting room or consulting room	Recording of weight/BMI is more likely	Patients and practitioners may feel more able to raise the issue of weight
Institutional	The process for recording BMI is automated	Recording of BMI is more likely	It is quick and easy
Infrastructural	There are systems in place for monitoring obesity trends and comparing trends across practices	Recording of weight/BMI is more likely	Practices may value the purpose of recording for audit/QI purposes

Table 5-11: If-Then-Because statements for referral

Level	If	Then	Because
Individual (patient)	Patients with obesity have weight-related co-morbidities	Referral to WMS is more likely	Their problem can be medicalised and practitioners feel more comfortable discussing it
	Patients and practitioners are both female	Referral to WMS is more likely	There is an expectation that they are more likely to attend
	Patients are not socio-economically deprived	Referral to WMS is more likely	Practitioners may believe that they are more likely to attend
Individual (practitioner)	Practitioners are familiar with the options available	Referral to WMS is more likely	Practitioners have increased awareness and familiarity
Interpersonal	GPs appear confident and optimistic about the service	Referral to WMS is more likely	Patients are more likely to trust the referral
Institutional	Practitioners have been shown evidence of effectiveness of WMS	Referral to WMS is more likely	Practitioners have increased confidence in service
	The recording of BMI is	Referral to WMS is	Practitioners are

	routine within the practice	more likely	aware of the diagnosis of obesity
	WMS have made efforts to improve communication with practices	Referral to WMS is more likely	Practitioners have increased trust in service
	There is an obesity lead/champion within the practice	Referral to WMS is more likely	Weight management is given priority and visibility within the practice
	The referral process is fast and easy to use	Referral to WMS is more likely	It becomes automatic and habitual for the practitioner
Infrastructural	There is a high prevalence of obesity in the area	Referral to WMS is more likely	Practitioners recognise the need for support because obesity is seen as a local priority
	There is a high prevalence of obesity in the area	Referral to WMS is less likely	Overweight is normalised and not seen as a priority

As noted in the methods section, it is likely that some CMOs will be linked – that is, that the outcome of one CMO configuration will become the context of the next. In the present example, it seems likely that the outcome 'discussion of weight' will be an important context for the outcome of 'recording of weight', which will then provide the context for 'referral to WMS' being offered, and vice versa; in another situation it might be that a patient with obesity has not had weight management discussed for some time, but if 'recording of weight' is routine, then 'discussion of weight' may be more likely to follow.

In the process of generating these 'If-then-because' statements, thought was also given to other synergies between them, including whether the same mechanism may be involved in producing different outcomes. Unintended consequences of intervention strategies were also considered. For instance, it seems reasonable to hypothesise that, for some people at least, the prospect of having their weight discussed by their GP or PN might put them off attending their practice in the first place. Thus, interventions that set out to increase the

number of primary care discussions of weight may have the unintended consequence of reducing the number of adults with obesity that attend.

A further example of a potential unintended consequence is the 'opportunity cost' of increasing time spent on weight management discussions, resulting in practitioners having less time to spend on other important clinical matters.

5.5.2 Programme mechanisms and categories of intervention

This stage of the review involved close reading and data extraction of each of the included papers, broken down into different intervention strategies to try to discern so-called 'Context-Mechanism-Outcome' configurations, informed by the working hypotheses generated using the If-The-Because statements; in essence, the aim is to identify mechanisms that produce different outcomes, taking account of the contexts that make these mechanisms more or less likely to 'work'.

In an ideal world, these would be presented as individual C-M-O configurations, but in practice it can be challenging to identify the particular aspect of 'context' (encompassing micro, meso, and macro levels) which affects a particular mechanism, as most aspects of context will have some impact on all mechanisms that are important for any given intervention. Furthermore, as noted in Chapter 3, it can be hard to untangle context and mechanism [287-289].

Context-Mechanism-Outcome configurations

In creating CMO configurations, a common approach in realist research is to start with the outcomes of interest and 'work backwards' to discern potential mechanisms and contextual factors that affect those mechanisms [458-460]. This approach was taken when generating the 'If-Then-Because' statements in Tables above. It was also used when analysing the data from the included studies, breaking them down by intervention strategy as shown in Table 5-3. The mechanisms have been presented here as 'resources' plus 'reasoning', in keeping with the approach of Pawson and others [246, 250, 292], with a separate column for contexts (generally enabling but occasionally constraining).

Table 5-12: Context-Mechanism-Outcome configurations

Intervention strategy (Study lead, year)	Enabling/constraining contexts	Mechanism Underlying programme theory (resources)	Mechanism Cognitive/emotional response (reasoning)	Potential outcomes (+ / -)
Training				
Training, e.g. around brief interventions. (Laws, 2004; Katz, 2005; Aspy, 2008; Ross, 2008; Schuster, 2008; Jay, 2010; Christian, 2011; Jay, 2013; Wilkes, 2013; Erickson, 2014; Barnes, 2015; Steglitz, 2015; Goodfellow, 2016; Aveyard, 2016).	Supportive atmosphere Feedback provided Draws on previous successes. Convenience of training setting. Incentives to take part in training (e.g. CPD points). *(This is also a mechanism – see below)*	Knowledge. Skills. Time/space for reflection.	Increased **confidence.** Increased self-efficacy. Increased **awareness** of referral options.	Increased discussion of weight. Increased referral rates. Patients with a higher BMI were more likely to receive counselling *(an individual-level C making an O more likely).*
Tools/resources to improve the identification of obesity				
Office-based prompts Including desk-based prompts such as flip-charts (Laws, 2004) and BMI charts in consulting rooms (Lemay, 2004; Barnes,	Consultation length. Repeated opportunities in primary care. Physicians still had to manually calculate BMI –	Physical reminder (practitioner). Knowledge of own BMI (patient).	**Opens safe space** for conversation. More likely to think about BMI. Objective measure **less stigmatising.**	Increased discussion of weight. Increased measurement of BMI. Increased documentation of

Intervention strategy (Study lead, year)	Enabling/constraining contexts	Mechanism Underlying programme theory (resources)	Mechanism Cognitive/emotional response (reasoning)	Potential outcomes (+ / -)
2015; Goodfellow, 2016), BMI chart and stamp in notes (Muo, 2013), posters on walls (Goodfellow, 2016), and written handbook (Sturgiss, 2017).	this needs to be automated. (Muo, 2013)			BMI. Patient more likely to raise issue themselves, which makes GP more comfortable. (*O becomes C for another CMO*)
Automatic calculation of BMI in Electronic Medical Record (Bordowitz, 2007; Clark, 2008; Clark, 2010; Baer, 2015)	Depends on patient BMI. May depend on patient co-morbidities. Danger of "alert fatigue".	Physical reminder to practitioner. Memory, attention and decision processes.	Objective measure **less stigmatising** (Doctors remain more influenced by patient appearance than by BMI).	Increased documentation of obesity. Increased management of obesity.
Reminder card (Shungu, 2015) *or sticker placed on notes* (Schuster, 2008; Banerjee, 2013) indicating diagnosis of obesity and recommending treatment/referral.	Depends on patient BMI. May depend on patient co-morbidities.	Physical reminder to practitioner. Memory, attention and decision processes.	More likely to think about BMI. Increase in % physicians "comfortable" discussing obesity.	Increased discussion of weight. Increase in recording of obesity management in patient records.
Computerised support tool Tailored physician reports and patient self-management goal	Patients reported that the booklet was not as important to them as the physician support and computer-generated	Patients select self-management goals prior to meeting physician – patients with greater levels of motivation can be identified quickly, so that subsequent	**Opened-up space** for conversation – set stage. Prompts physician to consistently discuss metabolic	Increased discussion of weight. Increased documentation of obesity.

Intervention strategy (Study lead, year)	Enabling/constraining contexts	Mechanism Underlying programme theory (resources)	Mechanism Cognitive/emotional response (reasoning)	Potential outcomes (+ / -)
sheet (Christian, 2011); Automated clinical reminder for the clinician to recommend lifestyle modification for adults with obesity (O'Grady, 2013; Erickson, 2014); Electronic registry of patients with obesity (Ely, 2008).	tailored report. Some preferred to deal with these issues over several consultations. Time pressures and immediate health issues were a barrier to addressing lifestyle and primary prevention. Lack of referral services and long waiting lists were a barrier to referral to other services.	resources required for more aggressive weight management can be targeted more effectively. Included content on using motivational interviewing and other evidence-based counselling styles.	risks and the potential value of lifestyle change. **Increased practitioner confidence** and a reduction in their perception of barriers. More likely to record a diagnosis of obesity in patients who are actively working on losing weight.	Increased referral to weight management resources.
Additional staff, e.g. 'practice enhancement assistant' (Aspy, 2008), 'weight management advisers' (Ross, 2008), 'clinic staff' (Krist, 2008; Schriefer, 2009; Steglitz, 2015), 'health educator' (Clark, 2008 & 2010); 'research team' (Aveyard, 2016).	Practitioners were more likely to drop the newly added screening items rather than drop the traditional physical measures.	Identification of obesity made simpler by 'additional' staff member routinely measuring height and weight. Some worked closely with PCPs to modify routines, forms, computer templates.	Trust. Additional Time. Social Norms – make checking weight automatic, habitual.	Increased identification of obesity. Increased rate of brief interventions.

Intervention strategy (Study lead, year)	Enabling/constraining contexts	Mechanism Underlying programme theory (resources)	Mechanism Cognitive/emotional response (reasoning)	Potential outcomes (+ / -)
Tools/resources to improve the ease of referral				
Rapid referral: - TCL (Take Charge Lite) study - "single computer keystroke" required to initiate referral (Clark, 2008; Clark, 2010). - eLINKS study – prompts and automated referrals (Krist, 2008; Wilson, 2010) Weight management screen (Baer, 2015).	Patient factors – reach highest for females, those aged 50 to 64, and non-Hispanic Black patients. Increased awareness attributable at least in part to presentations, clinic brochures and posters, and feedback from participating patients. Convenience (of different services offered) and clinician recommendation were influencing factors.	Ease of printing of TCL prescription. The screen displays and the EMR programming were designed to make the interface with clinicians **easy and fast**, to automate the referral process electronically, and to facilitate proactive counselling. Patient choice was a factor here too.	Reminder for PCP to have further discussions re weight management with the patient. Increased Pt and PCP **awareness and acceptance** of the programme. Importance of co-design (pre-existing engagement) for trust in service.	Increased discussion. Increased referral.
Web-based resource with database of community programmes and patient education materials (Flocke, 2006).	Community resources need to be easily accessible.	Improving links with community resources. Leaflets, posters, adverts (e.g. radio or newspaper) raising awareness of WMS.	**Increased awareness** of available resources. **Increased confidence.**	Increased discussion of health behaviours. Increased referral to WMS.

Intervention strategy (Study lead, year)	Enabling/constraining contexts	Mechanism Underlying programme theory (resources)	Mechanism Cognitive/emotional response (reasoning)	Potential outcomes (+ / -)
Improving links to community resources for weight management, e.g. local service referral directory (Clark, 2010; Wilkes, 2013; Goodfellow, 2016).	Patient factors (older, female, higher BMI, more likely to have co-morbidities). Acceptance of referral depends on patient-practitioner relationship and patient motivation.	One suggested solution (to lack of PCP time) is to have PCPs use less than one minute to refer patients to lifestyle programmes where the contact can take place.	**Improved communication and trust.** **Positive reinforcement** when positive results are seen.	Increased discussion. Increased referral.
Audit/feedback				
Feedback on individual or practice referral patterns (Laws, 2004; Eichler, 2007; Aspy, 2008; Ely, 2008; Ross, 2008; Schuster, 2008; Wilkes, 2013; Barnes, 2015; Erickson, 2015).	Accuracy of data. Time to discuss within practice. Practices able to decide how much time to spend on different tasks.	Social/group norms. Benchmarking against other anonymized practices, regionally and nationally.	**Weight viewed as a priority.** Peer comparison and competition may **spur on to improve practice.** **Positive reinforcement** when positive results are seen	Increased discussion of weight. Increased referral rates.
Working in networks/Quality circles				
Quality circles (Aspy, 2008; Wilkes, 2013); facilitated implementation groups	Participating health centres were given electronic data collection tools, and monthly data	Dedicated time. Peer support.	Increased knowledge, **confidence** and motivation. **Consensus building.**	Increased discussion of weight. Increased referral rates.

Intervention strategy (Study lead, year)	Enabling/constraining **contexts**	**Mechanism** Underlying programme theory (resources)	**Mechanism** Cognitive/emotional response (reasoning)	**Potential outcomes** (+ / -)
(Sinfield, 2013); peer support (Laws, 2004; Ross, 2008).	reports were required. Without such resources and financial support, it is unknown whether the Quality Improvement Collaboratives (QICs) could be implemented at community health centres.	Forming effective teams, setting aims, establishing measures, and spreading changes.	Increased trust among colleagues – **'safe space'** to discuss practice. **Improved communication** within team.	
Other intervention strategies				
Incentives (Katz,2005; Wilkes, 2013; Shungu, 2015). *Designated lead for weight management* (Erickson, 2014; Goodfellow, 2016).	Competing demands on time. Depends on awareness and understanding of incentives. Support for lead is important.	Incentives for training (e.g. CPD points) or for engagement with weight management (e.g. gift certificates or financial reimbursement). Protected time and resource for lead practitioner.	Practitioners **respond to financial or professional rewards.** Weight is seen as a **priority** . **Consensus** on management is built.	Increased discussion of weight. Increased recording of BMI and obesity diagnosis. Increased referral.

On reviewing Table 5-12 above, it is clear that there is considerable repetition of mechanisms within many of these CMOs. In the 'reasoning' column of the table, some of these recurring mechanisms are highlighted in bold. For instance, increasing practitioner awareness of available services and confidence in discussing weight are features of several of them. The next stage therefore, as outlined previously, involved identifying patterns such as this within these CMO configurations.

This process produced a total of 12 mechanisms through which interventions targeted at primary care practitioners to improve identification and referral of adults with obesity are proposed to work. This attempt to distil the data into a more manageable number of mechanisms, which may be transferable across different settings, resonates with previous realist research [246, 461]. The most extreme example of this is the assertion that all mechanisms can be reduced down to "carrots, sticks and sermons" [462], though this is clearly a gross oversimplification.

For ease of reference, and following the example of the realist review by Westhorp et al [457], each mechanism has been given a title that encapsulates how the mechanism works. Table 5-13 below presents the 12 mechanism titles, with a definition and illustrative example for each.

Table 5-13: Mechanisms with illustrative examples

Mechanism title	Definition	Illustrative example from the included papers
Yes we can	in which primary care practitioners have the confidence to talk about weight in a sensitive manner with their patients	*The GP has had a positive experience managing a patient with obesity leading to increased GP 'professional self-efficacy' to assist patients to change their behaviour. This has flowed into regular daily practice with the GPs reporting increased ease in discussing obesity and management options with patients who were not part of the pilot study.*(Sturgiss, 2017)
Spread the word	in which awareness of available weight management services is	*Developing easily accessible mechanisms to link clinicians and patients to community*

	raised among patients and practitioners	*resources could both raise awareness of these resources and facilitate guiding at-risk patients to external resources for health behaviour change support.* (Flocke, 2006)
Right time, right place	in which the consultation is considered a 'safe space' to discuss weight	*Providers found patients using the BMI tables to calculate their own scores while waiting in the exam room for the providers. This information often prompted patients to begin a dialogue with the provider about the health implications of an elevated BMI, as well as possible strategies for weight loss.* (Lemay, 2004)
No blame, no shame	in which the non-judgmental, supportive approach taken by primary care practitioners encourages engagement with weight management	*Providers reported that patient-initiated discussions helped them feel more comfortable – and thus potentially more effective – discussing an objective measure, i.e. BMI, rather than a stigmatising label (overweight or obese) with their patients. In addition, the use of the objective measure, not one based on the providers' view of the patient's weight, helped decrease patients' defensiveness. (*Lemay, 2004)
It's working!	in which seeing positive outcomes operates as a positive feedback loop motivating further action	*That it takes a month or so of program implementation for reach to elevate likely reflects growing patient and PCP awareness and acceptance of the program attributable at least in part to presentations, clinic brochures and posters, and feedback from participating patients* (Clark, 2008)
Eyes and ears	in which current practice is monitored/audited and action is taken on the basis of this feedback	*At a wider practice level, provision of feedback data on practice performance was appreciated and provided an incentive to continue implementing the programme.*

		(Ross, 2008)
It's good to talk	in which improved communication between primary care practitioners and weight management services results in increased trust and improved referrals	*During the monthly telephone calls and additional meeting, we assisted several practices to develop links with potentially useful local services, for example, an exercise class for people with limited mobility being run by a volunteer centre, or a health trainer service that offered one-to-one support in weight management.* (Goodfellow, 2016)
One size doesn't fit all	in which a choice of weight management options is offered to patients in recognition of the heterogeneity of obesity	*Tailoring questions and advice to each site's unique situation, challenges, and priorities, made it possible to identify barriers and potential solutions to QI implementation quickly* (Wilkes, 2008)
Same hymn sheet	in which primary care teams are working well together, with consensus around weight management activities	*… because we've had [the PHN] coming, checking in with us, and reminding us of things, and reviewing previously set goals, and assisting us in setting future goals . . . it's helped us stay on track, and it's helped us continue to be mindful of the process.* (Erickson, 2015)
This matters	in which primary care practitioners recognise the importance and value of weight management	*The daily physical presence of a project director could increase communication about current guidelines for obesity, serve as a reminder to staff and providers that obesity is a clinic priority, and promote the adoption of new behaviours that are consistent with a focus on obesity as a health priority.* (Barnes, 2015)

Quick and easy	in which a key step in the process of identification and referral is automated to reduce practical barriers	*The screen displays and the EMR programming were designed to make the interface with clinicians easy and fast, to automate the referral process electronically, and to facilitate proactive counselling* (Krist, 2008)
Carrots and sticks	in which primary care practitioners respond to actual application of rewards/incentives or sanctions	*"Inclusion of weight management in GP contracts may be necessary however to promote wider involvement of primary care in managing obese patients."* (Laws, 2004)

The next step in the review process was to link these 12 mechanisms to both the intervention strategies and the three key outcomes of interest. This is illustrated in Figure 5-4.
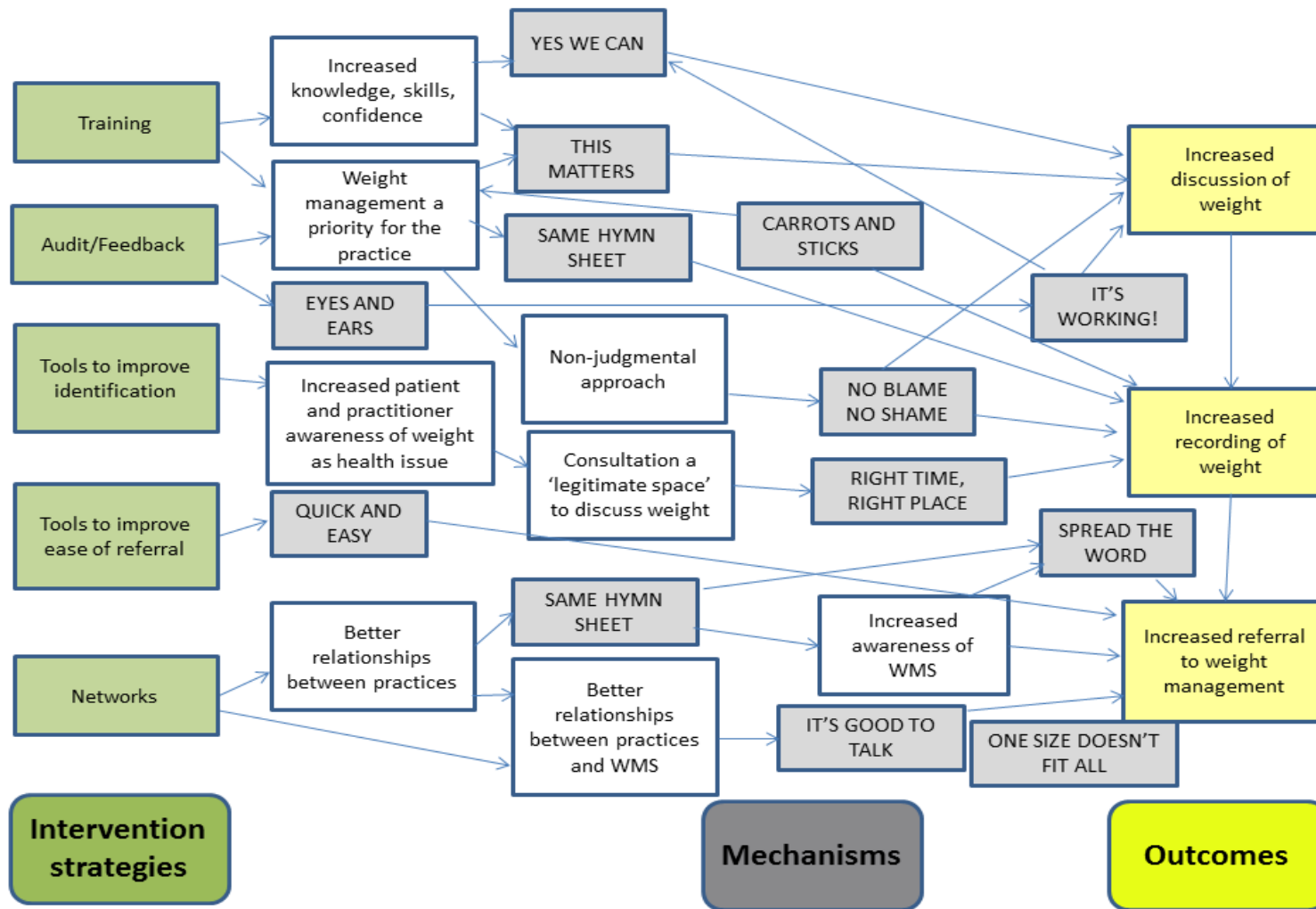
Figure 5-4: Linking Intervention strategies, Mechanisms and Outcomes

Figure 5-4 shows the five main intervention strategies in green boxes, with arrows linking these strategies to the 12 mechanisms (in grey boxes), which are then linked to the three key outcomes of interest (in yellow boxes). There are also white boxes which contain intermediate outcomes or additional explanation of the mechanisms to help make sense of the various connections.

Looking back at the 'If-Then-Because' statements which were developed as the review progressed it is striking (though perhaps unsurprising) how many of these fit into the 12 mechanisms described. There were only a few examples, such as those below, where the included studies were not able to provide any evidence. The qualitative interviews in Phase 4 will shed more light on these interpersonal interactions.

If	Then	Because
Patients and practitioners are both female	Referral to WMS is more likely	There is an expectation that they are more likely to attend
Patients are not socio-economically deprived	Referral to WMS is more likely	Practitioners may believe that they are more likely to attend

The next section looks at the contextual factors that were found to influence programme outcomes.

5.5.3 Contextual features influencing programme outcomes

In an ideal world, mechanisms would be linked not only to intervention strategies and outcomes (as in Figure 5-4 above), but also to contexts. However, most of the mechanisms in this review were affected by various contexts, and this level of complexity is extremely difficult to convey in an image or figure. What follows is an attempt to draw out the most important contextual influences (at micro, meso, and macro levels) with evidence from the included studies to demonstrate these. Table 5-14 outlines these influences at each level.

Table 5-14: Contextual features influencing outcomes

Micro (individual/interpersonal)	Patient characteristics (e.g. Age, Gender, Ethnicity, SES, BMI, Co-morbidities) Practitioner characteristics (e.g. Experience, BMI) Stigma Fear of causing offence
Meso (institutional)	Presence of "alert fatigue" Practice culture Competing priorities Team functioning Pre-existing engagement between practices and WMS Staff turnover
Macro (infrastructural)	High prevalence of obesity, leading to normalisation Timing of external events User fees / other costs Health insurance / Reimbursement system

Micro-level contextual factors (individual/interpersonal)

The main micro-level contextual factors that influenced outcomes were patient and practitioner characteristics. For the former, patient BMI was particularly important. The notion that practitioners are more likely to engage with weight for patients who are at the more severe end of the obesity spectrum, based on a visual assessment or judgement, featured in several studies [377, 380, 385]. For example, in attempting to explain why the automatic BMI calculation was more successful for improving documentation and treatment of adults with obesity than it was for those who were overweight, Bordowitz et al suggested that:

> One possible reason for this discrepancy is that physicians may check BMI only when the patient is noticeably obese. Another reason may be that physicians check BMI only when the patient has a comorbid illness. [380]

The second point in the quote above – that practitioners may be more likely to engage with weight as an issue when there is co-morbidity – was mentioned in other included studies and is well recognised in related research in this area [368, 463].

Other patient characteristics which may act as contextual factors, influencing the likelihood of intervention success included gender, age, ethnicity and socio-economic status. As the following quote demonstrates, some of these groups

may be more likely to engage with weight management than others. This topic is revisited in more detail in Chapters 7 and 8.

> eLinkS was used more for middle-aged patients and women, perhaps because the available services (e.g., Weight Watchers) appealed to this group. [376]

Practitioner characteristics influencing outcomes were cited less often, but one study reported higher quality of obesity counselling from female practitioners and those who were more patient-centred [388]. There were, however, a number of general barriers to practitioner engagement with weight, which were cited (usually in the introduction section) in several studies. In keeping with the barriers identified in Chapter 2, these included: lack of time, lack of confidence, lack of training, unwillingness to take responsibility, and weight bias or stigma [16, 368, 371, 374, 378, 383, 391].

Yet the stigma of obesity was not referred to in the included studies as often as one might expect. The excerpt below from the Banerjee paper highlights the potential effect of weight stigma:

> In some practices patients may view their problem list, either on a visit summary or through an online portal. If obesity is added to the problem list, the patient could become aware of this. While this may have a positive outcome in patient motivation to lose weight or desire to discuss obesity with the provider, it could also have unintended, negative psychological or social consequences. [385]

This is one of the few examples of unintended consequences of interventions being considered, even if it was not actually sought or recorded.

Meso-level contextual factors (institutional)

Several institutional (meso) level factors that influenced outcomes were identified in the studies, including factors related to the primary care consultation, the practice team, and the weight management services to which practitioners were referring patients. Each will be considered in turn.

First, at the level of the consultation, the issue of 'alert fatigue' was raised by O'Grady and colleagues. This is when practitioners are faced with so many alerts

and pop-up reminders on their computers that they start to pay less attention to them, and is another potential contextual factor that may influence the success of an intervention such as an automatic BMI calculator or similar EMR-based prompt:

> With the influx of a myriad of electronic reminders, clinicians may have simply succumbed to "alert fatigue" and ignored this reminder. [378]

There were other issues with electronic medical records highlighted in other studies. For instance, in the study by Aspy and colleagues:

> For this particular project, electronic health records were both a blessing and a curse. Certainly it was helpful to be able to codify the desired behaviours in an EMR template. However, most of the EMRs were so inflexible that it proved difficult to insert the screening questions within the record's vital-signs section. [371]

Similarly, in the study by Baer et al, they found that making adaptations to the EMR, or EHR (Electronic Health Record), was difficult:

> A major challenge was that the EHR-based tools had to fit within the existing structure of our EHR and into the clinical workflow of primary care providers. As a result, only a few of the features that were recommended by the expert panel could be incorporated. For example, one such feature was a graphical display of patients' weight measurements over time. However, there is no graphical interface within our EHR system, and adding one was not feasible within the time and budgetary constraints of this project. [366]

Second, with regard to the practice team, contextual factors that were highlighted as being likely to affect outcomes included staff turnover, practice culture and team working, and competing priorities. In a striking example of high staff turnover, participants in one study described the need for frequent orientation sessions to promote weight management programming to new providers [375].

In terms of practice culture, creating a culture that routinely included a proactive approach to the diagnosis and treatment of obesity required significant leadership. One paper, reporting on the Provider and Health care team Adherence to Treatment Guidelines (PHAT-G) intervention, described how the fact that it was implemented by a part-time project director may have

affected the success of the project. The part-time schedule limited opportunities for communication about the obesity guidelines, particularly face-to-face reminders [367].

Another important finding from the same project was about the importance of the interdisciplinary team, with each role having its own responsibilities upon which other members of the team rely [367]. National and international bodies also assert the importance of inter-professional teams in weight management [446], and several of the included studies and related papers endorsed this view [367, 372, 464].

As for competing priorities, the following excerpt from the paper by Goodfellow et al describes the context of UK general practice in 2016:

> General practice is under great pressure consequent upon the ageing population and growing levels of multimorbidity. Primary care teams may find themselves having to prioritise their activities and may be too busy caring for those who, for example, already have type 2 diabetes to be able to devote much time to people who are overweight or obese. [370]

The third and final meso-level contextual factor relates to the weight management services themselves. As shown in many of the included interventions, strategies to improve links between primary care and local WMS featured often [241, 366, 368-370, 376, 381, 387, 390]. In particular, raising practitioner awareness of, and confidence in, a service was critical to the success of these interventions [368, 369]. In the most striking example of contextual factors affecting the success of a weight management service, the eLinks intervention was stopped after 5 weeks due to high demand using up the available funding [376]. This example, which could equally be framed as a macro-level issue of insufficient funding for weight management generally, leads nicely to the next section.

Macro-level contextual factors (infrastructural)

The final level at which contextual factors might influence intervention outcomes (by enabling or constraining the identified mechanisms) is the macro, or infrastructural, level. Three factors cited in the included studies will be considered: the normalisation of obesity as a result of its high prevalence; the

timing of external events; and the funding (or lack of it) for weight management.

Starting with the normalisation of obesity, this was considered to have an impact on the outcome of identification of adults with obesity through its influence on both patients' and practitioners' perceptions of what a 'normal' or healthy weight looks like. For example:

> Given the high prevalence of overweight and obesity in the study population, physicians and patients alike may have a high threshold for detecting overweight and obesity. [377]

This resonates with recent research from NHS Health Scotland, which found that the public's understanding of what a person with obesity looks like does not match the medical definition; perceptions of adults with obesity were of people who were much more overweight than the medical definition of obesity [465].

The second macro-level contextual factor that may have influenced outcomes was the timing of external events. This includes those that may have drawn energy away from implementing the intervention, as described in the study by Flocke et al:

> For example, one practice's members cited a time-intensive but financially advantageous research collaboration that started simultaneously with this study's intervention as a reason few practice members used the Resource during the study period. [387]

Similarly, external events such as changes in policy could have minimised the observed effect of an intervention by influencing both intervention and control groups. For example:

> An additional factor may have been the publication of an update of the NICE obesity guidelines during the course of the study. However, the new guideline did not make substantive changes to the recommendations for primary health care teams. [370]

Even if the new obesity guidelines had made substantive changes to recommendations for primary care teams, it is unclear to what extent these changes would be implemented, a point made by Schuster and colleagues:

> The whole NHLBI Obesity Guideline is 262 pages, while the "Practical Guide" is 94 pages [445, 446]. It is very impractical for clinically active physicians to remember and implement detailed and complex guidelines during the ongoing daily care of their patients in an ambulatory setting. [383]

The third and final macro-level factor relates to the financing of a country's health system and funding for weight management in particular. Most of the included studies (n=23) took place in the US, with the remainder being situated in the UK (n=5), Australia and Israel (1 each). Each of these countries has different health systems: the US is a predominantly insurance-based system, with co-payments and significant gaps in health care coverage; the UK has a taxpayer-funded system, with no user fees and universal coverage. This has obvious implications for how health care is accessed and used, which in turn has an impact on health outcomes [14, 466].

With regard to the weight management interventions described in the included studies, however, perhaps the biggest issue was the extent to which health care costs related to obesity would be reimbursed through health insurance. As noted in Chapter 2, obesity was officially recognised as a disease (partly for insurance purposes) in the US in 2011, when the Centre for Medicare and Medicaid services (CMS) announced that Medicare would cover intensive behavioural counselling for patients with obesity [467]. This is reflected in the included studies from the US, with those carried out prior to 2011 more likely to mention lack of reimbursement as a barrier:

> Family physicians may have little motivation or incentive to bring the issue of obesity to the attention of the patient because physicians are not reimbursed by insurance companies for diagnosing obesity [364].

It stands to reason that practitioners are less likely to refer to a weight management services – and patients are unlikely to attend – if the costs of that service are not covered by the patient's health insurance company.

The issue of funding for adult weight management is also relevant to the UK NHS. As the excerpt below from one of the Counterweight papers shows, NHS GPs were incentivised through a pay-for-performance system called the Quality and Outcomes Framework (QOF), which had an effect on primary care activity [468, 469].

> Introduction of a new contract for general practice with few points
> linked to obesity management led some practices to withdraw from
> the programme. This may threaten practice-based weight
> management in the future. [382]

In summary, this section started with an initial 'rough' five step programme theory (Figure 5-3), then took three key outcomes of interest from this and used these as a basis for theorising potential 'If-Then-Because' statements, which described (at the individual, interpersonal, institutional and infrastructural levels) how certain contexts might enable certain mechanisms to produce these outcomes. Data from included studies was then used to generate a table of CMO configurations, which was distilled into 12 mechanisms, with Figure 5-4 illustrating how these mechanisms link the different intervention strategies to the key outcomes of interest. Finally, a number of important contextual factors at the micro (individual/interpersonal), meso (institutional), and macro (infrastructural) levels have been outlined. Next, the middle-range theory which is considered to be the 'best fit' in terms of explaining these findings will be described, providing a rationale for its selection.

5.6 Linking findings to middle-range theory

In this section, the results of the analysis that have been described thus far will be reappraised in relation to the middle-range theories identified earlier to see which of these theories resonates most strongly with the empirical findings.

As outlined previously, and in the protocol paper for this realist review [283], there are a number of theoretical frameworks – operating at different levels – which could be applied to this realist review.

1) Individual-level theories of practitioner behaviour change (for example Theoretical Domains Framework [354, 355], Behaviour Change Wheel [356]).

2) Interpersonal-level theories of doctor-patient interaction (for example candidacy theory [19], theories of stigma [357], and shame [358]).

3) Institutional or system-level theories of implementation (for example diffusion of innovations [359], normalisation process theory [360], PARiHS framework [361]).

All of these theories (and probably many others) have potential utility in helping us to understand the process of identification and referral of adults with obesity in primary care. However, for the purposes of this review, the middle-range theory of candidacy was chosen as one with excellent explanatory potential in this particular area. The strength of candidacy theory in this context is that it explicitly encompasses the two foci of the review – identification and referral. Furthermore, it is genuinely 'middle range' in that it is not too abstract but produces explanations that are, as per Merton, "sufficiently abstract to deal with different spheres of social behaviour and social structure, so that they transcend sheer description" [253]. Candidacy theory incorporates individual (patient and practitioner), interpersonal, and wider socio-cultural factors and will be described in more detail shortly, but first a brief explanation of why the other theories were not chosen will be provided. It is important to bear in mind here that "all models are wrong but some are useful" [470]; the discussion that follows proceeds on that basis.

Individual-level theories of practitioner behaviour change, such as the Behaviour Change Wheel (BCW), would certainly help us understand why certain interventions targeted at practitioner behaviours were more likely to work than others [356, 471, 472]. The BCW synthesises 19 pre-existing frameworks of behaviour change into a single interface incorporating a theory of behaviour, intervention functions, and associated policy categories [356]. It proposes nine possible intervention functions – education, persuasion, incentivisation, coercion, training, restriction, environmental restructuring, modelling, and enablement – and seven policy functions that may act as levers of change: Environmental/Social Planning, Communication/Marketing, Legislation, Service Provision, Regulation, Fiscal Measures, and Guidelines. At the centre of the wheel lies the COM-B system, that postulates that for any *Behaviour* to occur the person performing the behaviour needs to have the physical and psychological *Capability* to perform the behaviour, the social and physical *Opportunity* to do so, and be more *Motivated* to perform the target behaviour than any other behaviour at that moment in time.

The BCW has been widely cited and hugely influential, but is not without its critics. In particular, it has been criticised for removing the variability in health behaviour theories by integrating existing perspectives into one dominant model

and, perhaps most damningly, for neglecting the inherent variability in human behaviour itself [473]:

> the goal to specify which intervention tools should be used for a specific behaviour ignores the need for flexibility, variability and change according to not the type of behaviour, or the type of intervention or even the type of patient but how that individual patient happens to feel, think, look, behave or respond at any particular time. [473]

Returning to the findings from the present review, it is clear that while some of the proposed mechanisms operate at the individual level (e.g. 'Yes we can', 'Carrots and sticks' and 'This matters'), others are more interpersonal (e.g. 'No blame no shame' and 'Right time right place') and many are institutional or infrastructural (e.g. 'Eyes and Ears', 'It's good to talk', 'Same hymn sheet' and 'Quick and easy'). Moreover, there were important contextual factors identified at the micro, meso and macro levels. As noted above, candidacy theory is able to incorporate these different levels in a way that some other theories do not.

Normalisation process theory (NPT), for example, seeks to explain how the work of implementing and integrating a new task or practice is accomplished through the operation of four mechanisms: 'coherence' (sense-making work); 'cognitive participation' (relationship work); 'collective action' (enacting work); and 'reflexive monitoring' (appraisal work) [360]. Thus, while it has been predominantly used to understand and explain whether or not new policies or interventions are implemented in practice (and as such could be considered an institutional level theory), its focus is on the 'work' done by those implementing the policy or intervention. If NPT were to be applied to the topic of this review, the focus would likely be on the 'work' of the primary care practitioners in identification and referral. This focus may neglect the importance of factors beyond the control of the practitioners, including patient characteristics and wider socio-cultural influences identified in this review, such as stigma or the normalisation of obesity.

Candidacy theory

As introduced in Chapter 3, candidacy is a dynamic concept that posits that an individual's view of whether they are a candidate for a particular condition, and

its associated interventions or services, is socially constructed [317]. Therefore, by considering the utility of candidacy theory in understanding the process of identification and referral of adults with obesity in primary care, the issue is re-framed as one of access (to weight management services), rather than simply as two behaviours – identification and referral - carried out by practitioners, which interventions are seeking to change. This wider lens opens up the explanatory power of candidacy to encompass influences on the process of identification and referral operating at different levels.

Table 5-15 below explains the seven candidacy constructs in relation to access to WMS, drawing on the findings from this review. These will be returned to and expanded upon in Chapter 9. It is worth reiterating here that, while the constructs are presented in the original papers [19, 316] in an apparently linear fashion (presumably for the sake of simplicity), the process is inherently dynamic and iterative [317].

Table 5-15: Candidacy constructs explained in relation to WMS

Candidacy construct	Explanation in relation to access to WMS
Identification of candidacy	This relates both to how individuals with obesity identify themselves as being candidates for a service, but also to how health professionals identify patients as being candidates for the WMS. In terms of the interventions described here and the mechanisms associated with those, approaches which facilitated and supported professionals to have conversations with patients (by increasing confidence or facilitating weight measurement) supported identification.
Navigation of services	This relates to navigation of the primary care system and of the WMS. Both have their challenges.
Permeability of services	This relates to how easy it is to access the service. Interventions that improved communication between practices and WMS are more likely to improve permeability.
Appearing at services and asserting candidacy	The act of turning up and representing oneself in an interaction with a health professional. As with identification, a PCP can also assert candidacy on behalf of a patient.
Adjudication by professionals	This typically relates to the decision-making or judgment made by the health professional – a) whether to discuss weight (if it has not been raised by the patient); b) whether to offer referral. This depends first on being aware of what services are available and how to access them. Also depends on how likely the PCP thinks the patient is to benefit, or, indeed, attend the service. Assessment of motivation here and other competing demands on patient.
Offer of/resistance to	How a PCP 'sells' the WMS to the patient will influence their likelihood of: a) accepting the referral; and b) attending the service.

service	This review found that the offer of referral is influenced by PCP's awareness of, and confidence in, the WMS.
Operating conditions and local production of candidacy	This incorporates factors that influence the candidacy process. This review identified factors at the micro (individual/interpersonal), meso (institutional) and macro (infrastructural) levels.

Figure 5-5 below depicts the different stages of the candidacy process, and also shows how the five steps in the initial 'rough' programme theory relate to the candidacy constructs, reinforcing the notion that candidacy is a 'good fit' here.

As well as highlighting the links between the initial programme theory (as shown in Figure 5-3), the Figure below has two additional modifications to the candidacy model introduced in Chapter 3 (Figure 3-7). First, it has separated the 'permeability of services' construct into two: permeability of GP and permeability of WMS, in recognition that both of these systems need to be navigated in order to achieve access to WMS. Second, it has moved the 'Operating conditions and local production of candidacy' construct from being situated at the end of the process to being in a circle that surrounds the process. This is to reflect the finding from this review that contextual factors operate at different levels and can influence different steps in the candidacy process in different ways. For example, weight stigma or fear of causing offence may affect the likelihood of a practitioner raising the issue of weight and identifying an adult with obesity.

Chapter 9 presents a further adaptation of the candidacy model, drawing upon findings from all four results chapters.
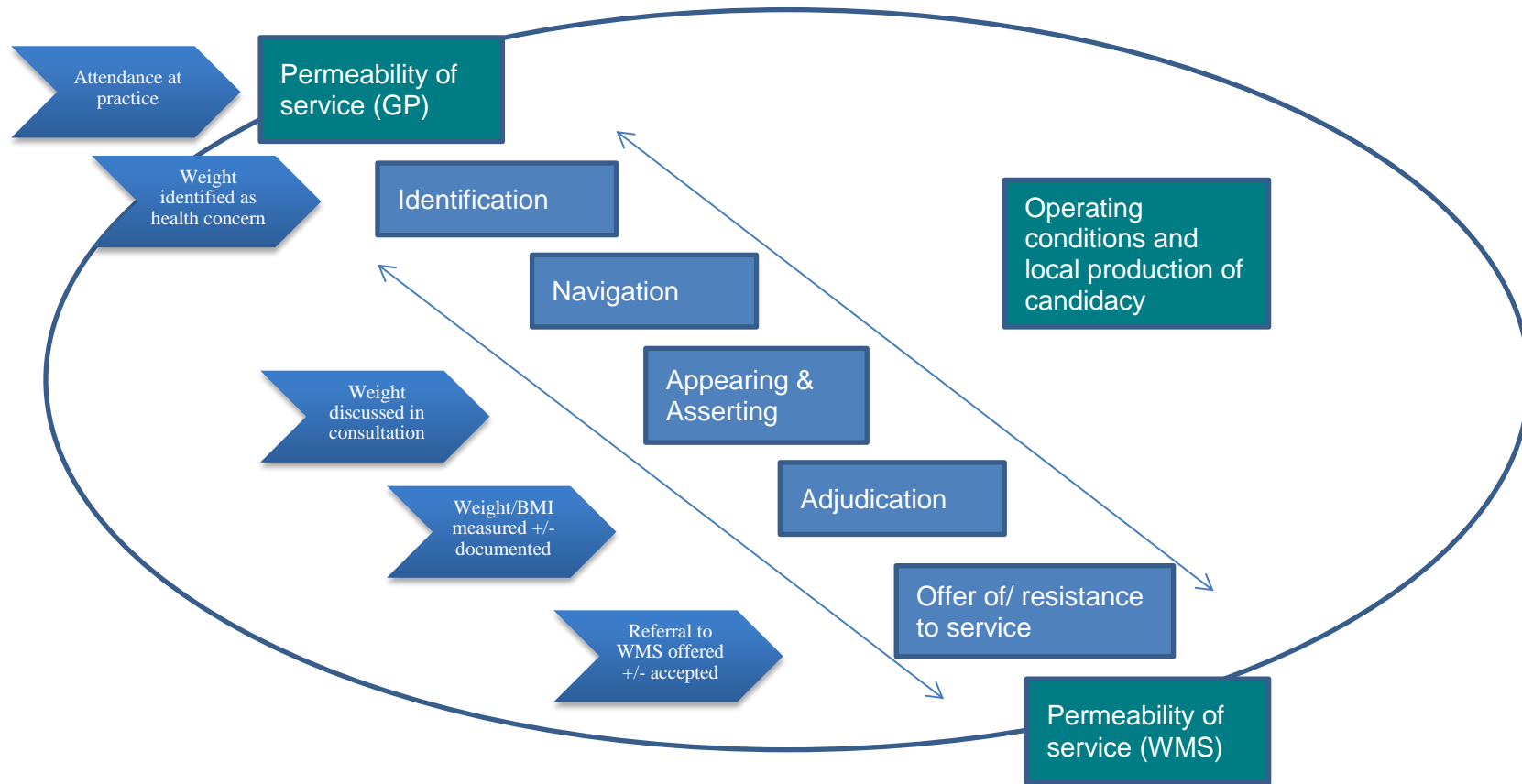
Figure 5-5: Linking initial programme theory to candidacy constructs

5.7 Discussion

5.7.1 Summary of findings

This realist review of interventions to improve the identification and referral of adults with co-morbid obesity in primary care analysed 30 included studies, from a total of 4232 papers screened. The 30 studies were mostly from the USA (n=23) and the UK (n=5), and included a range of study designs, with before-and-after studies being most common (n=11), followed by quality improvement studies (n=6), RCTs (n=5), non-randomised controlled trials (n=5), mixed methods studies (n=2) and one process evaluation. Ten studies were rated as 'good', nine as 'fair' and eleven as 'poor' though all were considered to be able to contribute usefully to theory development in the realist review process.

Most of the interventions described were complex interventions operating at multiple levels. For instance, the Chronic Care model described by Ely et al engaged patients (through self-management education), physicians and other health professionals (via clinical guidelines and continuing medical education), office staff (changes to patient flow and scheduling), health system administrators (with information systems support), and communities (via public health projects and policies) [381].

The review produced 12 mechanisms, operating at different levels (micro, meso and macro), through which interventions targeted at primary care practitioners to improve identification and referral of adults with obesity are proposed to work. It also identified a number of important contextual factors that will influence the extent to which these mechanisms are activated to produce the desired outcomes.

Finally, the findings from the review were re-assessed taking account of extant theoretical literature; the middle-range theory of candidacy was determined to be the 'best fit' theory in this review.

5.7.2 Comparison with other literature

In Chapter 3, the rationale for this review was outlined with reference to three previous reviews in this area. The first was a Cochrane systematic review from

2010 which assessed the effectiveness of interventions to change the behaviour of health professionals and/or the organisation of care to promote weight reduction in overweight and obese adults [238]. The review identified six RCTs, but only one of these was set in UK primary care [239]. It found evidence of a change in clinicians' behaviours after receiving an educational intervention (e.g. increased recording of weight), but no statistically significant difference in patient weight between intervention and control groups.

The second was a systematic evidence review for the US Preventive Services Task Force (USPSTF) from 2011, which found no trials examining the effect of primary care screening to identify overweight or obesity in adults [240]. This review did, however, have restrictive inclusion criteria (only looking at RCTs). It was updated in September 2016 as part of a different study, but again no trials were found [241].

There are, however, a number of other ways in which the findings from this review could be compared to other research literature. The following will be considered: the evidence for the intervention strategies used in the included studies; evidence for the effect of combining different intervention strategies; and whether some of the mechanisms identified in this review have been found in other realist reviews.

Evidence for the intervention strategies used in the included studies

First, when thinking about the evidence for the intervention strategies used in the included studies, the following main strategies will be reviewed: Training, Tools/resources, Audit/feedback, and Quality circles. Cochrane or other systematic reviews will be referred to in the first instance, where available.

There is a long history of educational interventions targeted at health care professionals to address gaps in knowledge and skills. They are generally effective for improving appropriate care outcomes, particularly when education is included as part of a multifaceted intervention [474], but as a Cochrane review concluded, may have only a "small beneficial effect on professional practice outcomes" when used alone or in comparison to no intervention [475]. This is broadly consistent with the suggestion from Theresa Marteau and

colleagues that "the potential for information-based interventions is fundamentally limited" [476]; human behaviour, they assert, is "automatic, cued by environmental stimuli, resulting in actions that are largely unaccompanied by conscious reflection."[476] This position is evidenced by a large body of work, popularised by the Nobel prize-winning behavioural scientist Daniel Kahneman in his book 'Thinking, Fast and Slow' [477], that shows that there are two broad categories of behaviour: automatic (fast, habitual) and reflective (slow, goal-directed) [478]. There is growing evidence that interventions aimed at changing people's behaviour are more successful if they target these automatic or habitual behavioural processes (e.g. by altering environments) than simply targeting reflective or rational processes [476, 479].

The use of tools or other additional material resources to change behaviour could be considered as one such form of environmental restructuring, and part of a broader category of behavioural interventions known as 'nudges'; that is, approaches that steer people towards a certain behaviour while maintaining their freedom of choice [480, 481]. Behavioural 'nudge-type' policies were advocated in the 2014 NHS Five Year Forward View as a way to accelerate innovation and improvement in health care through changing individual behaviours [177].

In the context of this review, the most common 'nudge-type' tools were electronic prompts or reminders incorporated into electronic medical records, though paper-based prompts were also used. Reminders have been shown to be generally effective in changing health practitioner behaviour and improving processes of care across a range of settings [482]. A Cochrane systematic review of on-screen, point of care computer reminders found small to modest improvements in practitioner behaviours such as medication ordering, vaccinations and test ordering [483].

Audit and feedback is defined by the Cochrane Effective Practice and Organisation of Care (EPOC) taxonomy as:

> A summary of health workers' performance over a specified period of time, given to them in a written, electronic or verbal format. The summary may include recommendations for clinical action. [484]

Audit and feedback is widely used in health care organisations as a quality improvement tool to improve health professionals' performance. The aim is to encourage the practitioner to modify their practice when given performance feedback showing that their clinical practice is inconsistent with professional standards [395]. A Cochrane review of 140 randomised trials of audit and feedback across many conditions and settings found a median 4.3% absolute improvement in provider compliance with desired practice [395]. However, this median improvement masks considerable heterogeneity; a quarter of interventions had a relatively large, positive effect on care quality while another quarter had a null or negative effect [485].

Ivers and colleagues suggest that, despite the general effectiveness of audit and feedback interventions in health care, there has been little progress with respect to understanding their key 'active ingredients' or mechanisms of action [485]. They propose a set of tentative 'best practices' when designing audit and feedback interventions, though these will be dependent on recipient, context and target behaviour [485].

Quality circles (QCs) are small groups of 6 to 12 professionals from a similar background who meet at regular intervals to discuss and review their clinical practice [486]. In some European countries they have been established as the main method of quality improvement and continuing professional development (CPD) [487]. QCs have themselves been framed as complex interventions, involving different components, each with its own evidence base: educational materials [488], contact with local knowledge experts [489], audit and feedback [395], educational outreach visits [490], and facilitation [491].

A realist review of quality circles examining how configurations of these components and the contextual features of QCs influence their performance is being undertaken by Rohrbasser and colleagues, but to date has not been published [486]. One of the potential mechanisms that may be relevant for both audit/feedback and quality circles is social comparison, which has been defined as drawing attention to the performance of others to allow comparison with a person's own performance [492], and has been demonstrated to be an effective way to change behaviour in many different areas [479].

In summary, there is considerable systematic review evidence for the four main intervention strategies used in the included studies. A recurring theme, however, is that the strategies are more likely to be effective in combination than they are in isolation.

Evidence for the effect of combining different intervention strategies

Most of the studies included in this review were complex and multi-faceted. The realist approach taken here attempted to unpack the interventions into their component strategies and search for important contextual factors, thereby elucidating the 'black box' of these complex interventions [493, 494]. At times, however, this was challenging, as many studies failed to provide sufficient detail about the interventions, or their context – an issue that has been identified by other researchers [495].

A theory-led analysis of systematic reviews on the effectiveness of behaviour change interventions suggested that interventions which contribute to normative restructuring of practice, modify peer group norms and expectations (e.g. educational outreach) and reinforce modified peer group norms by emphasising the expectations of an external reference group (e.g. via reminders, or audit and feedback), offer the best chances of success [474]. The authors suggest that combining such interventions is most likely to change behaviour.

With regard to the implementation of clinical guidelines in routine practice, there is some evidence to suggest that outcomes can be improved when multiple individual and system-level changes occur simultaneously [496, 497]. The included study by Erickson et al [372] cites a number of examples of system-level adaptations that support the implementation of clinical obesity guidelines, including: Designation of a person or department responsible for timely implementation and monitoring [498]; Incorporation of quality improvement systems such as chart pre-screening, risk assessment forms, prompts, flow-sheets, reminder/recall systems, and patient education materials [364, 376]; Selection of a uniform protocol such as the 5As for describing, delivering, and evaluating health behavioural counselling interventions [388, 499]; Integration of staff into practice teams [500]; Development of counselling skills via interactive, step-based continuing education learning opportunities during workshops, small

groups, and/or individual training sessions [501]; Utilization of an implementation process tailored to the practice [491, 497]; and adoption of a comprehensive worksite wellness policy that supports clinician health, as normal weight physicians and nurses are more apt than their overweight counterparts to address obesity with their patients [502].

With the exception of the latter, all of these other system-level adaptations were incorporated into several of the included studies. In this review process, however, it was very difficult to determine which of these different adaptations, or which intervention strategies, or indeed which combination of strategies, had the most effect. Rather, this review identified mechanisms through which successful strategies are likely to operate, and contextual factors that are likely to influence these mechanisms, but these require further empirical testing.

Transferability of mechanisms identified in this review

Finally, it is worth considering whether some of the mechanisms identified in this review have been found in other realist reviews. There have been no previous realist reviews exploring any aspect of adult weight management in primary care, but there have been two realist reviews that have focussed on screening or referral in different health care contexts [284, 503].

In O'Campo et al's review of intimate partner violence screening in health care settings [284], they found, in keeping with the present review, that most studies were multi-component. The four programme components that increased practitioner self-efficacy for screening were institutional support, effective screening protocols, thorough initial and ongoing training, and immediate access/referrals to onsite and/or offsite support services [284]. There are clear similarities between these four components and some of the effective intervention strategies used in the included studies in the present review, but the authors were not able to draw out potential mechanisms that underpinned these strategies, or any of the enabling or constraining contextual factors.

It would be of interest, for instance, to test whether certain mechanisms from this review might apply to the four components identified in the O'Campo review: is it the sense of priority (e.g. 'This matters') or the consistency of

message (e.g. 'Same hymn sheet') which is behind the importance of institutional support? Is it increased confidence ('Yes we can') or improved awareness of available services ('Spread the word') that make the links with other services work?

In the realist review of physical health screening in people with mental health conditions by Lamontagne-Godwin and colleagues [503], interventions were divided into those focusing on health service delivery changes (e.g. staff training and protocol development) and those using tools designed to facilitate screening (e.g. electronic prompts). As with the O'Campo study, the authors do not employ the CMO heuristic or make any attempt to discern mechanisms or theory of change behind the identified intervention strategies. They do, however, detail a range of barriers and facilitators to the successful implementation of both the health system delivery changes and the tools to facilitate screening. Some of the barriers resonate with those from this Phase 2 review, including resource constraints (e.g. lack of time, staff turnover), environmental barriers (e.g. poor communication between primary and secondary care), and unclear boundaries around professional role [503].

In summary, there is likely to be some transferability of mechanisms involved in interventions to improve the identification and referral of patients in primary care across different clinical situations, in line with Pawson's thinking on the issue [246, 461], but further empirical testing of this assumption is required.

5.7.3 Strengths and limitations

The strengths of this review are: 1) that it adopted a comprehensive search strategy based on a previous Cochrane review but not restricted by study design, 2) that it followed the international RAMESES guidelines for realist synthesis [291], and 3) that it has unpacked key interactions between theoretical mechanisms of intervention success and the enabling or constraining contexts in which these interventions take place, thus making an important potential contribution to policy and practice development in this area.

The strengths of realist review are described in detail in the RAMESES guidelines and in Chapter 3 but, in brief, such reviews go beyond the traditional systematic

review question of 'what works?' (with its mean of 'effect size' calculation) to a more nuanced and theoretically-informed consideration of 'what works, for whom, in what circumstances, how and why?'.

The main limitation of this review – in keeping with most realist reviews [504]- is that the primary data were often lacking in detail of context and were largely atheoretical, making it difficult to produce robust CMO configurations. Indeed, the 12 mechanisms proposed in this review and the range of contextual factors identified should be considered as preliminary and in need of further empirical testing. In particular, the focus on practitioner-level interventions means that wider macro-level factors were not so readily identifiable.

Similarly, the included studies did not all give information on patient participants' obesity-related co-morbidities, or comment on the impact of those co-morbidities on the processes of identification and referral. It is unlikely, however, that the findings would have been markedly different if studies had been excluded on the basis of such details being lacking.

Finally, as well as theoretical literature, this review could have extended its search to include a wider range of empirical literature from different clinical settings (e.g. smoking [504], alcohol [505], domestic violence [284]), which might have contributed to theory development.

5.8 Chapter summary

This chapter presented the findings from Phase 2 of this project; a realist review of interventions to improve the identification and referral of adults with co-morbid obesity in primary care. The two research questions related to this Phase have been addressed. The review proposes 12 mechanisms through which these interventions work, as well as a number of important contextual factors (identified at the micro, meso and macro levels) that may enable or hinder these mechanisms to produce successful outcomes (RQ2b). It also identifies the middle-range theory of candidacy as one which has good explanatory potential in this area (RQ2a), as not only does it explicitly encompass the two foci of the review – identification and referral – but it also incorporates individual (patient and practitioner), interpersonal, and wider socio-cultural factors.

6 Introduction to Case study of GP Referrals to GCWMS

6.1 Overview

This short chapter introduces the mixed methods case study of GP referrals to the Glasgow and Clyde Weight Management Service (GCWMS), comprising Phases 3 and 4 of this research (Figure 6-1). The results of each Phase are presented in Chapter 7 and 8 respectively. The role of candidacy theory in helping to understand the findings is explored in Chapter 9.
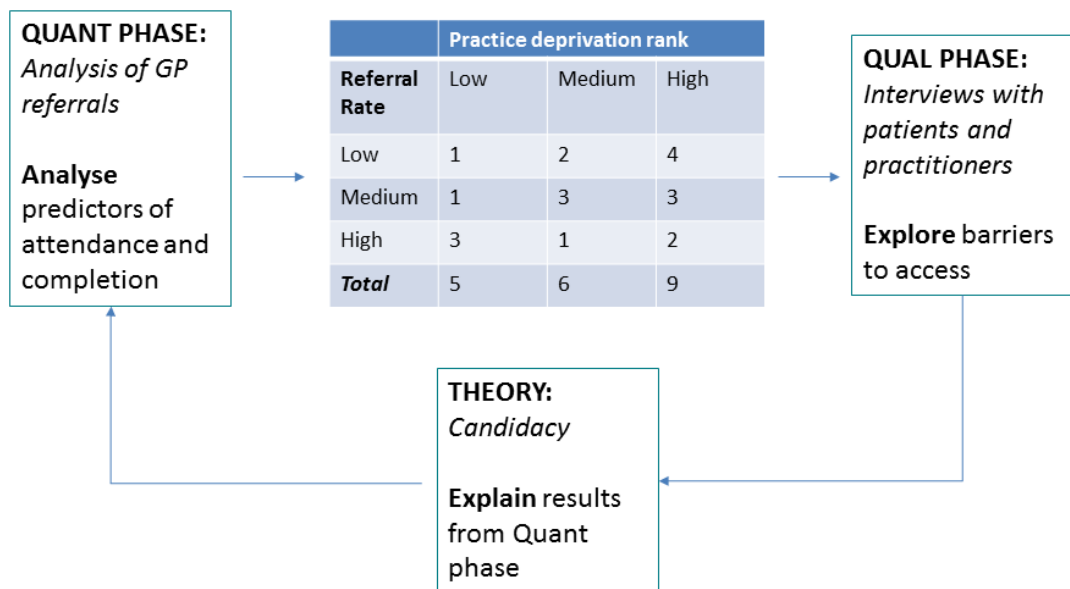
Figure 6-1: Mixed methods case study design

6.2 Aim of this chapter

This chapter will 'set the scene' for the results that follow, providing the background to the GCWMS, describing the context of obesity prevalence in the NHS Greater Glasgow and Clyde (GGC) Health Board area, and charting the impact of service re-design at GCWMS, which was taking place throughout the period that this research was undertaken. The chapter ends by giving more detail on the different field sites where data collection took place: namely, the service itself (GCWMS), the locations where patients (adults with obesity) were interviewed (usually in their own homes), and the locations where primary care practitioners were interviewed (usually in their practices).

6.3 Background

GCWMS was developed in 2004 to offer equitable access and a consistent approach to weight management across the NHS GGC Health Board area [304]. In keeping with the recommendations of the SIGN guidelines [13] (see Chapter 2 for more on the policy context), the service is part of a tiered approach to weight management (Figure 6-2). It forms the third tier between primary prevention (including Local Authority services and GP interventions) and bariatric surgery.

In the first few years, GCWMS piloted its treatment approaches and protocols in a small geographical area before gradually extending its coverage to the entire Health Board population (approximately 1.1 million people) in 2008 [304]. As described in more detail in the next section, the population of NHS GGC is a diverse mixture of urban and rural populations, with more ethnic diversity than any other part of Scotland [506].
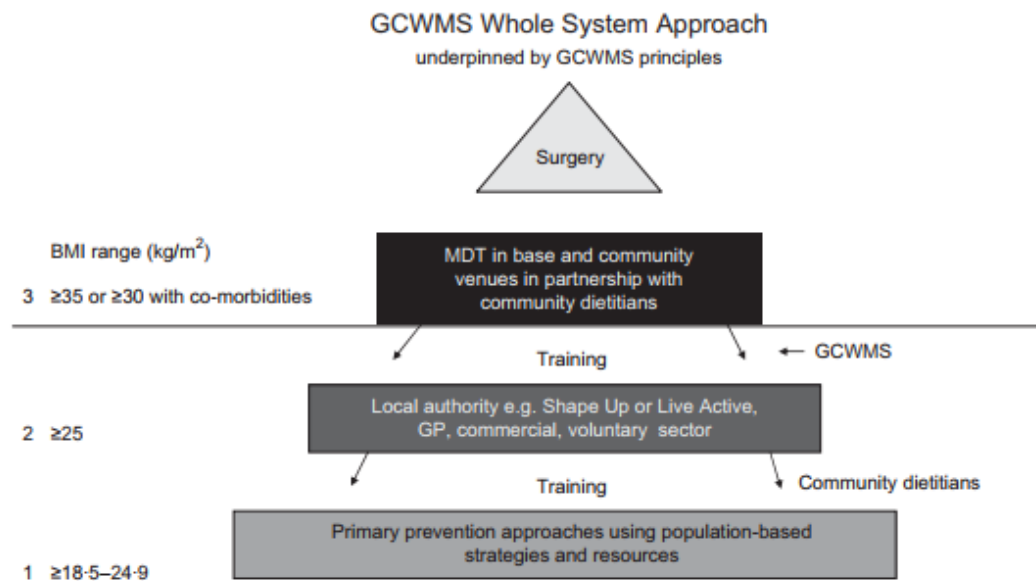
Figure 6-2: GCWMS hierarchy of services according to BMI
(from Morrison DS et al [304]. Reproduced under Creative Commons license)

The GCWMS is the most well-funded, and well-evaluated NHS-based non-commercial WMS in Scotland [304, 305, 339]. It is a multi-component weight management programme, including structured lifestyle advice underpinned by psychological approaches, and is available to patients aged 18 years and over with complex obesity (defined as BMI of ≥ 30 kg/m^2 with obesity-related co-

morbidities, or BMI of ≥35 kg/m^2 alone) [305]. For those patients with obesity that do not meet the eligibility criteria (i.e. BMI 30-35 kg/m^2 without weight-related co-morbidities), GPs and PNs can signpost patients to healthy eating classes or physical activity resources, where available.

Eligible patients are referred electronically by their GP or practice nurse (a small proportion come from secondary care referrals) and are required to 'opt in' to the service within 2 weeks of referral. They are then seen (usually within 1 or 2 months) by a dietitian at an initial assessment, who helps to direct them to an appropriate group or professional. Some patients (e.g. those with possible binge eating disorder) may receive further input from a clinical psychologist or physiotherapist. Most patients are seen in groups of no more than 16 people, led by a NHS dietitian, at a number of venues throughout Glasgow and Clyde (see Table 6-1 for a list of venues and Figure 6-3 for a map).

Phase 1 of the intervention includes nine sessions (90mins each) delivered fortnightly over a 16-week period. On completion of phase 1 patients can choose to enter phase 2, which consists of three 1-hour sessions delivered at monthly intervals and includes a range of further treatment options (including prescribed low-calorie diet or orlistat) [305]. At the end of phase 2 (or directly from the end of phase 1, dependent on patient preference), patients enter a weight maintenance programme (phase 3), which comprises twelve 1-hour sessions delivered at monthly intervals. Those who do not achieve their target weight loss can choose to repeat phase 2 once more and then enter the maintenance programme or, if they fail to lose 5 kg and have a BMI >40 kg/m^2, or BMI>35 kg/m^2 with comorbidities, they can opt for bariatric surgery [305].

Table 6-1: GCWMS venues (as of 07.05.14)

ASSESSMENT CENTRES	CENTRES FOR GROUPS CLASSES
Barrhead Health Centre Tuesday 9:00am Monthly	Castlemilk Monday 1:30pm – 4:00pm
Castlemilk Wednesday 9am-12pm Fortnightly	Clydebank Health Centre Thursday 9:30am – 11am Fridays 9:30am – 11am
Clarkston Clinic **(to close)** Tuesday 9am – 12pm Fortnightly	Drumchapel Community Centre Thursday 9:30am – 11am
Clydebank Health Centre Friday 9:30am – 12:30pm Weekly	Eastbank HPC

Community Centre for Health
Tuesday 9.00am -12pm Fortnightly
Wednesday 9.00am – 12.30 Fortnightly

Drumchapel Health Centre
Thursday 1:00pm – 4:00pm Fortnightly

Dumbarton Health Centre
Tuesday 1pm – 4pm, fortnightly

Easterhouse Health Centre
Tuesday 9am – 12pm Fortnightly
Tuesday 1-4pm Fortnightly

Elderpark
Monday 1pm-4pm Fortnightly
Friday 1pm-4pm Fortnightly **(on hold)**

Greenock Health Centre
Thursday 9:00am- 12:00 Fortnightly

Gorbals
Thursday 9am- 12pm Fortnightly
Friday 9am – 12pm Fortnightly **(on hold)**

Govanhill Health Centre
 Wednesday   9:30am-12:30pm Monthly

Inverclyde Royal Hospital
Thursday 9:00am – 12:00 Fortnightly

Mansionhouse Unit
Several clinics including :
Monday –Friday
Various times

KHCC (Kirkintilloch) **(on hold)**
Tuesday 1:30pm – 4:30pm Fortnightly
Thursday 9.30am-12.30pm Fortnightly

Milngavie Clinic
Wednesdays 9am – 12pm Fortnightly

Mirin Practice
Wednesday 10.00am Monthly

Parkhead Health Centre
Tuesdays 9am – 12pm Fortnightly
Thursday 9am-12pm Fortnightly

Pollok Health Centre
Tuesday   9am – 12pm, Fortnightly
Thursday 9am- 12pm Fortnightly

Wednesday 9am – 12.00am

Easterhouse Health Centre
Tuesday   1:30pm – 4pm

Elderpark
Fridays **Phase 3 only at present**

Inverclyde Royal Hospital
Thursdays 1.30pm – 3.00pm

KHCC (Kirkintilloch)
Thursday 9:30am – 11:00am (**on hold**)
Thursday 1:30pm- 3:00pm

Mansionhouse Unit
Monday – Friday
Various Times – morning, afternoon, evening

Milngavie Clinic
Wednesday 9:30am– 11am

Partick Burgh Hall/Riverside Resource Centre
Tuesday 1:30pm- 3:00pm
Friday 9:30am – 11:00am

Pollok Health Centre
Monday 1.30-4pm
Tuesday 1.30pm-3pm

Port Glasgow
Mondays 1.30pm- 4.15pm

Sir James Clark Building
Monday – Friday
Various Times morning, afternoon,
and evening.

Stobhill Hospital
Mondays 1:30pm – 4:00pm
Fridays 1.30pm – 4.30pm
Tuesday evening 5.00pm – 6:30pm

Vale of Leven
Tuesdays, 9.30am – 12.30pm

Victoria ACH
Thursday 9am-12pm
Friday 9am- 12pm

Sir James Clark Building Various times between 9.00am and 3:30pm Monday to Friday Shettleston Health Centre Monday 1:00pm- -4:00pm Fortnightly Stobhill Hospital Thursday 1.30pm – 4.30pm Fortnightly Friday 1pm – 4pm Fortnightly Friday 9am-12pm Fortnightly Vale of Leven Wednesday 1.30pm – 4.30pm Monthly Victoria ACH Monday 9.00 am – 12.00 pm Fortnightly	

At the time this research was carried out, GCWMS received the majority of its referrals from the 262 general practices in the NHS Greater Glasgow and Clyde (GGC) health board area, with a small proportion (<2% of total referrals) coming from practices in other health boards and directly from hospital specialities.

Figure 6-3: Map of NHS GGC showing locations of WMS groups (red) and assessment centres (green)

6.3.1 Previous evaluations of GCWMS

There have been two peer-reviewed publications describing evaluations of GCWMS. In the first, a paper describing the evaluation of the first phase of the service, for referrals between November 2004 and December 2006, Morrison et al found that 72.4% of those referred opted in to the service (n=2156 out of 2976 referred) and 809 of these (37.5%) completed phase 1 [305]. Of these 809 completers, 35.5% (n=287) lost ≥ 5kg. Roughly three-quarters (n=2156, 72.4%) of patients were female and the mean ages of women and men were 44.6 and 47.5 years, respectively [304]. The majority of patients (n=1848, 62.1%) were from the most deprived quintile of the Scottish population (SIMD5), with just 3% (n=95) from the most affluent quintile (SIMD1), reflecting the socio-economic context of the NHS GGC Health Board region (see next section).

With regard to the predictors of weight loss (≥ 5kg), the study found that, after adjustment in both sexes combined, age ≥40 years, male sex, BMI ≥50 kg/m^2 and depression were associated with greater likelihood of ≥5 kg weight loss in phase 1 of GCWMS. Patients from the most deprived quintiles were significantly less likely to lose this target weight but there was no clear trend across other socioeconomic groups [304].

In the second, more recent, publication, Logue et al analysed all referrals to the service from October 2008 to September 2009, with data censored in December 2011, so that full data were available on patients who completed phase 3, roughly 19 months after starting the programme [305]. They found that 61% (n=3460) of those referred (n=5637) opted in to the service and 34% (n=1916) attended phase one at least once. From this dataset of 1916 patients, they excluded a further 4 whose initial BMI was recorded as ≤30 kg/m^2 and 74 who were directed to the specialised disordered eating group (involving specialised psychological interventions that are significantly different from the main programme) [305].

Almost three-quarters (72%) of those who started GCWMS attended at least four sessions, and of these 'completers', 36% had lost ≥5 kg by the end of phase 1. Using the last observation carried forward (LOCF) method for managing missing

data, the study found that 28% of participants had achieved a 5 kg weight loss at 12 months [305].

The authors conclude that comparisons with other published studies are difficult to make due to methodological differences. This includes differences in definitions of 'completers', in data collection (e.g. measured versus self-reported weights) and in how to handle missing data; that is, whether to use LOCF or baseline observation carried forward (BOCF). They also point out that the patient population attending GCWMS is qualitatively different (i.e. more severe and complex obesity) from that of other UK-based weight management programmes that have been published in the peer-reviewed academic literature.

Therefore, although the reported outcomes from studies involving GP referral to commercial weight management services may have been more impressive, the mean BMI of patients in trials such as the Lighten Up study [179] and other primary care studies of weight loss on referral was under 38 kg/m^2 [507, 508]; the mean BMI of GCWMS patients in the Logue et al study was 43 kg/m^2 [305].

Unlike previous evaluations of GCWMS, however, the present case study did not seek to evaluate weight loss outcomes from the service. Rather, the focus was on understanding barriers and facilitators to referral and attendance. The following quote from the Morrison et al paper highlights one of the issues:

> Over a quarter (27.6 %) of patients who are referred do not opt into the treatment programme. Assessment of willingness to change weight-related behaviour is an integral part of the GCWMS model, but uptake rates might be improved if the referrer raised the issue of motivation for weight loss prior to referring on any individual who alleges a commitment to weight loss.

The rest of this Chapter will complete the 'scene setting' for the case study by describing the NHS GGC context and the different field sites where data collection took place.

6.4 NHSGGC context

National Records of Scotland estimated the 2013 NHS GGC population to be 1,137,930 (21.4% of the total Scottish population)[509]. Just over half of the population (51.9%, n=590,115) are female. There are six Local Authority areas that comprise NHS GGC: Glasgow City (52.4% of total population), Renfrewshire (15.3%), East Dunbartonshire (9.3%), East Renfrewshire (8%), West Dunbartonshire (7.9%) and Inverclyde (7.1%).

Figure 6-4 shows the NHS GGC population distribution by age group and gender [506].
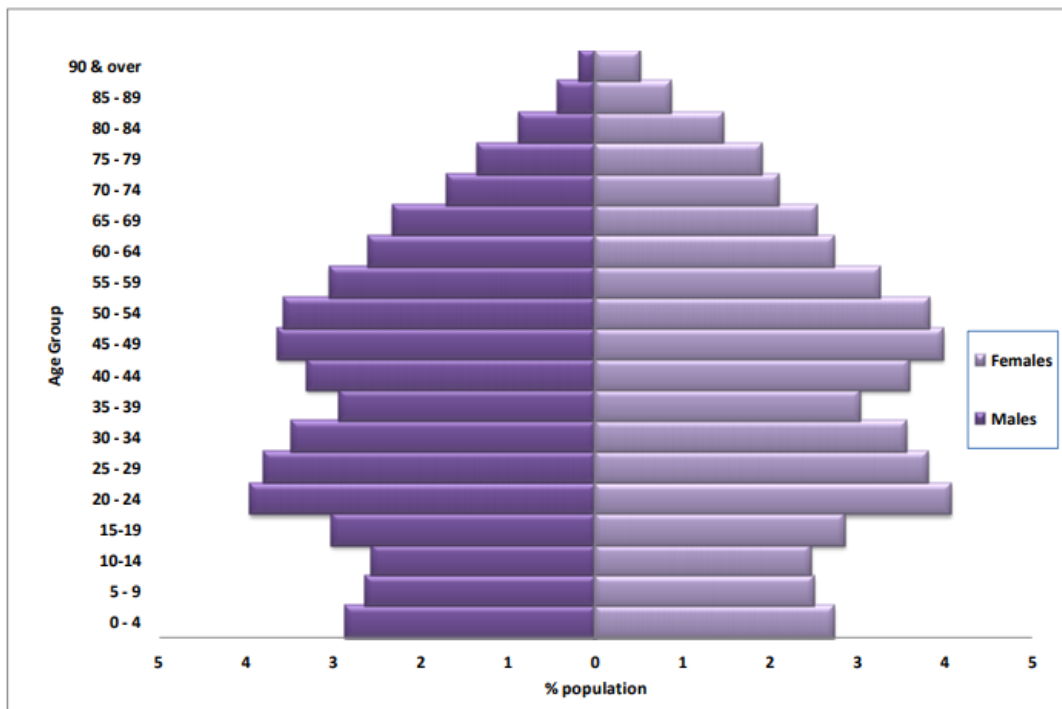
Figure 6-4: Population pyramid of NHS GGC, 2013

Ethnicity

The 2011 Census suggests that 7.5% (n=85,755) of the NHSGGC population was from a Black and Minority Ethnic (BME) group, compared to 4% for Scotland as a whole [506]. Within the Health Board itself, the figures range from 14.2% in the Glasgow South area to 1.4% in Inverclyde. The largest BME group was Asian (Asian, Asian Scottish or Asian British), comprising 5.3% of the total NHSGGC

population, and the largest sub-group within the Asian group were Pakistani, which made up 2.4% of the total population [506].

Deprivation

NHSGGC contains some of the most and least deprived areas in Scotland. Current population estimates (SAPE 2013) show that 36% of all NHSGGC residents (n=408,349) live in the most deprived areas as defined by the Scottish Index of Multiple Deprivation (SIMD). Nearly half of the Glasgow City population resides in the most deprived SIMD quintile. This figure rises to 62% in North East Glasgow. In comparison, only 3.6% of the East Dunbartonshire population lives in these most deprived areas. Sixty percent of the East Renfrewshire population reside in the least deprived quintile compared with only 2.5% of the North East Glasgow population.

Obesity

In 2012, a NHS GGC health care needs assessment for Tier 2 community weight management programmes was published [510]. Applying Scottish Health Survey rates of overweight/obesity to the age and sex distribution of the NHS GGC population, the report estimated the total number of adults with obesity in NHS GGC as being 268,398 [510].

More recently, in 2015, the report of the NHS GGC Director of Public Health (DPH) stated that "obesity requires recognition as a major public health challenge within Greater Glasgow and Clyde" [506]. The report recommended a multi-stranded approach, including:

- Develop an effective targeting strategy for weight management services which addresses the needs of men in achieving a healthier weight and actively supports younger women who are more likely to become obese, to lose weight at levels which will provide health gain. This strategy should be complementary to a universal weight management service, **widely available in areas of deprivation.**

- Increase the routine **identification of individuals who are overweight within primary** and secondary care settings and provide appropriate services to support weight loss including

> the development of life-skills to support longer-term weight management. Services require a combination of calorie deficit diets, increased physical activity and motivational interventions along with more intensive dietary regimes and potentially weight loss surgery for people with complex conditions and severe obesity as advocated by SIGN [13]

- An **upstream population approach** with local and national partners is imperative to address the wider obesogenic environment described within The McKinsey Global Institute's economic analysis of interventions related to tackling obesity [118]. Both nationally and locally a more strategic and encompassing approach is required with partners to respond to the obesogenic environment; influencing the food and drink sector; retailers and caterers creating an exemplary position of public sector provision; **improving food access in deprived local communities**; as well as creating an active physical environment supporting green space and active travel. (emphasis added)

These recommendations are very much in keeping with the wider policy context in Scotland, outlined in Chapter 2. There is recognition of the need to tackling the upstream determinants of obesity and to pay particular attention to the needs of deprived communities. With regard to primary care, the importance of routine identification and referral of adults with obesity to appropriate weight management services is reasserted.

Following on from the two reports mentioned above, the subsequent restructuring of the GCWMS will now be described.

6.5 Changes to GCWMS

As noted in Chapter 4, the National Planning Forum (NPF), a joint forum of Scottish Government and NHS Boards, wrote to all Health Boards in July 2012 to highlight the 'Obesity Treatment: Best Practice Guide' [338], which was developed by the Obesity Treatment Subgroup of the NPF, set up in response to the Obesity Route Map (ORM), the key Scottish Government policy document referred to in Chapter 2.

One of the core recommendations was for agreed national care pathways to be put in place for those patients with Type 2 diabetes aged 18-44 years with a BMI of 35-40 kg/m^2 and recent (less than 5 years) onset of their diabetes (referred to

as the 'Priority 1' group for consideration of bariatric surgery) [338]. This new criteria for bariatric surgery was based on a combination of available evidence [511], affordability and sustainability, and a desire to avoid perverse incentives to gain weight [512].

The previous criteria for bariatric surgery in GCWMS, developed in conjunction with NHS GGC surgeons, were as follows:

- If not achieved 5kg weight loss
- BMI > 40 with no co-morbidity
- BMI >35 with co-morbidity
- < 60 years
- Maintained weight or not gained 5kg
- Final decision by surgeon

Alongside the change in criteria for surgery, there was also a call for an increase in the number of bariatric operations performed (the NPF guidance identified a requirement for an increase in NHS Greater Glasgow and Clyde from 40 bariatric surgical interventions to 108 per year), but without any additional national funding. This has resulted in a number of redundancies within the service.

In November 2012, the NHS GGC health care needs assessment for Tier 2 community weight management programmes cited above concluded that Tier 2 weight management services were not meeting the needs of NHS GGC's overweight/obese population and recommended a "mixed economy" Tier 2 with provision of both commercial and NHS services [510].

In September 2014, a new strategic direction for NHS GGC weight management services was approved by the Board's Quality and Performance Committee. It was summarised as:

- Expansion of community based weight management services in conjunction with a commercial provider;

- Optimisation of specialist weight management services to provide intensive interventions for complex patient groups;

- Expansion of surgical intervention as a treatment option for suitable patients in line with National Planning Forum guidance [513].

Then in 2015, Weight Watchers were awarded the tender to provide the NHS GGC community based weight management programme (Tier 2). Since this was announced, the Local Medical Committee (LMC) of GPs in the area became concerned that this may result in "undue presentations at GP practices associated with gaining access to a commercial Weight Management Service" [513], so a self-referral option for patients with a BMI > 30 kg/m^2 and co-morbid diabetes, heart disease, or stroke was introduced.

This has since been changed again, along with a further change to remove the differences in referral criteria for GPs and hospital doctors (see Appendix 14 for evolving versions of criteria). From a primary care perspective, there is a danger of the 'change fatigue' described in Chapter 4 affecting future referrals.

Having described the wider NHS GGC context of the mixed method case study and the service re-design at GCWMS taking place throughout the period that this research was undertaken, the rest of this chapter will explore the different field sites in more detail.

6.6 The Field Sites

There are three stages to the case study:

1) Quantitative analysis of referral data
2) Qualitative interviews with patients
3) Qualitative interviews with practitioners (GPs and practice nurses)

As such, the three field sites described are the GCWMS itself, the sites of the patient interviews, and the locations of the practitioner interviews.

6.6.1 Glasgow and Clyde weight management service

When this project began, the main GCWMS offices were based at the Mansionhouse Unit in the south side of Glasgow. Formerly known as the Victoria

Geriatric Unit, it was the second home for GCWMS, which was originally located in the Glasgow Royal Infirmary in the east of the city.

In 2015, the service completed its tour of Glasgow by moving to the west end where it is currently located in the second floor of the West Glasgow Ambulatory Care Hospital (which was previously the Yorkhill Children's hospital).

One feature that the Mansionhouse Unit location and the West Glasgow location share is that they are both situated on top of hills. The irony of a weight management service requiring its patients to walk up a hill to get there was not lost on many of the patients interviewed for this case study.

Despite undergoing the substantial service re-design described above, which resulted in several redundancies, the staff at GCWMS were all very welcoming to me and supportive of my research. I presented my research proposal to their monthly staff educational meeting at the start of the project and returned towards the end of the research to discuss my findings.

6.6.2 Adults with obesity

The interviews with 20 patients took place at a range of venues between August 2015 and May 2016. Most interviews took place at participants' homes (n=11), with 5 taking place at their nearest weight management centre and 4 at the University of Glasgow department of General Practice and Primary Care (GPPC).

The interviews that took place at patients' homes provided more of an insight into their social and cultural environment. The homes ranged from council housing in very deprived areas to detached houses in more affluent areas, though overall the former were more common than the latter. In my research field diary I made notes about the housing environment and about details of the interview such as whether I was offered tea (I usually was) and whether other family members were present. Interruptions such as telephone calls or young children disturbing the interviewee were also noted.

The five interviews that were held at weight management centres took place at the New Victoria hospital, Stobhill hospital, Inverclyde Royal Hospital and at Easterhouse Health Centre.

6.6.3 Primary care practitioners

The interviews with primary care practitioners mostly took place in the general practices where the practitioners worked, with one taking place in a hospital (the GP also worked some shifts there) and one at GPPC (which was more convenient for them). Most of the interviews took place during the practitioners lunch break or on an afternoon that they had blocked off for administrative work. In my field diary, I took notes about the waiting areas in the practices (what patient information leaflets were on display, how the room was laid out) and about the setup of the consultation room (e.g. any BMI charts or weighing scales visible). Often the participants would say things to me after the audio recording had stopped, which they perhaps did not feel comfortable saying 'on the record'. I made a note of these comments also, though have not reported them in my findings.

6.7 Chapter summary

This short chapter has 'set the scene' for the results of the mixed methods case study of GP referrals to the GCWMS, comprising Phases 3 and 4 of this research, which are presented in Chapters 7 and 8 respectively. The background to the GCWMS was provided, including the context of obesity prevalence in NHS GGC and the service re-design at GCWMS. The chapter finished by giving more detail on the three different field sites where data collection took place: GCWMS, and the locations where patients and primary care practitioners were interviewed.

7 Results 3: GP Referrals to Glasgow & Clyde Weight Management Service

7.1 Overview

This Chapter presents the results of Phase 3 of this research – quantitative analysis of GP referrals to the Glasgow and Clyde Weight Management Service. The research question being addressed is:

RQ3 – What are the patient and practice-level predictors of attendance and completion at adult weight management services after primary care referral?

As noted in Chapter 2, there is marked variation in GP referrals to weight management services from primary care, and a high attrition rate between referral and attendance [305]. The reasons for this are unclear. One factor is patient characteristics, such as socioeconomic status, with more affluent patients more likely to be referred [514]. Previous research on referral variation has suggested that only 40% of variation can be explained by patient characteristics [515]. Practitioner factors such as views of risk and clinical experience, as well as system factors, such as distance to services, also explain some of the variation observed in referral rates to secondary care [515, 516]. These factors may also contribute to an individual's likeliness to both attend a service and complete the course of treatment on offer – each of these are important issues in weight management, where patients are being asked to make significant changes to their lifestyle and behaviour.

Several previous studies have explored individual practitioner views on referral to weight management services [220, 222, 517]. Issues raised included patient factors such as motivation and expectations, and practitioner factors such as previous experience and pessimism. However, there are no quantitative studies that have explored the predictors of attendance at weight management services taking account of both individual factors and practice characteristics.

7.2 Aim of this chapter

The aim of this chapter is to present the results of the quantitative analysis of GP referrals to GCWMS. The aim of the analysis was to use individual and practice level data to explore predictors of attendance and completion at a specialist weight management service (Tier 3), using multilevel binary logistic regression models.

7.3 Methods

The methodological considerations related to this case study are described in Chapter 3 and detailed background information on GCWMS (including an overview of the service, the population it serves, and previous evaluations) is presented in Chapter 6. As such, this methods section will outline the study design, study variables, and statistical analysis performed.

7.3.1 Study design and population

An observational cross-sectional study design was applied using data from GP electronic referrals to GCWMS. Non-identifiable data were provided by GCWMS (after discussion with their Research Governance Group) for the purposes of evaluating a routine NHS service, so this part of the project did not require ethics committee approval (although it was included in the application to the West of Scotland Ethics committee as part of the mixed methods case study).

The dataset was received from GCWMS in February 2016 and included data on the earliest referral per patient from 2012 to 2014 in order to avoid patients appearing more than once. Data cleaning ensured that the included cases were adults (aged 18 years and over), had a diagnosis of obesity (BMI $\geq$30 kg/m^2) and had complete data on sex, height and weight. 146 cases (1.5%) were excluded in this process. The final dataset comprised 9,677 adults with obesity referred from 262 general practices in GGC. The small number of referrals (<2% of total referrals) from outside GGC and from specialist services were excluded prior to receiving the data.

7.3.2 Study variables

Referral, attendance and 'completion'

The main outcome of interest was attendance at weight management, defined as attending at least one group session, after the initial assessment. A further outcome was 'completion', defined as attendance at 4 or more sessions. This was based on a definition used in a previous published study of the GCWMS [305].

Patient characteristics

Patient characteristics included sex, age (grouped into four categories: 18-24 years, 25-44 years, 45-64 years, 65+ years), socio-economic status (based on the Scottish Index of Multiple Deprivation (SIMD) 2012 quintiles [518]), and BMI (grouped into four categories: 30-35 kg/m^2, >35-40 kg/m^2, >40-45 kg/m^2, and 45+ kg/m^2). Data on co-morbidities of the referred patients were incomplete so were not included in the final analysis. There were no data on other variables that may have been of interest, such as ethnicity or smoking status.

Practice characteristics

Practice characteristics included GP training practice status, practice list size, distance from nearest weight management service (WMS) centre, achievement in the Quality and Outcome Framework (QOF) in the year April 2014 to March 2015, practice deprivation status, and referral rate to the GCWMS.

Data on training practice status were derived from the West Scotland GP training website [306]. Practice list size was taken from Information Services Division (ISD) Scotland [307] and divided into 3 groups: <4,000, 4000-8000, and >8000. Distance from the nearest weight management service centre was calculated using GPS mapping software using practice postcode and the postcodes of the 12 weight management service satellite clinics that were in operation during the referral period. The three groupings for this variable were less than 1 mile, 1 to 2 miles, and over 2 miles. QOF achievement data were taken from the ISD website [308] and grouped into <95, 95-98, 99, 100 points (out of a possible 100

points). Practice deprivation status was based on the % of the practice population living in the most deprived 15% of postcodes and categorised as: <15%, 15-40%, and >40% of practice population. Referral rate to GCWMS was per 1000 practice population (<5, 5-10, and >10).

7.3.3 Statistical analysis

Descriptive analysis of the study population examined how referral, attendance and completion varied by patient and practice characteristics. Multilevel binary logistic regression models were constructed in order to account for the clustering of patients within practices. Results are presented as univariable (crude) and multivariable (adjusted) odds ratios (ORs) and 95% confidence intervals (95% CI), with adjustment made for all patient and practice-level characteristics. Analysis was carried out using STATA-MP version 14.0 (Texas, USA).

7.4 Results

9,677 adults with obesity were referred to the regional specialist weight management service from 262 practices in NHS GGC between January 2012 and December 2014. This is about 4% of the approximately 260,000 adults with obesity estimated to live in NHS GGC [519].

Table 7-1 shows the individual-level characteristics of the total GGC population and of the study population (for those referred, attenders (attending at least one session), and 'completers' (attending 4 or more sessions)). The majority of those referred to the weight management service were female, aged 45 to 64 years, and from the most deprived population quintile. The mean age of those referred was 46.5 years (SD 14.3, range 18 to 88); the mean BMI was 41.4 kg/m^2 (SD 6.9, range 30 to 97.3). Approximately one third of those referred attended at least one session (n = 3250, 33.6%); of attenders, 69.3% (n = 2252) completed.

There was a similar picture for those attending the weight management service and those attending four or more sessions ('completers'). Over 70% were female and over half were aged 45 to 64, with the mean age of those attending 49.8 years (SD 13.5, range 18 to 84) and the mean age of 'completers' 50.6 years

(13.2, range 18 to 83). Over 40% were from the most deprived population quintile. The mean BMI of attenders was 42.0 kg/m^2 (SD 7.1, range 30 to 97.3) and the mean BMI of 'completers' was 42.1 kg/m^2 (SD 7.2, range 30 to 97.3).

Table 7-1: Individual characteristics of total GG&C population, those referred, attenders and completers (Number, (%))

	GGC Adult Population N= 924,727	Referrals N = 9677	Attenders N = 3250	Completers N = 2252
Sex†				
Women	485,629 (52.5)	6870 (71.0)	2331 (71.7)	1607 (71.4)
Men	439,098 (47.5)	2807 (29.0)	919 (28.3)	645 (28.6)
Age groups (years)†				
18-24	118,069 (12.8)	694 (7.2)	118 (3.6)	66 (2.9)
25-44	313,970 (34.0)	3543 (36.6)	1006 (31.0)	657 (29.2)
45-64	305,659 (33.1)	4369 (45.1)	1652 (50.8)	1179 (52.4)
65+	187,029 (20.2)	1071 (11.1)	474 (14.6)	350 (15.5)
SIMD 2012 quintile[a]				
Q1 – most deprived	331,977 (35.9)	4778 (49.4)	1388 (42.7)	922 (41.3)
Q2	163,677 (17.7)	1770 (18.3)	600 (18.5)	419 (18.7)
Q3	133,160 (14.4)	1254 (13.0)	481 (14.8)	339 (15.2)
Q4	122,064 (13.2)	970 (10.0)	368 (11.3)	265 (11.9)
Q5 – most affluent	173,848 (18.8)	844 (8.7)	386 (11.9)	290 (13.0)
Missing	-	61 (0.6)	27 (0.8)	17 (0.8)
BMI category[b] (kg/m^2)				
30-35	}231,182 (25%)	1232 (12.7)	329 (10.1)	225 (10.0)
>35-40		3465 (35.8)	1152 (35.4)	764 (33.9)
>40-45	}27,742 (3%)	2611 (27.0)	920 (28.3)	658 (29.2)
45+		2369 (24.5)	849 (26.1)	605 (26.9)

†National Records of Scotland Small Area Population Estimates (SAPE) mid-2014 [509].

a Based on estimates from NHS GGC Director of Public Health report 2015-17 [506].

b Based on estimates from Scottish Health Survey 2014 [49].

Table 7-2 shows the distribution of patients by the characteristics of their referring practice, compared to all GGC practices. In GGC, less than one-third of practices were training practices (n=80, 30.5%). The average list size was 5009 patients (range from 1227 to 16,825). Roughly half (n=130, 49.6%) of all practices were within 1 mile of the nearest WMS clinic. The mean number of referrals per practice was 42 (range from 1 to 257), with a mean referral rate of 8.5 per 1000 population (range from 0.7 to 26.3).

Just over 40% of all patients were referred from training practices (n=4013, 41.4%) and a little under half were from medium-sized practices with list sizes between 4000 and 8000 patients (n=4633, 47.8%). Over half of patients (n=5486,

56.6%) were from referring practices within 1 mile of the nearest weight management service clinic. Practices generally scored very highly on QOF, with 66.2% of patients being referred by a practice that achieved 99 or 100 points out of a possible 100. The characteristics of those attending or 'completing' were broadly similar to those initially referred.

Table 7-2: Practice characteristics for referrals, attenders and completers (Number (%))

	GGC Referring Practices N = 262	Referrals N = 9677	Attenders N = 3250	Completers N = 2252
Training practice				
No	158 (60.3)	4920 (50.8)	1664 (51.1)	1123 (54.8)
Yes	80 (30.5)	4013 (41.4)	1310 (40.3)	926 (45.2)
Missing	24 (9.2)	752 (7.8)	280 (8.6)	203 (9.0)
List size				
<4000	110 (42.0)	2249 (23.2)	641 (19.7)	465 (20.6)
4000-8000	113 (43.1)	4633 (47.8)	1655 (50.9)	1130 (50.2)
8000+	39 (14.9)	2795 (28.9)	954 (29.3)	657 (29.2)
Distance from WMS				
Within 1 mile	130 (49.6)	5486 (56.6)	1784 (54.8)	1214 (53.9)
Between 1-2 miles	88 (33.6)	2738 (28.3)	919 (28.2)	654 (29.0)
2 miles or more	44 (16.8)	1453 (15.0)	547 (16.8)	384 (17.1)
QOF points				
<95	7 (2.7)	231 (2.4)	72 (2.2)	52 (2.3)
95-98	38 (14.5)	820 (8.5)	280 (8.6)	186 (8.3)
99	44 (16.8)	1597 (16.5)	533 (16.4)	373 (16.6)
100	110 (42.0)	4812 (49.7)	1611 (49.5)	1111 (49.3)
Missing	63 (24.0)	2225 (23.0)	758 (23.3)	530 (23.5)
Deprivation status (% of practice population defined as most deprived)				
<15%	67 (25.6)	2068 (21.4)	795 (24.4)	581 (25.8)
15-40%	100 (38.2)	4171 (43.1)	1506 (46.3)	1034 (45.9)
>40%	95 (36.2)	3438 (35.5)	949 (29.2)	637 (28.3)
Referral Rate per 1000 practice population				
>10	75 (28.6)	4178 (43.1)	1328 (40.8)	938 (41.7)
5-10	104 (39.7)	4553 (47.0)	1550 (47.6)	1062 (47.2)
<5	83 (31.7)	946 (9.8)	372 (11.4)	252 (11.2)

GGC: Greater Glasgow & Clyde, WMS: weight management service, QOF: Quality and Outcome Framework

Overall 34% of those referred actually attended the service, and 2252 (23%) completed by attending for 4 or more sessions. There were, however, particular groups within the referred population that were more likely to both attend and to complete (Table 7-3). Those aged 65 years and over had a higher attendance rate (44.3%), as did those from the least deprived quintile (45.7%) and those in the highest BMI category (BMI 45+ kg/m^2; 35.8%). There was a higher proportion of attenders from larger and less deprived practices and from practices further

away from weight management centres (37.6% attendance from those referred from practices 2 or more miles away). A similar pattern was observed for those completing 4 or more sessions at the WMS (Table 7-3).

Table 7-3: Profile of service attenders and completers compared to those referred, by patient and practice characteristics, as a percentage of those referred (Number, percentage of those referred)

	Referrals N = 9677	Attendances N = 3250	Completers N = 2252
Patient characteristics			
Sex			
Women	6870	2331 (33.9)	1607 (23.4)
Men	2807	919 (32.7)	645 (23.0)
Age group (years)			
18-24	694	118 (17.0)	66 (9.5)
25-44	3543	1006 (28.4)	657 (18.5)
45-64	4369	1652 (37.8)	1179 (27.0)
65+	1071	474 (44.3)	350 (32.7)
SIMD 2012 quintile			
Q1 – most deprived	4778	1388 (29.0)	922 (19.3)
Q2	1770	600 (33.9)	419 (23.7)
Q3	1254	481 (38.4)	339 (27.0)
Q4	970	368 (37.9)	265 (27.3)
Q5 – most affluent	844	386 (45.7)	290 (34.4)
Missing	61	37	17
BMI category (kg/m^2)			
30-35	1232	329 (26.7)	225 (18.3)
>35-40	3465	1152 (33.2)	764 (22.0)
>40-45	2611	920 (35.2)	658 (25.2)
45+	2369	849 (35.8)	605 (25.5)
Practice characteristics			
Training practice			
No	4920	1664 (33.8)	1123 (22.8)
Yes	4013	1310 (32.6)	926 (23.1)
Missing	744	276	203
List size			
<4000	2249	641 (28.5)	465 (20.7)
4000-8000	4633	1655 (35.7)	1130 (24.4)
8000+	2795	954 (34.1)	657 (23.5)
Distance from WMS			
Within 1 mile	5486	1784 (32.5)	1214 (22.1)
Within 2 miles	2738	919 (33.6)	654 (23.9)
2 miles or more	1453	547 (37.6)	384 (26.4)
QOF points			
<95	231	72 (31.2)	52 (22.5)
95-98	820	280 (34.1)	186 (22.7)
99	1597	533 (33.4)	373 (23.4)
100	4812	1611 (33.5)	1111 (23.1)

Missing	2217	754	530
Deprivation status (% of practice population defined as most deprived)			
<15%	2068	795 (38.4)	581 (28.1)
15-40%	4171	1506 (36.1)	1034 (24.8)
>40%	3438	949 (27.6)	637 (18.5)
Referral rate per 1000 practice population			
>10	4178	1328 (31.8)	938 (22.5)
5-10	4553	1550 (34.0)	1062 (23.3)
<5	946	372 (39.3)	252 (26.6)

SIMD: Scottish Index of Multiple Deprivation, BMI: body mass index, WMS: weight management service, QOF: Quality and Outcome Framework

Table 7-4 presents the logistic regression models of attendance and completion, with individual and practice characteristics, and taking account of clustering within practices. Patient-level characteristics were the strongest predictors of attendance at the specialist weight management service, with the odds of attendance increasing with age (OR 4.15, 95% CI 3.27 to 5.26 for adults aged 65 years and over compared to those aged 18-24 years), BMI category (OR 1.83, 95% CI 1.56 to 2.14 for those with a BMI 45+ kg/m^2 compared to BMI 30-35 kg/m^2), and increasing affluence (OR 1.74, 95% CI 1.47 to 2.06 for patients from the most affluent practices compared to the most deprived). Men had a lower odds of attendance than women (OR 0.87, 95% CI 0.79 to 0.96).

Practice-level characteristics that were most strongly associated with attendance were being a non-training practice, having a larger list size, and having a more affluent patient population. Those patients referred from training practices had a slightly lower odds of attending (OR 0.89, 95% CI 0.81 to 0.99) than those referred from non-training practices. Those from a practice with a list size of 4000-8000 were more likely to attend that those from a practice with a list size of under 4000 (OR 1.41, 95% CI 1.25 to 1.59). Similarly, those from a practice with a list size greater than 8000 were also more likely to attend at least one of the weight management appointments following referral (OR 1.29, 95% CI 1.12 to 1.48). Patients referred from practices serving the most deprived populations (where more than 40% of the practice population live in the most deprived postcodes) were less likely to attend the WMS (OR 0.82, 95% CI 0.71 to 0.95).

Similar patterns were observed for those who completed a course of sessions at the WMS (Table 7-4), with the same patient-level characteristics the strongest

predictors of 'completion'. The likelihood of attending four or more sessions increased with increasing age, such that those aged 65 years and over were almost five times as likely to attend 4 or more sessions compared to those aged 18-24 years (OR 4.83, 95% CI 3.62 to 6.45).

As with attendance, there was a social gradient in 'completing' with increasing odds from the most deprived to the most affluent quintiles (OR 1.83, 95% CI 1.53 to 2.19 for patients from the most affluent practices compared to the most deprived). Similarly, the odds of attending four or more sessions also increased with each increase in BMI category, with the highest odds being for those from the BMI 45 kg/m^2 and over category (OR 1.88, 95% CI 1.58 to 2.25) compared to the reference group of BMI 30-35 kg/m^2.

Table 7-4: Logistic regression models for attenders and completers at the WMS

	Attenders			Completers		
	Unadjusted OR (95% CI)	Adjusted OR† (95% CI)	P-value	Unadjusted OR (95% CI)	Adjusted OR† (95% CI)	P-value
Sex						
Women	1.00	1.00		1.00	1.00	
Men	0.95 (0.86 to 1.04)	0.87 (0.79 to 0.96)	0.005	0.98 (0.88 to 1.09)	0.89 (0.80 to 0.99)	0.036
Age group (years)						
18-24	1.00	1.00		1.00	1.00	
25-44	1.96 (1.58 to 2.43)	1.93 (1.56 to 2.39)	<0.001	2.20 (1.68 to 2.87)	2.15 (1.64 to 2.81)	<0.001
45-64	3.02 (2.45 to 3.730	3.04 (2.46 to 3.75)	<0.001	3.59 (2.76 to 4.67)	3.54 (2.72 to 4.61)	<0.001
65+	3.88 (3.07 to 4.90)	4.15 (3.27 to 5.26)	<0.001	4.59 (3.45 to 6.11)	4.83 (3.62 to 6.45)	<0.001
SIMD 2012 quintile						
Q1 – most deprived	1.00	1.00		1.00	1.00	
Q2	1.24 (1.10 to 1.40)	1.15 (1.02 to 1.30)	0.023	1.29 (1.13 to 1.47)	1.19 (1.04 to 1.36)	0.014
Q3	1.48 (1.29 to 1.69)	1.33 (1.16 to 1.53)	<0.001	1.53 (1.32 to 1.77)	1.37 (1.18 to 1.60)	<0.001
Q4	1.46 (1.26 to 1.69)	1.32 (1.13 to 1.55)	<0.001	1.55 (1.32 to 1.83)	1.39 (1.17 to 1.65)	<0.001
Q5 – most affluent	1.99 (1.70 to 2.33)	1.74 (1.47 to 2.06)	<0.001	2.14 (1.82 to 2.53)	1.83 (1.53 to 2.19)	<0.001
Missing	1.95 (1.17 to 3.26)	1.96 (1.17 to 3.28)	0.01	1.61 (0.91 to 2.84)	1.61 (0.91 to 2.86)	0.101
BMI category (kg/m^2)						
30-35	1.00	1.00		1.00	1.00	
>35-40	1.38 (1.19 to 1.60)	1.53 (1.32 to 1.78)	<0.001	1.28 (1.08 to 1.51)	1.43 (1.21 to 1.70)	<0.001
>40-45	1.51 (1.29 to 1.75)	1.74 (1.49 to 2.03)	<0.001	1.53 (1.29 to 1.81)	1.79 (1.50 to 2.13)	<0.001
45+	1.56 (1.34 to 1.82)	1.83 (1.56 to 2.14)	<0.001	1.57 (1.32 to 1.86)	1.88 (1.58 to 2.25)	<0.001
Training practice						
No	1.00	1.00		1.00	1.00	
Yes	0.96 (0.85 to 1.08)	0.89 (0.81 to 0.99)	0.029	1.01 (0.89 to 1.15)	0.97 (0.86 to 1.08)	0.550
Missing	1.13 (0.92 to 1.40)	1.13 (0.91 to 1.39)	0.268	1.29 (1.04 to 1.61)	1.23 (0.98 to 1.57)	0.074
List size						
<4000	1.00	1.00		1.00	1.00	
4000-8000	1.37 (1.21 to 1.57)	1.41 (1.25 to 1.59)	<0.001	1.21 (1.05 to 1.40)	1.21 (1.06 to 1.39)	0.006

8000+	1.31 (1.12 to 1.53)	1.29 (1.12 to 1.48)	<0.001	1.17 (0.99 to 1.39)	1.14 (0.98 to 1.34)	0.097
Distance from WMS						
Within 1 mile	1.00	1.00		1.00	1.00	
Within 2 miles	1.04 (0.91 to 1.18)	1.03 (0.92 to 1.14)	0.621	1.10 (0.96 to 1.26)	1.09 (0.97 to 1.24)	0.149
2 miles or more	1.29 (1.09 to 1.51)	1.06 (0.93 to 1.21)	0.399	1.32 (1.11 to 1.57)	1.06 (0.91 to 1.23)	0.469
QOF points						
<95	1.00	1.00		1.00	1.00	
95-98	1.11 (0.76 to 1.63)	0.97 (0.70 to 1.34)	0.849	0.99 (0.66 to 1.49)	0.81 (0.56 to 1.17)	0.254
99	1.09 (0.76 to 1.57)	0.85 (0.62 to 1.16)	0.314	1.02 (0.69 to 1.50)	0.82 (0.58 to 1.16)	0.258
100	1.12 (0.79 to 1.59)	0.89 (0.66 to 1.20)	0.454	1.03 (0.71 to 1.50)	0.82 (0.58 to 1.14)	0.238
Missing	1.14 (0.80 to 1.62)	0.90 (0.66 to 1.23)	0.506	1.09 (0.75 to 1.60)	0.80 (0.57 to 1.14)	0.219
Deprivation status (% of practice population defined as most deprived)						
<15%	1.00	1.00		1.00	1.00	
15-40%	0.88 (0.78 to 1.00)	1.09 ([0.95 to 1.23)	0.212	0.83 (0.72 to 0.95)	0.96 (0.83 to 1.11)	0.561
>40%	0.60 (0.53 to 0.69)	0.82 (0.71 to 0.95)	0.008	0.57 (0.50 to 0.66)	0.74 (0.63 to 0.87)	<0.001
Referral rate per 1000 practice population						
>10	1.00	1.00		1.00	1.00	
5-10	0.79 (0.67 to 0.95)	0.92 (0.79 to 1.08)	0.311	0.83 (0.69 to 1.01)	0.99 (0.83 to 1.18)	0.915
<5	0.71 (0.59 to 0.85)	0.91 (0.77 to 1.08)	0.269	0.79 (0.65 to 0.96)	1.07 (0.88 to 1.29)	0.516

CI: confidence interval, OR: odds ratio, SIMD: Scottish Index of Multiple Deprivation, BMI: body mass index, WMS: weight management service, QOF: Quality and Outcome Framework

† Adjusted for all other variables

7.5 Discussion

7.5.1 Summary of main findings

Phase 3 of this study was an observational cross-sectional study of GP referrals to an NHS Health Board specialist weight management service. Just over a third of the 9,677 adults with obesity who were referred between 2012 and 2014 attended at least one session. There was further attrition after first attendance, with less than a quarter 'completing' treatment, defined here as attending four or more sessions. Patient-level characteristics were the strongest predictors of attendance and completion, with the odds of attendance increasing with age, BMI category, and increasing affluence. Practice-level characteristics most strongly associated with attendance and completion were being a non-training practice, having a larger list size, and not being in areas of extreme deprivation.

7.5.2 Comparison with other literature

This study of GP referrals to a large regional weight management service found that patient characteristics were more significant predictors of attendance than practice characteristics. This is in keeping with previous research on variation in GP referrals to secondary care services [514, 515]. The powerful effect of socio-economic deprivation – both at the individual level and at the practice level – also resonates with existing literature on barriers to access [316].

The low level of referral to adult weight management from primary care in this study – roughly 4% of the approximately 260,000 adults with obesity estimated to live in NHS GGC – is similar to previously published studies from the UK [149, 520]. The reasons for this low engagement with weight management are multifactorial, including patient, practitioner and health system factors [220, 222, 339, 517]

7.5.3 Strengths and limitations

There are no previous studies that have explored the predictors of attendance at NHS adult weight management services taking account of both individual patient factors and referring practice characteristics. This study used individual patient level data and practice level data to explore predictors of attendance and

completion at a specialist weight management service, using multilevel binary logistic regression models.

A strength of this work is that it was based in the largest health board in Scotland, with data available for all referrals made by primary care practitioners based in general practice, between 2012 and 2014. Thus the findings are broadly generalizable to other parts of the NHS and beyond, particularly in terms of gender, age and socioeconomic status. Unfortunately, however, there were no data on ethnicity; a limitation of many routine data sets in Scotland [521].

As noted in the previous chapter, while Scotland overall has a lower percentage of the population who are from minority ethnic groups – at 4% overall – this Health Board region has the highest percentage of minority ethnic groups, with the Asian background (defined as Asian/Asian Scottish/Asian British) the largest population group [519].

As with any secondary data analysis, the quality and validity of the findings are only as good as the quality of the original data. In this case, confidence in the accuracy and consistency of the data is increased as the main outcome variables of interest were referral, attendance and completion, which are reliably recorded.

There were no available data on weight loss outcomes in this study population, which is a limitation. However, previous work conducted in this weight management service found that 26% of those completing Phase 1 attendance had lost at least 5kg [305]. Similarly, there were no available data on the total population of adults with obesity in the NHS GGC area, which makes it difficult to comment on the representativeness of the study population. In this study, the definition of 'completers' used was 'attending 4 or more sessions', which is perhaps lower than in some other studies. However, the attrition rate was even greater if the threshold for the number of sessions attended was increased. In addition, higher thresholds for completion tend to be used when describing weight outcomes, rather than being used as an indicator of attendance, as in this study.

7.6 Chapter summary

This chapter has presented the results of the Phase 3 quantitative analysis of GP referrals to GCWMS, which used individual and practice level data to explore predictors of attendance and completion at the service.

The underlying explanation for the observed findings merits further investigation. In terms of patient characteristics, one might hypothesise, for instance, that attendance is more likely for older adults because they are less likely to be working and may be more able to attend appointments during working hours. Similarly, it is possible that those adults with a higher BMI may be more motivated to attend as they are experiencing more problems (functional or health-related) as a result of their weight, and may need more support to manage their weight.

With regard to practice characteristics, lower attendance by patients referred from training practices could be related to more referrals done by GP trainees, without perhaps knowing the patient well or fully discussing the implications of referral. Lower attendance from more deprived practices, over and above the effect of individual deprivation status, could point to area-based barriers to attendance such as poorer transport infrastructure or an unwillingness to cross territorial boundaries. Lower attendance by patients referred from smaller practices is harder to explain and may be related to other confounding factors, such as smaller practices being more likely to be situated in more deprived areas [522, 523].

The next chapter presents results from qualitative interviews with patients and practitioners and aims to shed more light on these findings.

8 Results 4: Qualitative analysis of interviews with patients and practitioners

8.1 Overview

This chapter presents the results of Phase 4 of this research – qualitative analysis of interviews with patients referred to the NHS GCWMS and primary care practitioners from the referring practices. The research questions addressed are:

RQ4a – What is the role of primary care in adult weight management, from the perspective of patients (adults with co-morbid obesity) and primary care practitioners?

RQ4b – What are the barriers and facilitators to primary care referral to, and subsequent attendance at, adult weight management services?

Phase 1 of this study – qualitative interviews with those that are involved in planning and delivering adult weight management services across Scotland - identified several tensions in relation to the role of primary care in weight management, and how weight management services have engaged with primary care. In this chapter (Phase 4 results), findings from qualitative interviews with patients and practitioners will be presented. Their views on the role of primary care in weight management will be described, and compared to those of the key weight management stakeholders.

Phase 3 of this study highlighted different patient and practice characteristics that predicted attendance and completion at the Glasgow & Clyde Weight Management Service. Individual patient characteristics (female sex, older age, higher BMI, and increasing affluence) were stronger predictors of attendance than practice level characteristics. Findings from this chapter will help us to understand these differences, and provide a better understanding of how patients gain access to the GCWMS through primary care.

8.2 Aims of this chapter

This chapter has two aims: 1) to explore the views of patients and primary care practitioners on the role of primary care in adult weight management; and 2) to understand the barriers and facilitators to GP referral to a specialist weight management service

8.3 Methods

Ethical approval was granted by the West of Scotland Research Ethics Committee 5. Relevant documents related to ethical approval can be found in Appendix 9.

8.3.1 Sampling of practices

A sampling frame was developed using GP referral data from Phase 3 to create a 3x3 table of practices in NHS Greater Glasgow and Clyde that were low-, medium-, and high referring and low-, medium-, and high deprivation (practices ranked based on the percentage of registered patients in the top 15% of the Scottish Index of Multiple Deprivation). The prevalence of obesity is higher in more deprived areas, so one might expect referral rates from practices in more deprived areas to be higher also (as observed in Phase 3). The sampling frame allowed purposive sampling of so-called "deviant cases" in more depth (e.g. high deprivation but low referral; or low deprivation and high referral). Table 8-1 shows the spread of patients recruited.

Table 8-1: Sampling frame for patient recruitment (Target number of patients in cell (total practices in each cell in brackets))

	Practice Deprivation Rank (based on % of population in 15% most deprived postcode data zones)		
Referral Rate (per 1000 pop)	Low (<15%)	Medium (15-40%)	High (>40%)
Low (<5)	1 (33)	2 (28)	4 (22)
Medium (5-10)	1 (28)	3 (37)	3 (39)
High (>10)	3 (6)	1 (35)	2 (34)
Total	*5 (67)*	*6 (100)*	*9 (95)*

8.3.2 Recruitment of participants

A two-stage recruitment process was followed. Patients from referring practices were recruited first. This was done via GCWMS sending out invitation packs to

patients who had attended the initial assessment and who had given consent to be contacted for research purposes. Initially, invitation packs (Appendix 15) were sent to patients from practices in all nine cells in batches of 50 (with the expectation of a 10% response rate). As recruitment progressed, invitation letters were targeted to patients from practices in specific cells to achieve the target sample. Patients were assigned an ID number (shown in Table 8-2) in the order in which they returned their opt-in reply slips (Appendix 10). One patient (ID4) was not subsequently contactable and another one (ID6) was not recruited as they only spoke Polish (with very limited English) and there was no available funding for an interpreter.

After the patient interviews were completed, recruitment of primary care practitioners was done by sending invitation packs to the referring practices of participating patients. This was followed up by telephone contact by DB. 16 practitioners were recruited in this way, but it was not possible to recruit a practitioner from 3 of the 19 practices that the 20 patients were registered at (two of the patients were registered at the same GP). Practitioner participants were assigned the same ID numbers as the patients recruited from their practices (e.g. practitioner ID 3, PN6, was the practice nurse from patient ID3's practice). This allowed patient-practitioner pairs to be identified during analysis.

As noted in Chapter 3, it was not possible to conduct the planned focus group with practitioners from practices that had *never* referred a patient to the service, but a further batch of invitation packs were sent to the five lowest referring practices; only one further practitioner (a GP) was recruited in this way.

8.3.3 Data collection

Patients were interviewed in person at a venue of their choice, either at home (n=11), at their nearest weight management centre (n=5), or at the University of Glasgow department of General Practice and Primary Care (GPPC) (n=4). Interviews were audio-recorded and transcribed verbatim. Interviews were semi-structured with the use of a topic guide developed from the findings of the Phase 1 study, the realist review and the candidacy framework. Patient

interviews took place between August 2015 and May 2016 and lasted between 30 and 73 minutes, average 46.

Practitioners were also interviewed in person, usually at their place of work (n=16), with one being interviewed at GPPC. Again, a topic guide was developed to inform these interviews as described for the patient topic guide. Practitioner interviews took place between May and October 2016 and lasted between 23 and 46 minutes, average 34.

8.3.4 Data analysis

Interviews were audio-recorded and transcribed verbatim. The transcripts were then thoroughly checked for inconsistencies against the recordings and anonymised. Each interviewee was given a unique code (e.g. F1 = the first female patient interviewed; GP2 = the second GP interviewed) to allow anonymization and the transcripts were checked again for any other identifying features, which were then altered. QSR International NVIVO 10 qualitative data analysis software [524] was used to aid data handling and analysis.

8.3.4.1 Thematic analysis

An inductive thematic analysis was undertaken, allowing emergent themes to be uncovered. The six stages described by Braun and Clarke [267] were followed: familiarisation with data, generating initial codes, searching for themes among codes, reviewing themes, defining and naming themes, and producing the final report.

Familiarisation with data

After receiving each transcribed interview, the transcripts were read and re-read while listening back to the audio version of the interviews to check for any errors or omissions, and to remove any identifiable features (e.g. names, places). This process also developed familiarisation with the data. A summary of the key characteristics of the interviewee (e.g. age, sex, BMI, ethnicity, previous attempts at weight loss), as well as key messages from the interview, was made and compared with field notes taken immediately after the interviews.

Generating initial codes

The next step involved going through each interview transcript line by line and noting potential codes. This was done on printed hard copies of the first four interviews, after which coding clinics with DB, SM and COD were held to review the codes. This was an iterative process, which ultimately resulted in an agreed coding framework (Appendix 16). Subsequent transcripts were coded by DB according to this framework, using NVIVO 11 software. A further coding clinic was held to check the consistency of this coding.

Searching for themes among codes, and reviewing themes

Codes were then reviewed to look for patterns and relationships between codes that might represent broader themes. A number of these 'higher level' themes were generated, and these were again discussed in a meeting with DB, SM and COD. From this, a thematic framework (see Appendix 16) was developed and applied to the remaining transcripts by DB, with on-going coding clinics to discuss the process with SM and COD.

Defining and naming themes

It became clear that there was considerable overlap between the themes generated from the patient interviews and the practitioner interviews, and that there were similarities too between these themes and those from the interviews with senior dietitians. The OSOP approach described in Chapter 4 was used again to summarise and refine the codes [268].

Producing the final report

The themes were written through with exemplar quotes and reflection on how they related to the research questions, particularly those related to barriers and facilitators to accessing weight management, and suggestions for change.

8.4 Results

The characteristics of the 20 patients interviewed are shown in Table 8-2, with the characteristics of the 17 practitioners interviewed shown in Table 8-3.

Table 8-2: Patient characteristics from Phase 4 interviews

ID	Sex	Age group	Practice SIMD	SIMD	BMI range	Outcome in service at time of interview	Co-morbidities recorded
1	F1	65+	Low	8	30-35	currently in phase 2	diabetes
2	F2	55-64	Med	5	45+	currently in phase 2	none
3	F3	45-54	Med	1	40-45	discharged DNA x 2	none
5	F4	35-44	High	2	35-40	discharged opted out	none
7	F5	45-54	Low	2	45+	currently in phase 3	none
8	M1	45-54	Low	2	40-45	currently in phase 3	none
9	F6	45-54	High	2	40-45	currently in phase 2	none
10	M2	55-64	Med	9	45+	currently in phase 3	hypertension
11	M3	55-64	Med	3	45+	currently in phase 1	diabetes, hypertension, sleep apnoea
12	F7	18-34	Med	6	35-40	currently in phase 1	none
13	F8	65+	Med	6	35-40	currently in phase 3	hypertension
14	F9	45-54	Low	6	30-35	currently in phase 1	previous CHD/Stroke
15	F10	65+	High	1	35-40	currently in phase 3	none
16	M4	55-64	High	2	45+	discharged not opted in	diabetes
17	F11	45-54	Low	3	35-40	discharged not opted in	none
18	F12	55-64	High	2	35-40	discharged DNA x 2	none
19	F13	45-54	High	1	40-45	currently in phase 1	none
20	F14	45-54	High	1	40-45	currently in phase 2	none
21	F15	18-34	High	3	35-40	starting disordered eating group	diabetes
22	F16	55-64	High	2	45+	DNA Psychology, did not opt in	diabetes, prev CHD/stroke

The majority of patient participants were female (n=16, 80%) and the average age was 53 (range 24 to 74). The mean BMI at first assessment was 42 (range 30 to 54). Despite a reasonable spread of patients from practices categorised as low (n=5), medium (n=6) and high (n=9) deprivation, most participants (n=14) lived in relatively high deprivation postcodes (SIMD 1-3). Six of the participants were discharged from the service either because they did not opt in (n=3), they opted out (n=1), or they did not attend (DNA) on more than 2 occasions (n=2).

Only 8 of the 20 patient participants were recorded as having co-morbidities at the time of referral, with diabetes being the most commonly recorded co-morbidity (n=5). However, most reported co-morbidities during their interviews.

Interviews were conducted with 8 GPs and 8 practice nurses from practices that had referred patient participants. A further one GP from a very low referring practice was also recruited. All of the practice nurses were female and five of the nine GPs were female. There were 3 practitioners (all GPs) in the 30-40 age group, 8 in the 40-50 age group, and 6 in the 50-60 age group. Most practitioners had over 10 years of experience in their current practice (n=12, 70%).

Table 8-3: Practitioner characteristics from Phase 4 interviews

ID	GP or PN	Sex	Age group	Practice SIMD	Practice referral rate	Years in current practice	Practice list size	Training practice
1	GP1	F	30-40	Low	Low	<5	<4000	No
3	PN6	F	50-60	Med	Med	10+	4000-8000	No
5	PN1	F	50-60	High	Low	10+	4000-8000	Yes
7	GP3	M	30-40	Low	High	5-10	<4000	No
9	PN4	F	50-60	High	Low	10+	4000-8000	No
10	GP2	F	40-50	Med	High	<5	<4000	No
11	PN3	F	50-60	Med	Med	10+	4000-8000	Yes
12	GP4	M	30-40	Med	Low	5-10	<4000	No
13	PN5	F	40-50	Med	Low	<5	4000-8000	No
14	GP6*	F	40-50	Low	High	10+	<4000	No
15	PN2	F	40-50	High	Low	10+	<4000	No
16	GP5	F	40-50	High	Med	10+	<4000	No
17	GP6*	F	40-50	Low	High	10+	<4000	No
18	PN7	F	40-50	High	Low	10+	4000-8000	No
19	GP9	F	40-50	High	Med	10+	4000-8000	No
20	PN8	F	50-60	High	Med	10_+	8000+	Yes
22	GP7	M	50-60	High	High	10_+	8000+	Yes
LOW	GP8	M	40-50	Low	Very low	10+	<4000	No

*GP6 was the GP of patients ID14 and 17

8.4.1 Thematic analysis

The 20 patient interviews and 17 practitioner interviews were analysed separately, but there was sufficient overlap between the main themes generated that they will be presented together here, thus reducing repetition and making it easier to compare views and experiences of patients and practitioners across different themes.

Table 8-4 below shows the main themes and sub-themes across the patient and practitioner interviews. Four of the main themes are the same for both patients and practitioners, but there is an additional main theme from the patient interviews, called 'Living with obesity'. Most of the sub-themes are also the same, except for the main theme of 'Experiences of weight management', which has a sub-theme for patients of 'Weight management in primary care'; for practitioners, the sub-theme is 'Referral process'.

The main themes and sub-themes will be described in turn, using sample quotations, with participant identifier in brackets (e.g. F1 = first female interviewee; GP3 = third GP interviewee). Additional information will also be included in brackets after the identifier: for patients, their age group and BMI category (characteristics found to be most associated with attendance from Phase 3); for practitioners, their referral rate (low, medium, or high) and practice deprivation status (low, medium, or high). Where extracts include conversation between a participant and the interviewer, INT will be used in brackets to denote the interviewer, DB. The participant's full descriptor (e.g. F4, 35-44yrs, BMI 35-40) will only be used after the first piece of text, with the shorter descriptor (e.g. F4) used thereafter.

Table 8-4: Main themes and sub-themes from thematic analysis of patient and practitioner interviews

Main theme	Sub-theme	
	Patients	*Practitioners*
Explanatory models of obesity	• Behavioural • Biological • Psychological • Socio-cultural	• Behavioural • Biological • Psychological • Socio-cultural
Living with obesity	• Impact on function • Concerns related to weight • Influence of family and friends • Stigma and shame	
Experiences of weight management	• Weight management in primary care • Experiences of GCWMS • Expectations of GCWMS	• Experiences of GCWMS • Expectations of GCWMS • Referral process
Role of primary care	• Information and Signposting • Discussing weight • Monitoring weight • Practitioner preference	• Information and Signposting • Discussing weight • Monitoring weight • Practitioner preference
Suggestions for change	• For primary care practitioners • For practices • For the weight management service	• For primary care practitioners • For practices • For the weight management service

Explanatory models of obesity

Both patients and practitioners had a range of views on what the main drivers, or causes, of obesity are, mapping on to those that have been identified in the literature – namely behavioural, biological, psychological and socio-cultural. For patients, the most common of these was a behavioural framing, citing individual eating behaviours and physical inactivity as the main explanations for obesity.

Behavioural

Eating behaviours were often framed in moralistic language of 'good' and 'bad' foods, as the following quote illustrates.

> I need structure, you know, one day I could be really good and then the next day I could make up for being really good, the next day, you know, being bad and it's not the best, so I need structure. (F4, 35-44yrs, BMI 35-40)

> And when you say you are being bad is it certain foods that you tend to…? (INT)

> Yeah, takeaways, cake is a big thing. (F4)

Most patients described diet as being more important than physical (in)activity in determining weight status, but some felt that physical activity was key.

> The key is obviously the sports activity which has got to be a high, high level because of the foods they are eating these days. (F3, 45-54yrs, BMI 40-45)

Several patients recognised the interconnectedness of weight and physical activity:

> I think as you get fatter and fatter you get less and less mobile until you are just quite happy to sit or lie in your bed reading books like I do. (F16, 55-64yrs, BMI 45+)

Many practitioners, too, were signed up advocates of the simplistic 'eat less, move more' approach to weight management, though usually with some appreciation of additional complexities.

> Obesity in 99% of cases, apart from the people who have got hypothyroidism, is a lifestyle issue and I mean it's quite obvious throughout the Western world that obesity rates are related to food intake and lifestyle and it's different in difference cultures. (GP4, low ref, med dep)

Biological

For patients, the most frequently cited biological causes of obesity were genetic predisposition and the effect of certain medications, particularly steroids and insulin, on weight gain.

> I had a brother who was massively overweight and died before he was fifty… So it is genetic, there is yeah and I've lived with enough people to know that some people can eat anything they like and it doesn't have any effect. (F8, 65+yrs, BMI 35-40)

> With taking the steroids it was causing chaos with my diabetes, so my diabetes, I was having to take more insulin then it became a vicious circle, more insulin, put on more weight. (M4, 55-64yrs, BMI 45+)

Other biological factors discussed by patients included the idea of different people having different metabolic rates, which might affect their propensity to gain weight, and hormonal influences on weight, particularly in relation to sleep deprivation, as the following quotes highlight.

> I think you know it's like your metabolism probably slows down and I don't even know if there is, you know people say 'oh you've got a slow metabolism' I don't know if that's true. (F9, 45-54yrs, BMI 30-35)

> When you are not sleeping you are not getting the right balance of hormones that you need and so you'll easily eat an extra 300 calories because your brain is going 'I need something to keep the energy, to keep going'. (F6, 45-54yrs, BMI 40-45)

For practitioners, biological factors included not just medical or medication-related causes of obesity, but also the evolutionary perspective expressed in the quote below:

> I say to patients 'you know thousands of years ago we had to be lean to find food and we had to gain a bit of weight in the winter to survive the winter when we live in a cave but you don't have to now you go to Tesco's and Sainsbury's and you don't have to exercise and animals

> exercise to feed and they get fatter in winter to survive winters and we evolved to be like that'. (PN2, low ref, high dep)

Psychological

Psychological factors such as adverse childhood experiences, or depression, were also cited by a few patients and practitioners as being important underlying causes of obesity, as drivers of unhealthy eating behaviours. For patients, this was pertinent either to them personally or to other people in their weight management class.

> I sometimes think I didn't have a very good childhood. It was actually quite difficult and I tended to comfort eat. I would buy, you know, if I had pocket money or something I would always buy chocolate and I'd always eat in bed at night. (F2, 55-64yrs, BMI 45+)

Practitioners could recount comparable stories.

> I think there is so many factors, there is so many factors that cause people to be overweight. I had a woman, the same woman that put on weight but didn't go to weight management she said well her grandson's been sexually abused and her son has just been sent to [State prison] for ten years. (PN7, low ref, high dep)

> Goodness me. (INT)

> I mean that's that one woman so she said 'oh I just started eating again', you know if you've got a lovely lifestyle and you can float about and buy nice food, you can lose weight but if you've got all this. So it's a whole lot of other factors. (PN7)

The quotes above demonstrate a more nuanced understanding of the drivers of 'unhealthy' behaviours – the factors that limit someone's ability to eat a healthy diet or achieve the recommended level of physical activity. The final sub-theme in this main theme also relates to wider factors: socio-cultural ones.

Socio-cultural

Several patients and practitioners identified wider socio-cultural or environmental drivers of obesity. For patients, this included aspects of the built environment (e.g. high streets with many fast food outlets) as well as the social

and cultural habits that contribute to this environment (e.g. demand for fast food, lack of traditional cooking skills).

> I mean I know this area here is bad, bad diets, I mean there is a chip shop just down the road now I pass that every night coming home from work and I guarantee there is about 6 cars and a queue of people every night in that chip shop it just goes like a fair. (F1, 65+yrs, BMI 30-35)

The increasingly sedentary nature of modern lifestyles, characterised by (real and perceived) pressures on time, coupled with overall increases in living standards and disposable income (the means to buy fast food), were also identified as contributing to obesity.

> I think it's, as the years have gone on people have got more disposable income to a certain extent, more choices of food, it's more temptation, there's a lot and there's, we are not exercising as much, you know, it's not I mean I'll say myself I jump in the car now as opposed to walking anywhere and it's partly because I also feel like I could go out in a car journey and do three things and be back in the same time it would take me to walk, if I've got loads of time I'm more than happy to walk but, no I think we are in quite a disposable kind of environment now. (F14, 45-54yrs, BMI 40-45)

For practitioners, too, the idea of tackling obesity through action on so-called 'obesogenic environments', either through legislation to improve opportunities for healthy eating or more green space to improve opportunities for physical activity, was felt to be important and necessary, as the following quotes demonstrate:

> It's complex, that's the problem it's, you know it's not just, I mean the weight management service isn't going to be able to do it. There's going to have to be changes at a government level, taxing businesses and whatever that sell fast food. (GP7, high ref, high dep)

> I think obesity becomes a health issue but I think it's wider remit than that and it needs to be about the ability for and as we see the children in our area getting fatter and fatter as well there is nowhere for them to go and exercise and run around and be kids and let off steam so there needs to be a more society wide look at that and all the different ways that they are talking about, whether we should have sugar tax and different things or having more green spaces and exercise for people to do so I think that needs to be a huge part of it too and it can't all just be completely medicalised and put down to GPs. (GP5, med ref, high dep)

Several practitioners recognised the complexity of obesity – citing multiple contributory factors – the bio-psycho-social approach:

> There is a lot of people who actually don't eat that much but seem to stay overweight and you think you know okay sometimes it's their medication and sometimes genetics, some people have different problems or sometimes they are just not telling you what they are actually eating or they are just absolutely doing no exercise and not using any calories so but they are also not able to because they have got whatever problem. (PN3, med ref, med dep)

Living with obesity

The second main theme, which applies only to the patient interviews, was around living with obesity, and the concerns and challenges that this presented. There are four sub-themes, which will be described in turn: impact on function, concerns related to weight, influence of family and friends, and stigma and shame.

Impact on function

Every patient had a different story about how obesity impacted their day-to-day lives. As noted previously, the patients interviewed had a range of BMIs, from 30 to 54, and functional limitations tended to be more apparent for those with higher BMIs.

> I was starting to get uncomfortable with it, I knew it was affecting my lifestyle, my knees were bothering me and the weight I'm carrying is not helping my knees, it's not helping my back. (M2, 55-64yrs, BMI 45+)

> I find it difficult to walk, I like to walk, I like to walk the dog but I can't walk very far, things like, stupid things like going on holiday having to ask for an extension on the plane, you know a seatbelt extension. It's so embarrassing. (F2, 55-64yrs, BMI 45+)

Eight of the 20 patients had documented co-morbidities at the time of referral (5 had diabetes, 2 had hypertension, and 1 had cardiovascular disease), although almost all of the others reported weight-related co-morbidities that did not feature in the referral letter. These included musculoskeletal problems (notably

osteoarthritis), obstructive sleep apnoea, gallstones, reflux disease, and psychological problems (mostly depression, but also binge eating disorder). These conditions generally had a significant impact on their day-to-day functioning, both physically and mentally, as the following two quotes show.

> I've got problems with my back, I've got pains in my hips, my breathing as well, I've noticed my breathing's deteriorated. (F13, 45-54yrs, BMI 40-45)

> I think my confidence to go for interview you know and then I've had a couple of interviews and I keep going 'I'm sure it's because I'm not young and slim' and, you know, 'if I were young and slim I would have had that' because I don't remember not getting jobs when I was younger. (F6, 45-54yrs, BMI 40-45)

As well as *existing* impacts on daily function caused by obesity and weight-related conditions, several patients also expressed concerns about *potential* issues related to their weight.

Concerns related to weight

The main concerns related to weight were about health problems such as hypertension and diabetes. For some patients, this concern was grounded in the experience of family or friends who had had similar weight-related health problems.

> Of course I'm worried for [my family] because they have problems like blood pressure, stuff like that and it's, some of them have developed [diabetes]. So it worries me. Because I don't' want to end up like them. I want to have a better lifestyle. (F7, aged 18-34, BMI 35-40)

The above quote was from one of the younger patients in the sample who was also in one of the lower BMI groups. It has been reported in previous studies that younger people who are overweight or obese, particularly women, are more concerned about appearance than health, but in this study health concerns were reported in all age groups.

Another weight-related concern raised by several patients was about fitness for surgery, or general anaesthetic, and the need to lose weight prior to an operation (usually orthopaedic).

> I mean I've always been unhappy with my size but healthwise I'm now on tablets for blood pressure and that really concerns me that you know that I have, my blood pressure was high and I had to go on these tablets also my knees you know I've had a knee replacement and I've got to have another one so I must lose weight for that. I lost about three stone to have this one done, that was five years ago. And of course I put it back on again but I know I wouldn't suffer with my knees as bad if I didn't have all this extra weight. (F2, aged 55-64, BMI 45+)

Influence of family and friends

Several patients talked about the influence of family and friends in relation to living with obesity. For some, supportive family made a huge difference. The following quote, for example, highlights how family members can encourage healthy food choices, or restrict unhealthy ones.

> My wife is very supportive, we will just not have certain things in the house because I know if they are in the house I'll eat them but as I say but because of her support and she will just say "no we'll not have them" that's it, we don't have them. (M2, aged 55-64, BMI 45+)

For others, however, family members were unsupportive, or just simply did not understand their situation, as this excerpt shows.

> My sister will say to me 'I can't believe', she'll actually say to me 'what does it take for you to lose weight, you've got a wee yin now, what does it take, is that not important enough?' And I can see where her argument is but it's just not as simple as that. She just can't get it, she can't get it. (F3, aged 45-54, BMI 40-45)

> Yeah yeah and I would think probably a lot of people who haven't been through that don't understand. (INT)

> Loads of people don't get it, loads of people, it's like an alcoholic doesn't want to be an alcoholic, a drug taker doesn't want to be a drug taker, smoker doesn't want to be a smoker, fat folk don't want to be fat and anybody that says otherwise is a liar as far as I'm concerned. People want to be healthy. (F3)

Family and friends could also have profoundly negative impacts, affecting self-esteem, and self-confidence, and contributing to excessive eating and social withdrawal.

> I've been judged not just by my friends, I've been judged by my boyfriends I've had and the father of my children judges me on how big I am, but that's okay because I'm kind of used to it. But it doesn't help in any way because it just makes me eat more. It just makes me seclude myself. It's probably what makes me feel that way when I'm like going for a job interview, maybe that's what makes me feel that way because of the way my friends around me judge me already, so I'm already in that mind-set that I'm being judged. (F7, aged 18-34, BMI 35-40)

Harsh judgment from friends and family is closely related to the final sub-theme within the 'living with obesity' theme; that of stigma and shame.

Stigma and shame

Stigma is a set of negative and often unfair beliefs that are held by a group in society about a particular group or characteristic. As described in Chapter 2, there is widespread recognition of negative beliefs and attitudes towards individuals who are considered overweight or obese, including from health care professionals. Shame is an internalised feeling of humiliation, which is closely related to stigmatising attitudes within society.

The adults with obesity interviewed in this study described numerous examples of stigma and shame that they had experienced. In terms of anti-fat stigma, the following quote highlights how perceptions of stigma can be quite subtle, based as much on how someone looks at you as what they might say.

> I think it's more your own personal feeling really as that you feel as if people are judging you, possibly they are not but you personally feel as though you are being judged because of your weight and because of your build, because you can't get up and dance, birthday do's or christenings, things like that somebody comes round with a bit of birthday cake and it's you sitting there and it's like **you feel as if people are kind of sitting looking at you because you are heavy** and you are sitting there eating this big bit of birthday cake kind of thing so it does make you very conscious of your weight. (F13, aged 45-54, BMI 40-45) (emphasis added)

Feelings of shame and embarrassment influence behaviour, with several patients saying that they avoid certain activities in public places, such as going swimming or using public transport, for fear of humiliation.

> I don't go out very much. If I do go out it's got to be somewhere that I know, if I go into a group I've got to know everybody. And I don't use public transport or anything like that. If I've got to use public transport for any reason I hate it. **I hate sitting down and feeling as though I'm taking up two seats** and things like that. (F16, aged 55-64, BMI 45+) (emphasis added)

The next quote points to one of the core assumptions underlying anti-fat stigma – namely, that fat individuals have brought it upon themselves through their own gluttony.

> I feel you carry a stigma, you know, it's your fault you shouldn't be so fat, you know, if you could only lose, you know, control your eating you wouldn't be fat and I would, if we ever got down to the nitty gritty I would say most of us would say that. (F8, aged 65+, BMI 35-40)

This sense of personal responsibility and guilt over perceived loss of control drives feelings of shame for many. As a result, a number of participants did not tell family members that they were attending the weight management service.

> My other brother up here I probably wouldn't tell him because not for any reason other than, it's probably a big bit of embarrassment as well because sometimes we'll joke you know he'll say 'oh I'm going to cut out x, y and z because it's January' or whatever and in my head I'm thinking 'crikey if you only knew what I'm doing' you know but I probably wouldn't say to him because it's, I don't know it's a funny, it shouldn't be like this but even I know it is, a weight thing is a bit of an embarrassing type subject, you know, and **you are embarrassed at what you've done**. (F14, aged 45-54, BMI 40-45) (emphasis added)

Adults with obesity themselves are not immune from holding anti-fat attitudes. Indeed, you could say that the pervasive nature of anti-fat attitudes is the soil within which the seeds of shame grow. A few of the patients interviewed expressed stigmatising views of their fellow weight management participants.

> I suppose I wasn't really dead heavy and I think people that are dead heavy have got views on, you know what I mean, like a lot of people do think "oh my God look at the size of them" because I've done it myself sometimes if you have been out at a party or something and you see them and you think **"oh my God why do they not do something about their selves?"** you know what I mean and I don't know because like I wouldn't go by a certain weight, you know, I go 'right I wouldn't go by that' and then I'll start slimming down even if I lose half a stone and put it back on but **I wouldn't go by a certain weight whereas a lot of people don't bother, they just eat and eat and eat** and put it on. (F12, aged 55-64, BMI 35-40) (emphasis added)

Unfortunately, a few patients also described negative interactions with the health care system, which contributed to feelings of shame. The quote below is one example from a lady who was told that she was too big (i.e. weighed too much) to attend the local weight management class, and would have to go to one of the main hubs, which was much further away. In the end, she was able to join the local group.

> I felt awful, I felt 'oh my God I'm really', I knew I'm big but I didn't think that that would have an effect, you know, that because I was larger I wouldn't be able to go to a normal sort of class with other people. And I did, I felt really bad about that and, you know, I do suffer with depression and I was quite bad at that time with depression so it just made me feel absolutely useless, you know, hopeless. (F2, aged 55-64, BMI 45+)

There were stigmatising attitudes expressed by some of the practitioners interviewed for this study too. Offensive stereotypes, such as that overweight people are lazy, unintelligent or usually unemployed, were expressed by several practitioners – from both low and high-referring practices.

> People who are overweight or obese they are obviously not the most proactive people anyway. Because they are laid back and they don't think too deeply about things, so you have to see that personality, how to deal with that personality, because then you have to sometimes push things from your end to get the equation right. (GP2, high ref, med dep)

This quote from a GP from a high-referring practice suggests that the GP is more pro-active with referrals because they think patients need a helping 'push'. Contrast this attitude to that of the practice nurse from a low-referring practice, quoted below, who felt that if patients were not being honest about their eating habits then they were not ready for help/referral.

> A lot just don't face up to, you know if you are trying to discuss what they eat, they are not going to, they just tell you a load of rubbish you know 'I eat a lettuce leaf all day' and they clearly don't, so it's hard because you are not really knowing, they clearly then don't want a referral. (PN7, low ref, high dep)

The next section will look in more detail at patients' and practitioners' experiences of weight management, both at the GCWMS and within primary care

(for patients), often comparing their experiences with other settings, such as commercial weight management classes.

Experiences of weight management

All participants were asked about their experiences of weight management. For patients, this theme has the following sub-themes: weight management in primary care, experiences of GCWMS, and expectations of GCWMS. For practitioners, the latter two sub-themes also emerged, but also an additional theme of 'referral process' related specifically to the process of accessing GCWMS. Each sub-theme will now be considered in turn.

Weight management in primary care

There was a spectrum of experiences – positive and negative – of weight management activity in primary care. As will be described under the next theme, 'Role of primary care', most patients viewed the role of primary care as being to inform them of the existence of GCWMS and to offer referral, if eligible. All of the patients interviewed had been offered – and had accepted – such a referral, so most of them were reasonably happy with this aspect of their care in general practice. That is, in most cases, they had asked to be referred and the referral was done.

However, a few patients recounted less favourable experiences of weight management in primary care. These can be further characterised as either:

- They blame everything on my weight;

- They never mention my weight; or

- They don't seem to care one way or the other.

The quote below illustrates an unintended consequence of the first approach, whereby patients who are overweight are potentially put off attending their doctor if they feel that their weight is being blamed for all of their problems.

> You feel as if every time you go to the doctors anything that you go for is either blamed on weight, drinking or smoking, right. So, I don't drink, I don't smoke, so the only thing they can actually put any of my problems down to is weight, right. (F13, aged 45-54, BMI 40-45)

> Mmm mm. (INT)

> So every time you go in with something you tend to kind of step back from the doctors because when you do go it's, "that's down to your weight, just do such and such, you need to lose weight, you need to lose weight" so you feel as if you are kind of put down for being overweight by the doctors instead of them trying to encourage you, you feel as if they are kind of, you don't want to go because they are blaming everything on your weight. (F13)

The second approach – primary care practitioners never mentioning weight – is problematic also, as it could result in patients who might benefit from weight management not being offered it.

> No not really I mean I've never you know you hear of people saying they go to the doctor and they'll say 'oh you are so overweight you better get that off'. He never ever pressurises me sometimes I wish they would, I wish they would say 'come on F2 this weight is terrible' but they don't. The only person that has ever said it was the surgeon with my knee. You know he said oh this is awful, you are going to have to get this weight off and he's the only person that has ever said to me you are so obese you are suffering. My own doctor never ever mentions my weight. (F2, aged 55-64, BMI 45+)

Similarly, the third approach to weight management in primary care characterised above – that of indifference – is also potentially damaging, as it conveys a lack of importance attached to weight management by some practitioners.

> So you know I really felt it wasn't a big deal for them you know. Almost as if I was, this is my judgement but as if I was wasting their time I mean I went for 3 things I can't remember what they were, I go about once a year, you know my weight was one, oh and I had done something to my ankle and this skin thing, so it was one of three and I thought you know well she was short and precise, you know, it was like a what you call it, a conveyor belt. You know and I thought well she has more time for those who need, I don't really need. (F8, aged 65+, BMI 35-40)

Overall, then, patients' experiences of weight management in primary care were not overwhelmingly positive. We turn now to patients' and practitioners' experiences of weight management within the GCWMS itself.

Experiences of GCWMS

For most patients, the experience of GCWMS once they had engaged was generally positive. Many did, however, draw attention to the practical barriers they had encountered, such as the location and timing of groups, or the delays between referral and first assessment, then between assessment and allocation to a group.

> In terms of the access you said that there was a potential to have been engaged with the eating disorder group but that was just going to be too difficult? (INT)
>
> Uh huh yeah. (F11, aged 45-54, BMI 35-40)
>
> What about that was difficult? (INT)
>
> I think it was the time of day, it was I think it was maybe half nine in the morning and at that time I normally, I think I was working four days, I think I was working five days a week then and it was half nine in the morning but I normally started work at seven. So it would have meant me going into work several hours, you know, later than normal. And then having to make that time up at another time I just didn't feel that I could, that I would manage it. (F11)
>
> Yeah. (INT)
>
> You know and even where it's, where it was based at the Mansionhouse unit is not easy to get to you know I would either have to have a very very long walk or have a walk, a bus and then a walk so you know so actually physically accessing it was quite difficult unless you've got a car, it's not an easy place to get to. (F11)

The experience of GCWMS for practitioners was less positive. Many described how they had stopped referring patients to the service as they were not convinced that it did much good, or reported that patients had difficulty attending. Lack of useful or timely feedback on referrals was also raised by several practitioners.

> To be honest, I know this sounds quite negative but I can't really think of many success stories that we've had at all through the weight management. (GP9, med ref, high dep)

> I know that the Glasgow weight management service has been around for several years, in all that time I can't think of one patient who has commented positively on the experience, at all. (GP5, med ref, high dep)

There were a few practitioners, mostly nurses, who did have some positive stories of patients who had benefitted from the service.

> We have had positive feedback, we have had two or three patients who have and really enjoy it and feel it has been hugely beneficial to them. (PN8, med ref, high dep)

Most patients found the staff very helpful and supportive and felt confident that the service was being run by highly trained professionals. The non-judgmental approach was often contrasted to some of the more blaming attitudes they had experienced with commercial weight management services, as the quotes below illustrate.

> I think you think people are going to judge you but they don't, they really didn't. And even if you weren't comfortable in the group they just took you away and they just did one to one which I thought was good. And weigh ins and stuff I wasn't comfortable with getting weighed in front of everybody so they just took me in a private room and weighed me and just wrote down on my card and they didn't even say 'oh you've lost this much, ah you've put this much on', it was just kept between me and like the person that was weighing me then which was good because I was, I didn't want to get weighed in front of everybody. (F15, aged 18-34, BMI 35-40)

> Yeah you actually feel more involved in it and you've got more of an input as well. Whereas with the Slimming World it's 'oh this one has lost this weight and this one has lost that weight' and that's it really and it's tips about how they lost the weight and then it's like 'give me your money and out the door' kind of thing. Where it's more personal with the weight management I think. (F13, aged 45-54, BMI 40-45)

Several patients noted that they enjoyed the peer support from the group classes and felt that there were more people 'like them' (i.e. with more severe weight issues) than there were in the commercial groups they had been to.

> Sometimes you were getting size 8s and all that going to Slimming World thinking they were big and they had had a packet of crisps that week. Where, at the weight management, we had all struggled with food more, it was like, they had a small bag of crisps, like we've had ten bags of them in a day and it was just totally different, better actually though because then you could relate more to them. I felt like an outcast going to Slimming World and that, I didn't fit in there. (F15, aged 18-34, BMI 35-40)

Others, however, would have preferred the groups split more sensitively by BMI category, finding it difficult to be the 'biggest' in the group.

> There is maybe about 10 or 12 of us all sitting like this, like a circle and the lady sitting beside me and an older gentleman over there and they were all a lot older than me I would say maybe 70, a couple of them, and I'm thinking 'they don't even look that fat to me', I was the fattest one there 'they don't look that fat to me'. (F3, aged 45-54, BMI 40-45)

> But the first one that I went to was, I mean I was looking at people going in and thinking 'is she the one that is going to be taking the class?', do you know what I mean, not realising that they were actually there for the same reason that I was, only as I say they had ten pound to lose I had ten stone so. (F16, aged 55-64, BMI 45+)

Most patients were asked what they thought of the gender mix of the groups, as it is well recognised that there is a higher proportion of men attending GCWMS groups than there are in most commercial slimming groups. Both men and women responded positively to this. The first quote is from one of the male participants.

> And from your point of view as a man then in that sort of setting did you find it helpful that it was a mixed group? (INT)

> Yeah yeah because I felt that if it was all women and you are the only man I think you would go into your shell and if it was all men, men being men they wouldn't speak about their problem but with the mixture there you seemed to bring it out in you more the fact that there was a mixture. (M4, aged 55-64, BMI 45+)

The second quote below is from one of the female participants.

> And it's amazing it's a mixed group there are males and there are older males which is, you envisage it when you come it's all going to be ladies, and it's not. (F5, aged 45-54, BMI 45+)

> Yeah and how did that strike you? (INT)

> I thought that was actually really good and I think maybe GPs should say that it's mixed and there are men there because obviously you know these men are wanting to come but they probably were very apprehensive because they'll be thinking it's for a woman because it's notorious it's always women that are dieting. So I thought it was quite refreshing. (F5)

Another aspect of GCWMS that several patients spoke positively about was the longer period of support (up to 2 years) being offered by GCWMS.

> Because 18 weeks or 20 weeks, whatever it is, it's not long enough for you to adjust, you know, to new habits and that's what it is, it's just bad habits and I don't think that's long enough. However, knowing that it can be up to 2 years is super, you know. (F2, aged 55-64, BMI 45+)

This longer period of support was not, however, well publicised to patients from the outset; one aspect of a broader issue of expectations of the service, which is the next sub-theme.

Expectations of GCWMS

There were marked differences in patients' expectations of the GCWMS, and their awareness of what was involved. Most had very little idea of what to expect, as the following excerpt illustrates.

> Did you feel that you were, you knew what you were going in for when you were referred? (INT)

> Not really. Not really I knew, I mean don't get me wrong they were good, they were good at explaining on your first day there what it was all about and all the rest of it after that you know you knew roughly but prior to that no I went in sort of I suppose blind to a certain degree. (M2, aged 55-64, BMI 45+)

It was clear from the interviews that practitioner knowledge of what the service entailed was also patchy. The information provided to patients at the time of referral was highly variable, and this would undoubtedly have an impact on patient expectations.

Some of the patients had been to GCWMS before, often several years earlier, so had a better understanding of what the service entailed. For others, they had quite fixed expectations of wanting to access Orlistat or bariatric surgery via GCWMS. For a few of the patients interviewed, this resulted in significant disappointment when those expectations were not met.

> I was under the impression that when I got referred up there that that [Orlistat] was what I would be going for. (F4, aged 35-44, BMI 35-40)

> What I actually went, I went to the doctors and asked them about getting a gastric band, that was how it started and he said 'well if you can go to weight management and you can lose some weight' so I went and I spoke to them about it and they said 'no you need to fit into a certain category, you can't lose too much weight and you can't put on too much weight and you've got to be right in the middle' I mean it would have been too difficult. (F16, aged 55-64, BMI 45+)

This patient was one of those who failed to opt in to further group classes.

A few practitioners cited unrealistic patient expectations as a reason for poor engagement following referral. There was a perception that some patients asked for referral to GCWMS because they wanted bariatric surgery, or Orlistat, but were perhaps not overly keen to go through the weight management classes in the first instance.

> I think that there has been a small percentage or a minority of patients who do engage very well and seem to get some good outcomes. I think there is a significantly bigger majority who possibly have unrealistic expectations of what it's going to involve so I think a lot of people think that the weight management programme is essentially a fast track to getting bariatric surgery. (GP4, low ref, med dep)

As noted, many practitioners – GPs and practice nurses – had a limited understanding of what happened at the weight management service, or indeed where the nearest GCWMS groups were held. Some practitioners also had unrealistic expectations of what might be achieved in the weight management service.

> INT   Do you have a feeling yourself of what would count as a success for weight management? What would you consider to be a good outcome?

> PN8   A good outcome? I think well obviously you want to try and get them down to a normal BMI but I think anybody that achieves weight loss that they are comfortable with is a good outcome.

The idea that most people who are referred to GCWMS (who have a mean BMI greater than 40) could be returned to 'a normal BMI' is simply unrealistic. The service follows the SIGN guideline recommendations of a 5% weight loss having significant clinical benefits. References to this target appear on the GCWMS website, the referral leaflet, and letters sent to referring practitioners.

These differences in patient and practitioner expectations – ranging from those that had no idea what to expect, to those who had unrealistic expectations – raises the question of the extent to which patients could be better informed by the referring practitioner in primary care.   The role of primary care is the next main theme in this section, but before that, there is the final sub-theme for practitioners, which is about their experiences of the referral process itself.

Referral process

Most practitioners had issues with the referral process, with very few saying they found it quick or straightforward. The complexity of the 'patient journey' at the time these interviews were conducted is illustrated in Appendix 17. There were issues identified at each step of the process: from having to print off the patient leaflet, to the telephone opt-in within a 2-week window, to the wait for initial assessment, and then a further opt-in to group classes, which could be another few months down the line. Then there was the issue of the 1 year 'lock out', whereby a patient could not be re-referred to the service within 1 year of a previous referral.

> I would say my main hurdle is getting people to opt in even though they have told me they are going to opt in. (GP1, low ref, low dep)

> Yeah yeah. (INT)

> I know that weight management have to use barriers somehow to deal with people who aren't going [to be] motivated at that point but even the threat I suppose is, even the threat that they won't accept another referral for another year, they don't opt in, it doesn't seem to be enough to get people to opt in sometimes. (GP1)

This first quote from a younger GP in a more affluent area, with a low referral rate, highlights the frustration felt with the opt-in system. The inference here is that if patients do not opt in it is because they are lacking motivation; the possibility that the process itself is not well understood (by patients or practitioners), or clearly explained to patients by practitioners, or that there are other barriers to opting in (e.g. lack of money, lack of confidence speaking to strangers on the phone) was not often expressed by practitioners. There was, however, recognition that for those that have opted in and made it to the initial assessment, the additional delays presented by a further opt in step (to a group) were an unnecessary complication.

> A lot of the time, when I'm making that referral I think 'well you are not going to see this through' but what else can we do apart from, you know, then talk about exercise etc. Whenever we get the letter back, they do the initial assessment at the end it says, 'I've asked them to give it some thought and to get back to me within six months' but that, for me there, I would be thinking, 'well I'm here now, I want to do this, why are you sending me away to think about?' I feel it's a bit of a long complicated process. And it's unnecessarily complicated. (GP6, high ref, low dep)

> they have to phone in to opt in and then if they don't get through on the phone then the whole process gets delayed and they have that window period of two weeks so if we are referring them we are asking them anyway before referring them so I don't see the point of opting in. (GP2, high ref, med dep)

Role of primary care

The patients and practitioners interviewed were all asked about the role of primary care in adult weight management. In keeping with the mainstream (and policy) view on the role of primary care, most patients and practitioners agreed that the focus in primary care should be on having discussions about the health risks of excess weight, identifying people at risk, and signposting or referring appropriate patients to sources of further support, such as GCWMS. There were a few patients, however, who felt that primary care could be more pro-active in these activities than it is currently. The following sub-themes were evident across both sets of transcripts: information and signposting, discussing weight, monitoring weight, and practitioner preference, in relation both to role (GP

versus practice nurse) and to characteristics such as sex, experience, and weight.

Information and Signposting

Most practitioners agreed that primary care was not best placed to deliver weight management interventions, other than basic advice, information and signposting to other services. This practice nurse, for instance, cites research evidence suggesting that weight management groups are more effective than one-to-one consultations (which are the norm for primary care), and that general practice lacks the resources (principally time) and skills (e.g. psychology expertise) to do weight management properly.

> And I think the evidence is that the group situations worked and that general practice actually don't do it very well. I think our job is to facilitate people to make, to help people to think about change. I don't think we really have the resources to do it very well here and I think you need a trained psychologist to help you alongside that.
> (PN1, low ref, high dep)

Most patients were happy to talk about their weight with their GP or practice nurse and saw it as within the health professionals' remit to discuss and give advice on diet and exercise. Indeed, many felt that their weight – and the offer of referral to GCWMS – could have been discussed at an earlier stage.

> When you say you want to find out about the access I think you have to push the GPs and say, 'if you've got people who are obese will you please offer them [referral to GCWMS]'. (F8, aged 65+, BMI 35-40)

One male patient felt that there should be certain weight thresholds above which a GP should be obliged to intervene and offer referral.

> if being a GP you know that I am having a risk, I'm at risk if my weight is, should be 70kg but it is now more than 150kg, more than double, then the GP should be concerned. So I think that if the standard weight is for instance for one person is 100Kg according to his height or age, if that, there should be a certain limit, 120, 130 if it is crossing 130 immediately NHS should intervene it. That will cut, ultimately that will cut the budget of NHS in the long run. Because if the person gets more weight, the whole burden will be shifted to NHS.
> (M3, aged 55-64, BMI 45+)

While many patients felt that practitioners could be more pro-active in discussing weight, most also recognised the importance of sensitivity when talking about people's weight, as the following sub-theme illustrates.

Discussing weight

Given the societal stigma attached to obesity – and the shame that many people feel about their weight and their bodies – it is understandable that patients want their primary care practitioners (GPs and nurses) to discuss weight with sensitivity.

> I think given again all the different you know health problems you can get and how you know those health problems will drain the NHS I think GPs should definitely be raising it. But just nicely and gently [laughs]. (F11, aged 45-54, BMI 35-40)

Practitioner empathy has been shown in numerous research studies to be important for patient enablement, making patients feel better equipped to deal with their health problems [525, 526]. In the context of obesity, however, it can be hard to empathise if you have not had any direct experience of being overweight, or any close family or friends who are overweight.

> I don't think GPs can understand it unless they have been through it or somebody in their family has been fat and they've seen it, they have seen how hard it is. (F16, aged 55-64, BMI 45+)

There was clear evidence of sensitivity around discussing weight among the practitioners interviewed, notwithstanding some of the more stigmatising attitudes demonstrated by a minority. The following quote from a GP in a high-referring practice illustrates empathy, but also the sense of frustration felt by many practitioners when discussing weight with adults with obesity.

> I don't, as a profession, I don't see where our strengths lie I mean I personally, I'm not judgemental, I don't criticise them, I do tell them that I know it's very hard to lose weight and it's a challenge you know and I try and suggest ways of doing it. I think it's very difficult if you are very obese to lose weight just with exercise, I just don't see how you can do that. (GP7, high ref, high dep)

Similarly, the quote below suggests that many practitioners do not have an appetite for a more pro-active role in discussing weight.

> I'm happy to support somebody but I'm not sure what the overall
> benefits of us going out looking for it is. Some people really don't
> want to address it and I still, and so I still think that we should take
> most of the cue from the person. (GP1, low ref, low dep)

We have seen, therefore, that there is a tension between the expectations of
patients regarding weight discussions in primary care and the enthusiasm for
such discussions on the part of practitioners. If practitioners are reluctant to
discuss weight, it seems unlikely that they will be championing the idea of more
frequent weight monitoring - the next sub-theme related to the role of primary
care in weight management.

Weight monitoring

Regular weighing at the surgery was advocated by some patients, as being
helpful for monitoring any changes in weight. Some patients felt they would
have more confidence in the accuracy of the scales at the GP surgery, compared
to their own scales at home. Very few patients had actually experienced regular
weighing or weight monitoring at the GP practice.

> If like also if they had a record of weights probably I think that would
> help, it would help them because if they had that record of weight
> then they would see the fluctuations. (F7, aged 18-34, BMI 35-40)
>
> Yeah yeah but do you feel that they don't have that record? (INT)
>
> I don't think they have the record. (F7)

There were other patients, however, who felt that GPs and practice nurses were
already overwhelmed with work, and that more intensive weight management
was an inappropriate use of their time.

> Measuring the weight, I think if you are in for an appointment,
> measure the weight, but I don't think you can ask a practice nurse or
> a GP to go in every week to get weighed, they've got far too much to
> do, too many people to see that's a bit more important than just
> standing on the scales. (F5, aged 45-54, BMI 40-45)

This latter view was more closely aligned with that of most practitioners.
Practice nurses were more likely to be involved in regular weight monitoring
than GPs, but they too felt constrained by competing demands of their job.

Several nurses mentioned the Quality and Outcomes Framework, or QOF, as being the main driver of their clinical activity. Weight monitoring for adults with obesity has never been a QOF priority in Scotland, so nurses have never been compelled to engage with it, as this quote illustrates.

> A lot of our pressures probably are on things that the GPs get paid for. So if they turn round and they were getting a whack of money every quarter or whatever for your nurse to be doing such and such a thing I'm sure they would all be embracing it because we would be pointed in that direction to make that time up to do that. (PN3, med ref, med dep)

The belief that weight management was not a priority for GPs was evident from the following quote also, from a practice nurse who had a particular interest in weight management and who was keen to set up a weight clinic in the practice. The practice, which was medium-sized (4000-8000 patients) and non-training, had one of the lower referral rates to GCWMS.

> [The GPs] just thought 'mmm mm, a weight clinic' you know, you know they didn't see it, you know as being an important part of my work. (PN5, low ref, med dep)

Weight monitoring and BMI calculation has been an integral component of chronic disease management templates (e.g. for diabetes, CHD, stroke) in general practice for many years. These templates are usually filled in by practice nurses, who deal with most routine chronic disease management in primary care. Despite this in-built prompt to discuss and monitor weight, many practice nurses found this counter-productive, as the bureaucratic (and time-consuming) 'tick-box' nature of the consultation undermined the potential for a more authentic and detailed discussion about weight.

> I think the whole thing has fallen by the wayside to be perfectly honest. With the disease management and with the QOF and it's basically been a tick box exercise and I feel an awful lot of it got neglected to a certain degree, you never had the time you were too busy ticking the boxes, too busy going over different things and I think weight was just basically a tick box then, you know, like you get their weight done, you give them advice about their weight and how you had to, you know, but there was no great management of it apart from the odd referral. (PN4, low ref, high dep)

The final sub-theme related to the role of primary care was practitioner preference – that is, which practitioners (e.g. GPs or practice nurses) do patients and practitioners think are best placed to engage with weight management, and are there some other practitioner characteristics that they feel are more suited to weight management than others.

Practitioner preference

The first aspect of practitioner preference was about whether GPs or practice nurses were best placed to have a role in weight management. There was a mix of views on this, with most preferring one or the other, but some recognising that both have a role.

> I think both of them because you go to them for different things, don't you? (F8, aged 65+, BMI 35-40)

More patients described being weighed by the practice nurse than by the GP, though many felt more comfortable discussing their weight with their GP than their practice nurse. This often depended on who they had the best relationship with; continuity of care was important when discussing sensitive issues such as weight. This sentiment is captured in the following exchange.

> Would you feel more comfortable talking about your weight with some doctors or practice nurse rather than others? (INT)
>
> I think you would yes sometimes yeah. Because I think some of them wouldn't understand. (F9, aged 45-54, BMI 30-35)
>
> Yeah okay. (INT)
>
> And so I think you suss out who understands you and who is actually listening. (F9)
>
> Yeah so it just depends on the individual? (INT)
>
> Exactly. (F9)

In contrast, most practitioners felt that practice nurses were better placed to talk about weight, with some GPs delegating the task to their nurses. The following two quotes, first from a GP, second from a nurse, are illustrative.

> I think practice nurses are fantastic at tackling lifestyle advice and I think they tend to be better than doctors. (GP5, med ref, high dep)

> So I often get people referred into me by GPs, 'go and see PN1 she'll help you with your weight'. And sometimes you get a wee bit, 'I've been sent here' you know so if people aren't ready I think that's a bit of a thorny subject. (PN1, low ref, high dep)

For most patients, the practitioner's empathy and understanding was felt to be more important than other characteristics such as age, gender, or years of experience. Unless, of course, the patient felt that women were generally more empathic and understanding, as the following quote shows.

> I think probably any GP really. But preferably I would probably say a female when you are talking about your weight because obviously as the saying goes women are from Venus and men are from Mars, type of thing and so I think the female doctor would probably have a better understanding of mentally and emotionally how the woman is actually feeling for being overweight. (F13, aged 45-54, BMI 40-45)

> Yeah. (INT)

> Whereas men don't actually comprehend the underlying of somebody being overweight, they just see this woman as overweight and 'right this is your fix, there you go' whereas women are a wee bit more understanding. (F13)

Another practitioner characteristic that patients were asked about was their weight; that is, would they find it easier or harder to speak to a doctor or nurse that was overweight themselves. Again this split opinion, with the majority saying that it would not make any difference, but some saying that it would be hard for a 'normal weight' practitioner to empathise with someone with obesity, while a few others felt that it would be difficult to take lifestyle advice from someone who was overweight.

> I really do think that the doctors yeah should be encouraged and practice nurses, mind you practice nurses, I feel that at least in the practice I go to, the practice nurses, there are two of them and they are not thin, they are not normal weight so I would say maybe there is a hesitation there, the doctors yes they are all within the norm. None of them are overweight but I would say the two, because I remember once when we, she said "you have put weight on" and I suddenly thought and you kind of feel like saying "well you are no skinny Lizzy yourself" you know but which is, the super sensitivity of an

> overweight person I think, do you know what I'm saying there yeah?
> (F8, aged 65+, BMI 35-40)

Opinion was split on this issue for practitioners too, as the following interview excerpts show. Some felt that it was harder for a practitioner to empathise with overweight patients if the practitioner had no experience of being overweight.

> Interestingly, I've discussed this slightly with one of my [GP] partners who is very tall and thin and she says she actually actively finds it quite awkward discussing weight with patients that are overweight because she says she can see them looking at her thinking 'you are tall and thin and you have no idea of what it's like to be overweight' and then she sort of laughingly points out that I'm not tall and thin and that I can get away with pointing out that, you know, you are a bit overweight or you need to do that or. (GP5, med ref, high dep)

Others, however, felt strongly that lifestyle advice could not be taken seriously from a practitioner unless they were 'walking the walk' and not just 'talking the talk', so to speak. The following dialogue was with a GP from a high referring practice, which had a small list size and was non-training.

> Do you think it's possible for GPs or practice nurses in a consultation to generate motivation for a patient? (INT)
>
> Yes absolutely uh huh yeah. Yeah and I think if you are doing it yourself you can fully motivate people, if somebody says to me 'what's that?' 'It's a FitBit.' 'What is that?' Ten minutes discussing what a FitBit is, and they say 'I might get one of them'. You know and if you get interested, if you are interested in it you can interest other people. (GP6, high ref, low dep)
>
> Yeah yeah okay. (INT)
>
> So whatever, you've got to, but the thing is there is no point sitting preaching if you are not doing it yourself. (GP6)

Suggestions for change

The final theme from both the patient and practitioner interviews was about suggestions for change, to improve access to weight management. These can be divided into suggestions for practitioners, for primary care practices and for the weight management services themselves.

For primary care practitioners

From the patient perspective, the main suggestions for change reflected doing more of all the things identified by patients within the 'role of primary care' theme: more frequent discussion of weight, if done sensitively; more frequent weighing and weight monitoring; and more offers of support and referral.

> I don't think there is enough done about obesity. I mean I've been putting on weight for years and yet the doctor has never actually said to me, 'you know you are gaining all the time this is not good enough.' (F2, aged 55-64, BMI 45+)

> I really think [referral to GCWMS] should be [offered more] because they only have to offer, I mean everybody is free to say yes or no. (F8, aged 65+, BMI 35-40)

From the practitioner perspective, the main suggestion for change was around training, recognising that many health care professionals lack training in weight management, which affects both their confidence in having discussions about weight and their enthusiasm for referrals related to weight management, as the following quote illustrates.

> I think training is a good idea definitely. I think all the KeepWell training I think if you have a bit of knowledge you are definitely, definitely more able to promote it and give a, you know, a better sales pitch to encourage them to go. (PN7, low ref, high dep)

For practices

For patients, the main suggestion for change at the practice level was to advertise the weight management service more clearly in primary care (e.g. through posters, or information evenings).

A few patients also felt that better use could be made of health centres and GP surgeries to host the weight management services more locally.

> I think it would be good if they have stuff in the doctor's surgeries like even once a week or something or once a month, people get weighed and it's near, maybe it's more convenient, I think a lot of people need that. (F12, aged 55-64, BMI 35-40)

Practitioners were asked about potential changes that could be introduced at the practice level, based on the interventions that were found to be effective in the realist synthesis – namely, pop-up reminders in the electronic medical record (EMR), having a BMI calculator in the waiting area, and auditing practice obesity registers and outcomes of practice referrals to weight management services. There was support for all of these strategies, though with varying degrees of enthusiasm.

EMR pop-ups received the most lukewarm reception, with several practitioners citing 'pop-up fatigue' whereby pop-ups are ignored if they are appearing too often. It was, however, felt that this approach may work better now that QOF targets were no longer incentivised in Scottish general practice (see Chapter 9 for discussion of the new GP contract in Scotland).

> I think before we had so many pop ups we were completely saturated that people would just turn them off and just fed up with it but I think that now QOF is pretty much off the record it might work as just a reminder to check their BMI. (GP9, med ref, high dep)

Audits were regarded as a useful strategy by all the practitioners, and it was recognised that weight management was an area that many had not done audits in before.

> An audit probably would let us know exactly, well we could see who we had referred and see what the outcomes were and 'was that successful?' and if it wasn't, well you know well maybe we can see why it wasn't successful, how many people completed the actual programme. (PN8, med ref, high dep)

The final suggestion for change at the practice level was the introduction of BMI charts (and possibly scales) in the waiting area, which would not only allow interested patients to check their own height, weight, and BMI, but also demonstrate that this was something that could then be discussed in their consultation with the GP or practice nurse.

> I know that some places have pods in their waiting areas where you can do your blood pressure and you can do your height and weight and things like that… something where it didn't take staff time to identify these people, you know, if they could have something that says, you know, 'you are at risk, do you want to come and talk about it?', that

> would encourage them and kind of streamline it a little bit. (GP1, low
> ref, low dep)

For the weight management service

The main suggestions for change for the weight management service reflected

the barriers to access that were identified: services should be more local,

familiar, and easier and quicker to access.

Both patients and practitioners agreed that more local services would be

beneficial.

> They don't want to go to hospitals, they don't want to go anywhere
> else. If the weight management people came to the surgery then that
> would be excellent, even if they came like once in six months, you
> know, we could keep those patients booked for them. Maybe it's not
> practically possible because of so many practices but even if they had
> one in an area, in a five-mile radius, then that might not be a bad
> idea. (GP2, high ref, med dep)

Another barrier to access was the timings of the weight management
classes, so a frequent suggestion for change was to extend the opening
times beyond working hours.

> I found with the weight management and this is my only downside is it
> basically just runs normal office hours, there is nothing there at night
> time really and there is nothing at the weekends. (F13, aged 45-54,
> BMI 40-45)

Another suggestion related to access was to allow a drop-in review process,

beyond the initial 6 months.

> The weight management I think that it would be good, see if we had
> like a drop in at the end that people could maybe just drop in or go to
> meetings like if they are having a meeting they could maybe drop in
> and get weighed, something like that would quite good I think. (F12,
> aged 55-64, BMI 35-40)

There were a few practical suggestions from patients about the content and

structure of the classes. First, that they should group people according to their

weight.

> If people go to the doctor because they are overweight whether it's
> ten pounds or ten stone they've got as much right to lose that ten

> pounds as I've got to lose that ten stone but don't put them next to me, do you know what I mean, because two weeks down the line they could be at their target weight and I've got two years to go, so it's not a good thing, for me, it's not a good thing. (F16, aged 55-64, BMI 45+)

Second, that they should have more culturally adapted resources.

> It would be much more appropriate if they prepared some recipes especially for the Asian people. And if there are some African people their eating habits are different so their recipes should be according to their eating habits. And secondly what was delivered, whatever lecture is delivered it would be much appropriate if the same thing is delivered on paper in their own language. (M3, aged 55-64, BMI 45+)

Practitioners felt that the telephone opt-in was a barrier for some patients, particularly in more socio-economically deprived areas, where some people are less confident about speaking to strangers on the phone, or may not want to spend money on calls.

A further suggestion for change, in keeping with the recommendations from the Phase 1 stakeholder interviews, was that the weight management service should increase its efforts to communicate with practices, to improve awareness of the service.

> I think giving a talk to staff so that everybody is pretty clear exactly what the service is and how to access it and where it is and also I don't know whether it would be worth even a presence in the waiting area when there's a particular clinic going on like diabetes because we also see our impaired glucose patients as well so you know that's quite a good you know good group to catch or before they actually become type 2. And so that patients can then maybe approach them and find out a wee bit more about them. (PN8, med ref, high dep)

Parallels were drawn between GCWMS and the NHS Stop Smoking services, with several practitioners citing the flexibility and accessibility of the smoking cessation services as being particularly helpful; the support can be face-to-face, online, over the phone, individually or in groups, and can be accessed by PCP referral or by self-referral.

> I've got so many resources with regards to smoking cessation to the point that it's so easy to initiate a conversation with a patient because we've got all these options available. You know, we've got the local pharmacy setting up a service, we've got the smoking cessation helplines, we've got our own smoking cessation officers upstairs,

> we've got the open-access clinic, they can pop in anytime they want
> to. There is a lot of things on the NHS websites, there is a lot of
> advertisement about it all, all over the place as well and it's
> something that is quite easy that you can discuss, I mean partly
> because, yes I know that there are services available locally and the
> person can just walk into it and start treatment as well and I think
> that brings us back to obesity and what we were discussing as well I
> don't know where to send them to. (GP3, high ref, low dep)

Finally, one practice nurse suggested that people from the local area who have successfully lost weight with GCWMS could be invited as 'experts by experience' to support future groups, particularly if held more locally.

8.5 Discussion

8.5.1 Summary of main findings

Phase 4 of this study involved semi-structured qualitative interviews with 20 patients who had been referred to GCWMS, 16 practitioners (8 GPs and 8 PNs) from practices that had referred those patients, as well as one GP from a very low referring practice. The findings build on those of Phase 1 by providing further insight into the role of primary care in adult weight management from the perspectives of patients and practitioners.

Most patients were happy to talk about their weight with their GP or practice nurse and saw it as within the health professionals' remit to discuss and give advice on diet and exercise. Indeed, many felt that their weight – and the offer of referral to GCWMS – could have been made at an earlier stage.

Monitoring and regular weighing at the surgery was advocated by some patients, while others felt that GPs and practice nurses were already overwhelmed with work, and that more intensive weight management was an inappropriate use of their time. More patients described being weighed by the practice nurse than by the GP, though many felt more comfortable discussing their weight with their GP than their practice nurse. This often depended on who they had the best relationship with; continuity of care was important when discussing sensitive issues such as weight.

For patients, the experience of GCWMS once they had engaged was generally positive. However, both patients and practitioners identified a range of barriers to accessing NHS weight management services. These included both structural issues (e.g. location and timing of classes) and process issues (e.g. opt-in) and are explored in more detail in the next chapter.

Suggestions for changes to the approach to weight management in primary care included: increased discussion of weight and increased weighing and weight monitoring in primary care; to discuss weight sensitively; and to advertise the weight management service more clearly in primary care (e.g. through posters, or information evenings). Suggestions for the weight management service included: having services in more local areas (e.g. within health centres); extending opening times beyond working hours; and allowing a drop-in review process, beyond the initial 6 months.

8.5.2 Comparison with other literature

Qualitative research has offered several proposed explanations for the sub-optimal engagement with weight management by GPs and PNs, including: lack of time in the consultation [332]; lack of knowledge and lack of confidence in discussing weight [333]; perceptions of poor outcomes of interventions [333]; fear of causing offence [334]; belief that the patient is responsible [17]; lack of priority placed on weight management within the practice and wider health system [17]; lack of focus on obesity throughout medical training [166]; negative attitudes towards obesity [527, 528]); and the weight of the health professional themselves [529]. The findings presented here resonate with much of this literature, but there are some novel findings presented here also, reflecting the unique context of the GCWMS.

The different explanatory models of obesity held by patients and practitioners are broadly similar to those found in previous research [223, 530]. In the study by Greener et al, the overweight respondents were more likely to view the problem of obesity as arising from their personal (motivational and physical) shortcomings, with a strong sense of personal responsibility for overcoming their weight problems [223]. Health professionals, on the other hand, viewed obesity

as a socio-ecologically determined problem, similar to the more nuanced views expressed by practitioners in this study [223].

In keeping with previous literature, it was clear from this study that patients were happy for their GPs to initiate weight counselling, if handled sensitively [531-533]. In a qualitative study involving 28 semi-structured interviews with patients living with obesity, Torti et al explored patients' perspectives on the role of primary care in weight management in Canada [533]. They found four common themes: 1) co-ordinated and person-centred care, reflecting the need to address the multiple conditions and drivers that affect weight and weight management; 2) the role of family physicians, including the expectation to initiate discussions around weight; 3) Primary Care Network resources for weight management, asserting that support should be accessible, accountable and consistent; and 4) Patients' weight management needs, which should be individualised to their medical, socio-economic, and educational needs, with better linkages to available resources, and further follow-up [533]. The present study echoes these findings, suggesting a degree of commonality of perspectives among patients in Canada and Scotland.

8.5.3 Strengths and limitations

The ability to compare and contrast the views of the patients, and their referring practitioner, is a strength of this phase of the thesis, as it allows investigation of two perspectives on the same local context. The use of the 3x3 sampling frame, incorporating low, medium and high deprivation practices with low, medium and high referral rates is another unique aspect of this research, which lends itself to the use of theory to help explain differences. Indeed, findings from these interviews will be used in the next chapter to explain the observed variation in referral and attendance highlighted in Phase 3, using the theoretical framework of candidacy [19].

As with Phase 1, there are certain limitations inherent in qualitative studies. This was a sample of patients who had attended at least one assessment at the weight management service, so was not representative of all patients with obesity, or of those who have been referred but never attended.

Similarly, the patients and practitioners were only accessing one weight management service, so views and experiences of accessing other services in Scotland may be quite different.

8.6 Chapter summary

This chapter has presented the results of Phase 4 of this research – qualitative analysis of interviews with patients referred to the NHS GCWMS and primary care practitioners from the referring practices.

The research questions related to this phase (RQ4a and RQ4b) have been addressed: the role of primary care in adult weight management from the perspectives of patients and practitioners has been clearly described; and a range of barriers and facilitators to primary care referral to, and subsequent attendance at, adult weight management services have been articulated.

The next chapter will synthesise findings from all four phases of this thesis and propose an expanded model of candidacy for adult weight management.

9 Discussion

9.1 Aims of this chapter

This chapter has five aims: 1) to synthesise findings from all four phases of the study to create an expanded model of candidacy, thereby advancing our understanding of access to weight management in primary care; 2) to consider the implications of these findings for policy and practice; 3) to discuss how the findings fit in the context of other literature; 4) to consider strengths and limitations of this thesis; and 5) to suggest considerations for future research.

9.2 Rationale

This thesis aimed to explore the challenges of identifying and referring patients with co-morbid obesity to weight management services, from multiple perspectives. The following research questions (RQs) were set out at the start of the thesis:

RQ1 – What is the role of primary care in adult weight management, from the perspective of key stakeholders involved in the planning and delivery of adult weight management services?

RQ2a – What is the 'programme theory' of interventions targeted at primary care practitioners to improve the identification and referral of adults with co-morbid obesity?

RQ2b – What are the mechanisms at play in different components of these interventions and what are the contextual factors that enable these mechanisms to produce successful outcomes?

RQ3 – What are the patient and practice-level predictors of attendance and completion at adult weight management services after primary care referral?

RQ4a – What is the role of primary care in adult weight management, from the perspective of patients (adults with co-morbid obesity) and primary care practitioners?

RQ4b – What are the barriers and facilitators to primary care referral to, and subsequent attendance at, adult weight management services?

These research questions were addressed over four phases of work (Figure 9-1). In Chapter 4 (Phase 1), interviews with senior dietitians involved in NHS adult weight management across Scotland highlighted a number of tensions related to weight management services themselves, to primary care and its management of weight, and to the interface between primary care and WMS. As described in Chapter 2, the way that obesity is conceptualised and 'problematized' was found to be important here. In Chapter 5 (Phase 2), a realist review of interventions to improve the identification and referral of adults with co-morbid obesity in primary care proposed 12 mechanisms through which these interventions work, as well as a number of important contextual factors (identified at the micro, meso and macro levels) that may enable or hinder these mechanisms to produce successful outcomes. In Chapter 7 (Phase 3), analysis of GP referrals to a large regional weight management service found that patient characteristics were more significant predictors of attendance than practice characteristics. In Chapter 8 (Phase 4), qualitative interviews with patients and practitioners provided insights into the barriers and facilitators affecting primary care referral to, and subsequent attendance at, adult weight management services.
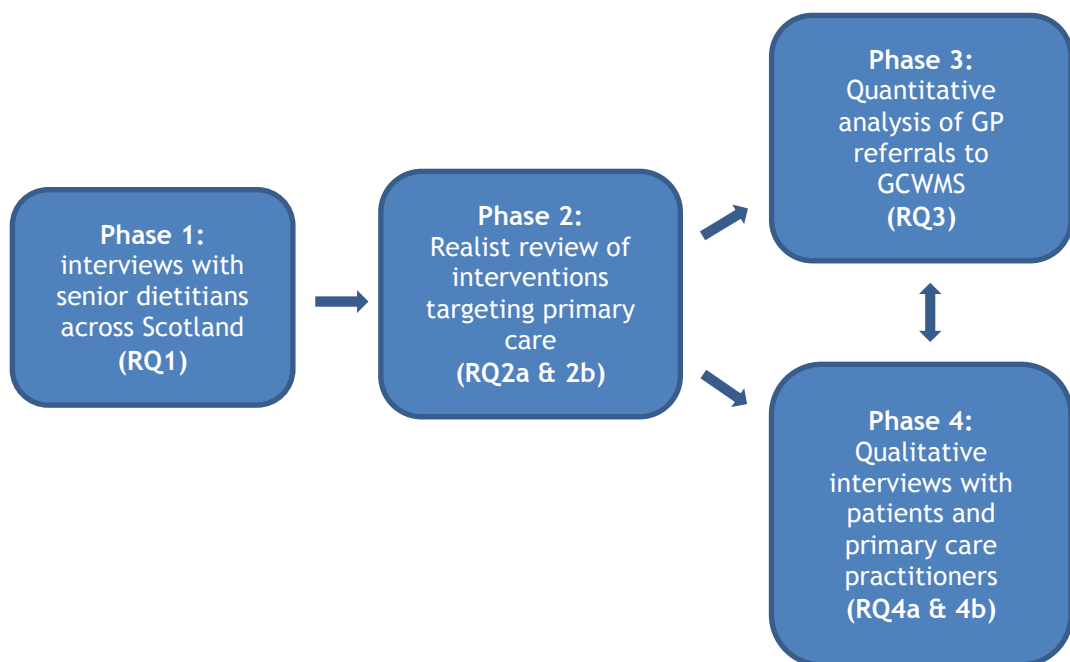
Figure 9-1: Overview of research phases and research questions

In this chapter, the findings from these four phases of work will be synthesised in relation to the seven stages of the candidacy framework. Candidacy theory was identified in the Phase 2 realist review as being the 'best-fit' middle-range theory to help understand the process of identification and referral of adults with co-morbid obesity in primary care. Not only does it explicitly encompass the two foci of both the review and the thesis overall – identification and referral – but it also incorporates wider socio-cultural influences on patients and practitioners – both individually and through their interaction in the consultation – identified as being particularly important in the background literature.

Here, the limitations of the candidacy framework will be discussed and an expanded model of candidacy for weight management will be presented and then assessed for its potential to explain the observed variations in access to GCWMS from Phase 3. Two main critiques will be presented: first, that the candidacy framework does not currently take into account the multiplicity of candidacies that interact to facilitate or prevent access (namely, multiple identities, multiple people, multiple services, and multiple interpretations of the processes involved); and secondly, that the framework pays insufficient attention to the meso and macro level contextual factors that shape candidacy.

9.3 Synthesis of findings in relation to candidacy theory

Candidacy theory was introduced in Chapter 3 and described in more detail in Chapter 5 but will be summarised again briefly now. Dixon-Woods et al describe seven overlapping stages of the candidacy framework: identification, navigation, permeability, assertion, adjudication, offers of/resistance to services, and operating conditions/local production of candidacy [316, 317]. These stages chart the process of access from an individual identifying his or her candidacy for a particular health service (in this case, support for weight management) through its ease of access (depending on how 'permeable' the service is), the work required to assert one's need for the service, for this to be acknowledged and acted upon by a health care practitioner, and for any subsequent referral to be taken up. The final construct is operating conditions and local production of candidacy. These stages will now be considered in turn, drawing upon evidence from this thesis and illustrated, where possible, with quotations from phases of this work (Table 9-1).

Table 9-1: Candidacy constructs and supporting evidence from this thesis

Candidacy construct	Evidence from research findings
Identification	Adults with obesity identify themselves as being candidates for a WMS: i) when they have functional limitations, ii) when they have concerns about health or appearance, and iii) when they are aware of the existence of NHS WMS **(Phase 4)** Practitioners also have a role in identification, often when they too identify functional limitations. **(Phases 1, 2 & 4)** Measurement of BMI makes identification of obesity more 'objective' – both for patients with obesity and for practitioners - and therefore easier to discuss **(Phases 2 & 4)**
Navigation	Navigation can refer to both the primary care system and WMS **(Phase 4)** Actually getting to the WMS can be a major barrier (e.g. public transport; location of the WMS) **(Phases 2 & 4)** Distance to WMS not a predictor of attendance **(Phase 3)** Which centre someone is seen at depends on their weight
Permeability	Overlap with navigation – Barriers to accessing WMS include: Telephone opt-ins **(Phase 4)** Delays between referral and 1st assessment, then group allocation **(Phase 4)** 1 year 'lock-out' prior to re-referral **(Phase 4)** Location of services – not 'local' **(Phases 2 & 4)** These are barriers for patients and practitioners **(Phases 1, 2, 3 & 4)**
Appearing/Asserting	The act of turning up and representing oneself – people from lower SES may find it harder (less confident / articulate) **(Phase 4)** Operates at practice level (making case for referral) and at WMS level (e.g. patient with BED not seen by psychologist) **(Phase 4)** Attending the WMS has to 'fit' with patients' lives – getting there, time off work, etc. **(Phases 2 & 4)**; this overlaps with permeability
Adjudication	Different professionals involved – GP, PN, WMS staff **(Phases 1,2 & 4)** For GPs in particular, decisions include: i) Whether to discuss weight, ii) whether to offer referral (requires their knowledge of service, confidence in service, and judgment of likely benefit, including consideration of motivation and competing demands) **(Phases 1, 2 & 4)** Type and location of care also adjudicated (depending on weight and eligibility criteria) **(Phase 4)**
Offer of/Resistance to services	Framing / 'selling' of the service likely to influence: i) accepting referral and ii) attendance **(Phases 2 & 4)** **T**his overlaps with adjudication – GP framing likely to be shaped by knowledge and view of the service; patient acceptance may also be influenced by knowledge **(Phase 4)**
Operating conditions/local production of	Wide variation in availability of different WMS across Scotland **(Phase 1)** Different explanatory models of obesity among all stakeholders

candidacy	**(Phases 1 & 4)**
	Financial context affects service cuts and may lead to 'change fatigue' **(Phases 1, 2 & 4)**
	Communication between WMS and primary care **(Phases 1, 2 & 4)**
	There are individual-level and practice-level predictors of attendance **(Phase 3)**

Identification

In the original framing of candidacy, this stage relates to how individuals view themselves as being legitimate candidates for a service. In the context of weight management, this can be further broken down into three steps: first, an individual must identify themselves as having obesity (this is not always the case); then they must recognise that their obesity (or, more likely, health or functional problems related to their obesity) are legitimate for discussion with their GP or PN; and finally, they must be aware that there is a service (or medication, in the case of orlistat) available within the health system (and not a commercial diet or gym membership) that can help. The following quote from a patient interviewed in Phase 4 illustrates identification:

> Beginning of this year I thought 'no I'm going to have to do something about my weight again', I was starting, to be honest I was starting to get uncomfortable with it, I knew it was affecting my lifestyle, my knees were bothering me and the weight I'm carrying is not helping my knees, it's not helping my back and I think when I was down there I think I mentioned again but then they says 'oh aye by all means we'll back you' (M2, 55-64yrs, BMI 45+)

However, this research has shown that identification can also be 'by proxy': that is, it is not just the individuals that are candidates for services that identify themselves as such; other people – usually health professionals but potentially family members or others – can also identify a person's candidacy and help them to assert it in order to access services.

This is my first significant critique of the candidacy framework as originally set out: that it does not take into account the **multiplicity of candidacies** that interact to facilitate or prevent access. Mackenzie et al first proposed the notion of 'multiple candidacy' in relation to multiple components of identity coinciding and competing to influence candidacy (they cite the example of a mature

student's role as a mother conflicting with their role as a student to impact on their access to higher education) [317].The concept of multiple candidacies is taken further here, however, beyond thinking about multiple personal *identities* (Gender, age, ethnicity, job, SES, health, etc.) to also include the potential for: i) multiple *people* to be involved in the identification and navigation of candidacy; ii) multiple *services* (primary care and WMS) to be accessed; and iii) multiple *interpretations* of the processes involved (e.g. does the opt-in process reward motivation or act as an additional barrier to access?). These issues will be returned to later in this chapter.

Identification is the critical first step in access to services but it is worth reiterating that the candidacy process is not always linear. There is undoubtedly a degree of linearity to it (e.g. you cannot make a referral without first identifying someone's candidacy for that referral), but the framework also allows for circularity and an iterative move through different steps. For instance, an individual's prior experience of adjudication by a health professional (perhaps resulting in resistance to referral) may influence that individual's identification of their candidacy at any future health care encounters.

Findings from Phase 2 and Phase 4 suggested that, from a practitioner perspective, this identification may be based on an eye-balling assessment of a person's weight, on the existence of weight-related co-morbidities, or on an objective measure such as BMI. The realist review highlighted strategies to improve identification, ranging from training to improve practitioners' knowledge, skills and confidence to automatic BMI calculators, making the process of identification more objective and potentially less stigmatising.

Navigation

This relates to knowing how to make contact with appropriate services in relation to identified candidacy. For access to adult weight management services, Phase 4 of this research demonstrated that the process of navigation includes not only the services themselves, but also the primary care system and the interaction between the two (e.g. the telephone number and subsequent opt-in). Both have their challenges and are primarily issues for patients, as they

have to physically get from A to B, but navigating the weight management service could also be problematic for GPs and PNs.

While navigation may be thought of in terms of knowledge and making contact, the work presented here also demonstrated the importance of geographic navigation (i.e. physically getting there), which can be challenging with obesity. One of the patient participants in the Phase 4 interviews joked that both Mansionhouse and Yorkhill WMS were on top of hills, presenting a challenge for overweight patients to get to. These barriers were also recognised by primary care practitioners:

> Those other hurdles are just the length of time to get seen when often they've lost their interest in what they were doing at that point. I think there is the access to it and where the sites are has been a disincentive for a lot of my patients who are poor and don't have either the time or the funds to get to the [other side of the city] for instance. (GP5, med ref, high dep)

Another factor here is that heavier patients (over 120kg) can only be seen at one of the main centres (due to availability of appropriate equipment such as bariatric chairs and scales), which is not only potentially further to travel, but can also be stigmatising for patients.

Findings from Phase 3 found that distance from WMS was not a statistically significant predictor of attendance at WMS, however it was mentioned by both patients and practitioners as being an important consideration for some people. This suggests some dissonance between the population-level description of service access and the, albeit perhaps particular, impact on some individuals.

Permeability of service

This relates to how easy it is to access the service – the complexity of its referral systems and how many barriers are put in place. There is overlap here with navigation and again, permeability applies to both the primary care system and the weight management service. In Phase 4, a few patients described issues accessing their GP, but far more had problems with the GCWMS – some of which overlap with those described under navigation. The quote below is from a

practice nurse from a low referring practice in a high deprivation area, describing issues that patients have fed back to her over the years.

> There is maybe a barrier that they do want to [opt in] but they are not quite sure who they are going to speak to or… or they forget to phone and then it's only two weeks isn't it and then that's you so if you are just over two weeks that's you off the system. (PN7, low ref, high dep)

In short, GCWMS is not a very 'permeable' service. The following are all potential barriers and are evident in the service's own 'patient journey' flowchart (Appendix 17):

- GP referral required
- Telephone opt-in
- Wait for initial assessment
- Further opt-in to groups
- Further wait to join available group
- 1 year lock-out if miss sessions or do not opt-in at any stage

Findings from the Phase 3 quantitative analysis of GP referrals to GCWMS suggest that such barriers are more of an issue for patients living in more socio-economically deprived areas, as they have higher drop-out rates following referral. This may also partly explain why distance is not a predictor of attendance – the predictors relate more to permeability issues.

The quote below, from a GP in a low referring practice, illustrates the impact that these barriers have on GP referral behaviour.

> There is the annoyance of having to print the leaflet out. It sounds trivial but, I mean, you know what it's like, but I suspect although when you sit and think about how minimal time that should take my guess is in your mind it probably does play a factor and you are not doing that and I suppose if you could just say, I suppose if there was a self-referral mechanism that involved you not having to use SCI gateway [on-line portal] or print out a leaflet that would probably make it more likely that you would refer more people. Certainly you would maybe even just say here is the number, there you go. And my guess is that would increase the likelihood of doing it. (GP4, low ref, med dep)

The Phase 2 realist review indicated a number of strategies to improve the ease of referral, some of which tackled the permeability of services. The links

between intervention strategies, mechanisms and main review outcomes, as well as how these outcomes map into the candidacy process, is shown in Figure 9-2 below.
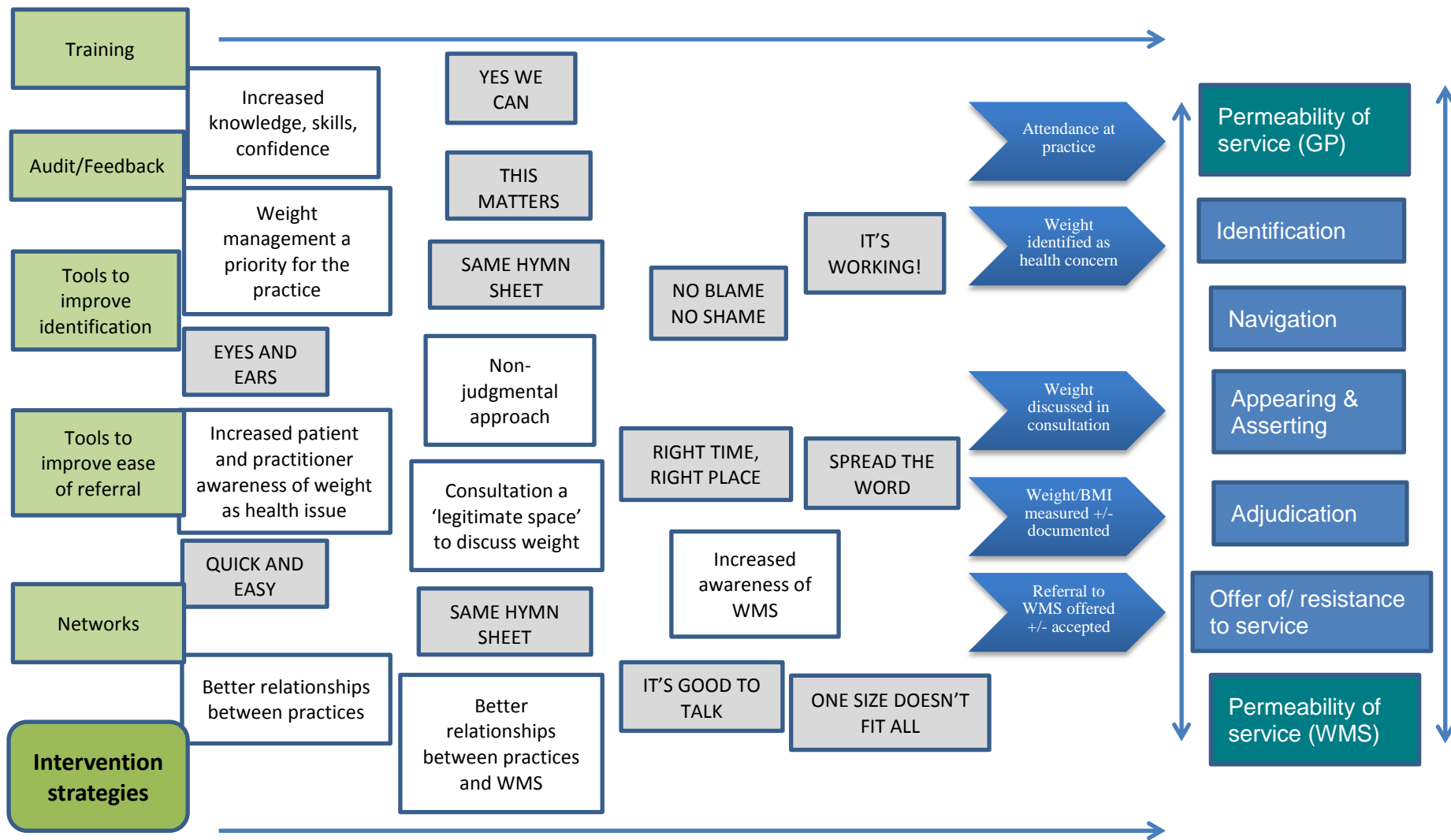
Figure 9-2: Links between realist review findings and candidacy model

Appearing and asserting

This stage refers to the work that individuals must do to appear at services and assert their candidacy in an interaction with a health professional. Findings from Phase 4 suggested that this was often a repeated act, as patients described having to assert their candidacy to several different health professionals, both within primary care (see first quote below) and again within the WMS (second quote).

> So I decided to speak to my GP about weight management, she told me to speak to my nurse within the GP practice. And she weighed me and she told me you choose either between weight management but you have to commit to a certain period of time or we can refer you to a local gym. (F7, aged 18-34, BMI 35-40)

> While I would say the service has been helpful, I think it could be more helpful or easier to access. You know, both from actually getting, you know, to speak to who you need to speak to, because you've got to go through all these different, like to speak to a psychologist you've kind of got to, you can't directly access them and because really I would imagine for most people, you know people that are very overweight rather than just a wee bit, I think, you know, it's something psychological and if you don't deal with that it's never going to be fixed. (F11, aged 45-54, BMI 35-40)

The second quote was from a participant who had previously been offered an appointment at the Disordered Eating Group and was looking for psychological support for symptoms that would be in keeping with binge eating disorder, but dropped out of the service altogether when this support was not forthcoming.

In the original candidacy paper, Dixon-Woods et al assert that people from lower SES backgrounds may find it harder to assert themselves as they may be less confident and articulate than middle class patients [316]. In Phase 4, interviews were conducted with 20 patients who had been referred to GCWMS and had attended at least one appointment (and had consented to further contact for research purposes). This group of patients had, therefore, already demonstrated a degree of assertion to get to that stage. Yet even within this small sample, my impression was that the minority of patients (n=5) who lived in more affluent postcodes (SIMD 6-10) were more confident and articulate. Of the 20 patients interviewed, nine were registered in 'high deprivation', or 'Deep End' practices

(where more than 40% of the practice population live in the most deprived 15% of postcode data zones), but even more (n=14) actually lived in relatively high deprivation postcodes (SIMD 1-3). Of the six patients that dropped out, five were registered at Deep End practices, but all six lived in deprived areas (SIMD1-3).

As with identification, health professionals can also assert candidacy on behalf of patients. Indeed, it is not always clear what is identification and what is assertion.

> I hadn't really heard about [the weight management service] before so when the opportunity came up and they said 'look this is, you are going to have to, you know, it's time, it actually has a high lot of value because you know you get a lot of expert advice and stuff' and I was like 'yes yes yes yes!' (F6, 45-54yrs, BMI 40-45)

A final point about this stage in the candidacy journey is that the process of appearing at services and asserting one's candidacy has to 'fit' with patients' lives, taking account of the 'work' (to borrow a phrase from treatment burden literature [534]) involved for example, in getting there, taking time off work or arranging childcare.

Adjudication

This stage relates to the decision-making or judgment made by the health professional in relation to an individual's candidacy for a service. In the context of access to WMS, this includes: a) whether to discuss weight (if it has not been raised by the patient); and b) whether to offer referral. The former will also influence identification of obesity by a health professionals, while the latter, as demonstrated clearly in Phase 4, depends first on being aware of what services are available and how to access them. The adjudication process also depends on how likely the health professional thinks the patient is to benefit from, or indeed attend, the service. This may or may not include an assessment of motivation and consideration of other competing demands for the patient.

> It just got to the stage it reached a peak and when [my GP] said 'no you are going to have to do something or else it's going to become very serious' so at that point I said 'right okay we'll go to the weight management'. (M4, 55-64yrs, BMI 45+)

The patient quote above illustrates adjudication by a GP which has *enhanced* the patient's candidacy. In contrast, the following quote from an experienced GP from a practice with a medium referral rate (5-10 per 1000 population) shows how adjudication can also *depress* or reduce a person's candidacy.

> I suppose there is also sort of doctor initiated things that because I don't perceive it to be particularly good I'm sure there is an effect that I don't offer it as much now because of my previous experience or maybe I don't sell it as being fantastic either. (GP5, med ref, high dep)

There was evidence of adjudication in the Phase 2 realist review also, as the following excerpt from the discussion section of a paper reflecting on the outcomes of the Take Charge Lite (TCL) intervention demonstrates:

> Once prescribed, the TCL program appears to be similarly accessible and preferred by patients of varied backgrounds. This indicates that the differences in total reach were related not to TCL visit patterns but to prescription practices. A TCL prescription was more likely for non-Hispanic, middle-aged women, and those with higher BMIs than for their counterparts. These differences may reflect real differences in eligibility due to varying rates of serious chronic illness, cognitive impairment, substance abuse, or pregnancy [all exclusion factors], but may also be due to **differences in patient preferences and/or physician perceptions of patient eligibility.** (Clark, 2008 [369], emphasis added)

This quote highlights the authors' belief that practitioner factors – specifically their perceptions of patient eligibility (or candidacy) - are a strong influence on referral practice.

Offer of/resistance to service

This stage is closely related to adjudication and refers both to whether or not a follow-up service (e.g. referral to WMS) is offered and to whether or not that offer is accepted. The way in which a practitioner frames a service ('sells it') to the patient is likely to influence their likelihood of: a) accepting the referral; and b) attending the service, as demonstrated by this quote from a GP in a low-referring practice (Phase 4).

> I kind of say to them think about it and let me know if you want to go. As opposed to me just referring them. I know there is an opt in as well right enough but so that yeah I suppose I've probably watered it down a little bit by doing that. (GP4, low ref, med dep)

Practitioners may also resist requests by patients for referral, perhaps as a result of lack of awareness or confidence in the service, as discussed in Chapter 8.

Operating conditions/local production of candidacy

In the original candidacy paper, Dixon-Woods et al [19] describe this construct as:

> …the contingent and locally specific influences on interactions between practitioners and patients, which may be emergent over time through repeated encounters. Crucial to the local production of candidacy is the perceived or actual availability or suitability of resources to address that candidacy.

This has been described as "the least clearly articulated component of candidacy" [317], but can be thought of as the **local** cultural, organisational and political contexts that influence encounters between patients and professionals.

My second main critique of the candidacy framework as originally set out is that it pays insufficient attention to the **wider contextual factors** that shape candidacy – particularly those at the meso and macro levels. This critique has been made by others, such as Mackenzie et al [317], but is worth exploring in more detail in relation to access to weight management services, drawing on findings from the four phases of research in this thesis.

Throughout this thesis, I have taken the well-established 'barriers and facilitators' approach to the consideration of these wider contextual factors. Context here refers to aspects of the social, cultural, political, economic, and geographic environment which influence the candidacy process. These contextual factors have been considered at different levels, namely: the micro (individual and interpersonal), meso (institutional) and macro (infrastructural) levels. Table 5-14 presented evidence from Phase 2 of a number of contextual factors at each of

these levels which influenced intervention outcomes. The three other phases of research also provided evidence of contextual influences on access to WMS.

In Phase 1, the stakeholder interviews identified several contextual factors that influence referral. Most significantly, the interviews – taken together with a published mapping survey of weight management services across Scotland [339] – highlight the wide variation in availability of WMS in Scotland. This is one of the key contextual factors influencing referral, and therefore access, to WMS. If, for example, there is no Tier 3 service available in your area, the chances of you accessing such a service (e.g. by special appeal to your health board to be treated out of sector) are very small.

The Phase 1 interviews also highlighted wider socio-cultural factors that influence candidacy. Stakeholders held different explanatory models of obesity, reflecting differences held more widely across society, and mapping closely on to the varied explanatory accounts held by patients and practitioners (from Phase 4). These models include differences in thinking about the causes of obesity (e.g. medical versus social model), responsibility for obesity (e.g. individual versus society), and the extent to which obesity is normalised, stigmatised and medicalised.

This research did not assess the degree to which an individual's explanatory model of obesity influences their candidacy, but it is reasonable to suggest that if a patient views their obesity as their own fault (and feels ashamed and stigmatised as a result), they may be less likely to identify themselves as candidates for support from a NHS WMS. Similarly, if a practitioner views obesity as an individual's responsibility, they may be less likely to offer referral to WMS.

Other contextual barriers and facilitators to the local production of candidacy highlighted in Phases 1 and 4 can be divided into those related to the weight management services themselves, and those related to the way in which the services communicate with primary care.

For WMS, the challenging financial context of budget and service cuts (related to austerity measures [23]) has resulted in some services (particularly Tier 2)

changing (e.g. criteria for access) or even stopping. Indeed, even the GCWMS – the focus of Phases 3 and 4 in this study – underwent significant reforms during the period of this research. This can result in so-called 'change fatigue' as illustrated by this quote from one of the Phase 4 interviews with a practice nurse from a low-referring practice.

> Just now the way it is, it's very hard to know where to refer to because Waist winners I think has now stopped. I got an email there so before that there was something else and it got stopped and it got different areas to where you were to refer them to so you end up, you don't refer. (PN4, low ref, high dep)

Another contextual factor related to WMS that affects candidacy is the demographic of the eligible population, and the extent to which the service can accommodate the diverse needs of this population. A specific example of this from Phase 4 relates to lack of cultural adaptation of the service. One South Asian patient cited the lack of culturally informed recipes in GCWMS as a weakness; another noted that some of the groups met on Fridays, which was not a convenient day for many Muslims, as the following quote shows.

> Would you say Fridays are bad for medical things or? (INT)

> It's because it's quite a very religious day for us. So you try not to, you know, go out, because you want to stay in and do your reading and prayers. (F9, 45-54yrs, BMI 30-35)

> I just wondered if that had been considered, it must have been considered for other services that are trying to support particularly Muslim communities if they realise that Fridays are not the best day. (INT)

> Yeah I know lots of people that wouldn't turn up on a Friday. (F9)

In Phase 3, predictors of attendance and completion at the GCWMS included practice factors, which could be considered as contextual factors affecting the local production of candidacy. These included practice size, deprivation status, distance from WMS, referral rate, training status, and a proxy for quality (the QOF score). While only two of these variables – training status and deprivation status - were found to be significantly predictive of attendance in fully adjusted regression

models, they are all potentially important in the production of candidacy. Indeed, while it was not possible from the available data to produce a model of predictors of referral, it would be interesting to explore, for instance, whether a factor such as distance from the nearest WMS group was predictive of a referral decision, even if it was not found to be a significant factor determining attendance *after* referral. Individual GP characteristics would need to be taken into account in such an analysis, and were not available in this study.

In summary, there are multiple contextual factors – operating at micro, meso and macro levels, which influence a person's candidacy and their access to WMS. They will have as much influence on identification (the start of the candidacy process) as they do on referral (the end of the process), and some of these factors (such as referral processes and systems) will be more amenable to change than others (such as local and national policy or socio-cultural attitudes to obesity). An expanded model of candidacy will now be presented, incorporating the findings from this synthesis of the four phases of research in this thesis.

9.4 Expanded model of candidacy

Figure 9-3 below presents an expanded conceptual model of candidacy, the mid-level theory that has been referenced throughout this work. The model shows five of the original candidacy constructs (identification, navigation, appearing and asserting, adjudication, and offers of/resistance to services) in blue boxes; the sixth, permeability, is separated into permeability of GP and of WMS services; while the seventh, local operating conditions, has been separated into a yellow box with examples of more local contextual factors influencing the realisation of candidacy (e.g. practice factors such as consultation length and role responsibilities, as well as the communication between practices and WMS) and three rings (representing micro, meso and macro levels of context), which wrap around the candidacy process.

There are also two green boxes, representing patient and practitioner factors that were thought to impact on identification and referral of adults with obesity (from Phase 2 and Phase 3). Patient factors included age (variable, but older people

were generally better engaged), gender (women were more likely to attend WMS), ethnicity (varied by study), SES (poorer individuals generally found it harder to attend WMS), and BMI (those with higher BMIs were more likely to be referred). This will be considered in more detail in the next section.
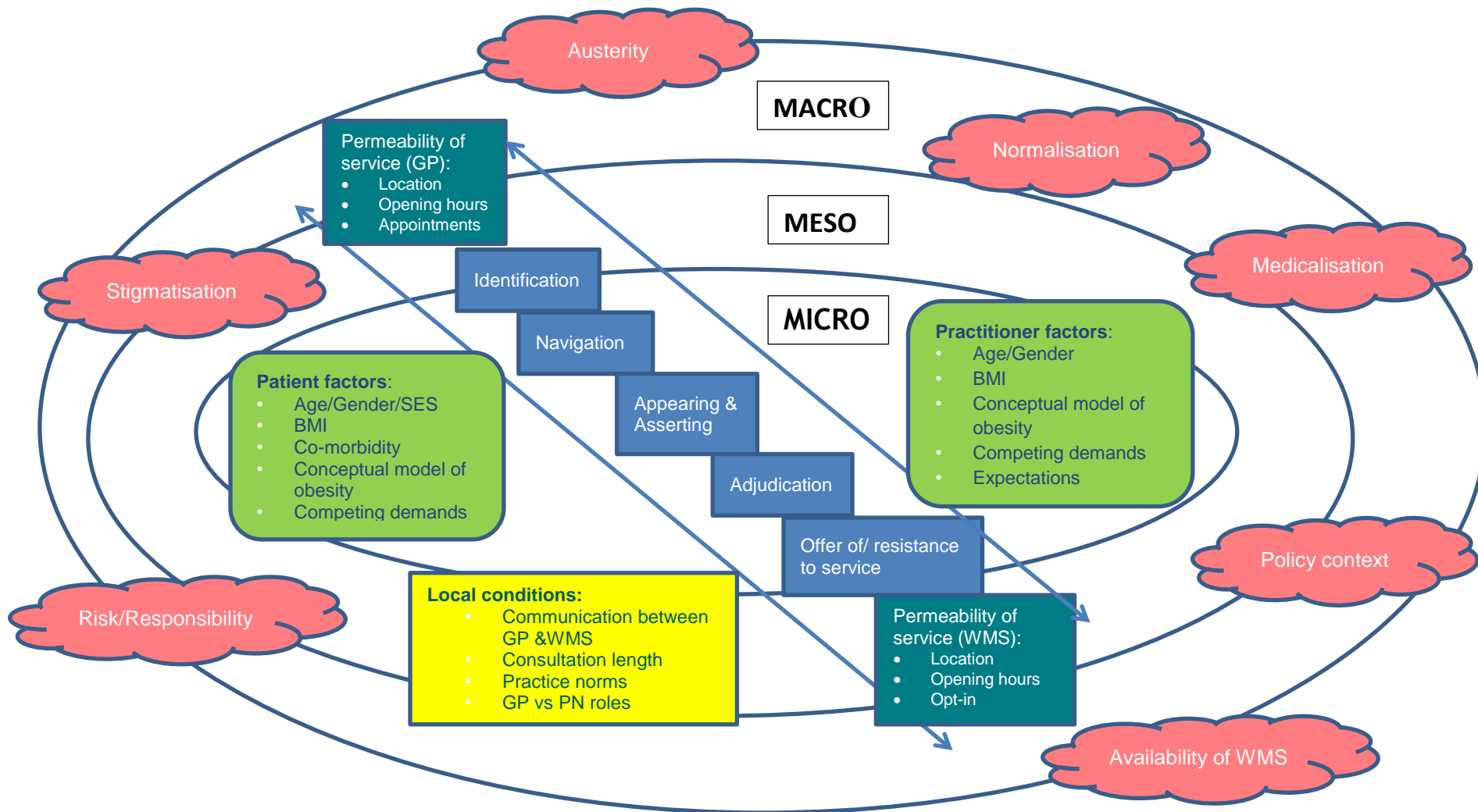
Figure 9-3: Expanded conceptual model of candidacy in relation to identification and referral of adults with obesity

Practitioner factors that were considered potentially influential included age (younger practitioners were generally more engaged with weight management) and gender (female doctors were generally better at discussing weight).

The three rings representing micro, meso and macro levels contain contextual factors (in red clouds) that were evident in the findings from Phases 1, 2 and 4. Some of these factors are socio-cultural – namely, the extent of stigmatisation, normalisation, and the medicalisation of obesity in a particular setting – while others are more structural (e.g. the impact of austerity and service cuts).

There is a significant social stigma associated with obesity, arguably more so than with smoking or alcohol, and GPs may be wary of upsetting a good doctor-patient relationship. Weight bias has been observed in many health professional groups [527, 528] and the weight of health professional themselves can influence discussion of weight. An overweight/obese practitioner may be less inclined to give advice on weight management [529]; similarly, an overweight/obese patient may be less inclined to take heed of any advice coming from a practitioner of similar weight [535].

The model does not include any of the key mechanisms that support the identification and referral of adults with obesity identified in Phase 2, as these have already been presented in Figure 9-2 and their addition would result in an unwieldy model. They are, nonetheless, important in consideration of practitioners' identification and referral of adults with obesity, but would operate mainly at the micro (interpersonal) and meso (institutional) levels.

A final important barrier is that many GP/PNs do not believe there are any effective interventions for patients with obesity and are, therefore, reluctant to refer patients to a service they believe will be ineffective [14]. Weight management interventions to date have had mixed results but a growing number of studies have shown that primary-care based weight management programmes can be effective at achieving weight loss of ≥5kg [179, 304, 536]; a widely accepted weight loss target [13]. The issue is perhaps more accurately framed as being one of re-setting expectations – away from a target of "normal weight" and towards a more realistic target of 5-10kg weight loss (or 5-10% of body

weight), or even healthy behaviour change (i.e. healthier diet and increased physical activity) regardless of weight loss.

9.4.1 Using the model to explain differences in attendance at GCWMS

In this short section, the model above will be used, along with evidence from the Phase 4 qualitative interviews, to propose potential explanations for the observed differences in attendance at GCWMS found in Phase 3.

As described in the Phase 3 findings from the GP referral data, certain patient and practice-level characteristics were more strongly predictive of attendance and completion at the GCWMS than others. Concentrating on patient-level predictors of attendance:

1) Men were less likely to attend than women (OR 0.87, 95% CI 0.79 to 0.96);

2) Older age groups were more likely to attend than younger age groups (OR 4.15, 95% CI 3.27 to 5.26 for adults aged 65 years and over compared to those aged 18-24 years);

3) More affluent patients were more likely to attend than less affluent (OR 1.74, 95% CI 1.47 to 2.06 for patients from the most affluent practices compared to the most deprived); and

4) Those with higher BMI were more likely to attend (OR 1.83, 95% CI 1.56 to 2.14 for those with a BMI 45+ kg/m^2 compared to BMI 30-35 kg/m^2).

These will now be considered in turn.

1) Gender differences

The gendered nature of normative body 'ideals' has received much critical attention in the sociological literature, with body dissatisfaction, dieting and other weight loss practices being more typically associated with women than men [537, 538]. During the Phase 4 interviews, some of the practitioners gave

their views on who they thought was most likely to engage with weight management.

> I think females are probably more likely to do something about it unless you've got a very motivated male and there are very few men, male patients who come and say 'can you help me with my weight?' I have to say, very few. (GP6, high ref, low dep)

For public health researchers and practitioners, the observation that overweight men are less engaged with weight management than women has led to the development of gender-sensitive interventions, such as Football Fans in Training (FFIT) [539]. I am not aware, however, of any research that has used the framework of candidacy to explain gender difference in access to WMS. It is likely that socio-cultural attitudes to gender and obesity influence different stages of the candidacy process: i) the extent to which men identify themselves as overweight or obese, ii) the extent to which they identify themselves as candidates for weight management support, and iii) the extent to which practitioners validate this candidacy and offer a service which is predominantly attended by female patients.

Other research has supported the first of these conjectures, by showing that men are less likely to consider themselves overweight than women across different BMI categories [540].

2) Age differences

As with gender, the relationship between age and obesity is complex, but candidacy could again be a useful framework for understanding differences in attendance at WMS by age group. Some of the explanation may be to do with differential identification of candidacy for NHS WMS, as opposed to dieting or commercial WMS. Previous research has shown that younger adults are motivated to lose weight more because of appearance than for health reasons [541], so may not consider a health service to be appropriate for them, even after they have been referred.

There may also be other, more practical barriers to engagement, such as family and work commitments. The quote below, from a retired patient interviewed in Phase 4, illustrates this point:

> Although I used to bring it up regularly 'I want to lose weight', mmm mm 'you know what to do - eat smaller portions', thanks. And he was right, he was my GP, had been my GP for years and retired just last year. And I pushed if I had, if I had pushed then probably I could have done something but I didn't have time. I've now got time on my hands. (F1, aged 65+, BMI 30-35)

3) SES differences

In Chapter 2, a range of explanations for the social gradient in obesity were provided, including the influence of education, employment and income on obesity risk via access to health information and the ability to process that information, as well as direct access to other resources for healthy behaviours. This was also found in the Phase 4 interviews.

> Are there any kind of groups that you feel are more likely, I mean male versus female, or age groups, or BMI categories or? (INT)

> I think possibly slightly more educated people are much more likely to opt in. And probably they are more aware of health, they have maybe online, they've researched it, and they have got a better understanding of it all, it's not just about not eating, taking exercise there is more to it and they are possibly more likely to opt in. (GP6, high ref, low dep)

As well as these differences in individual agency, self-efficacy and resources (at the micro level) which facilitate a person's candidacy, there are also important meso and macro-level considerations which the expanded candidacy model can help us to think through, including factors at the meso-level of the consultation (e.g. lack of time to address health needs in more deprived practices [542, 543]) and macro-level factors such as austerity policies, which invariably affect more socio-economically disadvantaged communities the hardest [23].

4) BMI category differences

The final individual patient-level predictor of attendance to be considered here is BMI category. Evidence from throughout this thesis has contributed to the idea that both patients and practitioners are more likely to identify candidacy for WMS with increasing BMI. Practitioners are also more likely to discuss and record weight in people with a higher BMI, and make an offer of referral. This is

partly related to eligibility criteria for WMS, particularly if there is no obvious weight-related co-morbidity.

9.5 Implications for policy and practice

There are a number of implications of this research for policy and practice. They are considered here in four sub-headings: improving adult weight management; the role of primary care in adult weight management; comparison with smoking cessation; and the gap between policy and practice.

Improving adult weight management

This research has highlighted several areas for improvement in relation to adult weight management. From Phase 1, it is clear that adult weight management services in Scotland have been under-resourced, resulting in gaps in services and variation in engagement with primary care. The different explanatory models of obesity impact on how services are organised (e.g. focus on weight loss versus wellbeing) and have the potential to create confusion among referring practitioners. Greater consistency – in funding, in the aims of the different WMS across Scotland, and in expectations of referring practitioners – is recommended. This will require dedicated time, especially in building relationships and managing expectations, which also requires the reliability that comes from secure funding.

Phase 2 described how previous interventions demonstrated the importance of good communication between primary care referrers and weight management services to improve the identification and referral of adults with obesity. Successful interventions were usually multi-component, including training of practitioners, audit/feedback on referrals, quality circles, and tools to aid both identification (e.g. automatic BMI calculators, posters in waiting area) and referral. The mechanisms underlying successful strategies included increased knowledge about obesity and awareness of and confidence in WMS among practitioners, improved communication and trust between practitioners and WMS, and higher priority given to weight management among primary care teams. These findings resonate with the views of those running the WMS (Phase 1 findings) and with the recommendations given in Phase 1.

Phase 3 highlighted wide variation in referral rates across general practice, despite similar prevalence of obesity, suggesting that there is still much to be done to improve engagement with weight management by primary care practitioners. The high attrition rate from referral to attendance and from attendance to completion suggests there are ongoing barriers for patients. Furthermore, the observation that those from the most socio-economically deprived areas are least likely to attend suggests structural barriers and the need for a more targeted response. Finally, the practice characteristics of quality (as measured by QOF achievement) and distance from the nearest WMS were not associated with attendance in this study, and these negative findings are of interest suggesting that practice quality and proximity are not major drivers of attendance.

In Phase 4 of the mixed methods case study of GP referrals to GCWMS, the preference among patients and practitioners for WMS to be more local, familiar, and relatively quick and easy to access was emphasised. This is particularly important in deprived areas, which have the highest proportion of referrals but the lowest likelihood of attendance. The re-structuring of GCWMS is likely to improve these aspects of access. The new Tier 2 service provided by Weight Watchers will be more accessible in terms of geographic location and timing (including evenings and weekends), and the new self-referral pathway will remove the barrier of having to be referred by a GP or PN and then having to opt in. To be clear, the decision to re-structure the services was not directly influenced by this research, but DB has presented research ideas to the Health Board's Obesity Planning Group, the Primary Care Engagement group and to the GCWMS staff, and has had informal discussions with those driving the change. DB has also met with Ministers of Public Health and civil servants from the Scottish Government to discuss research findings. These discussions may have helped these policy makers to understand how primary care practitioners and patients 'think' in relation to WMS and may guide future decisions about the structure of the wider service.

The role of primary care in adult weight management

A central aim of this thesis was to understand the role of primary care in the management of adults with co-morbid obesity. As noted throughout, this is a

contested area, with different perspectives from policy makers, weight management service planners, primary care practitioners, and patients (adults living with co-morbid obesity). A key tension for general practice is that GPs are expected to care for individuals *and* populations.

This tension is expressed in the growing movement against 'overdiagnosis' and 'overtreatment' [544, 545], defined as the application of diagnoses and treatments which are of little or no value to patients, or cause net harm [546]. The movement challenges medical orthodoxy on many fronts and articulates particular concerns about the unintended consequences of screening, lowering of thresholds for cardiovascular risk management, and the opportunity costs of using GP time for lifestyle advice, as expressed in this quote:

> Doctors with a public health orientation can be quick to say what general practitioners should be doing on the basis of population data. Yet doctors and nurses in general practice face the frustration of being bribed or bullied by governments to achieve targets that many patients are not ready to accept for personal and social reasons. Nothing is more likely to reduce the likelihood of long term "success". Coercion may in the short term achieve apparent health gain targets, but at what cost to relationships and the professionals' feelings of integrity and self-respect? The opportunity costs are still unevaluated [547].

The intrusion of health promotion into the workload of general practice has been the object of criticism for many years [548]. Dr Iona Heath, former President of the RCGP and an inner-city GP in London for over 25 years, suggests that the root of this intrusion is an abdication of responsibility for health by successive governments. In her essay 'The Mystery of General Practice', Dr Heath writes about the distinction between health promotion, which is a responsibility of health workers, and health protection, a responsibility of government:

> The government has pursued the rhetoric of health promotion to disguise its failure in the arena of health protection. Patients are deprived twice over; first by the absence of adequate health protection measures and then by the erosion of time within the consultation by the ever-increasing health promotion agenda [549].

The case of weight management is apposite here. At a conference on Overdiagnosis in February 2016, organised by the Royal College of General Practitioners in Scotland, the academic GP, Professor Carl Heneghan cited the

example of GP referrals to Weight Watchers. He used data from published studies to argue that, if 1000 patients are invited to participate in Weight Watchers by their GP, only 115 will take up the offer [179]. Of these 115, 62 (54%) would attend all classes and achieve a median weight loss of 5.4kg [507]. He then used a different data set to suggest that only 13 of the 62 would maintain their goal weight at 2 years, and only 10 (9 women and 1 man) would maintain their goal weight at 5 years [550]. Prof Heneghan thus concluded that only 10 out of 1000 people (1%) who are invited to participate in Weight Watchers by their GP would maintain their goal weight at 5 years. The implication was that this was not a very cost-effective intervention.

However, more recent research has challenged this assumption [241], and the case for a strong role for primary care in adult weight management was made clearly in a BMJ editorial in 2004:

> The opportunity is great. Primary care clinicians in the US and the UK have repeated access to the public, even those not currently ill, and are influential, usual sources of care for patients. By building on these strengths and continuing personalized relationships, primary care is well positioned to promote healthy behaviors (sic). [551]

The findings from this thesis are not going to settle the debate – a person's view on the role of primary care in adult weight management will be shaped in part by their explanatory model of obesity, but also by their view of the interface between primary care and public health. At the time of writing, there seems little appetite (among practitioners or policymakers) for expanding the role of primary care in adult weight management beyond that of identification and referral, which has been the focus of this thesis. However, the findings presented here identify ways to support primary care practitioners' identification of patients with obesity; mechanisms to increase primary care practitioners' knowledge of – and confidence in – WMS; and improvements to the referral pathways between primary care and WMS.

In terms of where primary care interventions are situated within the broader field of obesity interventions, the work of Capewell and colleagues has suggested that primary care interventions to support health behaviour change are relatively low in the "evidence of effectiveness" hierarchy [552]. Drawing on

the famous work of Geoffrey Rose [553], the authors argue that preventive interventions which are population-wide and more 'upstream' (e.g. legislation or regulation to limit availability of harmful products such as tobacco, alcohol or HFSS food and drinks) have greater population health benefit than those which are targeted at individuals and more 'downstream' (e.g. health education or 'nudge' interventions) [552]. Such upstream interventions are also likely to be more cost-effective and have greater potential to reduce health inequalities [340, 554]. The next section continues the analogy between obesity and another risk factor for ill health which is the target of health behaviour change interventions: smoking.

Comparison with smoking cessation

Throughout this thesis, comparisons were drawn by various stakeholders (patients, practitioners and senior dietitians), and in various policy documents [1, 164, 166, 172, 175], between obesity and smoking or - from an NHS services perspective - between weight management services and smoking cessation services.

In Phase 2, for instance, parallels were drawn between weight management and smoking cessation in relation to raising practitioner awareness:

> In the early periods of the promotion of tobacco cessation and getting physicians to address death and dying, the first challenge to be overcome was physician awareness [555]. Obesity management may be analogous. (From Schuster [383])

The analogy also extends to potential interventions, such as the 5As framework, referred to in the 2010 study by Jay et al [388]:

> Training physicians about this [5As] framework has been shown to improve patient outcomes in smoking cessation [556]. (From Jay [388])

There is a strong evidence base for the effectiveness and cost-effectiveness of brief interventions to help patients stop smoking [420, 557, 558]. NICE guidelines recommend that GPs assess and record the smoking status of patients at least once a year and advise smokers to stop [557]. Furthermore, GPs received

payments via the QOF for maintaining this register of smoking status and recording the delivery of cessation advice.

In contrast, GPs do not record whether they discuss weight management with patients, even in the situation of obesity-related co-morbidities such as diabetes, and there is no national surveillance system for recording brief interventions. It is widely recognised that weight management has been under-resourced in comparison to smoking cessation [177, 559].

As well as the disparity in funding, another notable difference between weight management and smoking cessation is that GPs and PNs are more likely to be personally affected by obesity than they are to be current smokers [560, 561]. This has implications for their engagement with weight management, as there is some evidence that health professionals' lifestyle behaviours influence the frequency and willingness with which they offer health advice [529, 562, 563].

From a Scottish policy perspective, the abolition of the QOF in 2016 and the introduction of a new GP contract, to be rolled out in 2018, presents an opportunity for a new approach to engagement with primary care around public health issues such as smoking cessation and weight management. The new contract requires GP practices to work in Quality Clusters, leading health care quality improvement with a focus on local needs [564]. These primary care reforms are at the heart of the Scottish Government's plans to transform the health and social care system [565, 566] and are underpinned by the Chief Medical Officer's (CMO) vision for 'realistic medicine'[567, 568]. Obesity could easily be made a priority for GP clusters, with support provided for some or all of the strategies that were shown in Phase 2 to make a difference: training, audit/feedback, and tools to improve identification and referral of adults with co-morbid obesity (the clusters could already be considered a sort of quality circle or network).

To date, however, there has been a marked gap between the policy rhetoric around obesity (i.e. that it is an 'epidemic' or a 'crisis' that demands immediate and wide-ranging attention [7, 154]) and the reality in practice (that weight management remains under-resourced, particularly when compared to other services to support health behaviour change such as smoking cessation services).

This thesis helps us to understand the reasons for that gap and offers solutions to bridge the gap.

The gap between policy and practice

There are at least five potential explanations for the mis-match between the political rhetoric about the magnitude of the 'obesity problem' and the funding of adult weight management services. First and foremost, there is a lack of consensus about obesity policy [132], with inconsistent evidence around the most effective means of supporting weight management in primary care [569].

Second, there is still a widespread view that obesity is about individual responsibility, and it is not for the state (or indeed the health service) to intervene in people's freely-made lifestyle choices [154]. It is much easier to make the case for funding of services for childhood obesity (e.g. the Scottish Government's HEAT target), as children cannot be held responsible for their weight and deserve protection [552].

A third and related explanation is about stigma. Fat bodies are viewed negatively in contemporary popular culture, where young, thin, and muscular is synonymous with beauty [537]. If you hold the view that obesity is universally 'bad' and individuals are solely responsible for their weight, then stigma and discrimination related to body size inevitably follows, and there is no reason to believe such weight bias is any less common among policy makers than it is in any other group [570].

Fourth, there is no clinical specialty championing the cause of weight management, lobbying for resources and co-ordinating activity. Obesity can affect all body organs and systems, and weight management is necessarily multi-disciplinary, but most of those leading weight management services are dietitians, who lack the political clout of doctors.

Fifth, the normalisation of obesity makes political action more difficult. When the population mean BMI is increasing, being overweight becomes 'the norm', and any population-level policy to, for instance, restrict access to or advertising/promotion of HFSS foods is likely to be met with resistance. For an

analogous example, the implementation of the ban on smoking in public places in the UK only became politically acceptable after extensive public debate and when the population smoking prevalence had fallen to around 20% [552].

The work presented here, along with the wider literature, thus points to potential explanations (at micro, meso and macro levels) for why weight management services have not managed to attract the same funding priority as smoking cessation services, as well as ways in which they might be given more prominence in future funding decisions. Ultimately, however, health care policy and practices, as Russell and Greenhalgh conclude in their study of rationing in the NHS, "inevitably involve judgments of moral worth and deservingness, and can never be simply evidence-based endeavours"[571]. This could be applied to the current climate of obesity prevention and management; the work presented here may help us to recognise, and respond to, such judgements of 'worth and deservingness'.

9.6 How findings fit with other research

The findings from the four Phases of research presented in this thesis were compared to other relevant literature in their respective chapters. This section will therefore focus on how the expanded model of candidacy presented in this discussion chapter fits with other research.

Dixon-Woods et al's candidacy theory was found to provide a helpful framework for understanding access to weight management in primary care. In keeping with a previous study by Kovandzic et al [318], which found that some co-morbidities, such as depression, can reduce a person's candidacy for services, this research suggested that, in the context of weight management, certain conditions (particularly diabetes) enable candidacy and make people more 'warrantable' candidates for weight management than others. Diabetes was an easier entry point into discussion of weight than, for instance, breathing problems or psychological problems related to weight.

This observation fits with findings from the thematic synthesis of physicians' views and experiences of discussing weight management within routine consultations discussed in Chapter 2 [220]:

The findings suggested that physicians fail to view 'obesity alone' as a legitimate medical problem so was therefore not within their remit. This is consistent with research that physicians are more willing to initiate and discuss weight when they 'medicalize' it or when patients present with comorbidities affecting health outcomes [234, 572].In addition medical training favours the biomedical model so physicians may feel more comfortable viewing weight as a medical problem [573].

There have been a number of other notable applications of candidacy which extend the original model and contribute additional dimensions to the challenges of access [317, 318, 574-579]. Both Koehn and Klassen emphasise the importance of social norms on the candidacy process, and Klassen demonstrates that these norms, along with issues of racism and socio-economic disadvantage, construct a series of interrelated barriers to candidacy [575, 576].

The concept of 'intersectionality' explores the extent to which different axes of exclusion interact in any one individual (e.g. gender, age, SES, ethnicity, sexuality) [580]. Certain diseases/conditions could be considered as further axes of discrimination (see, for example, Macdonald et al's comparison of heart failure patients' and colorectal cancer patients' differential access to support [578]); one could argue that obesity is another such 'condition'[581]. Mackenzie et al used insights from both candidacy and intersectionality to understand women's accounts of domestic abuse and their use of support services [582]; to date, no such analysis has been conducted in the context of access to weight management services.

Mackenzie and colleagues also explore the idea of 'multiple candidacies' in their work, in relation to the interaction of multiple identities [317, 582]. This thesis extends the notion of multiple candidacies to include: multiple people involved in the process of identifying, asserting and navigating candidacy ('candidacy by proxy'); multiple services requiring to be navigated in order to fulfil one's candidacy; and multiple interpretations of the candidacy process.

The role of the primary care practitioner in the process of enabling or depressing a person's candidacy for NHS adult weight management services was critical here. At each stage in the candidacy process - identification, asserting, adjudicating and navigating referral systems – practitioners could make or break

candidacy. Candidacy for weight management depends on the diagnosis of obesity and is facilitated by the presence of weight-related co-morbidities. There is, of course, the potential for what might be called 'contested candidacy', that is, a situation of a doctor or nurse identifying a patient as having obesity and being a WMS candidate, but that patient rejecting the diagnosis ("I'm not obese"). This is perhaps unsurprising given what we know both about the inadequacies of BMI as a measure of health [26], the heterogeneity of obesity [36], and the tensions and uncertainties related to the role of the NHS in adult weight management [569].

As well as advancing the notion of multiple candidacies, the expanded model presented in this chapter also advances understanding of the wider contextual influences on the production of candidacy. While identifying a range of factors at the micro, meso and macro levels, the model does not consider the impact of the most macro of all factors – the global political economy of neoliberalism itself - on candidacy for weight management [341, 583].

Previous research has explored how the globalisation of food production and distribution by a small number of multinational corporations has created an obesogenic environment of 'ultra-processed' foodstuffs [584]. Capitalist economies emphasise individuals as consumers and widespread over-consumption follows for most people; as noted throughout this thesis, however, obesity is socially patterned and another feature of neoliberal societies is their shaming discourses [358], with the obese body associated with gluttony and sloth and, increasingly, with lower social class [583].

This gives rise to the notion of 'discordant pleasure', whereby the reliable pleasures of eating are accompanied by feelings of guilt and shame [583]. The future-oriented messages of public health campaigns to manage risk are harder to incorporate into daily life when poverty and survival are far more immediate threats [583]. The implication here is that, as with smoking, efforts to reduce obesity among the most deprived members of society are "unlikely to succeed unless they are supported by measures designed to improve the material circumstances of these individuals" [58].

9.7 Strengths and limitations

The strengths and limitations of each of the four phases of work in this thesis have already been considered in their respective chapters. In this section, therefore, consideration will be given to the strengths and limitations of the synthesis of findings in this chapter and of the use of mixed methods throughout the thesis.

A strength of this chapter is that it has integrated findings from the four phases of this thesis into an expanded theoretical model of candidacy. It then used the model to explain differences in attendance at GCWMS observed in Phase 3. The model was then compared to other literature and areas for further development (such as consideration of intersectionality or the impact of neoliberalism) were explored. More robust empirical testing of this model is a necessary next step.

The "barriers and facilitators" approach to understanding access to weight management that was adopted throughout this thesis has been criticised for over-simplifying the complexities of programme intervention or policymaking in the real world [585]. However, in recognition of these complexities, concrete recommendations for addressing identified barriers were not made, which could be considered a limitation. There are some aspects of context, such as practice systems and some policy (local and national), which may be more amenable to change than others (see, for example, Ulrich Beck's 'Risk society' for evidence of the many 'unknowable' factors beyond our control [586]).

A further limitation is that co-morbidity did not feature as strongly as one might have hoped, particularly in the realist review, where patients' co-morbidities were infrequently reported in the included studies.

The use of mixed methods in this thesis – qualitative interviews, quantitative analysis and realist review – is a strength in my view; this triangulation of methods increases the depth and credibility of results [302].

9.8 Future research directions

As noted above, the expanded model of candidacy presented in this chapter requires further empirical testing. Particular attention could be given to access issues for specific groups, including ethnic minorities, and those with learning disabilities, or eating disorders. The additional theoretical insights provided by intersectionality may be valuable in this respect.

The re-structuring of GCWMS and use of Weight Watchers to deliver Tier 2 community-based weight management services lends itself to further research and evaluation, particularly with regard to assessment of whether the reforms have improved equity of access for more socio-economically deprived populations. Similarly, there is a need for better recording of co-morbidities and other risk factors among patients attending NHS adult weight management services. Scottish Health Survey data has been used to examine the clustering of key risk factors for chronic disease, including overweight/obesity, smoking, and alcohol. This found that the prevalence of multiple behavioural risk factors was high and strongly associated with lower SES [587]. There were similar findings from European data (the Survey of Health, Ageing and Retirement in Europe (SHARE) [588]). Further research is required to understand how best to support individuals with multiple behavioural risk factors. This should include "measures designed to improve the material circumstances of these individuals"[58].

The long-term aim of this thesis was the development of a theory-driven, evidence-based intervention targeted at primary care practitioners to improve the management of co-morbid obesity, in line with Phase 1 of the MRC Framework for design and evaluation of complex interventions [24]. Since starting the PhD process, I have been involved in the development of an intervention targeting primary care practitioners to improve adult weight management – called 'Small Talk Big Difference'[589]. This has drawn upon the findings from this thesis and incorporates training of practitioners, with audit/feedback and the use of tools to support identification and referral.

9.9 Conclusion

This thesis has highlighted a number of issues related to the role of primary care in adult weight management. NHS adult weight management services in Scotland have been under-resourced, particularly when compared to support services for smoking and alcohol, resulting in gaps in services and variation in engagement with primary care.

Previous interventions have shown the importance of good communication between primary care referrers and weight management services for improving the identification and referral of adults with obesity, through increased trust, knowledge and confidence. It is therefore imperative that weight management services are supported in the more time consuming, but ultimately effective, role of developing local relationships with potential referrers to their service. This is especially important if the over-riding ethos of the service is one of wellbeing rather than weight loss. However, even when weight loss is important, time and effort is required to engage with practitioners and highlight what are realistic expectations of the service.

Furthermore, the services need more secure, sustained funding. This will require more effective lobbying for resources, though it is not clear where this pressure will come from. One vision for a way forward has been to call for weight management to follow the example of smoking cessation in the UK, where there is a network of well-resourced NHS Stop Smoking Services, accessible via different means and in different locations [336]. The thesis has, however, highlighted a number of tensions to be negotiated for this vision to become a reality.

Primary care can do more to support adults with obesity, but to do so weight management services need to be more local, familiar, and relatively quick and easy to access. This is particularly important in deprived areas, which have the highest proportion of referrals but the lowest likelihood of attendance. Responses to the public health problem of obesity need to be multi-sectoral, but if primary care is to fulfil its potential in this area –to increase the identification and referral of appropriate patients to weight management services [590] – there needs to be better engagement between weight management services and

primary care and better support to ensure that primary care practitioners approach discussions with patients with confidence and respect.

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Understanding the Role of Primary Care in the Management of Adults with Co-morbid Obesity: A mixed methods programme

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VOLUME 2 – APPENDICES

Table of Contents

Appendix 1: Published protocol paper from Phase 2 realist review

SYSTEMATIC REVIEWS

PROTOCOL   **Open Access**

Interventions targeted at primary care practitioners to improve the identification and referral of patients with co-morbid obesity: a realist review protocol

David N Blane[1], Sara Macdonald[1], David Morrison[2] and Catherine A O'Donnell[1*]

Abstract

Background: Obesity is one of the most significant public health challenges in the developed world. Recent policy has suggested that more can be done in primary care to support adults with obesity. In particular, general practitioners (GPs) and practice nurses (PNs) could improve the identification and referral of adults with obesity to appropriate weight management services. Previous interventions targeted at primary care practitioners in this area have had mixed results, suggesting a more complex interplay between patients, practitioners, and systems. The objectives of this review are (i) to identify the underlying 'programme theory' of interventions targeted at primary care practitioners to improve the identification and referral of adults with obesity and (ii) to explore how and why GPs and PNs identify and refer individuals with obesity, particularly in the context of weight-related co-morbidity. This protocol will explain the rationale for using a realist review approach and outline the key steps in this process.

Methods: Realist review is a theory-led approach to knowledge synthesis that provides an explanatory analysis aimed at discerning *what works*, *for whom*, in *what circumstances*, *how*, and *why*. In this review, scoping interviews with key stakeholders involved in the planning and delivery of adult weight management services in Scotland helped to inform the identification of formal theories - from psychology, sociology, and implementation science - that will be tested as the review progresses. A comprehensive search strategy is described, including scope for iterative searching. Data analysis is outlined in three stages (describing context-mechanism-outcome configurations, exploring patterns in these configurations, and developing and testing middle-range theories, informed by the formal theories previously identified), culminating in the production of explanatory programme theory that considers individual, interpersonal, and institutional/systems-level components.

Discussion: This is the first realist review that we are aware of looking at interventions targeted at primary care practitioners to improve the weight management of adults with obesity. Engagement with stakeholders at an early stage is a unique feature of realist review. This shapes the scope of the review, identification of candidate theories and dissemination strategies. The findings of this review will inform policy and future interventions.

Systematic review registration: PROSPERO CRD42014009391

Keywords: Realist review, Realist synthesis, Obesity, Primary care, General practitioners, Practice nurses, Referral, Weight management, Effectiveness

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Background

Rationale for the review

Obesity is widely regarded as one of the most significant public health challenges in the developed world [1]. Obesity is a risk factor for, amongst others, coronary heart disease, diabetes, stroke, osteoarthritis, and a number of different cancers [2] and is, ultimately, associated with premature death [3]. The benefits of weight loss for adults with obesity include reduced progression to type 2 diabetes [4,5] and lower blood pressure and cholesterol [6].

Strategies to prevent and treat obesity include interventions aimed at the individual, family, healthcare provider, and environmental levels [1]. Current UK and Scottish guidelines on obesity emphasise the central role of primary care (particularly general practitioners and practice nurses) in its prevention and management [7,8]. The strengths of primary care - population coverage, first contact, continuity, and relationships of trust built over serial encounters [9] - support this role in theory, but there is a considerable gap between policy rhetoric ('every healthcare contact is a health improvement opportunity' [10]) and the reality in practice. Obesity remains under-treated in primary care: few are referred to external sources of support, where they exist, and there are wide variations in referral rates and attendance following referral [11,12].

Qualitative research offers several proposed explanations for this sub-optimal engagement with weight management by general practitioners (GPs) and practice nurses (PNs), including lack of time in the consultation [13], lack of knowledge, and lack of confidence in discussing weight [14], perceptions of poor outcomes of interventions [14], and fear of causing offence [15]. We will briefly explore each of these in turn.

Time constraints are clearly an issue. For instance, a UK review recommending motivational interviewing as an evidence-based strategy to support weight loss for patients in primary care noted that 15 min was the minimum time found to be effective and training in motivational interviewing itself takes at least 2 days [16]. This is a time commitment that most GPs and PNs would be unable to make. More recently, attention has turned towards the use of brief interventions for weight management in primary care, building on the successful use of brief interventions for smoking cessation or alcohol [17]. It remains to be seen how transferrable such an approach might be in the context of weight management, as there are significant qualitative differences between the discussion of a patient's weight and that of their smoking or alcohol intake, as the following barriers demonstrate.

A recent report from the Royal College of Physicians stated that training for GPs in weight management has been minimal and poorly coordinated, 'reflecting a lack of focus on obesity throughout medical training as a whole' [18]. Lack of knowledge and lack of confidence are far more pertinent in primary care weight management than they are for smoking or alcohol. Successful interventions to improve weight management in primary care are likely, therefore, to require at least an element of training for primary care practitioners, in particular GPs and practice nurses.

A further barrier is that many GP/PNs do not believe there are any effective interventions for patients with obesity and are, therefore, reluctant to refer patients to a service they believe will be ineffective [14]. Weight management interventions to date have had mixed results, but a growing number of studies have shown that primary care-based weight management programmes can be effective at achieving weight loss of ≥5 kg [19-21], a widely accepted weight loss target [8]. The issue is perhaps more accurately framed as being one of re-setting expectations - away from a target of 'normal weight' and towards a more realistic target of 5 to 10 kg weight loss (or 5 to 10% of body weight), or even healthy behaviour change (that is healthier diet and increased physical activity) regardless of weight loss.

Additional factors that may influence GP/PN engagement with weight management include attitudes to obesity (weight bias has been observed in many health professional groups [22,23]) and the weight of the health professional themselves. An overweight/obese practitioner may be less inclined to give advice on weight management [24]; similarly, an overweight/obese patient may be less inclined to take heed of any advice coming from a practitioner of similar weight.

Finally, fear of causing offence is another barrier to GP/PN engagement with weight management. Many GPs feel uncomfortable with the idea of raising a patient's weight as a health issue if this is not the reason why the patient has attended. There is a significant social stigma associated with obesity, arguably more so than with smoking or alcohol, and GPs may be wary of upsetting a good doctor-patient relationship.

Overall, it is clear that any intervention targeted at primary care practitioners to improve weight management will have a number of potential barriers to consider. A Cochrane systematic review assessed the effectiveness of interventions to change the behaviour of health professionals and/or the organisation of care to promote weight reduction in overweight and obese people, using a search to May 2009 [25]. The review identified six RCTs, but only one of these was set in UK primary care [26]. It found evidence of a change in clinicians' behaviours after receiving an educational intervention, but no statistically significant difference in patient weight between intervention and control groups, suggesting a

more complex interplay between patients, practitioners, and systems.

A more recent systematic review (from 2011) found there were no trials examining the effect of primary care screening to identify overweight or obesity in adults and brief intervention was effective [27]. This review did, however, have restrictive inclusion criteria (only looking at RCTs), and it is likely that more recent research does exist in this area.

Objectives and focus of the review

In keeping with policy recommendations, which emphasise the role of primary care in the *identification* of individuals with obesity and appropriate *signposting/referral* to services, the focus of this review is on how GPs and practice nurses identify individuals with obesity and why they refer some patients but not others.

This review will have a particular focus on the management of individuals with 'high risk' co-morbid obesity - that is obesity with weight-related co-morbidities, such as diabetes and hypertension. This focus is for two reasons: first, given the high prevalence of obesity, most health systems have adopted a tiered approach to weight management services, based on clinical need, as there is no capacity to see all individuals with obesity. Secondly, given the rising rates of co-morbid obesity, this is something that GPs and PNs will be seeing more of and must become better at managing.

The objectives of this review are (i) to identify the underlying 'programme theory' of interventions targeted at primary care practitioners to improve the *identification* and *referral* of adults with obesity and (ii) to explore *how* and *why* GPs and PNs *identify* and *refer* individuals with obesity, particularly in the context of weight-related co-morbidity.

Review questions

1) What is the 'programme theory' of interventions targeted at primary care practitioners to improve the identification and referral of adults with obesity?
2) What are the mechanisms at play in different components of these interventions and what are the contextual factors that enable these mechanisms to produce successful outcomes?
3) How do GPs and practice nurses identify individuals with obesity?
4) Why do they refer some patients but not others?
5) What is the influence of co-morbidity on referral decisions?

Methods

A realist approach was chosen for this review because it is particularly suited to the management of a mixed body of evidence, typical of complex interventions with multiple interacting components. Realist review or synthesis (RS) is based on the recognition that the same policy or intervention may be effective in one setting but completely ineffective in another. It provides an explanatory analysis aimed at discerning *what works*, *for whom*, in *what circumstances*, *how*, and *why* [28]. The ultimate ambition of a realist review is to produce (and test) a refined 'programme theory', which explains how and why a particular programme or intervention works (or not). It does this by applying a realist philosophy of causation and focussing, not on the intervention itself but on the mechanisms (M) that lead to successful - or unsuccessful - outcomes (O) in different contexts (C). It is expected that a realist synthesis will produce a *description* of positive and negative context-mechanism-outcome (CMO) configurations, explore patterns among these CMO configurations, and develop and test one or more middle-range theories that *explain* how and why these configurations relate to each other, drawing on formal theory (that is substantive theory from disciplines such as sociology, economics, psychology, and so on) in the domain in which the review is situated [29].

Unlike more conventional systematic reviews, there has, until relatively recently, been little guidance on how to conduct a realist synthesis. Rycroft-Malone and colleagues addressed this gap by providing a step-by-step account of a realist synthesis exploring the effectiveness of interventions to promote evidence use in health care [30]. More recently, Wong and colleagues produced the RAMESES quality standards for researchers undertaking realist reviews [29] and also publication standards for realist syntheses, which set out a 19-point list of items to be included when reporting a realist synthesis [31]. These resources will be used to structure the realist synthesis process in this project. There are several steps outlined in the quality standards that are considered to be good practice when conducting realist review, including scoping interviews, identification of candidate programme and formal theories, and iterative literature searching. These will be addressed in turn now.

Scoping interviews

One aspect of a realist synthesis that is different from a systematic review is the opportunity to include scoping interviews at an early stage. Scoping interviews with relevant stakeholders allow the researcher to understand different perspectives on how the policy or intervention in question is believed to operate in practice and can help to shape nascent programme theories. This stage of work can also help to shape what literatures are searched and how it is interrogated. Stakeholders can be interviewed again later in the review process to assess

whether the review findings resonate with their experience in practice.

In the present study, scoping interviews have been conducted with individuals involved in the planning and delivery of adult weight management services across a number of different health boards in Scotland. It is beyond the scope of this protocol paper to present detailed analysis of these interviews, but they have been valuable not just in informing the identification of candidate theories (see next section) but also in understanding the variation in contextual factors across different regions, in terms of the way that weight management services are resourced, organised, accessed, and evaluated. The topic guide used for these interviews, informed by Pawson [32], can be found in an additional file (see Additional file 1).

Identifying candidate programme and formal theories

In the realist approach, the primary ambition of the research synthesis is explanation building [33]. As noted by Pawson, '[t]he purpose is to articulate underlying programme theories and then to interrogate the existing evidence to find out whether and where these theories are pertinent and productive' [33]. As such, many realist syntheses begin with a literature search for candidate programme theories, before exploring the primary research around the area of interest to test the pertinence of these theories [34,35]. This approach does not work so well, however, when the extent of primary research in the area of interest is limited or unknown or when there is considerable heterogeneity in the interventions involved [36].

Both of these issues are relevant in this review. First, as noted above, we know that two systematic reviews found very few interventions targeted at primary care practitioners to improve the screening and referral of adults with obesity [25,27], though these are now a number of years old, and this is clearly an area where new research is being produced on a regular basis [17,37]. Second, we know from similar research into interventions targeted at primary care practitioners to improve identification and referral in sensitive areas - in this case intimate partner violence screening [38] - that there are a number of different potential intervention components (for example effective protocols, ongoing training, feedback, improving access to support), which may in turn have different mechanisms underpinning them (for example practitioner self-efficacy, trust and confidence in the service, accepting responsibility).

It is possible that similar intervention strategies, perhaps with similar mechanisms, have been implemented in interventions related to weight management in primary care, but we have not attempted, at the start of the review process, to sketch out the various programme

theories that may be at play across a potentially wide range of different interventions strategies. For instance, an intervention that aims to increase the identification of patients with obesity by providing desktop BMI calculators to primary care practitioners will have a very different programme theory to an educational intervention. As such, we made the decision to search for the interventions first and then to develop the programme theories underpinning these interventions. We have, however, identified a number of formal or substantive theories - from psychology, sociology, and implementation science - that we believe will be pertinent to this area of enquiry, through a two-stage process: (i) background reading and expert opinion and (ii) stakeholder interviews.

Background reading has been ongoing for some time, prior to the drafting of the proposal for the funding of this project. Expert opinion has been sought in the form of project supervisors, an advisory panel of academics, and presentation of research plans at interdisciplinary meetings and national conferences.

Stakeholder interviews, as noted above, were conducted with healthcare professionals, across Scotland, responsible for delivering weight management services that receive referrals from primary care. We sought the views of these professionals on how they engage with primary care practitioners, what they thought the barriers to identification and referral are and what they consider to be the most effective methods for increasing appropriate referrals. While few interviewees mentioned specific theories, several did draw attention to factors that influence the referral process at different levels (for example interpersonal versus institutional) and some were mindful of behaviour change theories.

This process has revealed three overlapping levels, within which potentially relevant theoretical fields are situated:

1) *Individual-level* theories of practitioner behaviour change (for example Theoretical Domains Framework [39,40], Behaviour Change Wheel [41])
2) *Interpersonal-level* theories of doctor-patient interaction (for example candidacy theory [42], theories of stigma [43], and shame [44])
3) *Institutional or system-level* theories of implementation (for example diffusion of innovations [45], normalisation process theory [46], PARiHS framework [47])

This is a somewhat artificial categorisation of theories into these different levels, as almost all of them operate to a greater or lesser extent across all three levels.

These substantive theories will be used to help make sense of the CMO patterns identified during the synthesis phase. It is important to note that these theories are

likely to be refined in an iterative process as the review progresses and the programme theories of the interventions are developed.

Search strategy

A comprehensive search strategy was developed in conjunction with the subject librarian of the University of Glasgow. This was adapted from the search strategy used by a previous Cochrane systematic review in the area [25], but with some important differences. First, search terms for different study designs were not included, as the realist approach does not exclude studies on the basis of design (for example qualitative studies can provide useful information on potential mechanisms). Secondly, the databases used were extended to include Ovid MEDLINE, EMBASE, CINAHL, PsycINFO, Web of Science, and ScienceDirect. Thirdly, the start date for the search was from 2004 onwards. This was the year the new General Medical Services (GMS) GP contract was implemented in the UK, when the Quality and Outcomes Framework (QOF) was introduced. QOF set important standards for record keeping and chronic disease/risk factor management, albeit in relation to performance monitoring and practice incentivisation. It was also the year of the UK government's landmark White Paper, *Choosing Health: Making Healthier Choices Easier* [48], which signalled a shift of attention towards public health and overweight/obesity in particular. It also highlighted the role of healthcare practitioners in supporting people to make healthy lifestyle changes. (The search strategy can be found in Additional file 2.)

Citation searches and snowballing strategies will be used as the study progresses. Furthermore, results of stakeholder discussions and interviews, as well as training and conference material, may also be used as data.

Iterative searching

As the synthesis progresses and nascent programme theories are developed and tested, further iterative searches will be necessary. This will involve purposive searching of the literature for evidence to support or refute candidate programme theories that are most relevant from the initial data analysis, potentially incorporating additional formal theories that may be identified during the review process.

Study selection

Titles and/or abstracts of studies retrieved using the search strategy and those from additional sources will be screened independently by two review authors to identify studies that potentially meet the inclusion criteria. The questions and responses used for screening at title and abstract levels can be found in Table 1. This process will be conducted using Distiller SR software, with

Table 1 Screening questions and responses at title and abstract levels

Screening question		Response
Title level	Could this be about adult weight management in primary care?	Yes
		No, not adult
		No, not weight management
		No, not primary care
		Unclear
Abstract level	Could this article provide useful information about the identification and referral of adults with obesity in primary care?	Yes
		No, not weight management for adults with obesity
		No, not involving primary care practitioners
		No, not related to identification or referral
		No, not original research (for example review, opinion piece, conference abstract)

references uploaded from the EndNote reference manager software. Inclusion criteria at the title and abstract screening level will be broad, including any primary study (quantitative or qualitative) describing or reporting on an intervention, targeted at primary care practitioners, to improve the management of adults with obesity. Exclusion criteria will include non-English language, non-adult studies, review articles, and opinion pieces. Review articles will, however, be checked for relevant primary studies.

The full text of these potentially eligible studies will be retrieved and independently assessed by two review team members. We recognise that double screening at title, abstract, and full paper levels is not a requirement for realist reviews, but we adopted this more rigorous approach as this review is part of DB's PhD. Any disagreement between reviewers over the eligibility of particular studies will be resolved through discussion with a third reviewer. Reasons for exclusion will be documented.

Data extraction and synthesis

A standardised, pre-piloted form will be used to extract data from the included studies for assessment of study quality and evidence synthesis. Extracted information will be considered in terms of 'context, mechanism, and outcome' and will include study setting; study population, participant demographics and baseline characteristics; details of the intervention and control conditions (if appropriate); study methodology; recruitment and study completion rates; outcomes and times of measurement; indicators of acceptability to users; any suggestion by the authors of mechanisms of action of the chosen intervention strategies; and information for assessment of the risk of bias. Two review authors will extract data

367

Blane *et al. Systematic Reviews* (2015) 4:61   Page 6 of 8

independently, and any discrepancies will be identified and resolved through discussion (with a third author where necessary).

In this review, we have adopted an approach similar to that taken by Jagosh and colleagues [36], of first searching for studies relating to interventions in this field, then developing initial programme theory, and then, after immersion in the data, reviewing the goodness of fit with pre-existing formal theory. A three-stage process of analysis will be followed.

In the first stage of analysis for each included study, a CMO configuration will be identified, describing how contextual factors interact with mechanisms to produce outcomes. Outcomes will include final desired outcomes, such as identification of obesity, recording of BMI, and referral to a weight management service, but also more proximal outcomes, such as markers of practitioner behaviour change (for example change in measures of knowledge or attitude) or system-level outcomes (for example improved communication between weight management service and practitioners) that make the final desired outcomes more probable. There are likely to be long implementation chains in any complex intervention, with each link in the chain having its own CMO configuration. Studies will be grouped together into those with similar intervention strategies, such that an initial programme theory or theories can be articulated.

The second stage of analysis will involve exploring patterns within these CMO configurations. Mechanisms will be compared across different contexts to assess if they are consistent in producing similar outcomes. In this way, statements of what works, for whom and in what circumstances (so-called demi-regularities) can be formulated.

The final stage of analysis will involve configuring these demi-regularities into a coherent and plausible 'refined' programme theory, drawing on the formal theory previously identified. It is anticipated that, through the process of increasing familiarity with the data, a shortlist of the most apposite theories from the initial scoping search will be determined and the empirical data used to test and refine the 'best fit' theory. It is hoped that an explanatory programme theory (or theories) encompassing individual, interpersonal, and institutional/systems-level components will be produced.

It is likely that, in some cases, study authors will be contacted to obtain further information on some aspects of their study. For example, contextual and implementation factors are often poorly described in journal articles due in part to word limits.

Quality appraisal

In realist synthesis, studies are assessed based on two criteria: relevance - whether they contribute to theory building and/or testing and rigour - whether the methods used to generate the relevant data are credible and trustworthy. We will, however, also assess the quality of the included studies to develop an understanding on the quality and rigour of the evidence underpinning our theory development. For qualitative studies, we will use Popay *et al.* [49]; for other study types, we will use CASP checklists. Studies will not, however, be routinely excluded on the basis of quality appraisal.

Reporting and dissemination of findings

In addition to producing a report for the funders of this review, a paper will be submitted to a leading journal in this field. The RAMESES reporting standards will be followed. Furthermore, findings will be disseminated through consultations with stakeholders. The lead researcher (DB) is already in communication with key stakeholders within the local health board and the regional weight management service. Should the findings of the review warrant a change in practice, a one-page summary report will be prepared and sent to lead clinicians and healthcare professionals in the National Health Service in Scotland.

Ethical issues

Ethical approval for stakeholder interviews was obtained from the University of Glasgow College of Medical, Veterinary and Life Sciences Ethics Committee [*Project No:* 200130121]. The study protocol has been registered with PROSPERO, the international prospective register of systematic reviews: CRD42014009391.

Discussion
Limitations

This realist review has a number of limitations. Firstly, as has been widely reported in other realist reviews, many study authors do not describe contextual factors in detail or discuss the mechanisms that explain their study outcomes. This will be addressed by contacting authors for clarification and by asking for any related reports that may provide additional contextual information. A further limitation is the risk of selective bias by searching the literature for relevant interventions in the first instance and then developing programme theory and applying formal theoretical frameworks thereafter. This was a decision made in a transparent manner from the outset, due to uncertainty around the number and heterogeneity of studies in this area.

Summary

Obesity is widely regarded as one of the most significant public health challenges of our time. Recent policy suggests that primary care practitioners (that is GPs and practice nurses) could do more in the identification and

referral of adults with obesity. This review of previous interventions in this area uses a realist synthesis methodology to develop and test the programme theory of these interventions, through exploration of context-mechanism-outcome configurations of successful (and unsuccessful) interventions. This protocol has outlined key features of realist synthesis, including the use of stakeholder interviews, identifying candidate theories, and the iterative nature of searching. The process of data extraction, quality appraisal, and analysis is also described. Stakeholders will be consulted again as the review progresses to ensure the findings resonate with their experience.

Additional files

> **Additional file 1: Stakeholder interview topic guide.** This file contains the theory-driven topic guide used for the stakeholder interviews.
>
> **Additional file 2: Search strategy.** This file describes the initial search strategy undertaken on six databases.

Abbreviations

BMI: body mass index; CASP: Critical Appraisal Skills Programme; CMO: context-mechanism-outcome; GMS: general medical services; GP: general practitioner; PARiHS: Promoting Action on Research implementation in Health Services; PN: practice nurse; QOF: Quality and Outcomes Framework; RAMESES: Realist and Meta-narrative Evidence Syntheses - Evolving Standards; RCT: randomised controlled trial; RS: realist synthesis; SR: systematic review.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

DB prepared this protocol as part of his PhD (PhD in General Practice and Primary Care, University of Glasgow). SM, DM and COD supervised the development of the protocol and critically reviewed the text. All authors read and approved the final manuscript.

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Appendix 2: Published paper from Phase 1 interviews

RESEARCH ARTICLE

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CrossMark

The role of primary care in adult weight management: qualitative interviews with key stakeholders in weight management services

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Abstract

Background: Primary care has a key role to play in the prevention and management of obesity, but there remain barriers to engagement in weight management by primary care practitioners. The aim of this study was to explore the views of key stakeholders in adult weight management services on the role of primary care in adult weight management.

Methods: Qualitative study involving semi-structured interviews with nine senior dietitians involved in NHS weight management from seven Scottish health boards. Transcripts were analysed using an inductive thematic approach.

Results: A range of tensions were apparent within three key themes: weight management service issues, the role of primary care, and communication with primary care. For weight management services, these tensions were around funding, the management model of obesity, and how to configure access to services. For primary care, they were around *what* primary care should be doing, *who* should be doing it, and *where* this activity should fit within wider weight management policy. With regard to communication between weight management services and primary care, there were tensions related to the *approach* taken (locally adapted versus centralised), the *message* being communicated (weight loss versus wellbeing), and the *response* from practitioners (engagement versus resistance).

Conclusions: Primary care can do more to support adult weight management, but this requires better engagement and communication with weight management services, to overcome the tensions highlighted in this study. This, in turn, requires more secure, sustained funding. The example of smoking cessation in the UK, where there is a network of well-resourced NHS Stop Smoking Services, accessible via different means, could be a model to follow.

Keywords: Obesity, Primary care, Health services, Weight management, Qualitative

Background

Current United Kingdom (UK) guidelines on obesity emphasise a key role for primary care, particularly in the identification of individuals with obesity and appropriate signposting or referral to weight management services. [1, 2]. The strengths of primary care – population coverage, contact, and continuity [3] – support this role in theory, but there is a considerable gap between policy rhetoric ("*every healthcare contact is a health improvement opportunity*" [4])

and the reality in practice. Obesity remains under-treated in primary care: few patients are referred to external sources of support, where they exist, and there are wide variations in referral rates and attendance following referral [5, 6].

Previous research has explored the barriers to engagement with weight management from the perspective of primary care practitioners (i.e. general practitioners (GPs) and practice nurses). This identified: lack of time in the consultation [7]; lack of knowledge and lack of confidence in discussing weight [8]; perceptions of poor outcomes of interventions [8]; fear of causing offence [9]; and a belief that individuals are responsible for obesity and it's not a medical problem [10]. There has,

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however, been a paucity of research exploring the views of those senior professionals – usually dietitians by background – involved in the strategic planning and delivery of adult weight management services [11]. In particular, understanding their views on the role of primary care and how they have engaged with primary care practitioners may help us to improve communication and referrals between services, and ultimately improve adult weight management.

The recent BWeL study showed that a brief intervention by GPs, offering referral to a local weight management service, was both acceptable and effective [12]. The authors argued that if National Health Service (NHS) weight management services were resourced to the same extent as smoking cessation services, then this would increase the impact that primary care can have on population obesity levels [13]. The 'change fatigue' that referring practitioners experience when services are constantly changing would be less of an issue [14], and access to weight management services would improve.

The NHS in Scotland is publicly funded (largely through taxation) and there are 14 regional NHS Health Boards that are responsible for the delivery of all frontline healthcare services, including adult weight management. In theory, NHS weight management services in Scotland are based around a comprehensive tiered approach, with Tier 1 representing community-based interventions such as walking groups or cooking classes, Tier 2 lifestyle interventions delivered in the community, Tier 3 specialist multi-disciplinary services (e.g. including physiotherapy and psychology) and Tier 4 bariatric surgery [15].

In practice, however, provision of weight management services is patchy and highly variable. A recent national survey of weight management provision in the 11 NHS health boards of mainland Scotland identified wide variation in the provision and access to services; only four health boards offered services for those with a body mass index (BMI) 25-30 kg/m^2 and six health boards did not have both Tier 2 and Tier 3 services [16]. Some of the smaller health boards, such as the Orkney and Shetland Islands, do not have their own standalone weight management services, instead referring patients to one of the larger health boards. There is also variation in referral pathways to Tier 2 and 3 services, with some accepting self-referrals and others requiring GP referral. Tier 2 and 3 services are held in different health board locations across Scotland, including hospitals and health centres. This suggests a fluidity to the range of services and models available nationally which then have to interact with primary care.

The aim of this paper was to explore the views of key stakeholders involved in the planning and delivery of adult weight management services on the role of primary care in adult weight management and their experience of engaging with GPs and practice nurses.

Methods

A qualitative approach was used, with semi-structured interviews chosen as the best approach for exploring the views and experiences of a purposive sample of stakeholders. Ethics approval was obtained through the University of Glasgow MVLS ethics committee (Project No: 200130121). An approved consent form was signed by each participant at the start of each interview after providing the opportunity to ask questions or, in the case of telephone interviews, was emailed or posted to the research team prior to the interview.

Recruitment

Recruitment was by email to the service leads for adult weight management in all 14 health boards in Scotland, explaining the nature and purpose of the research. These individuals were targeted as they were assumed to have the necessary knowledge about the strategic planning and delivery of these services. The stakeholders that responded were from 7 of the 8 largest health boards, representing approximately 80% of the Scottish population. No attempts were made to contact non-respondents.

Data collection

Seven interviews were conducted with nine interviewees between May and September 2014. Most interviews were conducted face-to-face, but three were conducted over the telephone and two conducted with two participants in a small group interview. The face-to-face interviews were held at venues arranged by the interviewees themselves, usually their place of work. DB, an academic general practitioner with previous experience of and training in qualitative research, conducted all interviews as part of his PhD research. SM, an experienced qualitative researcher with a background in sociology, was also present for the first three interviews. SM and DB discussed initial reflections after each interview, informing small changes to the interview topic guide (see Additional file 1). The topic guide included questions about the interviewee's views on the role of primary care in adult weight management and their experience of engagement with primary care. It was influenced by Pawson's idea of the 'realist interview' [17], as the interviews also informed a separate realist synthesis study [18]. Interviews lasted between 49 and 82 min, average 63.

Data analysis

Interviews were audio-recorded and transcribed verbatim. The transcripts were then thoroughly checked for inconsistencies against the recordings and anonymised. QSR International NVIVO 10 qualitative data analysis software [19] was used to aid data handling and analysis.

The analysis process involved three steps, as described by Ziebland and McPherson [20]. The first step was

coding. Initially, two transcripts were read closely and coded independently by DB, SM and COD. Coding clinics with DB, SM and COD were then held to review the codes for each of these transcripts and to agree on a coding framework. Subsequent transcripts were coded by DB according to this framework, with a further coding clinic to check the consistency of this coding.

The second step involved summarising the codes using the 'OSOP' ('one sheet of paper') method [20]. All the data contained within each main code was gathered in a report, reviewed and all the themes identified summarised on the eponymous sheet(s) of paper. There was similarity and repetition of themes across the nine interviewees, but it is hard to say if data saturation had occurred. The third step aimed to draw out 'higher level' explanations or links between the issues in an inductive thematic analysis [21].. These steps were led by DB in discussion with SM and COD.

Results

Interviewee characteristics

The nine interviewees were all experienced dietitians with senior positions related to weight management within their respective health boards. Most were either service leads, or were involved in policy, strategy, and service development for Tier 2 and/or 3 services. Table 1 summarises stakeholder characteristics.

Themes

There were three overarching themes that reflect the relationship between primary care and adult weight management services – issues related to weight management services themselves, the role of primary care in adult weight management, and communication with primary care. Within each of these, there were three sub-themes,

framed as tensions that were evident in the data. The key themes are summarised in Table 2.

Weight management service issues

As noted, the interviewees worked in different health boards with differing approaches to adult weight management. One feature that was, however, consistent across most of the services was the struggle they had to secure funding. The tension between mainstream versus insecure funding is evident in the following quotes.

> "We know for a fact that we will not have any physio input without funding, we won't have any psychological input without funding and even simple things like venues and resources we are fairly limited for that as well." (F2)

> "My effort to get an NHS board to invest in adult weight management was, em, unsuccessful let's say." (F3)

A number of interviewees gave their views on why it was so hard to secure funding, which can be summed up as a lack of a coherent – and powerful – voice lobbying for resources.

> "I find it all quite frustrating to be honest because I think it's going back to… the fact it needs a very sort of cohesive group with somebody who has clout at the top and is able to get the argument for more resources to be put into weight management." (F4)

The second tension related to weight management services was between applying a medical or social model to the management of obesity. On the one hand, interviewees recognised that the scale of overweight and obesity (affecting two-thirds of the adult population) is

Table 1 Interviewee characteristics

Interviewee code	Health Board Region	Description of Health Board Region	Adult weight management tiers and referral pathways
M1[a] F1	A	Large[b], Urban	2 – GP referral 3 – GP referral
F2	B	Medium, Mixed Rural/Urban	2 – Self-referral 3 – No service
F3	C	Medium, Mixed Rural/Urban	2 – Mostly self-referral 3 – GP referral
F4	D	Medium, mostly Rural	2 – Mostly self-referral 3 – Pilot service (both)
F5	E	Large, Urban	2 – GP or secondary care referral 3 – GP or secondary care referral
M2 F6	F	Large, Urban	2 – Self-referral 3 – GP referral
F7	G	Medium, mostly Rural	2 – Dietetics or self-referral 3 – GP or secondary care referral

[a] M = male; F = female
[b] Large is >600,000 population; Medium is 300-600,000 (mid-2014 estimates)

Table 2 Results of thematic analysis

Main theme	Sub-theme
Weight management service issues	*Mainstream* versus *Insecure funding* *Medical* versus *Social model* *Access* versus *Capacity*
Role of primary care	*Referral* versus *Signposting* *GP* versus *Practice nurse* *Practice* versus *Community level*
Communication with primary care	*Local* versus *Centralised models* *Weight loss* versus *Wellbeing messages* *Engagement* versus *Resistance*

such that wider population measures need to be taken, but on the other hand the approaches used by the services were often individually-focussed, treating obesity as a chronic disease.

One health board, however, adopted a different model of weight management, following the principles of the *Health at every size (HAES)* movement [22]. This approach focusses on wellbeing rather than weight loss per se.

"In [health board G] we take a particular approach to weight management which isn't about weight loss. In fact, we particularly, we try to get people to stop focussing on weight loss as a goal and look at health gain. So what is it about, the question we ask people, we say to people, 'what is it about weight loss that's important to you? And let's work on that.' So it might be that 'I want to play with my grandchildren', 'I want to feel better about myself', 'I want to get my diabetes under control', 'I want to develop a better relationship with food', you know. So that's what we focus on." (F7)

This represents a significant change of approach compared to other health boards in Scotland. It is the closest to a social model of obesity, with a focus on supporting patients *in their context* and challenging stigmatising societal attitudes to obesity.

The third tension was between a desire to make the service available to as many people as possible (i.e. widening access) and recognition that there was not enough capacity to support the potential numbers of eligible patients.

"When we set it up there was a lot of people around the table saying 'we don't want to promote this heavily because we think we are going to be inundated.' We've not been..." (F2)

"We hadn't actually gone out to GPs and said, 'send us all your really overweight people', because we were worried that would be overwhelming." (F6)

Several approaches to the access versus capacity dilemma were described. The most common approach was the use of group sessions rather than one-to-one sessions for weight management classes.

"What has taken a lot of time to get engagement from our own, our own colleagues to do, is to apply a group approach because previous to that it was a one-to-one approach. They were able to show if nothing else from that is that on the basis of that one-to-one approach all they could address is 0.5% of need. A group approach we are now up to expecting to be able to address 2% of the need." (F3)

Another approach was to work with local authorities or businesses to make use of their resources.

"In [health board F] we decided what we were going to do was we were going to upskill leisure colleagues, to deliver on our behalf." (F6)

There were further considerations related to improving access to weight management services, which can be thought of in terms of both structure (e.g. location and timing) and process (e.g. self-referral or GP referral). The latter is explored in the next section.

Role of primary care

Stakeholders expressed tensions about the role of primary care in adult weight management in three areas: *what* primary care should be doing, *who* should be doing it, and *where* this activity should fit in with wider weight management policy.

There was general agreement that primary care was not well placed to be *delivering* weight management interventions wholesale (i.e. structured courses of dietary advice, physical activity, psychological support, etc.), but that its focus should be on linking with weight management services. The first tension, therefore, was between signposting of patients to services versus formal referral. These appear very similar, both involving linking patients with a service, but for the interviewees they reflected differing attitudes to responsibility and risk. For those that advocated signposting, responsibility rests very much with the patient; once they have been told about a service and how to access it, it is up to them to make contact. Signposting, it is argued, encourages patient motivation more than the passive approach of *being referred*.

"I do think it should be, the onus should be on the person to think 'right okay, that's for me and I'm going to phone up about it and book myself onto a place' rather than involving more paperwork, etc., etc., of a sort of formal referral going in." (F4)

In contrast, those who advocated formal referral believed the GP 'gatekeeper' role was important, selecting those patients who may be most 'appropriate' for a weight management intervention.

> "The model of care that we are providing in Tier two is, the gateway is the GP, so the GP will have identified with the patient and assessed their willingness, readiness to change." (F1)

Furthermore, they highlighted the role of the GP in managing risk related to the referral, as this quote shows:

> "So we got agreement from all the clinical leads that this question could be put on [electronic referral system] which runs through, the benefits of this – undertaking physical activity – outweigh the risks involved and there's a big exclusion list and we got sign up that that is now on [electronic referral system], so that gives us assurance 'well the GP has done that risk assessment'… so the GP is saying yes… so that gives us, well we can move ahead with our physical activity so I think that's really important." (M1)

Thus, some interviewees saw a clear role for GPs in risk assessment prior to referral. Others, though, felt that practice nurses were in a better position to engage with patients about weight management. The second tension, therefore, focussed on role remit and responsibility of GPs versus practice nurses.

> "I think practice nurses think they have got more of a role in weight management in the talking to people and supporting people with their weight. I think in a traditional model a lot of the time might be that people come to see the practice nurse to get weighed because they know they have got a good set of scales." (F7)

> "I think it should be a routine part of care that there is a set of scales that you go on if you are coming to be treated for your blood pressure and you're overweight, or your diabetes and you are overweight. Or your asthma and you are overweight, you know, it's, practice nurses are in that routine and it's part of their care but I'm not sure if the GP would always do that." (F1)

The third tension was between viewing primary care as a 'hub' of weight management activity or more of a peripheral player. It also relates to the extent to which general practices should be engaging with other community activities and services related to weight management,

which ties in with the earlier tension between a medical or a social model of weight management.

> "…part of this coming through that not to medicalise their weight problem too that there are other things that the patient should perhaps be given, steered into and, you know, I suppose that's part of what our health and social care partnerships are about, trying to encourage more access to physical activity, healthier eating… and I think more and more general practitioners are trying to be, well part of the process and philosophy is to try and encourage those communities in the health centre so that there is more and more information available there that the patient can be, not directed, but you know, give them a steer towards and I think there is more of that going on now." (F1)

The above quote reflects this tension and suggests that practices should be looking beyond their responsibilities to individual patients and be thinking more about their place within communities.

Communication with primary care

Interviewees shared their experiences of working with primary care and how they have communicated with GPs and practice nurses. Again a series of tensions emerged. The first related to the *approach* taken to communication with primary care, between locally adapted versus more centralised models. The local models used more personal approaches to communication, such as face-to-face meetings with practitioners.

> "We are starting to do, like, raising awareness sessions and just talking to some of the practice nurses in [health board B], you know they are quite interested in getting involved…" (F2)

In contrast, the more centralised models used more impersonal approaches such as various forms of electronic communication – email, website, intranet, or electronic newsletter. Of course, it is possible to use electronic communication in a personalised way – for instance, by providing practice-specific feedback on referrals by email – but this did not happen very often. Most services used a mixed model, with both central (impersonal) and local (personal) approaches.

> "Each time the service moved out to a different [area] every practice was emailed and lettered with the referrals, information over here, and we also invited them to come here, or asked them if they'd like someone to come to the practice, and we've been to many practices." (F5)

There was a feeling that in those areas where there was a previous history of working closely with practices (e.g. with a related service such as Exercise on Referral), the services benefitted from this improved relationship.

> "What's interesting is that where there has been long term sort of work between the local authorities and the GPs and practice nurses in the area they are getting much better referrals coming through. So where there is already a partnership, a relationship built up, they are getting, you know, they are getting frequent referrals coming through. In the areas where that's not as well established then you can kind of see the difference." (F2)

Method of communication was a key consideration. The more personal forms of communication were preferred by most, as the following quotes demonstrate.

> "It's very difficult sometimes to have a relationship with people if you have never actually met them, or the first time you are on the phone is to say 'no I'm sorry this patient doesn't meet our criteria for the weight management service'." (F1)

> "I still I think a lot of it is down to the communication aspect again and so I think that doing more face to face communication with people and raising awareness, so whether it's, you know, attending whatever kind of meetings so that you can have more of a conversation about it would be helpful from that point of view because I think, I do think, you know, email, etc. has its place and it is very useful but I don't think anything, you know, kind of compares to face to face" (F4)

The second tension related to the *message* being communicated to primary care practitioners by the service, between stressing the importance of weight loss versus more holistic wellbeing messages. This, in turn, is likely to affect both how practitioners 'sell' the service to patients and patients' expectations of the service. This was a tension felt most acutely by the service in health board G, which had adopted a *Health at every size* approach.

> "We are now in the position to go and have a few more discussions with GPs because really what we don't want is - because of the approach we take - we don't want GPs to tell people to lose weight all the time." (F7)

A key aspect of this tension is about shaping GP expectations of the service, by providing them with information about what is considered a good result. For the majority of services where weight loss was the ultimate goal, it was important to make referring practitioners aware of the realistic weight loss outcomes from the service.

> "…in all our discharges we put on, 'five kilogram weight [loss]', and we reference SIGN [national guidelines], and 'this is considered successful and a clinical improvement.' And, we put it in every bit of our literature that we can, because that is an education to our referrers." (F5)

Finally, there was an evident tension around the GP *responses* to attempts by weight management services at engagement with primary care. When asked about previous contact with primary care, the following exchange between two interviewees in health board A gives a sense of the challenge:

> "I think it's so variable. You know I think some of our lead GPs have been fantastic at opening the gates for us." (F1)

> "But then you get other GPs who say 'well I'm not doing weight management until you give me money', so it's 'give me money'." (M1)

The second quote above refers to the Quality and Outcome Framework (QOF), which was a pay-for-performance system that was used in general practice in Scotland at the time of the interviews, but has since been replaced.

Responses to more proactive methods of GP engagement by different weight management services have also been mixed. One respondent described the challenge of getting a GP representative on a weight management group. Others described poor turnout by GPs at awareness-raising or training events that had been organised. The main explanation offered by interviewees for the resistance to primary care engagement with weight management is that GPs do not see it as part of their role.

> "Many many people in primary care… didn't see weight management as their business." (F5)

Discussion
Main findings
This study highlights a number of challenges that health authorities face when planning and managing adult weight management services. There are challenges for the weight management services themselves, such as insecurity of funding, due in part to a lack of a powerful lobbying voice for more resources. These funding issues can, in turn, result in changes to available services,

making it difficult for primary care practitioners to keep abreast of what is available and fostering a degree of apathy towards these services – what has been described as 'change fatigue' [14].

Other challenges relate to tensions within general practice – notably around the extent to which obesity is considered a medical versus a social problem, but also related to role responsibilities of GPs versus practice nurses. These tensions are compounded by sub-optimal communication between adult weight management services and primary care. There were mixed messages at times (e.g. weight loss versus wellbeing) and inconsistent attempts at building relationships between the services. This may reflect the recognised challenges of dealing with a condition such as obesity, combining an individual, often medicalised approach within primary care consultations with the wider considerations of providing a more holistic, community-based service [23, 24].

What is already known

Obesity is widely recognised as a major public health issue, but has not been accorded the same level of priority in terms of funding as other public health issues related to health behaviours, such as smoking cessation [25, 26]. Primary care is well placed to support adults with obesity [12], yet there are a number of barriers to engagement with weight management by primary care practitioners, including lack of time in the consultation [7], lack of knowledge and confidence in discussing weight [8], perceptions of poor outcomes of interventions [8], fear of causing offence [9], and a belief that obesity is not a medical problem [10]. Most of the research on barriers to engagement with weight management has only involved GPs and practice nurses [7–10, 27]. Few studies have explored the views of those involved in planning and providing weight management services about the interface with primary care.

Researchers from the Counterweight Programme conducted a focus group study with 7 weight management advisers, presented alongside qualitative interviews with patients and practitioners [28]. In keeping with our findings, they reported that engagement with primary care staff was influenced not just by practitioners' beliefs and attitudes and practice-level factors, but also by the way in which the service was initiated and implemented.

What this study adds

This is the first qualitative interview study that we are aware of to explore the views of key stakeholders involved in the planning and delivery of adult weight management services about the role of primary care in adult weight management. The findings help us understand the marked variation in engagement with adult weight management in primary care. In particular, communication with primary care was seen as very important, with those services that had a previous history of working closely with practices benefitting from this improved relationship. This is a key message; it is therefore imperative that weight management services are supported in the more time consuming, but ultimately effective, role of developing local relationships with potential referrers to their service. This is especially important if the over-riding ethos of the service is one of wellbeing rather than weight loss. However, even when weight loss is important, time and effort is required to engage with practitioners and highlight what are realistic expectations of the service.

Finally, weight management services themselves need to secure mainstream funding in order to develop long-term, sustainable strategies of engagement and service delivery. Our results suggest that too much time is spent fire-fighting the implications of short-term funding rather than building relationships with practitioners who can help engage with and refer those who would most benefit from the services on offer.

Limitations of this study

The main limitations of this qualitative study are that it is a small sample, which was recruited pragmatically, so findings may be biased by self-selection. Our recruitment strategy was to ask for service leads involved in the strategic delivery of adult weight management services to volunteer to be interviewed; 7 of the 8 largest health boards in Scotland took part and, in all cases, the service lead was a dietician. While it is possible that other health professionals may be involved at a similar level of service delivery and, arguably, would have brought a different perspective to our study, it does seem to indicate a clear role for dieticians in the strategic delivery of such services. Furthermore, participant validation was not obtained following analysis due to limited time and resources; this would have strengthened the reliability and validity of the findings [29]. Finally, it is important to note that GPs are not involved in commissioning adult weight management services in Scotland (there is no so-called 'purchaser-provider split' [30]), so relationships between frontline clinicians and weight management service providers may be different in other parts of the UK and elsewhere.

Conclusions

Responses to the public health problem of obesity need to be multi-sectoral, but if primary care is to fulfil its potential in this area –to increase the identification and referral of appropriate patients to weight management services [31] – there needs to be better engagement by weight management services with primary care. Furthermore, the services need more secure, sustained funding. This will require more effective lobbying for resources,

377

Blane *et al. BMC Health Services Research* (2017) 17:764

Page 8 of 9

though it is not clear where this pressure will come from. One vision for a way forward has been to call for weight management to follow the example of smoking cessation in the UK, where there is a network of well-resourced NHS Stop Smoking Services, accessible via different means and in different locations [13]. The present study has, however, highlighted a number of tensions to be negotiated for this vision to become a reality.

Additional file

Additional file 1: Theory-Driven Stakeholder Interviews Topic Guide. (DOCX 20 kb)

Abbreviations
BMI: Body mass index; GP: General practitioner; HAES: Health at every size; NHS: National Health Service; OSOP: 'One sheet of paper'; UK: United Kingdom

Availability of data and materials
The datasets generated during and/or analysed during the current study are not publicly available due to on-going analysis of the datasets but are available from the corresponding author on reasonable request.

Authors' contributions
DB, SM, DM and COD were responsible for the initial study concept and design. DB carried out the data collection and drafted the initial manuscript with input from all authors. DB, SM and COD conducted the thematic analysis. DB, SM, DM and COD read and approved the final manuscript.

Ethics approval and consent to participate
Ethics approval was obtained through the University of Glasgow MVLS ethics committee (Project No: 200130121). An approved consent form was signed by each participant at the start of each interview after providing the opportunity to ask questions or, in the case of telephone interviews, was emailed or posted to the research team prior to the interview.

Consent for publication
Not applicable.

Competing interests
The authors declare that they have no competing interests.

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Appendix 3: Published paper from Phase 3 GP referral analysis

Open Access   **Research**

BMJ Open Patient and practice characteristics predicting attendance and completion at a specialist weight management service in the UK: a cross-sectional study

David N Blane,[1] Philip McLoone,[2] David Morrison,[2] Sara Macdonald,[1] Catherine A O'Donnell[1]

ABSTRACT

Objective To determine the association between patient and referring practice characteristics and attendance and completion at a specialist health service weight management service (WMS).

Design Cross-sectional study.

Setting Regional specialist WMS located in the West of Scotland.

Participants 9677 adults with obesity referred between 2012 and 2014; 3250 attending service and 2252 completing.

Primary and secondary outcome measures Primary outcome measure was attendance at the WMS; secondary outcome was completion, defined as attending four or more sessions.

Analysis Multilevel binary logistic regression models constructed to determine the association between patient and practice characteristics and attendance and completion.

Results Approximately one-third of the 9677 obese adults referred attended at least one session (n=3250, 33.6%); only 2252 (23%) completed by attending four or more sessions. Practice referrals ranged from 1 to 257. Patient-level characteristics were strongest predictors of attendance; odds of attendance increased with age (OR 4.14, 95% CI 3.27 to 5.26 for adults aged 65+ compared with those aged 18–24), body mass index (BMI) category (OR 1.83, 95% CI 1.56 to 2.15 for BMI 45+ compared with BMI 30–35) and increasing affluence (OR 1.96, 95% CI 1.17 to 3.28). Practice-level characteristics most strongly associated with attendance were being a non-training practice, having a larger list size and not being located in the most deprived areas.

Conclusions There was wide variation in referral rates across general practice, suggesting that there is still much to do to improve engagement with weight management by primary care practitioners. The high attrition rate from referral to attendance and from attendance to completion suggests ongoing barriers for patients, particularly those from the most socioeconomically deprived areas. Patient and practice-level characteristics can help us understand the observed variation in attendance at specialist WMS following general practitioner (GP) referral and the underlying explanations for these differences merit further investigation.

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Strengths and limitations of this study

► Explores the predictors of attendance and completion at adult weight management services (WMS) taking account of both individual patient factors and referring practice characteristics.
► Data were obtained from a large urban WMS between 2012 and 2014, with data on referrals, attendances and completion.
► Patient-level data linked to the characteristics of the 262 general practices in the Health Board area who make referrals to the service.
► There were no available data on weight loss outcomes in this study population, which is a limitation.

INTRODUCTION

Obesity is a major global public health concern with considerable health and economic consequences.[1–3] International guidelines recommend that practitioners opportunistically identify overweight and obese patients, with the aim of encouraging weight loss.[4 5] Much of this work takes place in primary care.[6] However, obesity remains undertreated in primary care,[7 8] and patient identification is only the first part of the journey. Current UK policy recommends a comprehensive tiered approach to weight management (box),[5 9] but there is marked variation in referrals to weight management services (WMS) from primary care, and a high attrition rate between referral and attendance.[10] The reasons for this are unclear. One factor is patient characteristics, such as socioeconomic status, with more affluent patients more likely to be referred.[11] Previous research on referral variation has suggested that only 40% of variation can be explained by patient characteristics.[12] Practitioner factors such as views of risk and clinical experience, as well as system factors, such as distance to

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> **Box**   **Tiered approach to weight management**
>
> Tier 1: Population wide health improvement work (eg, prehealthcare lifestyle advice, community pharmacies and commercial weight management).
> Tier 2: Lifestyle interventions delivered in the community (eg, healthy eating, exercise referral and community dietetic service).
> Tier 3: Specialist weight management services.
> Tier 4: Bariatric surgery.

services, also explain some of the variation observed in referral rates to secondary care.[12][13] These factors may also contribute to an individual's likeliness to both attend a service and complete the course of treatment on offer—each of these are important issues in weight management, where patients are being asked to make significant changes to their lifestyle and behaviour.

Several previous studies have explored individual practitioner views on referral to WMS.[14–16] Issues raised included patient factors such as motivation and expectations, and practitioner factors such as previous experience and pessimism. However, there are no quantitative studies that have explored the predictors of attendance at WMS taking account of both individual factors and practice characteristics. The aim of this study, therefore, was to use individual and practice-level data to explore predictors of attendance and completion at a specialist WMS (tier 3), using multilevel binary logistic regression models.

METHODS
Setting
The Glasgow and Clyde Weight Management Service (GCWMS) is the most well-established, well-funded and well-evaluated National Health Service (NHS)-based non-commercial service in Scotland.[10][17][18] It is a multicomponent weight management programme, which includes structured lifestyle advice, underpinned by psychological approaches, and is available to patients aged 18 years and over with complex obesity (defined as body mass index (BMI) of ≥ 30 kg/m^2 with obesity-related comorbidities or BMI of ≥ 35 kg/m^2 alone).[10] For those patients with obesity that do not meet the eligibility criteria (ie, BMI 30–35 kg/m^2 without weight-related comorbidities), general practitioners (GPs) and practice nurses can sign-post patients to healthy eating classes or physical activity resources, where available.

Eligible patients are referred electronically by their GP or practice nurse (a small proportion come from secondary care referrals) and are required to 'opt in' to the service within 2 weeks of referral. They are then seen (usually within 1 or 2 months) by a dietitian at an initial assessment, who helps to direct them to an appropriate group or professional. Some patients (eg, those with possible binge eating disorder) may receive further input from a clinical psychologist or physiotherapist. Most

patients are seen in groups of no more than 16 people, led by a NHS dietitian, at a number of venues throughout Glasgow and Clyde. Phase 1 of the intervention includes nine sessions (90 min each) delivered fortnightly over a 16-week period. Further treatment options, including prescribed low-calorie diet, pharmacotherapy (orlistat) and bariatric surgery, are only available after completion of phase 1 of the programme. A previous paper has described the service and its weight loss outcomes in more detail.[10]

It receives the majority of its referrals from the 262 general practices in the NHS Greater Glasgow and Clyde (GGC) health board area, with a small proportion (<2% of total referrals) coming from practices in other health boards and directly from hospital specialities.

Study design and population
An observational cross-sectional study design was applied using data from GP electronic referrals to GCWMS. The dataset was received from GCWMS in February 2016 and included data on the earliest referral per patient from 2012 to 2014 in order to avoid patients appearing more than once. Data cleaning ensured that the included cases were adults (aged 18 years and over), had a diagnosis of obesity (BMI ≥ 30 kg/m^2) and had complete data on sex, height and weight. One hundred and forty-six cases (1.5%) were excluded in this process. The final dataset comprised 9677 adults with obesity referred from 262 general practices in GGC. The small number of referrals (<2% of total referrals) from outside GGC and from specialist services were excluded prior to receiving the data.

Study variables
Referral, attendance and 'completion'
The main outcome of interest was attendance at weight management, defined as attending at least one group session, after the initial assessment. A further outcome was 'completion', defined as attendance at four or more sessions. This was based on a definition used in a previous published study of the GCWMS.[10]

Patient characteristics
Patient characteristics included sex, age (grouped into four categories: 18–24 years, 25–44 years, 45–64 years, 65+ years), socioeconomic status (based on the Scottish Index of Multiple Deprivation 2012 quintiles[19]) and BMI (grouped into four categories: 30–35 kg/m^2, >35–40 kg/m^2, >40–45 kg/m^2 and 45+ kg/m^2). Data on comorbidities of the referred patients were incomplete so were not included in the final analysis. There were no data on other variables that may have been of interest, such as ethnicity or smoking status.

Practice characteristics
Practice characteristics included GP training practice status, practice list size, distance from nearest WMS centre, achievement in the Quality and Outcome Framework

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(QOF) in the year April 2014–March 2015, practice deprivation status and referral rate to the GCWMS.

Data on training practice status were derived from the West Scotland GP training website.[20] Practice list size was taken from Information Services Division (ISD) Scotland[21] and divided into three groups: <4000, 4000–8000 and >8000. Distance from the nearest WMS centre was calculated using GPS mapping software using practice postcode and the postcodes of the 12 WMS satellite clinics that were in operation during the referral period. The three groupings for this variable were under 1 mile, 1–2 miles and over 2 miles. QOF achievement data were taken from the ISD website[22] and grouped into <95, 95–98, 99, 100 points (out of a possible 100 points). Practice deprivation status was based on the percentage of the practice population living in the most deprived 15% of postcodes and categorised as: <15%, 15%–40% and >40% of practice population. Referral rate to GCWMS was per 1000 practice population (≤5, 5–10 and >10).

Statistical analysis

Descriptive analysis of the study population examined how referral, attendance and completion varied by patient and practice characteristics. Multilevel binary logistic regression models were constructed in order to account for the clustering of patients within practices. Results are presented as univariable (crude) and multivariable (adjusted) ORs and 95% CIs (95% CI), with adjustment made for all patient and practice-level characteristics. Analysis was carried out using STATA-MP V.14.0.

Patient involvement

There was no patient involvement in this study.

RESULTS

Nine thousand six hundred and seventy-seven adults with obesity were referred to the regional specialist WMS from 262 practices in NHS GGC between January 2012 and December 2014. This is about 4% of the approximately 260 000 adults with obesity estimated to live in NHS GGC.[23]

Table 1 shows the individual-level characteristics of the total GGC population and of the study population (for those referred, attenders (attending at least one session) and 'completers' (attending four or more sessions)). The majority of those referred to the WMS were women, aged 45–64 years and from the most deprived population quintile. The mean age of those referred was 46.5 years (SD 14.3, range: 18–88); the mean BMI was 41.4 kg/m² (SD

Table 1 Individual characteristics of total GGC population, those referred, attenders and completers, n (%)

	GGC adult population N=924 727	Referrals N=9677	Attenders N=3250	Completers N=2252
Sex*				
Women	485 629 (52.5)	6870 (71.0)	2331 (71.7)	1607 (71.4)
Men	439 098 (47.5)	2807 (29.0)	919 (28.3)	645 (28.6)
Age groups (years)*				
18–24	118 069 (12.8)	694 (7.2)	118 (3.6)	66 (2.9)
25–44	313 970 (34.0)	3543 (36.6)	1006 (31.0)	657 (29.2)
45–64	305 659 (33.1)	4369 (45.1)	1652 (50.8)	1179 (52.4)
65+	187 029 (20.2)	1071 (11.1)	474 (14.6)	350 (15.5)
SIMD 2012 quintile†				
Q1-most deprived	331 977 (35.9)	4778 (49.4)	1388 (42.7)	922 (41.3)
Q2	163 677 (17.7)	1770 (18.3)	600 (18.5)	419 (18.7)
Q3	133 160 (14.4)	1254 (13.0)	481 (14.8)	339 (15.2)
Q4	122 064 (13.2)	970 (10.0)	368 (11.3)	265 (11.9)
Q5-most affluent	173 848 (18.8)	844 (8.7)	386 (11.9)	290 (13.0)
Missing	–	61 (0.6)	27 (0.8)	17 (0.8)
BMI category‡ (kg/m²)				
30–35	231 182 (25%)	1232 (12.7)	329 (10.1)	225 (10.0)
>35–40		3465 (35.8)	1152 (35.4)	764 (33.9)
>40–45	27 742 (3%)	2611 (27.0)	920 (28.3)	658 (29.2)
45+		2369 (24.5)	849 (26.1)	605 (26.9)

*National Records of Scotland Small Area Population Estimates mid-2014.[24]
†Based on estimates from NHS GGC Director of Public Health report 2015–2017.[25]
‡Based on estimates from Scottish Health Survey 2014.[23]
BMI, body mass index; GGC, Greater Glasgow and Clyde; NHS, National Health Service; SIMD, Scottish Index of Multiple Deprivation.

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Table 2 Practice characteristics for referrals, attenders and completers, n (%)

	GGC referring practices N=262	Referrals N=9677	Attenders N=3250	Completers N=2252
Training practice				
No	158 (60.3)	4920 (50.8)	1664 (51.1)	1123 (54.8)
Yes	80 (30.5)	4013 (41.4)	1310 (40.3)	926 (45.2)
Missing	24 (9.2)	752 (7.8)	280 (8.6)	203 (9.0)
List size				
<4000	110 (42.0)	2249 (23.2)	641 (19.7)	465 (20.6)
4000–8000	113 (43.1)	4633 (47.8)	1655 (50.9)	1130 (50.2)
8000+	39 (14.9)	2795 (28.9)	954 (29.3)	657 (29.2)
Distance from WMS				
Within 1 mile	130 (49.6)	5486 (56.6)	1784 (54.8)	1214 (53.9)
Between 1 and 2 miles	88 (33.6)	2738 (28.3)	919 (28.2)	654 (29.0)
2 miles or more	44 (16.8)	1453 (15.0)	547 (16.8)	384 (17.1)
QOF points				
<95	7 (2.7)	231 (2.4)	72 (2.2)	52 (2.3)
95–98	38 (14.5)	820 (8.5)	280 (8.6)	186 (8.3)
99	44 (16.8)	1597 (16.5)	533 (16.4)	373 (16.6)
100	110 (42.0)	4812 (49.7)	1611 (49.5)	1111 (49.3)
Missing	63 (24.0)	2225 (23.0)	758 (23.3)	530 (23.5)
Deprivation status (% of practice population defined as most deprived)				
<15	67 (25.6)	2068 (21.4)	795 (24.4)	581 (25.8)
15–40	100 (38.2)	4171 (43.1)	1506 (46.3)	1034 (45.9)
>40	95 (36.2)	3438 (35.5)	949 (29.2)	637 (28.3)
Referral rate per 1000 practice population				
10+	75 (28.6)	4178 (43.1)	1328 (40.8)	938 (41.7)
5–10	104 (39.7)	4553 (47.0)	1550 (47.6)	1062 (47.2)
<5	83 (31.7)	946 (9.8)	372 (11.4)	252 (11.2)

GGC, Greater Glasgow and Clyde; QOF, Quality and Outcome Framework; WMS, weight management service.

6.9, range: 30–97.3). Approximately one-third of those referred attended at least one session (n=3250, 33.6%); of attenders, 69.3% (n=2252) completed.

There was a similar picture for those attending the WMS and those attending four or more sessions ('completers'). Over 70% were women and over half were aged 45–64, with the mean age of those attending 49.8 years (SD 13.5, range: 18–84) and the mean age of 'completers' 50.6 years (13.2, range: 18–83). Over 40% were from the most deprived population quintile. The mean BMI of attenders was 42.0 kg/m^2 (SD 7.1, range: 30–97.3) and the mean BMI of 'completers' was 42.1 kg/m^2 (SD 7.2, range: 30–97.3).

Table 2 shows the distribution of patients by the characteristics of their referring practice, compared with all GGC practices. In GGC, less than one-third of practices were training practices (n=80, 30.5%). The average list size was 5009 patients (range from 1227 to 16 825). Roughly half (n=130, 49.6%) of all practices were within 1 mile of the nearest WMS clinic. The mean number of referrals per practice was 42 (range from 1 to 257), with a mean referral rate of 8.5 per 1000 population (range from 0.7 to 26.3).

Just over 40% of all patients were referred from training practices (n=4013, 41.4%) and a little under half were from medium-sized practices with list sizes between 4000 and 8000 patients (n=4633, 47.8%). Over half of patients (n=5486, 56.6%) were from referring practices within 1 mile of the nearest WMS clinic. Practices generally scored very highly on QOF, with 66.2% of patients being referred by a practice that achieved 99 or 100 points out of a possible 100. The characteristics of those attending or 'completing' were broadly similar to those initially referred.

Overall 34% of those referred actually attended the service, and 2252 (23%) completed by attending for four or more sessions. There were, however, particular groups within the referred population that were more likely to both attend and to complete (table 3). Those aged 65 years and over had a higher attendance rate (44.3%),

Table 3 Profile of service attenders and completers compared with those referred, by patient and practice characteristics, as a percentage of those referred, n (% of those referred)

	Referrals N=9677	Attendances N=3250	Completers N=2252
Patient characteristics			
Sex			
Women	6870	2331 (33.9)	1607 (23.4)
Men	2807	919 (32.7)	645 (23.0)
Age group (years)			
18–24	694	118 (17.0)	66 (9.5)
25–44	3543	1006 (28.4)	657 (18.5)
45–64	4369	1652 (37.8)	1179 (27.0)
65+	1071	474 (44.3)	350 (32.7)
SIMD 2012 quintile			
Q1-most deprived	4778	1388 (29.0)	922 (19.3)
Q2	1770	600 (33.9)	419 (23.7)
Q3	1254	481 (38.4)	339 (27.0)
Q4	970	368 (37.9)	265 (27.3)
Q5-most affluent	844	386 (45.7)	290 (34.4)
Missing	61	37	17
BMI category (kg/m^2)			
30–35	1232	329 (26.7)	225 (18.3)
>35–40	3465	1152 (33.2)	764 (22.0)
>40–45	2611	920 (35.2)	658 (25.2)
45+	2369	849 (35.8)	605 (25.5)
Practice characteristics			
Training practice			
No	4920	1664 (33.8)	1123 (22.8)
Yes	4013	1310 (32.6)	926 (23.1)
Missing	744	276	203
List size			
<4000	2249	641 (28.5)	465 (20.7)
4000–8000	4633	1655 (35.7)	1130 (24.4)
8000+	2795	954 (34.1)	657 (23.5)
Distance from WMS			
Within 1 mile	5486	1784 (32.5)	1214 (22.1)
Between 1 and 2 miles	2738	919 (33.6)	654 (23.9)
2 miles or more	1453	547 (37.6)	384 (26.4)
QOF points			
<95	231	72 (31.2)	52 (22.5)
95–98	820	280 (34.1)	186 (22.7)
99	1597	533 (33.4)	373 (23.4)
100	4812	1611 (33.5)	1111 (23.1)
Missing	2217	754	530
Deprivation status (% of practice population defined as most deprived)			
<15	2068	795 (38.4)	581 (28.1)
15–40	4171	1506 (36.1)	1034 (24.8)
>40	3438	949 (27.6)	637 (18.5)

Continued

Table 3 Continued

	Referrals N=9677	Attendances N=3250	Completers N=2252
Referral rate per 1000 practice population			
>10	4178	1328 (31.8)	938 (22.5)
5–10	4553	1550 (34.0)	1062 (23.3)
<5	946	372 (39.3)	252 (26.6)

BMI, body mass index; QOF, Quality and Outcome Framework; SIMD, Scottish Index of Multiple Deprivation; WMS, weight management service.

as did those from the least deprived quintile (45.7%) and those in the highest BMI category (BMI 45+ kg/m^2; 35.8%). There were a higher proportion of attenders from larger and less deprived practices and from practices further away from weight management centres (37.6% attendance from those referred from practices 2 or more miles away). A similar pattern was observed for those completing four or more sessions at the WMS (table 3).

Table 4 presents the logistic regression models of attendance and completion, with individual and practice characteristics, and taking account of clustering within practices. Patient-level characteristics were the strongest predictors of attendance at the specialist WMS, with the odds of attendance increasing with age (OR 4.15, 95% CI 3.27 to 5.26 for adults aged 65 years and over compared with those aged 18–24 years), BMI category (OR 1.83, 95% CI 1.56 to 2.14 for those with a BMI 45+ kg/m^2 compared with BMI 30–35 kg/m^2) and increasing affluence (OR 1.74, 95% CI 1.47 to 2.06 for patients from the most affluent practices compared with the most deprived). Men had a lower odds of attendance than women (OR 0.87, 95% CI 0.79 to 0.96).

Practice-level characteristics that were most strongly associated with attendance were being a non-training practice, having a larger list size and having a more affluent patient population. Those patients referred from training practices had a slightly lower odds of attending (OR 0.89, 95% CI 0.81 to 0.99) than those referred from non-training practices. Those from a practice with a list size of 4000–8000 were more likely to attend than those from a practice with a list size of under 4000 (OR 1.41, 95% CI 1.25 to 1.59). Similarly, those from a practice with a list size greater than 8000 were also more likely to attend at least one of the weight management appointments following referral (OR 1.29, 95% CI 1.12 to 1.48). Patients referred from practices serving the most deprived populations (where more than 40% of the practice population live in the most deprived postcodes) were less likely to attend the WMS (OR 0.82, 95% CI 0.71 to 0.95).

Similar patterns were observed for those who completed a course of sessions at the WMS (table 4), with the same patient-level characteristics the strongest predictors of 'completion'. The likelihood of attending four or more sessions increased with increasing age, such that those aged 65 years and over were almost five times as likely to

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Table 4 Logistic regression models for attenders and completers at the WMS

	Attenders			Completers		
	Unadjusted OR (95% CI)	Adjusted OR* (95% CI)	p Value	Unadjusted OR (95% CI)	Adjusted OR* (95% CI)	p Value
Sex						
Women	1.00	1.00		1.00	1.00	
Men	0.95 (0.86 to 1.04)	0.87 (0.79 to 0.96)	0.005	0.98 (0.88 to 1.09)	0.89 (0.80 to 0.99)	0.036
Age group (years)						
18–24	1.00	1.00		1.00	1.00	
25–44	1.96 (1.58 to 2.43)	1.93 (1.56 to 2.39)	<0.001	2.20 (1.68 to 2.87)	2.15 (1.64 to 2.81)	<0.001
45–64	3.02 (2.45 to 3.73)	3.04 (2.46 to 3.75)	<0.001	3.59 (2.76 to 4.67)	3.54 (2.72 to 4.61)	<0.001
65+	3.88 (3.07 to 4.90)	4.15 (3.27 to 5.26)	<0.001	4.59 (3.45 to 6.11)	4.83 (3.62 to 6.45)	<0.001
SIMD 2012 quintile						
Q1-most deprived	1.00	1.00		1.00	1.00	
Q2	1.24 (1.10 to 1.40)	1.15 (1.02 to 1.30)	0.023	1.29 (1.13 to 1.47)	1.19 (1.04 to 1.36)	0.014
Q3	1.48 (1.29 to 1.69)	1.33 (1.16 to 1.53)	<0.001	1.53 (1.32 to 1.77)	1.37 (1.18 to 1.60)	<0.001
Q4	1.46 (1.26 to 1.69)	1.32 (1.13 to 1.55)	<0.001	1.55 (1.32 to 1.83)	1.39 (1.17 to 1.65)	<0.001
Q5-most affluent	1.99 (1.70 to 2.33)	1.74 (1.47 to 2.06)	<0.001	2.14 (1.82 to 2.53)	1.83 (1.53 to 2.19)	<0.001
Missing	1.95 (1.17 to 3.26)	1.96 (1.17 to 3.28)	0.01	1.61 (0.91 to 2.84)	1.61 (0.91 to 2.86)	0.101
BMI category (kg/m^2)						
30–35	1.00	1.00		1.00	1.00	
>35–40	1.38 (1.19 to 1.60)	1.53 (1.32 to 1.78)	<0.001	1.28 (1.08 to 1.51)	1.43 (1.21 to 1.70)	<0.001
>40–45	1.51 (1.29 to 1.75)	1.74 (1.49 to 2.03)	<0.001	1.53 (1.29 to 1.81)	1.79 (1.50 to 2.13)	<0.001
45+	1.56 (1.34 to 1.82)	1.83 (1.56 to 2.14)	<0.001	1.57 (1.32 to 1.86)	1.88 (1.58 to 2.25)	<0.001
Training practice						
No	1.00	1.00		1.00	1.00	
Yes	0.96 (0.85 to 1.08)	0.89 (0.81 to 0.99)	0.029	1.01 (0.89 to 1.15)	0.97 (0.86 to 1.08)	0.550
Missing	1.13 (0.92 to 1.40)	1.13 (0.91 to 1.39)	0.268	1.29 (1.04 to 1.61)	1.23 (0.98 to 1.57)	0.074
List size						
<4000	1.00	1.00		1.00	1.00	
4000–8000	1.37 (1.21 to 1.57)	1.41 (1.25 to 1.59)	<0.001	1.21 (1.05 to 1.40)	1.21 (1.06 to 1.39)	0.006
8000+	1.31 (1.12 to 1.53)	1.29 (1.12 to 1.48)	<0.001	1.17 (0.99 to 1.39)	1.14 (0.98 to 1.34)	0.097
Distance from WMS						
Within 1 mile	1.00			1.00	1.00	

Continued

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Table 4 Continued

	Attenders			Completers		
	Unadjusted OR (95% CI)	Adjusted OR* (95% CI)	p Value	Unadjusted OR (95% CI)	Adjusted OR* (95% CI)	p Value
Between 1 and 2 miles	1.04 (0.91 to 1.18)	1.03 (0.92 to 1.14)	0.621	1.10 (0.96 to 1.26)	1.09 (0.97 to 1.24)	0.149
2 miles or more	1.29 (1.09 to 1.51)	1.06 (0.93 to 1.21)	0.399	1.32 (1.11 to 1.57)	1.06 (0.91 to 1.23)	0.469
QOF points						
<95	1.00	1.00		1.00	1.00	
95–98	1.11 (0.76 to 1.63)	0.97 (0.70 to 1.34)	0.849	0.99 (0.66 to 1.49)	0.81 (0.56 to 1.17)	0.254
99	1.09 (0.76 to 1.57)	0.85 (0.62 to 1.16)	0.314	1.02 (0.69 to 1.50)	0.82 (0.58 to 1.16)	0.258
100	1.12 (0.79 to 1.59)	0.89 (0.66 to 1.20)	0.454	1.03 (0.71 to 1.50)	0.82 (0.58 to 1.14)	0.238
Missing	1.14 (0.80 to 1.62)	0.90 (0.66 to 1.23)	0.506	1.09 (0.75 to 1.60)	0.80 (0.57 to 1.14)	0.219
Deprivation status (% of practice population defined as most deprived)						
<15	1.00	1.00		1.00	1.00	
15–40	0.88 (0.78 to 1.00)	1.09 (0.95 to 1.23)	0.212	0.83 (0.72 to 0.95)	0.96 (0.83 to 1.11)	0.561
>40	0.60 (0.53 to 0.69)	0.82 (0.71 to 0.95)	0.008	0.57 (0.50 to 0.66)	0.74 (0.63 to 0.87)	<0.001
Referral rate per 1000 practice population						
>10	1.00	1.00		1.00	1.00	
5–10	0.79 (0.67 to 0.95)	0.92 (0.79 to 1.08)	0.311	0.83 (0.69 to 1.01)	0.99 (0.83 to 1.18)	0.915
<5	0.71 (0.59 to 0.85)	0.91 (0.77 to 1.08)	0.269	0.79 (0.65 to 0.96)	1.07 (0.88 to 1.29)	0.516

*Adjusted for all other variables.
BMI, body mass index; QOF, Quality and Outcome Framework; SIMD, Scottish Index of Multiple Deprivation; WMS, weight management service.

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attend four or more sessions compared with those aged 18–24 years (OR 4.83, 95% CI 3.62 to 6.45).

As with attendance, there was a social gradient in 'completing' with increasing odds from the most deprived to the most affluent quintiles (OR 1.83, 95% CI 1.53 to 2.19 for patients from the most affluent practices compared with the most deprived). Similarly, the odds of attending four or more sessions also increased with each increase in BMI category, with the highest odds being for those from the BMI 45 kg/m^2 and over category (OR 1.88, 95% CI 1.58 to 2.25) compared with the reference group of BMI 30–35 kg/m^2.

DISCUSSION
Statement of principal findings
In this observational cross-sectional study of GP referrals to an NHS Health Board specialist WMS, we found that just over one-third of the 9677 adults with obesity who were referred between 2012 and 2014 attended at least one session. There was another marked attrition rate after first attendance, with less than a quarter 'completing' treatment, defined here as attending four or more sessions. Patient-level characteristics were the strongest predictors of attendance and completion, with the odds of attendance increasing with age, BMI category and increasing affluence. Practice-level characteristics most strongly associated with attendance and completion were being a non-training practice, having a larger list size, and not being in areas of extreme deprivation.

Strengths and weaknesses of the study
There are no previous studies that we are aware of that have explored the predictors of attendance at WMS taking account of both individual patient factors and referring practice characteristics. This study used individual patient-level data and practice-level data to explore predictors of attendance and completion at a specialist WMS, using multilevel binary logistic regression models. As with any secondary data analysis, the quality and validity of the findings are only as good as the quality of the original data. In this case, confidence in the accuracy and consistency of the data is increased as the main outcome variables of interest were referral, attendance and completion, which are reliably recorded.

There were no available data on weight loss outcomes in this study population, which is a limitation. However, previous work conducted in this WMS found that 26% of those completing phase 1 attendance had lost at least 5 kg.[10] Similarly, there were no available data on the total population of adults with obesity in the NHS GGC area, which makes it difficult to comment on the representativeness of the study population. In this study, we used a definition of 'completers' (ie, attending four or more sessions) which is perhaps lower than in some other studies. However, the attrition rate was even greater if the threshold for the number of sessions attended was increased. In addition, higher thresholds for completion tend to be used when describing weight

outcomes, rather than being used as an indicator of attendance, as in this study.

Comparison with existing literature
This study of GP referrals to a large regional WMS found that patient characteristics were more significant predictors of attendance than practice characteristics. This is in keeping with previous research on variation in GP referrals to secondary care services.[11 12] The powerful effect of socioeconomic deprivation—both at the individual level and at the practice level—also resonates with existing literature on barriers to access.[26]

The low level of referral to adult weight management from primary care in this study—roughly 4% of the approximately 260 000 adults with obesity estimated to live in NHS GGC—is similar to previously published studies from the UK.[8 27] The reasons for this low engagement with weight management are multifactorial, including patient, practitioner and health system factors.[14–16 18]

Meaning of the study: possible explanations and implications for clinicians and policy-makers
This study has highlighted several important issues related to the health service response to obesity. First, the wide variation in referral rates across general practice, despite similar prevalence of obesity, suggests that there is still much to be done to improve engagement with weight management by primary care practitioners. Second, the high attrition rate from referral to attendance and from attendance to completion, at this large regional WMS suggests there are ongoing barriers for patients. Third, the observation that those from the most socioeconomically deprived areas are least likely to attend suggests structural barriers and the need for a more targeted response. Finally, the practice characteristics of quality (as measured by QOF achievement) and distance from the nearest WMS were not associated with attendance in this study, and these negative findings are of interest suggesting that practice quality and proximity are not major drivers of attendance.

This work was based in the largest health board in Scotland, with data available for all referrals made by primary care practitioners based in general practice, between 2012 and 2014. Thus the findings are broadly generalisable to other parts of the NHS and beyond, particularly in terms of gender, age and socioeconomic status; however, there were no data on ethnicity. While Scotland overall has a lower percentage of the population who are from minority ethnic groups—at 4% overall— this Health Board region has the highest percentage of minority ethnic groups, with the Asian background (defined as Asian/Asian Scottish/Asian British) the largest population group.[28]

Unanswered questions and future research
The underlying explanation for the observed findings merits further investigation. In terms of patient characteristics, one might hypothesise, for instance, that attendance is more likely for older adults because they are less likely to be working and may be more able to attend appointments

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during working hours. Similarly, it is possible that those adults with a higher BMI may be more motivated to attend as they are experiencing more problems (functional or health-related) as a result of their weight, and may need more support to manage their weight.

With regard to practice characteristics, lower attendance by patients referred from training practices could be related to more referrals done by GP trainees, without perhaps knowing the patient well or fully discussing the implications of referral. Lower attendance from more deprived practices, over and above the effect of individual deprivation status, could point to area-based barriers to attendance such as poorer transport infrastructure or an unwillingness to cross-territorial boundaries. Lower attendance by patients referred from smaller practices is harder to explain and may be related to other confounding factors, such as smaller practices being more likely to be situated in more deprived areas.[29] [30] Qualitative research conducted alongside this study may shed more light on these findings. What these findings do indicate is that more work is required to fully understand the role and response of primary care practitioners to obesity management in their practice populations.

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Appendix 4: RCP obesity learning outcomes

Knowledge and understanding – generalists
'Generalist' is intended to be applicable to all health professionals who encounter overweight and obese patients as part of their daily clinical practice. This may be in primary care, in the community or within a hospital setting.
Aims:
- to enhance awareness and understanding of obesity as a significant medical condition
- to extend knowledge and understanding of the aetiology of obesity and the physiological consequences of excess weight
- to recognise the medical importance of modest weight loss and maintenance
- to recognise the social stigma and personal values and attitudes towards obesity

1. Aware of the impact on body weight of long-term conditions, treatments such as steroids, poor mental health and learning disabilities
2. Aware of societal attitudes and your own individual attitudes to overweight and obesity and the social implications of obesity
3. Understand the long and short term health implications of obesity and why it should be managed
4. Understand the definition and classification of obesity/overweight by BMI and its problems / limitations, including the difference in the adult and child definitions of obesity and overweight.
5. *Understand that BMI varies with the age of children and the ability to use and interpret centile charts and the importance of tracking weight and height*
6. Understand the importance of a coherent approach within the multiprofessional team when tackling obesity
7. Aware of the importance of and ability to determine realistic weight goals
8. Aware of the concept of cyclical weight gain and loss
9. Aware of national and local obesity prevalence and probable future trends
10. Aware of obesity epidemiology, prevalence and health risk differences according to Social and Economic status, ethnicity and gender
11. Understand factors contributing to obesity in the population and individuals, and how these might be altered
12. Understanding of the direct and indirect costs of obesity
13. Aware of the multifactorial aetiology of obesity
14. Understand influence of abdominal obesity – definition, visceral fat distribution, subcutaneous fat distribution, clinical assessment
15. Understand and promote the benefits of modest weight loss and potential benefits to associated complications (e.g. diabetes and hypertension) from weight loss of 5-10% presenting weight
16. Understand the role of pharmacotherapy, behavioural change and surgery as adjuncts to lifestyle management in certain selected individuals
17. Knowledge of the emerging evidence-base for successful interventions to promote healthy weight
18. Understand the importance of maintaining lowered weight or in those with difficulty losing weight, avoiding additional weight gain
19. Able to direct people to sources of information on local community facilities to support weight management – cooking clubs, leisure facilities, walking groups
20. Aware of psychological factors in obesity – causes, perpetuating factors and consequences
21. Aware of the physical factors in the aetiology of obesity – medication, excess alcohol, chronic disease and disability
22. *Aware that overweight children may be encouraged to grow into their current weight through a healthy eating and drinking and increased activity*
23. *Aware that some obese children may need to aim for a weight below their current*

weight with gradual weight loss and appropriate supervision
24. Knowledge and understanding of health risks, cardiovascular risk factors and status and potential benefits from modest weight loss
25. Recognise features suggesting serious pathology as a cause of obesity
26. Recognise features suggesting serious pathology resulting from obesity
27. Knowledge of, and ability to assess and advise on, the roles of diet and physical activity in promoting health and in managing and maintaining weight loss
28. Be aware of, and able critically to appraise conflicting evidence and controversy regarding obesity and lifestyle
29. Understand the importance and relevance of motivational interviewing

Nutrition and eating patterns – generalists

Aims:
- to facilitate understanding and awareness of the role of healthy eating and drinking in the management of overweight and obesity
- to increase the nutritional knowledge and skills required for best practice in the management of overweight and obesity

1. Understand and be able to demonstrate how to make a basic dietary assessment to identify patterns of eating including helping an individual explore how their food intake and eating behaviours affect them
2. Understand the importance of offering dietary advice that is tailored to an individual's normal patterns of eating but which also encourages regular family meals and limited snacking
3. Understand the main food groups and the key messages involved in promoting a healthy diet and healthy eating behaviours and be able to demonstrate practical advice using the five food groups appropriately to reduce energy intake relevant to the individual
5. Knowledge of the energy requirements and portion sizes of adults and appropriate energy requirements for weight loss
7. Knowledge of the energy, fat, saturated fat, sugar and salt content of a range of commonly eaten foods and soft and alcoholic drinks
9. Understand how to interpret nutritional and front of pack information on food labels
10. Knowledge of the roles of diet and physical activity in promoting health and in managing weight loss and maintenance
11. Knowledge of the effect of weight gain and weight loss for patients with diabetes and an understanding of how to provide appropriate dietary advice
12. Aware of personal preferences, religious and cultural variations in food intake and different eating/drinking patterns within the UK population and how these have changed over the last few decades
13. knowledge of alternative dieting practices, diet trends, myths and misconceptions and the nutritional implications of such practices
14. Knowledge of food preparation and cooking methods to reduce energy content of food
15. Understand how to develop strategies for eating out, social drinking, special occasions, etc.
16. Understand the importance of self-monitoring and self-management of food intake and drinks consumed for weight management
17. Understand the diagnostic criteria for eating disorders with particular reference to binge eating disorder and knowledge of appropriate referral strategies. Be able to judge when an individual may be presenting with a significant eating disorder and requires further referral
18. Understand the importance of influencing settings to provide healthy food and drinks for adults and children eating away from home (childcare, schools, workplaces, prisons, hospitals, etc.)

Physical activity – generalists

Aims:
- to facilitate understanding and awareness of the role of physical activity in the management of obesity
- to provide a foundation in the knowledge and skills required to safely, competently and effectively advise on physical activity in the overweight and obese populations

1. Have insight into the common barriers to physical activity change and practical strategies for tackling such barriers
2. Understand the impact of personal preferences, religious and cultural variations and environmental factors on levels of physical activity
3. Aware of benefits from health lifestyle independent of weight loss
4. Aware of the effects of physical activity on body mass and body composition
5. Aware of the value of improved physical fitness as having merit regardless of weight change
6. Understand and advise how increased physical activity can be incorporated into the normal daily routine, rather than requiring separate and programmed exercise
7. Aware of the beneficial psychological effects of regular physical activity on mood, self-esteem and body image
8. Aware of the lack of importance ascribed by many patients to the role of regular physical activity in weight management, lifestyle links and other factors beyond the HP's area of expertise
9. Understand how activity trends in the population have changed over time
10. Understand the recommended minimum physical activity levels for children and adults
11. Understand the beneficial effect of different levels of exercise on risk factors associated with obesity - blood lipids, blood pressure, insulin resistance
12. Understand the difference between low and moderate intensity activity and their proportionate benefits on weight management and physical fitness
13. Aware of the impact of physical activity on the blood glucose control of people with diabetes
14. Understand how physical activity differs with age and gender
15. Understanding of the role of regular physical activity in the management of mental health and cognitive decline
16. Understand the importance of influencing settings (childcare, schools , workplace etc.) to promote physical activity
17. Understand the usefulness and limitations of workplace activity on daily energy expenditure
18. Understand the importance of physical inactivity such as TV viewing in the aetiology and management of obesity

Treatment – generalists

Aims:
- to be able to identify the appropriate patient, the appropriate time and type of therapy other than medical or surgical intervention; and be able to change or combine the type of intervention as appropriate
- to be aware of the importance of monitoring patients prior, during and after intervention
- to be able to identify the appropriate patient, the appropriate time and type of medical and/or surgical intervention
- to be aware of the importance of monitoring patients prior, during and after therapeutic intervention

1. Able to signpost motivated patient to try to lose weight via community based physical activity or weight management programme – instead of, or as well as, prescribed therapy
2. Aware of the evidence base supporting the effectiveness of some commercially available weight management programmes
3. Able to share care of obese patient with other colleague(s) in multidisciplinary team who can provide intervention that does not involve prescribed drug or surgery via shared protocol
4. Able to optimise behaviour change models to avoid or minimise medical interventions (prescribed drugs or surgery)
6. Aware of the effectiveness and acceptability of the range of available treatment programmes
7. Able to support and encourage children and families to take part in treatment programmes and to make sustainable changes in their lifestyle.
8. Aware of the need to follow up patients following bariatric surgery on a lifetime basis in a multidisciplinary clinic
9. Aware of the long term consequences from bariatric surgery
10. Be aware of the range of community and health service weight management programmes, service and information that may be useful / available
11. Able to share care of obese patient with other colleague(s) in extended multidisciplinary team who can provide intervention that does not involve prescribed drug or surgery via shared protocol
12. Able to optimise behaviour change models to avoid or minimise medical interventions (prescribed drugs or surgery
13. Aware of and know how to combat presence of obesity arising as side effect of drug therapy for long term condition

Assessment skills – generalists

Aims:
- to be able to make a comprehensive assessment of overweight and obese subjects to facilitate individualised management
- to be able to select the appropriate treatment(s)
- to be able to define and demonstrate appropriate communication skills, tools and techniques to develop a therapeutic relationship with a range of individuals
NB all assessments will be done at the appropriate level for a generalist or specialist in their field

1. Judge the timeliness and appropriateness of initiating opportunistic intervention (or not)
2. Assess the patients' psychosocial history. For children this should include assessment of both child and family factors
3. Able to explore behaviours, habits and patterns relating to eating and physical activity without raising resistance
4. Aware of specific issues related to weight loss / weight control which should be addressed - e.g. self-efficacy, knowledge, motivation, goals for change, treatment expectations.
5. Able to carry out a basic assessment of dietary intake - eating and drinking patterns
6. Able to make a basic assessment of physical activity and inactivity (e.g. TV viewing)
7. Assess presenting symptoms and consider underlying causes of overweight or obesity
8. Assess existence of comorbidities and other risk factors for future disease
9. Assess environmental, social and family factors relating to motivation / ability to change
13. Assess medical drivers and explain to the patient behavioural contraindications to

treatment - bulimia nervosa, psychiatric disorders, major life crisis.
14. Assess health risks, cardiovascular risk factors and status
16. Understand the importance of, and be able to undertake, accurate measurement of height, weight and waist circumference and classification of BMI for adults
19. Know that the assessment for adults should include at a minimum a careful history, physical assessment of weight, height, waist circumference and blood pressure
22. Understand that several prescription medications are associated with weight gain.
23. Appreciate that quitting smoking can cause significant weight and be able to advise about measures to prevent this
24. Know when to refer to a specialist

Appendix 5: Topic guide for Phase 1 interviews

Intro: Make it clear who I am, why I am there, and why I am asking *them*.

Go through consent, audio-recording, housekeeping

In this realist review, the aim is to unpick interventions that have targeted primary care practitioners to improve the management of obesity, and I am particularly interested in co-morbid obesity. The focus is on potential mechanisms that might explain outcomes in certain contexts, e.g. why do some GPs refer more than others, and why are some people referred more than others?

Interviewee background
- I wonder if I can start by asking you to introduce yourselves - What is your current role? What involvement have you had with weight management services in primary care?

- Could you tell us a bit more about the weight management services in [your NHS region]?
    - Tier 2 – NHS or local authority?
    - Tier 3
    - Access to bariatric surgery?

- Do you monitor referrals by GPs?
- Do you meet with other weight management services?

Your experience of primary care weight management
- Have you had experience of engaging with primary care practitioners with regard to weight management?
- Have you found it easier to engage with GPs or PNs?
- What have you found to be the most effect *methods* of engagement, e.g. letter, email, meetings, open days, visiting practices, etc.?

Role of Primary care in weight management
- What do you think the role of GPs should be in weight management?
- What do you think the role of PNs should be in weight management?
- To what extent do you think these roles are being fulfilled currently?
- Did you have any experience of Counterweight?
- How is weight management funded where you are?

*Thinking about the outcomes of **increased identification** and **referral of** patients with obesity to weight management services…*

- Do you think there are any differences in these outcomes by *practitioner characteristics*, e.g. age/experience, gender, BMI

- Are there differences in these outcomes by *practice characteristics*, e.g. size, location (urban/rural; deprived/affluent), teaching/training practice
- Are some patients more likely to be referred that others? E.g. *patient characteristics* such as age, gender, SES, rurality?
- Are patients with certain **co-morbidities** more or less likely to be referred?
    - Depression
    - Diabetes
    - Mechanical joint pain

Previous research has suggested a number of possible explanations why GPs do not identify (and record) patients as having obesity. What do you think? Similarly, there are a number of possible explanations why GPs do not refer more patients with obesity to weight management services. What do you think?

Future interventions
- How would you approach improving the **identification** of individuals with obesity in primary care?

- How would you approach improving the **referral** of individuals with obesity in primary care to weight management services?

Any other comments or suggestions for changes to future stakeholder interviews?

Many thanks!

Appendix 6: Participant information leaflet for Phase 1 interviews

University of Glasgow | College of Medical, Veterinary & Life Sciences

PARTICIPANT INFORMATION SHEET

Understanding interventions to improve the management of co-morbid obesity in primary care

You are being invited to take part in a research study to help us understand how we can improve the **identification** and **referral** of individuals with obesity to weight management services by primary care practitioners. Before you decide whether to take part in the study, it is important for you to understand why the research is being done and what it will involve for you. Please take time to read the following information carefully.

What is the purpose of the study?
Obesity is one of the biggest health problems in Scotland today. GPs and practice nurses have an important role to play in supporting adults with obesity to lose weight, especially those with co-morbid obesity, i.e. additional weight-related health problems.

We know from previous research that the **identification** and **referral** of individuals with obesity to weight management services by primary care practitioners is highly variable, with the numbers referred being considerably lower than the numbers of those who might benefit from referral. This study aims to gain a better understanding of the reasons for these findings, in order to inform the development of future interventions in this area.

This part of the study involves gaining insights from key individuals involved in weight management. The option of an individual interview (ideally face-to-face, but by telephone if preferable) or focus group will be offered. The findings from the interviews/focus groups will help to shape a type of literature review called a realist synthesis. Realist synthesis is a way of bringing together evidence from different types of research. The aim is to understand not just whether an intervention works, but also *why*, *for whom*, and *in what circumstances*.

Why have I been chosen?
You are being asked to take part because in your role you have been involved in weight management in primary care, either from a development or implementation perspective. You are therefore well placed to help us understand the factors that might facilitate or inhibit primary care referrals into weight management services.

What will happen next?
If you do decide to take part, please contact the researcher David Blane (details overleaf), either by phone or email. You will then have the opportunity to discuss the study further, and to make any practical arrangements for the interview or focus group to take place.

What will taking part in the study mean for me?

Interviews (usually face-to-face, but by telephone if preferable) or focus groups will take place at a time and location convenient for you. We will start by going over the consent form which you received with this leaflet, to ensure that it is signed. We will then start the discussion. This will be audio-recorded, so that a transcription of the discussion can be typed, at which point all identifying details will be removed. If you do not want the interview to be audio-recorded, the researcher will take written notes instead.

We want to explore your thoughts on how to improve the **identification** and **referral** of individuals with obesity to weight management services by primary care practitioners. Overall, we expect the interview/focus group to take approximately 1 hour of your time. You may be approached at a later date in the research process and invited to take part in a follow-up interview to review and comment on findings from the review of the literature.

Do I have to take part?

No. It is up to you to decide whether or not to take part.

What are the possible benefits of taking part?

The information that is collected during this study will give us a better understanding of weight management in primary care and should help to improve the future care of people with co-morbid obesity. There may be no direct benefit for you from taking part in this study.

What are the possible disadvantages and risks of taking part?

There are no identifiable risks to you taking part in this study.

Can I change my mind?

Yes. You can withdraw from the study at any time without giving a reason. Your data will not be used and will be destroyed.

Will my taking part in this study be kept confidential?

Yes. All information which is collected about you during the course of the research will be kept strictly confidential. Any information about you will have your identifiable details removed so that you cannot be recognised from it.

What will happen to the results of the research study?

The information collected will be used to inform the literature review called a realist synthesis, which will examine the implementation and contextual factors that have enhanced or reduced the effectiveness of previous interventions targeted at primary care practitioners in this area. We plan to publish the results in relevant medical journals, so that other researchers can learn from the study. All information used will be anonymized so that any report or journal articles published will not identify you or any other individual taking part.

Who is organising and funding the research?

The study is being conducted by researchers at the University of Glasgow. It is funded by the Chief Scientist Office (CSO) Scotland and is sponsored by NHS Greater Glasgow & Clyde.

Who has reviewed the study?
The study has been reviewed by the University of Glasgow College of Medical Veterinary and Life Sciences Ethics Committee.

Contact for Further Information
David Blane
General Practice & Primary Care
Institute for Health & Wellbeing
1 Horselethill Road
University of Glasgow

Telephone: 0141 330 5765
Email: david.blane@glasgow.ac.uk

If you have any concerns about the research, please contact:
Professor Frances Mair
General Practice & Primary Care
Institute for Health & Wellbeing
1 Horselethill Road
University of Glasgow

Telephone: 0141 330 8312
Email: frances.mair@glasgow.ac.uk

Appendix 7: Consent form for Phase 1 interviews

University of Glasgow | College of Medical, Veterinary & Life Sciences

CONSENT FORM

Title of Project: *Understanding interventions to improve the management of co-morbid obesity in primary care*

Name of Researcher(s):
Dr David Blane, Prof Kate O'Donnell, Dr Sara Macdonald, Dr David Morrison

Please initial box

I confirm that I have read and understand the information sheet dated _____ (version _____) for the above study and have had the opportunity to ask questions.

I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my legal rights being affected.

I agree to take part in the above study.

I am happy to be approached for a second interview to discuss review findings.

_____ _____ _____
Name of subject   Date   Signature

_____ _____ _____
Name of Person taking consent   Date   Signature
(if different from researcher)

_____ _____ _____
Researcher   Date   Signature

(1 copy for subject; 1 copy for researcher)

Appendix 8: Topic guides for Phase 4 interviews

<u>Interview Topic Guide: Patients</u>

The **Attain** study: <u>A</u>ccess <u>t</u>o weigh<u>t</u> m<u>a</u>nagement <u>in</u> primary care

> This document is a guide to the principal themes and issues to be covered.
> Questions can be modified and followed up in more detail as appropriate.

1. Give full name.
2. Identify self as researcher from General Practice & Primary Care at the University of Glasgow.
3. Give short explanation of purpose of the study:

"Thank you for agreeing to help with this research. The aim of it is to understand the barriers and facilitators to GP referral to a specialist weight management service, such as the Glasgow & Clyde Weight Management Service (GCWMS). We are speaking to patients who have been referred and also to GPs and practice nurses who may have been involved in making referrals.

Everything that you say will be confidential. Although we hope to speak to a doctor or practice nurse from your practice, your own doctor won't find out anything you say. It's possible that some quotes from this interview might be used in publications, but if that happens then they will be anonymous, that is they won't identify you or the practice by name. Is there anything you want to ask me about at this point?

The style of the interview will be open ended so you may find some of the questions quite broad or quite difficult. There aren't any right or wrong answers. I'm interested in what you think and feel.

If at any time you want to stop the interview, or have a break, please feel free to let me know. I will be recording the interview, to capture exactly what has been said."

Patient profile
Date and time of interview:
Identifier:

I'd like to start by asking about your story – how were you referred to the weight management service? **Narrative**
- Were you concerned about your weight?
- Were your concerns to do with your health, or day-to-day functioning/activities?
- What made you decide to go to the practice that day? (*Appearing at services*)
- Did you ask to be referred for weight management? (*Asserting candidacy*)

Had your weight been discussed before at the practice? **Previous weight discussions**
- Do you have any other health problems that you think might be related to your weight?
- Do you smoke or drink alcohol?
- Has your weight been raised as an issue when you have been attending about another health problem? If so, how was this done?
- Were there any previous discussions about the Glasgow & Clyde weight management service? If so, what happened? (*Offers of/resistance to services*)

How often do you go to see your GP? **GP access**
- How long have you been registered with the practice?
- Are you able to choose which doctor you see? (*Permeability of services - GP)*
- Who do you normally see when you go to the practice?
- How easy or difficult is it to get to the practice?

At the time, did you know anyone else who had been to the weight management service? **Expectations**
- Did you know what to expect?
- Did you feel you were the sort of person who could benefit from the service? *(Identification of candidacy)*

How long did you have to wait for an appointment? (*Permeability of services - GCWMS)*
- How easy or difficult is it to get to the weight management service?

Do you feel that you have ever been treated differently because of your weight? (*Adjudication by professionals)* **STIGMA**
- Are there some doctors you feel more comfortable talking about your weight with?
  - E.g. your regular GP / does gender or weight of GP make a difference?
- Would you rather speak to your GP or the practice nurse about weight management?
- What has been your experience of the weight management service so far?

Have you ever done anything else to lose weight, e.g. WeightWatchers/ScottishSlimmers? **Weight hx**
- Have you had support from your family?
- Is there a family history of weight issues?
- What's different about GCWMS compared to other things you have been to before?

From your experience, do you think the practice does well at supporting people who are overweight or obese? *(local production of candidacy)*
- What do you think could be done differently at your practice to improve the support for people who are overweight or obese?
  - What do you think about: routine weighing / pop-up reminders / follow-up?
- What do you think could be done differently by the weight management service?
- What do you think about other proposed solutions, such as a tax on sugary drinks?

Are there any issues you would like to mention which haven't been covered? **Close of interview**

<div style="text-align:center">

Interview Topic Guide: Practitioners

</div>

The **Attain** study: **A**ccess **t**o weigh**t** m**a**nagement **in** primary care

> This document is a guide to the principal themes and issues to be covered. Questions can be modified and followed up in more detail as appropriate.

1. Give full name.
2. Identify self as researcher from General Practice & Primary Care at the University of Glasgow.
3. Give short explanation of purpose of the study:

"Thank you for agreeing to help with this research. The aim of it is to understand the barriers and facilitators to GP referral to a specialist weight management service, such as the Glasgow & Clyde Weight Management Service (GCWMS). We are speaking to patients who have been referred and also to GPs and practice nurses who may have been involved in making referrals.

Everything that you say will be confidential. It's possible that some quotes from this interview might be used in publications, but if that happens then they will be anonymous, that is they won't identify you or the practice by name. Is there anything you want to ask me about at this point?

The style of the interview will be open ended so you may find some of the questions quite broad or quite difficult. There aren't any right or wrong answers. I'm interested in your experience and your views.

If at any time you want to stop the interview, or have a break, please feel free to let me know. I will be recording the interview, to capture exactly what has been said."

Practitioner profile
Date and time of interview:
Identifier:

Age? (30-40 / 40-50 / 50-60)
Length of time in practice?
Number of sessions worked in practice?
Number of partners?
Training practice?
Number of practice nurses?

Narrative opening
I'd like to start by asking you to discuss your experience of referral into the weight management service.

Specific example - Referral consultation
I have already interviewed [Patient X] who was referred to GCWMS by the practice…
Previous experience of weight management service
- What was your previous experience of making referrals to weight management?
- Do you think it is an easy service to access?
- What is your view on the referral process itself?

- How do you think the GCWMS compares to other weight loss services, such as commercial services?
- How confident do you feel discussing weight with your obese patients?

Role of Primary care in weight management
- What are the different roles of GPs and practice nurses regarding weight management?
- What are their strengths and weakness regarding weight management?

Your practice
- How does your practice organise its approach to obesity e.g. do PNs take on the role of meeting with obese patients or is it mostly opportunistic in consultations?
- Overall, do you think your practice does well at supporting people to lose weight?
- Do you think the GPs and practice nurses at the practice are keen to refer people with obesity for weight management?

Attitude to obesity
- How often do you see people with health problems that might be related to their weight?
- To what extent do you feel that GPs/practice nurses can help people with obesity with their weight?
- How often do you discuss the Glasgow & Clyde weight management service with obese patients?
- How often do you raise weight as an issue when a patient has been attending about another health problem?
  - How do you go about this?

Variation in Referral Rates to GCWMS
We know there is considerable variation in referral rates to GCWMS, with some practices referring often and some practices never referring. I'm interested to hear your views on why that is the case.
- To what extent do you think differences in referral can be explained by *practitioner characteristics*, e.g. age/experience, gender, BMI
- To what extent do you think they can be explained by *practice characteristics*, e.g. size, location (urban/rural; deprived/affluent), teaching/training practice
- Are some patients more likely to be referred than others? E.g. *patient characteristics* such as age, gender, SES, ethnicity?
- Are patients with certain **co-morbidities** more or less likely to be referred?
  - Depression
  - Diabetes
  - Mechanical joint pain
- To what extent do you rely on 'eye-balling' in your risk assessment of adults with obesity?

Future interventions
- How would you approach improving the **identification** of individuals with obesity in primary care?
- What do you think could be done differently in general practice to improve the patient journey into a specialist weight management service?
- What do you think could be done differently by the weight management service to improve this?

What do you think of the following strategies to improve identification and referral?
- Ease of referral (process and access),
- Feedback on referrals
- Better relationship with weight management service, to improve trust/confidence
- Prompts/pop-up reminders,
- Additional time in consultation,
- Training (on discussing weight sensitively, the health benefits of weight loss, etc.),
- Practice protocols,
- Financial incentives,

Close of interview
- Ask if there are any issues they would like to mention which haven't been covered.
- Thank the participant for their time, and reiterate that all that has been discussed is confidential.

Appendix 9: Ethics correspondence

WoSRES
West of Scotland Research Ethics Service

NHS
Greater Glasgow
and Clyde

Dr David N. Blane
CSO Clinical Academic Fellow in General Practice
University of Glasgow
General Practice & Primary Care
1 Horselethill Road
University of Glasgow
G12 9LX

West of Scotland REC 5
Ground Floor - Tennent Building
Western Infirmary
38 Church Street
Glasgow
G11 6NT

Date	24 March 2015
Direct line	0141 211 2102
E-mail	WoSREC5@ggc.scot.nhs.uk

Dear Dr Blane

Study title:	**The ATTAIN study: Access To weighT mAnagement IN primary Care: a case study**
REC reference:	**15/WS/0057**
IRAS project ID:	**164050**

The Research Ethics Committee reviewed the above application at the meeting held on 18 March 2015.   Thank you for attending to discuss the application.

We plan to publish your research summary wording for the above study on the HRA website, together with your contact details. Publication will be no earlier than three months from the date of this favourable opinion letter. The expectation is that this information will be published for all studies that receive an ethical opinion but should you wish to provide a substitute contact point, wish to make a request to defer, or require further information, please contact the REC Manager Mrs Sharon Macgregor, WoSREC5@ggc.scot.nhs.uk. Under very limited circumstances (e.g. for student research which has received an unfavourable opinion), it may be possible to grant an exemption to the publication of the study.

Ethical opinion

The members of the Committee present gave a favourable ethical opinion of the above research on the basis described in the application form, protocol and supporting documentation, subject to the conditions specified below. .

Conditions of the favourable opinion

The favourable opinion is subject to the following conditions being met prior to the start of the study.

Management permission or approval must be obtained from each host organisation prior to the start of the study at the site concerned.

Management permission ("R&D approval") should be sought from all NHS organisations involved in the study in accordance with NHS research governance arrangements.

Guidance on applying for NHS permission for research is available in the Integrated Research Application System or at http://www.rdforum.nhs.uk.

West of Scotland REC 5

Attendance at Committee meeting on 18 March 2015

Committee Members:

Name	Profession	Present	Notes
Dr Stewart Campbell	Consultant Physician & Gastroenterologist	Yes	
Dr Roddy Chapman	Consultant Anaesthetist	No	
Dr James Curran	GP	No	
Dr Gillian Harold	Consultant Radiologist	No	
Dr Gillian Kerr	Consultant Physician	Yes	
Dr Ahmed Khan	Consultant Psychiatrist	Yes	
Professor Eddie McKenzie	Statistician	Yes	
Canon Matt McManus	Parish Priest	Yes	
Ms Janis Munro	Key Account Manager	Yes	
Dr Gregory Ofili (CHAIR)	Consultant Gynaecologist	Yes	
Mrs June Russell	Retired (Research Chemist)	No	
Mr Charles Sargent	Retired	Yes	
Dr Marcel Strauss	Consultant Radiologist	Yes	
Mrs Liz Tregonning	Retired (Special Needs Teacher)	Yes	

Also in attendance:

Name	Position (or reason for attending)
Dr Judith Godden	Scientific Officer/Manager
Mrs Sharon Macgregor	Co-ordinator

Appendix 10: Phase 4 Patient invitation letter and reply slip

Study Title: ATTAIN study - <u>A</u>ccess <u>t</u>o weigh<u>t</u> m<u>a</u>nagement <u>in</u> primary care

Date:

Dear …………

We would like you to help us improve access to weight management services.

We invite you to join in a study. We would like to find out more about why some people are referred to the Glasgow & Clyde weight management service (GCWMS) but others who might benefit are not. We hope that our results will help to improve access to weight management services in the future.

Our information leaflet gives you more detail about the study and what it involves. Please have a look at this information and decide whether you would like to be involved. There is a reply slip for you to fill in. Please send it back to us in the reply paid envelope. If you do take part, you will receive a £20 gift voucher as a token of appreciation for your time given.

If you have any questions please do ask us. Our contact details are below.

Yours sincerely,

Dr David Blane	Professor Kate O'Donnell
CSO Clinical Academic Fellow in General Practice	Professor of Primary Care Research
General Practice & Primary Care	General Practice & Primary Care
Institute of Health and Wellbeing	Institute of Health and Wellbeing
University of Glasgow	University of Glasgow
1 Horselethill Road	1 Horselethill Road
Glasgow	Glasgow
G12 9LX	G12 9LX
David.blane@glasgow.ac.uk	Kate.O'Donnell@glasgow.ac.uk

The ATTAIN study: <u>A</u>ccess <u>T</u>o weigh<u>T</u> man<u>A</u>gement <u>IN</u> primary care

<u>I am interested in helping with this research</u>

I have read the participant information sheet and I am interested to hear more about the study. Please contact me to discuss this further.

Name   ……………………………………………………………………………………………..

Address   ……………………………………………………………………………………………..

                            ………………………………………………………………………………………………

                            ………………………………………………………… Post code………………………….

Telephone number   ………………………………………………………………………………………

Email address   ………………………………………………………………………………………

Which is the best way to contact you?   Telephone ☐   Email ☐

My general practitioner is   …………………………………………………………………….. (GP Name)

                                            ………………………………………………………….. (Practice address)

Please fill this in and send it back to the research team in the reply paid envelope, or scan and email it.

(Please keep the participant information sheet).

Alternatively contact the researcher, David Blane, directly by:

Email: david.blane@glasgow.ac.uk   or   Telephone: 0141 330 5765

The ATTAIN study

Improving Access to Weight Management

Appendix 11: Full search strategy for Phase 2 review

Search strategy – run on 15/05/14

1. exp Obesity/ or exp Obesity, Morbid/
2. (obes$ or overweight$).tw.
3. Weight Loss/
4. 1 or 2 or 3
5. exp Education, Continuing/
6. (education$ adj2 (program$ or intervention? or meeting? or session? or strateg$ or workshop? or visit?)).tw.
7. (behavio?r$ adj2 intervention?).tw.
8. *pamphlets/
9. (leaflet? or booklet? or poster or posters).tw.
10. ((written or printed or oral) adj information).tw.
11. (information$ adj2 campaign).tw.
12. (education$ adj1 (method? or material?)).tw.
13. outreach.tw.
14. ((opinion or education$ or influential) adj1 leader?).tw.
15. facilitator?.tw.
16. Practice Guideline as Topic/
17. *guideline adherence/
18. practice guideline?.tw.
19. (guideline? adj2 (introduc$ or issu$ or impact or effect? or disseminat$ or distribut$)).tw.
20. ((effect? or impact or evaluat$ or introduc$ or compar$) adj2 training program$).tw.
21. *reminder systems/
22. reminder?.tw.
23. (recall adj2 system$).tw.
24. (prompter? or prompting).tw.
25. *feedback/ or feedback.tw.
26. chart review$.tw.
27. ((effect? or impact or records or chart?) adj2 audit).tw.
28. compliance.tw.
29. marketing.tw.
30. or/5-29
31. exp Patient Care Team/
32. exp Primary Health Care/
33. exp Family Practice/ or exp General Practice/
34. exp *Health Personnel/
35. (team? adj2 (care or treatment or assessment or consultation)).tw.
36. (integrat$ adj2 (care or service?)).tw.
37. (care adj2 (coordinat$ or program$ or continuity)).tw.
38. (case adj1 management).tw.
39. *ambulatory care/
40. or/31-39
41. exp "Referral and Consultation"/
42. ((effect? or impact or evaluat$ or introduc$ or compar$) adj2 (treatment or care or screen$ or prevent$) adj2 program$).tw.
43. ((effect? or impact or introduc$) adj2 (legislation or regulations or policy)).tw.
44. *medical records/
45. *medical records systems, computerized/
46. (information adj2 (management or system?)).tw.
47. *utilization review/
48. *Quality Assurance, Health Care/
49. Quality of Health Care/
50. *program evaluation/
51. triage.tw.
52. *telephone/
53. (physician patient adj (interaction? or relationship?)).tw.
54. ((standard or usual or routine or regular or traditional or conventional or pattern) adj2 care).tw.
55. (program$ adj2 (reduc$ or increas$ or decreas$ or chang$ or improv$ or modify$ or monitor$ or care)).tw.
56. ((introduc$ or impact or effect? or implement$ or computer$) adj protocol?).tw.
57. (computer$ adj2 (diagnosis or decision?)).tw.
58. or/41-57
59. 30 or 58
60. 4 and 40 and 59

61. animal/
62. human/
63. 61 not (61 and 62)
64. 60 not 63
65. Child/
66. 64 not 65
67. limit 66 to (english language and yr="2004 -Current")

EMBASE (OVID)
1. exp Obesity/
2. (obes$ or overweight$).tw.
3. weight reduction/
4. or/1-3
5. exp medical education/
6. (education$ adj2 (program$ or intervention? or meeting? or session? or strateg$ or workshop? or visit?)).tw.
7. (behavio?r$ adj2 intervention?).tw.
8. publications/
9. medical information/
10. information dissemination/
11. information service/
12. (leaflet? or booklet? or poster or posters).tw.
13. ((written or printed or oral) adj information).tw.
14. (information$ adj2 campaign).tw.
15. (education$ adj1 (method? or material?)).tw.
16. outreach.tw.
17. ((opinion or education$ or influential) adj1 leader?).tw.
18. facilitator?.tw.
19. consensus conference?.tw.
20. exp Practice Guideline/
21. practice guideline?.tw.
22. (guideline? adj2 (introduc$ or issu$ or impact or effect? or disseminat$ or distribut$)).tw.
23. ((effect? or impact or evaluat$ or introduc$ or compar$) adj2 training program$).tw.
24. reminder system/
25. reminder?.tw.
26. decision support system/
27. (recall adj2 system$).tw.
28. (prompter? or prompting).tw.
29. *feedback/ or feedback.tw.
30. chart review$.tw.
31. ((effect? or impact or records or chart?) adj2 audit).tw.
32. compliance.tw.
33. marketing.tw.
34. or/5-33
35. patient care/
36. patient care planning/
37. general practice/
38. general practitioner/
39. nurse practitioner/
40. (team? adj2 (care or treatment or assessment or consultation)).tw.
41. (integrat$ adj2 (care or service?)).tw.
42. (care adj2 (coordinat$ or program$ or continuity)).tw.
43. (case adj1 management).tw.
44. case management/
45. exp primary healthcare/
46. *ambulatory care/
47. healthcare practice/
48. community health center/
49. healthcare facility/
50. *group practice/
51. medical practice/
52. or/35-51
53. *medical record/
54. (information adj2 (management or system?)).tw.
55. "peer review"/
56. "utilization review"/
57. clinical practice/
58. quality assurance.tw.
59. Outcome Assessment/

60. Total Quality Management/
61. Health Care Quality/
62. program evaluation/
63. triage.tw.
64. patient referral/
65. *telephone/
66. (physician patient adj (interaction? or relationship?)).tw.
67. *health maintenance organizations/
68. managed care.tw.
69. or/53-68
70. ((standard or usual or routine or regular or traditional or conventional or pattern) adj2 care).tw.
71. (program$ adj2 (reduc$ or increas$ or decreas$ or chang$ or improv$ or modify$ or monitor$ or care)).tw.
72. ((effect? or impact or evaluat$ or introduc$ or compar$) adj2 (treatment or care or screen$ or prevent$) adj2 program$).tw.
73. (computer$ adj2 (diagnosis or decision?)).tw.
74. ((introduc$ or impact or effect? or implement$ or computer$) adj protocol?).tw.
75. ((effect? or impact or introduc$) adj2 (legislation or regulations or policy)).tw.
76. or/70-75
77. 34 or 52 or 69
78. 4 and 77
79. nonhuman/
80. 78 not 79
81. 80
82. limit 81 to (english language and yr="2004 -Current")
83. child/
84. 82 not 83

CINAHL (EBSCO)

1. (MH "Obesity+") or (MM "Weight Loss")
2. TX (obes* or overweight*)
3. 1 or 2
4. (MH "Education, Continuing+") or (MM "Pamphlets") or (MM "Practice Guidelines") or (MM "Professional Compliance") or(MM "Reminder Systems")
5. TX (education* N2 (program*or intervention* or meeting* or session* or strateg* or workshop* or visit*)
6. TX (behavior* N2 intervention*) or TI (behaviour* N2 intervention*) or AB (behavior* N2 intervention*)
7. TX (leaflet* or booklet* or poster or posters)
8. TX (written information) or TX (printed information) or TX (oral information)
9. TX (information* N2 campaign)
10. TX (education* N1 method*) or TX (education* N1 material*)
11. TX (outreach) or TX (facilitator*)
12. TX (opinion N1 leader*) or TX (education* N1 leader*) or TX (influential N1 leader)
13. TX (practice guideline*)
14. TX (guideline* N2 (introduc*or issu* or impact or effect* or disseminat* or distribut*))
15. TX ((effect* or impact or evaluat* or introduc* or compar*) N2 training program*)
16. TX (reminder*) or TX (recall N2 system*) or TX (prompter*) or TX (prompting)
17. TX (chart review*)
18. TX ((effect* or impact or records or chart*) N2 audit)
19. TX (compliance) or TX (marketing)
20. 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19
21. (MH "Health Personnel+")
22. (MH "Multidisciplinary Care Team+") or (MM "Ambulatory Care")
23. (MM "Family Practice") OR (MM "Physicians, Family")
24. TX ("patient care planning" or "case management"
25. TX (integrat* N2 care) or TX (integrat* N2 service*)
26. TX (care N2 (coordinat* or program* or continuity))
27. TX (chang* N2 location*) or TX (home N2 treat*)
28. 21 or 22 or 23 or 24 or 25 or 26 or 27
29. (MH "Medical Records+")
30. (MM "Peer Review") or (MM "Utilization Review")
31. (MM "Quality Assurance") or (MM "Outcome Assessment") or (MM "Quality Improvement") or (MM "Quality of Health Care") or (MM "Program Evaluation") or (MH "Referral and Consultation+") or (MM "Patient History Taking") or (MM "Telephone")
32. (MM "Process Assessment (Health Care)")
33. TX (computer* N2 diagnosis) or TX (computer* N2 decision*)
34. TX ((standard or usual or routine or regular or traditional or conventional or pattern) N2 care)
35. TX (program*N2 (reduc* or increas* or decreas* or chang* or improv* or modif* or monitor* or care))

36. TX ((effect* or impact or evaluat* or introduc* or compar*) N2 "treatment program*")
37. TX ((effect* or impact or evaluat* or introduc* or compar*) N2 "care program*")
38. TX ((effect* or impact or evaluat* or introduc* or compar*) N2 "screening program*")
39. TX ((effect* or impact or evaluat* or introduc* or compar*) N2 "prevention program*")
40. TX ((introduc* or impact or effect* or implement* or computer*) N2 protocol*)
41. TX (effect* N2 (legislation or regulations or policy)) or TX (impact* N2 (legislation or regulations or policy)) or TX (introduc* N2 (legislation or regulations or policy))
42. TX (information N2 management) or TX (information N2 system*)
43. TX ("physician practice patterns") or TX ("quality assurance")
44. TX ("triage" or "managed care")
45. TX ("physician patient interaction*") or TX ("physician patient relationship*")
46. 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 or 41 or 42 or 43 or 44 or 45
47. 20 or 46
48. 3 and 28 and 47
49. Restrictions to year 2004 onwards and English language

PsycINFO (EBSCO)

1. MJ Obesity or MJ Weight Loss
2. TX (obes* or overweight*)
3. 1 or 2
4. TX continuing education or TX physician education or TX Pamphlets or TX Practice Guidelines or TX Professional Compliance or TX Reminder Systems
5. TX (education* N2 (program*or intervention* or meeting* or session* or strateg* or workshop* or visit*)
6. TX (behavior* N2 intervention*) or TI (behaviour* N2 intervention*) or AB (behavior* N2 intervention*)
7. TX (leaflet* or booklet* or poster or posters)
8. TX (written information) or TX (printed information) or TX (oral information)
9. TX (information* N2 campaign)
10. TX (education* N1 method*) or TX (education* N1 material*)
11. TX (outreach) or TX (facilitator*)
12. TX (opinion N1 leader*) or TX (education* N1 leader*) or TX (influential N1 leader)
13. TX (practice guideline*)
14. TX (guideline* N2 (introduc*or issu* or impact or effect* or disseminat* or distribut*))
15. TX ((effect* or impact or evaluat* or introduc* or compar*) N2 training program*)
16. TX (reminder*) or TX (recall N2 system*) or TX (prompter*) or TX (prompting)
17. TX (chart review*)
18. TX ((effect* or impact or records or chart*) N2 audit)
19. TX (compliance) or TX (marketing)
20. 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19
21. TX multidisciplinary practices OR TX ambulatory medical care
22. TX Health practitioners OR Health Personnel
23. TX family practice OR TX family physicians
24. TX ("patient care planning" or "case management"
25. TX (integrat* N2 care) or TX (integrat* N2 service*)
26. TX (care N2 (coordinat* or program* or continuity))
27. TX (chang* N2 location*) or TX (home N2 treat*)
28. 21 or 22 or 23 or 24 or 25 or 26 or 27
29. TX medical records
30. TX peer review OR TX utilization review
31. TX Quality Assurance OR TX Outcome Assessment OR TX Quality Improvement OR TX Quality of Health Care OR TX Program Evaluation OR TX Referral OR TX Telephone
32. TX Process Assessment
33. TX (computer* N2 diagnosis) or TX (computer* N2 decision*)
34. TX ((standard or usual or routine or regular or traditional or conventional or pattern) N2 care)
35. TX (program*N2 (reduc* or increas* or decreas* or chang* or improv* or modif* or monitor* or care))
36. TX ((effect* or impact or evaluat* or introduc* or compar*) N2 "treatment program*")
37. TX ((effect* or impact or evaluat* or introduc* or compar*) N2 "care program*")
38. TX ((effect* or impact or evaluat* or introduc* or compar*) N2 "screening program*")
39. TX ((effect* or impact or evaluat* or introduc* or compar*) N2 "prevention program*")
40. TX ((introduc* or impact or effect* or implement* or computer*) N2 protocol*)
41. TX (effect* N2 (legislation or regulations or policy)) or TX (impact* N2 (legislation or regulations or policy)) or TX (introduc* N2 (legislation or regulations or policy))
42. TX (information N2 management) or TX (information N2 system*)
43. TX ("physician practice patterns") or TX ("quality assurance")
44. TX ("triage" or "managed care")
45. TX ("physician patient interaction*") or TX ("physician patient relationship*")
46. 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 or 41 or 42 or 43 or 44 or 45

47. 20 or 46
48. 3 and 28 and 47
49. Restrictions to year 2004 onwards and English language

Web of Science

1. **TOPIC:** (obesity) *OR* **TOPIC:** (weight management) *OR* **TOPIC:** (weight loss)
2. **TOPIC:** (family practice) *OR* **TOPIC:** (general practice) *OR* **TOPIC:** (primary care) *OR* **TOPIC:** (care NEAR/2 (coordinat* OR program* OR continuity)) *OR* **TOPIC:** (health personnel)
3. **TOPIC:** (medical education) *OR* **TOPIC:** (education NEAR/2 (program* OR intervention OR meeting OR session OR strateg* OR workshop OR visit))
4. **TOPIC:** (publications) *OR* **TOPIC:** ((written OR printed OR oral) NEAR/2 information) *OR* **TOPIC:** (information NEAR/2 campaign) *OR* **TOPIC:** (education NEAR/2 (method OR material))
5. **TOPIC:** (outreach) *OR* **TOPIC:** ((opinion OR education* OR influential) NEAR/1 leader) *OR* **TOPIC:** (facilitator) *OR* **TOPIC:** (practice guideline) *OR* **TOPIC:** (reminder) *OR* **TOPIC:** (decision support system) *OR* **TOPIC:** (recall NEAR/2 system)
6. **TOPIC:** (guideline NEAR/2 (introduc* OR issu* OR impact OR effect* OR disseminat* OR distribut*))
7. **TOPIC:** ((effect* OR impact OR evaluat* OR introduc* OR compar*) NEAR/2 training)
8. **TOPIC:** ((effect* OR impact OR records OR chart*) NEAR/2 audit) *OR* **TOPIC:** (feedback) *OR* **TOPIC:** (compliance) *OR* **TOPIC:** (marketing) *OR* **TOPIC:** (recall NEAR/2 system*)
9. **TOPIC:** (((effect* OR impact OR evaluat* OR introduc* OR compar*) NEAR/2 (treatment OR care OR screen* OR prevent*) NEAR/2 program*))
10. **TOPIC:** (outcome assessment) *OR* **TOPIC:** (program evaluation) *OR* **TOPIC:** (triage) *OR* **TOPIC:** (referral) *OR* **TOPIC:** ((physician AND patient NEAR/2 (interaction OR relationship))) *OR* **TOPIC:** (managed care)
11. **TOPIC:** ((program* NEAR/2 (reduc* OR increas* OR decreas* OR chang* OR improv* OR modify* OR monitor* OR care)))
12. **TOPIC:** (((effect* OR impact OR introduc* OR implement* OR computer*) NEAR/2 (treatment OR care OR screen* OR prevent*) NEAR/2 protocol*))
13. **TOPIC:** (((effect* OR impact OR introduc*) NEAR/2 (legislation OR regulations OR policy)))
14. **#3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13**
15. **#1 AND #2 AND #14**

Refined by: **RESEARCH AREAS:** NUTRITION DIETETICS OR HEALTH CARE SCIENCES SERVICES OR COMMUNICATION OR PSYCHOLOGY OR SOCIAL SCIENCES OTHER TOPICS OR EDUCATION EDUCATIONAL RESEARCH OR BEHAVIORAL SCIENCES OR SOCIOLOGY OR COMPUTER SCIENCE OR ANTHROPOLOGY OR MEDICAL ETHICS OR RESEARCH EXPERIMENTAL MEDICINE OR PUBLIC ADMINISTRATION

Restricted to year 2004 onwards and English language.

Science Direct

(obesity OR weight loss) AND (primary care OR general practice OR family practice) AND (refer* OR education* OR screen* OR feedback OR training OR guideline OR evaluat* OR effect* OR identif*)

Decision Sciences
Medicine and Dentistry
Nursing and Health Professions
Psychology
Social Sciences

Article
Review article
Short survey

2004 to date

Limit to 'topics' **"patient, weight loss, bariatric surgery, primary care, health care, life style, diabetes"**

Appendix 12: Data extraction form for Phase 2

Data Extraction – done by (initials) on (date)

Article Details			
Study Title			
Authors			
Journal, Vol, Issues, Page nos.			
Study Details	**Provided**	**Not provided**	**Unclear**
Country study set in			
Reimbursement system (if known) e.g. fee-for-service, capitation, mixed?			
Year study conducted			
Setting of care (e.g. general practice, outpatient)			
What is the research question or research objective(s)?			
How are participants sampled? (e.g. theoretical, purposive, random)	Patients: Practitioners:		
How were participants recruited?	Patients: Practitioners:		
Participants – patients (e.g. adults with overweight/obesity/diabetes)?			
Mean BMI			
Number of patient participants			
Age of patient participants			
Gender			
Ethnicity			
Socio-economic status			
Co-morbidities mentioned (give details)			
Exclusions			
Participants –			

practitioners (e.g. GPs or PNs)?			
Level of training/Experience			
Proportion of eligible providers who participated			
Number of practitioners			
Age			
Gender			
Practice characteristics (e.g. urban, rural, singlehanded)?			
Exclusions			
What type of study is it? (e.g. RCT, cohort, qualitative etc)			
Details of the intervention (e.g. what is the 'resource(s)' provided?)			
Timing of the intervention (e.g. Frequency, duration, etc.)			
Intervention Recipient (individual or group)			
Intervention Deliverer (individual or group)			
Practitioner behaviour targeted? (e.g. increased referral)			
Any suggestion by the authors of mechanisms of action of the chosen intervention strategies?			
Consultation with recipients?			
Evidence base of intervention? (e.g. any reference to 'theory' – either implementation or behaviour change or other?)			
Barriers to change identified?			
Details of control conditions (if appropriate)			
Any indicators of acceptability to users?			
RESULTS Primary outcome			
Secondary outcome			
Losses to follow-up			
Ethical approval sought			

and obtained?			
How is data collected?			
How is data analysed? (e.g. grounded theory, thematic analysis)			
What is the overall conclusion or recommendations of the study?			
What (if any) study limitations are declared?			
How is the study funded? Are any conflicts of interest declared?			

Reviewer's notes on 'what is going on here?' 'What are the mechanisms?'

Other notes

Reporting	Yes (1)	No/Unclear (0)
1. *Is the **hypothesis/aim/objective** of the study clearly described?*		
2. *Are the **main outcomes** to be measured clearly described in the Introduction or Methods section?*		
3. *Are the **characteristics of the patients** included in the study clearly described?*		
4. *Are the **interventions of interest** clearly described?*		
5. *Are the **distributions of principal confounders** in each group of subjects to be compared clearly described?*		
6. *Are the **main findings** of the study clearly described?*		
8. *Have all important **adverse events** that may be a consequence of the intervention been reported?*		
9. *Have the characteristics of **patients lost to follow-up** been described?*		
External validity		

11. *Were the subjects **asked to participate** in the study representative of the entire population from which they were recruited?*		
12. *Were those subjects **who were prepared to participate** representative of the entire population from which they were recruited?*		
13. *Were the **staff, places, and facilities** where the patients were treated, representative of the treatment the majority of patients receive?*		
Internal validity - bias		
15. *Was an attempt made to **blind those measuring** the main outcomes of the intervention?*		
16. *If any of the results of the study were based on **"data dredging"**, was this made clear?*		
17. *In trials and cohort studies, do the analyses **adjust for different lengths of follow-up** of patients, or in case-control studies, **is the time period** between the intervention and outcome **the same** for cases and controls?*		
18. *Were the **statistical tests** used to assess the main outcomes appropriate?*		
19. *Was **compliance with the intervention**/s reliable?*		
20. *Were the main **outcome measures used accurate** (valid and reliable)?*		
Internal validity - confounding (selection bias) 21. *Were the patients in different intervention groups (trials and cohort studies) or were the cases and controls (case-control studies) **recruited from the same population**?*		
22. *Were study subjects in different intervention groups (trials and cohort studies) or were the cases and controls (case-control studies) **recruited over the same period of time**?*		
23. *Were study subjects **randomised** to intervention groups?*		
25. *Was there adequate **adjustment for confounding** in the analyses from which the main findings were drawn?*		
26. *Were **losses of patients to follow-up** taken into account?*		
Power 27. *Did the study have **sufficient power** to detect a clinically important effect where the probability value for a difference being due to chance is less than 5%?*		
TOTAL		/23

Appendix 13: Detailed summary of included studies for Phase 2

Appendix 1: Characteristics of individual studies

AUTHOR (YEAR)	LOCATION	AIM	STUDY DESIGN (QUALITY)	PARTICIPANTS (PRACTITIONERS)	PARTICIPANTS (PATIENTS)	MAIN OUTCOME(S)
Laws (2004)	**UK**	To collect national (anonymous) obesity data from primary care registers. • To develop treatment models for the management of obesity in primary care. • To facilitate the implementation of these treatment models into primary care. • To evaluate the impact of these models of care, and to inform future practice.	Quality improvement study (Poor)	7 regions of UK – 10 practices in each region (except Aberdeen, where 20 practices recruited)	**N=1256** **Mean BMI** was 36.9 kg m^2 (SD 5.4) **Female = 74%** **Mean age** = 50.6	91% received one of the core lifestyle interventions in the first 12 months. 34% achieved a clinical meaningful weight loss of 5% or more.
Lemay (2004)	New England, **USA**	To evaluate the effectiveness of BMI tables left in examination rooms as an intervention to encourage providers to calculate and record BMI scores in patients' medical records.	Prospective cohort study – intervention and control (Fair)	Federally funded community health centre	**N=276** No Mean BMI data **Female = 75%** **Mean age** = 39.2	Increased recording of BMI in patient's chart (49% vs 17%, p=0.0001)
Katz (2005)	**Israel**	The study objective was to determine if an interactive course would raise the self-efficacy of family practitioners (FPs) to treat obesity. The objectives of	Pre-post test design; **no control** group; some qual interviews	Twenty-nine FPs (62% female) chose to participate in the course along with other Continuing	No patient data	Self-reported increases in self-efficacy to treat obesity

AUTHOR (YEAR)	LOCATION	AIM	STUDY DESIGN (QUALITY)	PARTICIPANTS (PRACTITIONERS)	PARTICIPANTS (PATIENTS)	MAIN OUTCOME(S)
		the course were to enrich the knowledge of FPs with up-to-date information on obesity and to raise their motivation to treat it.	(Poor)	Medical Education (CME) courses. All participants work as FPs in public health care clinics throughout the country		
Flocke (2006)	Ohio, **USA**	The purpose of this study was to evaluate the effect of a practice-tailored intervention using Internet-based tools on the outcomes of clinician discussions of health behaviour change, referral to patient education and community resources, and patient movement in stage of motivation to change health behaviour.	A mixed-method longitudinal pre- and post-test study design. (Good)	The seven participating practices included one solo physician practice, and single-specialty family practices ranging in size from 2 to 12 clinicians	**N=789** Pre-intervention cohort: 368 Post-intervention cohort: 421 **Mean BMI = 29.4** (SD 7.2; pre) / 29.5 (SD 7.7; post) **Female = 77.5%** (pre) / 68.5% (post) **Mean age = 42.5** (SD 14.1; pre) / 43.2 (SD 15.0; post)	Increased rates of discussion of diet (25.7% vs 20.2%), exercise (27.8% vs 16.9%), and **weight management (23.2% vs 16.3%, OR 1.57 (1.35-1.81), p<0.001).** Increased recommendation to consider looking into community programmes
Bordowitz (2007)	New York, **USA**	To evaluate if implementing an automatic calculation of BMI in an electronic medical record (EMR) vital signs section improves clinicians' documentation and treatment of overweight and obese patients.	Before – after study (Poor)	10 attending physicians, 18 family medicine residents, and approximately 120 medical students who saw patients in the health centres.	**N=302** patient charts (153 charts before EMR and 149 charts after EMR). **Mean BMI = 29.2** (±6.6)(before); 28.5(±7.2)(after)	**Increased documentation of obesity from 31% to 71%** (prevalence ratio =2.30, 95% CI= 1.44-3.68) Documentation of treatment of obese patients also improved, from 35% to 59%, (PR=1.84, 95% CI=1.19-2.86)

AUTHOR (YEAR)	LOCATION	AIM	STUDY DESIGN (QUALITY)	PARTICIPANTS (PRACTITIONERS)	PARTICIPANTS (PATIENTS)	MAIN OUTCOME(S)
					Female = 66% (before); 64% (after) **Mean age** = 41(±16.1) (before); 36(±12.7) (after)	
Aspy (2008)	Oklahoma, **USA**	To test an implementation strategy that included audit with feedback, training, practice facilitation, and quality-circle meetings on screening and intervention rates for each of four behaviours: tobacco use, unhealthy diet, physical inactivity, and risky alcohol use.	Non-controlled, non-randomised intervention study (Poor)	Of the 30 clinicians invited to participate, ten completed training and nine actually implemented changes in their process of care, resulting in an adoption rate of 30% (9/30)	No patient data	Increase in screening for diet (25.8% to 69.0%) and physical activity (0% to 23.6%) Increase in brief intervention for diet (2.9% to 21.3%) and physical inactivity (2.9 to 21.0%)
Clark (2008)	Indiana, **USA**	To report the reach (in terms of primary care provider (PCP) prescriptions and patient first visits) of Take Charge Lite (TCL), a lifestyle weight management programme, in primary care.	Observational - audit (Poor)	Two full-time and five part-time primary care providers (i.e., general internal medicine, family practice, and an adult nurse practitioner)	**N=2528** **Mean BMI** = 38.2 (Range: 30-89; SD 7.8) **Female = 71%** No Mean age, just ranges	Increase in referral from 5% at baseline to around 20% Of those screened positive for overweight/obesity, 5,034 (40.3%) received a TCL referral from their PCP
Ross (2008)	**UK**	To determine to what extent measures of success [in adult weight management] seen in intensive clinical trials can be achieved in routine	QI – non-randomised (Fair)	Of 65 practices agreeing to participate in the Counterweight Programme, 56 participated.	**N=1906** **Mean BMI** = 37.1 (6.0) **Female = 77%**	Mean weight change in those who attended and had data at 12 months (*n* = 642) was –3.0 kg (95% CI = –3.5 to –2.4 kg) and at 24 months (*n* = 357) was –2.3 kg (95% CI = –3.2 to –1.4 kg)

AUTHOR (YEAR)	LOCATION	AIM	STUDY DESIGN (QUALITY)	PARTICIPANTS (PRACTITIONERS)	PARTICIPANTS (PATIENTS)	MAIN OUTCOME(S)
		primary care.			Mean age = 49.4 (SD 13.5)	
Ely (2008)	Kansas, USA	To conduct a pilot randomized trial of a chronic care model programme for obesity care in rural Kansas primary care.	Pilot RCT (Good)	3 practices in 3 frontier rural counties	N=107 Active arm n=51. Control arm n=56. Mean BMI (SD) = 36 (7.3). Female = 71% Mean age = 49 (SD 14)	Day 180 mean (SD) weight change for the active and control arms, respectively, was −9.4 (10.3) pounds and −2.1 (10.7) pounds (P = 0.01 for difference)
Krist (2008)	Virginia, USA	To test the feasibility of an electronic linkage system (eLinkS) to help connect primary care practices with community resources to support behavioural counselling.	Non-randomized, pre-post design, feasibility evaluation (Fair)	9 practices (Two sites were solo practices, five had 3 clinicians, one had 8 clinicians, and one (a family medicine residency programme) had 30 part-time clinicians and residents)	N=5679 No Mean BMI; BMI ≥25-29 kg/m² = 1415 (25%) BMI ≥30 kg/m² = 2197 (39%) Female = 64% Median age = 53 years	The % of patients with unhealthy behaviours who received intensive counselling through eLinkS (10%) exceeds practice norms. Advice given to 17% of obese patients – 12% of obese patients received a referral
Schuster (2008)	Ohio, USA	To improve physician awareness and improve outcomes of overweight/obesity.	Before and after analysis of medical records (Poor)	Family physicians who are part of Premier HealthNet group. Total of 100+ physicians in the group; 21 took	N=641 Mean BMI = Intervention group at baseline (n=102): 29.6.	Increase in recording of obesity management in patient records: Intervention group: 2.4% to 9.2% (p=0.001). Enhanced intervention group: 3.9% to 15.6% (p-0.002). Increase in % physicians

AUTHOR (YEAR)	LOCATION	AIM	STUDY DESIGN (QUALITY)	PARTICIPANTS (PRACTITIONERS)	PARTICIPANTS (PATIENTS)	MAIN OUTCOME(S)
				part working in 5 offices.	Enhanced intervention group (n=104): 30.66 **Female = 60%** No Mean age; 32% >18-45 42% >46-65 26% >65	"comfortable" discussing obesity from 53% at baseline to 100% at 12 months (p=0.041).
Schriefer (2009)	North Carolina, **USA**	To evaluate whether or not the inclusion of a computerized BMI chart prompt as a vital sign on an electronic medical record would increase the likelihood that patients would receive a diagnosis of obesity and referral for treatment from their family physicians.	Before-and-after (non-randomised) controlled trial (Good)	Family medicine residency programme clinic: 37 physicians in total (18 intervention and 19 control)	N=846 (379 intervention and 467 control) **Mean BMI** not reported 　　　　Prompt Control Class I 46.7%　47.1% Class II 29.3%　27.8% Class III 24.0%　25.0% **Female = 68%** No Mean age data 20-30 10.3%　12.6% 31-40 19.5%　16.5% 41-50 21.9%　21.4% >51　48.3%　49.5%	Obese patients of physicians who had a BMI chart prompt in their medical records were significantly more likely than obese patients of physicians who did not receive a BMI chart prompt to receive a diagnosis of obesity (16.6% versus 10.7%; P=.016), and to receive a referral for diet treatment (14.0% versus 7.3%, P=.002) and exercise (12.1% versus 7.1%, P=.016).
Clark (2010)	Indiana, **USA**	To report on the percent of adult patients successfully screened for overweight or obesity, the percent of positive screens that received a primary	Retrospective evaluation (Fair)	Five CHCs were used for the analyses reported in the paper. These were staffed with	N=12,487 eligible **Mean BMI (SD).** All TCL eligible: 34.7 (8.6)	Increase in referral from 5% at baseline to around 20% Of those screened positive for overweight/obesity, 5,034 (40.3%) received a TCL referral

AUTHOR (YEAR)	LOCATION	AIM	STUDY DESIGN (QUALITY)	PARTICIPANTS (PRACTITIONERS)	PARTICIPANTS (PATIENTS)	MAIN OUTCOME(S)
		care practitioner (PCP) referral, the percent of referred patients with Take Charge Lite (TCL) contact, the number of contacts, and the association between number of contacts and weight loss.		anywhere from six to 11 full- and part-time PCPs (i.e., general internal medicine, family practice, and nurse practitioners), as well as temporary internal medicine residents.	**Female** = 71.2 **Mean age (SD)** All TCL eligible: 43.3 (15.0)	from their PCP
Jay (2010)	New York, **USA**	To measure the impact of an obesity counselling curriculum on resident physicians' obesity counselling, operationalized as the use of 5As counselling strategies.	Non-randomized, wait-list/control design (Good)	23 resident physicians in the primary care residency programme in this study	**Total N= 152** n=74 (control) n=78 (intervention) **Mean BMI** (SD) 34.5 (4.6)(control) 33.8 (3.8)(int) **Female = 73%** (control); 71% (int) **Mean age** = 43.5 (13.45) (control) 46.1 (13.7)(int)	Small but significant effects of the intervention on **quality of counselling** but not on the rate of counselling
Wilson (2010)	Virginia, **USA**	To test a clinician-delivered intervention that utilized community resources for in-depth counselling for unhealthy behaviours including overweight.	Pre/Post study design. (Fair)	Nine primary care practices in a small town, semi-rural setting.	**N=146** **Mean BMI** Group counselling: 34.8. Telephone counselling: 35.0.	**Group counselling:** stat sig reductions in weight (3.5kg, p<0.001) **Telephone counselling:** reduction in mean body weight (2.0kg, p=0.037) **Usual care:** Small non-sig

AUTHOR (YEAR)	LOCATION	AIM	STUDY DESIGN (QUALITY)	PARTICIPANTS (PRACTITIONERS)	PARTICIPANTS (PATIENTS)	MAIN OUTCOME(S)
		(eLINKS)			Usual care: 31.0. **Female = 70%** **Mean age** (range) Overall: 57 (23-90)	reductions in body weight (0.30kg)
Christian (2011)	Colorado, **USA**	To test the effect of a computerized support tool to enhance brief physician-delivered health lifestyle counselling to patients with increased metabolic risk factors during two usual care visits.	Prospective controlled trial (Good)	Two large urban community-based health centres: the Pueblo Community Health Centres (PCHCs)	**N=263** (130 control; 133 intervention) **Mean BMI** = 33.8 (7.3)(control); 34.7 (7.4)(int) **Female = 66.9%** (control); 69.9% (int) **Mean age** = 50 (11.8)(control); 49.2 (13.0)(int)	Significantly more patients in the intervention group lost ≥5% of their body weight at 12 months than controls (26.3% vs 8.5%; odds ratio=3.86; *P*<0.01).
Banerjee (2013)	Philadelphia, **USA**	To determine how often obesity was included on the problem list and whether adding obesity to the problem list affected the rate at which it was addressed in future visits.	RCT (Good)	Urban family medicine residency office. There were 51 providers seeing patients in this office: 39 resi-dents, nine faculty members, and three physician assistants.	**N=497** Intervention: 258 Control: 239 **Mean BMI** = Intervention: 34.9 (4.8) Control: 34.3 (4.4) **Female = 73%** **Mean age** = Intervention: 48.0	During the 5-month follow-up, obesity was addressed for 38 of 258 (14.7%) patients in the intervention group, compared with 11 of 239 (4.6%) patients in the control group (*P*<.001).

AUTHOR (YEAR)	LOCATION	AIM	STUDY DESIGN (QUALITY)	PARTICIPANTS (PRACTITIONERS)	PARTICIPANTS (PATIENTS)	MAIN OUTCOME(S)
					(16.9) Control: 46.0 (16.4)	
Jay (2013)	New York, **USA**	To assess whether a 5-h multimodal longitudinal obesity curriculum for residents on the basis of the 5As (assess, advise, agree, assist, and arrange) was associated with weight loss in their obese patients.	Retrospective chart review (Good)	All 23 residents in the New York University School of Medicine (NYUSOM) primary care internal medicine residency programme (12 intervention; 11 control)	**N=87** (intervention = 46; control = 41) **Mean BMI** = 33.69 **Female = 72%** **Mean age** = 48.26 (14.32)	**Mean Weight loss** of 1.53kg (SD 3.72) in intervention group compared to 0.30kg (SD 3.60) weight gain in control. **Referrals:** 21 (45.7%) in intervention group versus 11 (26.8%) in control
Muo (2013)	New York, **USA**	To investigate the impact of the availability of height and weight data, in the form of BMI chart reminders, on physician documentation of BMI and documentation of abnormal weight diagnosis and management.	Retrospective intervention study (Fair)	Federally funded health centre. 30 residents and 14 attending internists provide primary care in the internal medicine practice.	**N=406** (out of 486) **Female = 71%** **Mean age** = 54 (SD: 15) No Mean BMI data: **Number (%):** Underweight (BMI<18.5) =**4** (0.8) Normal weight (BMI>18.5 and <25.0) =**86** (17) Overweight (BMI>25.0 and <30.0) =**152** (31) Obese (BMI>30) =**218** (45) Missing data for BMI calculation =**31** (6)	**Significant increase** in the proportion of charts with **documented BMI** (2.5 vs 5%, P < 0.04). No difference in the rate of physician **documented weight-management plan** before and during the intervention (9.1 vs 9.8%, P = 0.75).

AUTHOR (YEAR)	LOCATION	AIM	STUDY DESIGN (QUALITY)	PARTICIPANTS (PRACTITIONERS)	PARTICIPANTS (PATIENTS)	MAIN OUTCOME(S)
O'Grady (2013)	Minnesota, USA	To determine whether an automatic prompt for the clinician to recommend lifestyle changes to patients with a body mass index (BMI) >25 kg/m2 led to greater weight loss over a 3- to 6-month interval compared with the absence of a clinical reminder	Retrospective before-after case note review (Fair)	No info on practitioners	N=1600 Mean BMI = 32.3 ± 7.4 Female = 60% No Mean age: 18–29 = 281 30–44 = 562 45–59 = 1271 60-75 = 1086	The mean (± SD) change in weight was -0.51 (± 9.83) kg in the clinical reminder group, which did not significantly differ from the -0.35 (± 9.40) kg change in the controls (P = .64). Physician diagnoses of obesity or hyperlipidaemia were associated with weight loss, suggesting that formally noting these diagnoses contributes to successful weight loss
Sinfield (2013)	UK	To investigate tailored implementation (i.e. investigating the context and barriers to change before selecting appropriate interventions) by two implementation groups as a part of a study to improve adherence to NICE guidelines on adult obesity in primary care.	Pilot study of small-group QI Approach (Poor)	Implementation group A (n = 6) consisted of three medical practitioners, two PCT managers and a member of the research and development (R&D) support staff from a mental health trust. Implementation group B (n = 6) consisted of three PCT staff, two university academic staff and a member of the R&D support	No patient data	The practices had not identified as many people with obesity as predicted from population surveys (12% vs 26%) and interventions to assist weight loss were not delivered consistently, e.g. dietary advice was provided for approx. 39% of adults with obesity; referral to weight loss services was for <1% of patients.

AUTHOR (YEAR)	LOCATION	AIM	STUDY DESIGN (QUALITY)	PARTICIPANTS (PRACTITIONERS)	PARTICIPANTS (PATIENTS)	MAIN OUTCOME(S)
				staff from a mental health trust.		
Wilkes (2013)	Illinois, **USA**	To determine whether the Quality Improvement Collaborative (QIC) model can be feasibly implemented with limited resources at community health centres in order to improve weight management programmes.	Qualitative evaluation (Poor)	Five health centres, representing diverse settings across the Midwest, enrolled in the COACH collaborative	No patient data	Qualitative evaluation. Participants reported improved ability to identify overweight patients in need of weight management. Three of the five teams reported an increasing ability over time to engage their providers in order to increase referrals to the weight management programme.
Erickson (2014)	Minnesota, **USA**	(1) to evaluate the extent of guideline translation across organizations and (2) to assess the Omaha System as a method for translating system-level interventions and measuring outcomes.	Retrospective, mixed methods research (Poor)	10 Administrators and 29 Clinicians (12 PHNs, five RNs, four NPs, two physicians, two physician assistants, and one each of the following: registered dietitian, physical therapist, occupational therapist, and physical therapy assistant.)	No patient data reported	On a scale of 1–5 (1 = low/neg; 5 = high/pos), the average Knowledge Behaviour Status (KBS) ratings across partner orgs increased over two points from baseline to 3 years follow-up.
Shungu (2015)	North Carolina, **USA**	To determine whether attaching a physical reminder card to patient encounter forms would	QI study – before and after	Data were collected from one team (team number two),	490 unique charts, of whom 211 (43.1%) were obese, were reviewed in the pre-	Increase in assessment of obesity or morbid obesity, defined as clicking on obesity or morbid obesity as an active

AUTHOR (YEAR)	LOCATION	AIM	STUDY DESIGN (QUALITY)	PARTICIPANTS (PRACTITIONERS)	PARTICIPANTS (PATIENTS)	MAIN OUTCOME(S)
		increase electronic medical record (EMR) assessment of and documentation of obesity and dietary counselling	(Fair)	comprised of seven attending and 10 resident physicians, at a large urban academic family medicine practice	intervention period. A total of 329 charts, of whom 127 (38.7%) were obese, were reviewed in the intervention period	problem in the problem list in the EMR chart for the patient, **42.5% vs 28.0% (p=0.006)** but no difference in dietary counselling.
Baer (2015)	Massachussetts, **USA**	(1) To develop EHR-based tools to help primary care providers identify, evaluate, and treat patients who are overweight or obese and (2) to conduct a cluster-randomized trial to examine the effectiveness of the new EHR-based tools.	Pragmatic clinical trial (Good)	The 12 practices were divided into 23 clinical areas or teams	**Phase 2 N=20886 (control) N=14779 (int)** Adults with overweight/obesity **Mean BMI** was 31.1 (control) and 31.2 (intervention). **Female = 54% (control), 61% (int)** **Mean age** = 53.3 years (control) and 53.7 (int)	Increase in recording of OV/OB on problem list, from 36% to 71%, compared to 16% to 8% in control group (p<0.0001). No significant differences in weight loss meds or nutrition counselling among pts with BMI>27
Steglitz (2015)	Illinois, **USA**	To examine whether implementation of an obesity intake protocol and an electronic health record (EHR) obesity management form could improve evidence based obesity practices and outcomes in a Federally Qualified Health Center (FQHC).	Before and after study design (Fair)	12 clinicians recruited from a FQHC in West Chicago that served predominantly low-income, Hispanic adults	Pre (n=6624) Post (n=6960) * **Mean BMI** not reported Obese, n(%) 2237 (33.7) 2543 (36.5)* Overweight	**Clinician Surveys** Clinicians self-reported that their practice of assessing physical activity, diet, and obesity-related medical conditions increased after the addition of the obesity intake protocol and weight mx form. Although their attitudes about treating obesity showed no

AUTHOR (YEAR)	LOCATION	AIM	STUDY DESIGN (QUALITY)	PARTICIPANTS (PRACTITIONERS)	PARTICIPANTS (PATIENTS)	MAIN OUTCOME(S)
					1499 (22.6) 1841 (26.4)* **Mean age = 41**	significant change, clinicians also reported that the new protocol and EHR form made it easier to identify obese patients and increased their confidence about managing obesity. **Exposure study (n=46 cases, 46 controls)** NS
Barnes (2015)	West Virginia, **USA**	To evaluate the impact of the Provider and Healthcare team Adherence to Treatment Guidelines (PHAT-G) intervention on adherence to current obesity clinical practice guidelines in an academic primary care centre.	Longitudinal practice-based evaluation project	PHAT-G was implemented in a primary care centre operated by the School of Medicine at a large state university in West Virginia, located approximately 75 miles from an urban area.	**N=100 records** **Mean BMI** = 30.2 **No data reported on age or sex**	There was no routine documentation of BMI prior to the PHAT-G intervention. From time 1 (phase 1) to time 2 (phase 3), overall BMI documentation increased by 13%, which was significant ($P < 0.01$). Documentation rate of weight loss plan increased from 2 to 6 from time 1 to time 2 (NS)
Aveyard (2016)	**UK**	To establish whether physician brief intervention is acceptable and effective for reducing bodyweight in patients with obesity	parallel, two-arm, randomised trial (Good)	137 primary care physicians at 57 practices from across the south of England	**N=1882** Adults with obesity (BMI > 30 kg/m2) and a raised body fat percentage **Mean BMI** was 34.9 (SD = 4.8). **Female = 57%** **Mean age** = 56 years	As a result of the support intervention, 722 (77%) of 940 participants accepted referral to the weight management programme and 379 (40%) attended an appointment, compared with 82 (9%) participants who were allocated the advice intervention.

AUTHOR (YEAR)	LOCATION	AIM	STUDY DESIGN (QUALITY)	PARTICIPANTS (PRACTITIONERS)	PARTICIPANTS (PATIENTS)	MAIN OUTCOME(S)
					(SD = 16.1)	
Goodfellow (2016)	UK	To determine whether a tailored implementation intervention, in comparison with no intervention, increases the proportion of overweight/obese patients who are offered weight management as described in the NICE guidelines	Cluster randomised trial (Good)	16 control practices (6 rural, 10 urban); 12 intervention (3 rural, 9 urban)	N=32079 (control) N=17728 (int) Adults with overweight/obesity Mean BMI was 30.2 (control) and 30.5 (intervention). Female = 52% Mean age = 50 years (control) and 53 (int)	There were no significant differences in the proportion of patients offered a weight management programme between the control and intervention practices (15.1 % in the control practices, 13.2 % in the intervention practices, p=0.53).
Sturgiss (2017)	Australia	To describe the impact of participating in a pilot intervention for obesity management, The Change Programme, on the self-efficacy and confidence of Australian GPs	Nested mixed methods study (Poor)	12 GPs, from 5 different general practices, 1 rural and 4 urban	No patient data reported	Increase in GPs' confidence and self-efficacy by providing them with a structured toolkit for the management of obesity.

Appendix 14: Changes to GCWMS referral criteria

GLASGOW & CLYDE WEIGHT MANAGEMENT SERVICE – GUIDELINES FOR SCREENING AND REFERRAL

Table 1. Obesity Related Co-morbidities or Reasons for Additional Intervention (ARI)

List of Co-morbidities
- ☐ Previous CVA
- ☐ Previous CHD
- ☐ Diabetes   Type I ☐   Type 2 ☐
- ☐ Hypertension: Attending Blood Pressure Clinic
- ☐ Sleep Apnoea: Attending Sleep Apnoea Clinic
- ☐ COPD: FEV<50

Additional Reason For Intervention
- ☐ Patient is aged 18-25 years old
- ☐ Poor mobility requiring wheelchair, stick, frame or other aids
- ☐ Surgical Decision; weight loss required prior to surgery
  Please Describe ....
- ☐ If patient of Asian, South Asian, Chinese, Malay, Asian-Indian or Ethnic South & Central American origin, and has a waist circumference of ≥90cm for men or ≥80cm for women
- ☐ Iatrogenic: Requires medications which are causing weight gain (see medications list)

Please list medications: ....

Have alternative medication been tried Yes ☐   Not Possible ☐

Table 2. Prior to Referral to GCWMS. Please only refer to GCWMS once stable

Problem	Recommended management
Current Alcohol or Drug Abuse	Referral to Drug and Alcohol Services
Current Poorly controlled major psychiatric illness	Referral to psychiatry
Please describe:	
Hypothyroidism	Medical Treatment
Cushing's Syndrome	Refer to endocrinology
If attempting smoking cessation	Please delay referral for (>6 months)if successful

NB Results from the services listed above should be included with the referral Pregnant or breastfeeding women are excluded from Glasgow & Clyde Weight Management Service.

Table 3. Levels of Intervention – to access level 3 of GCWMS referral must be made from GP or Hospital Doctor

	BMI	Interventions
1	≥18.5 < 25	• Primary prevention initiatives using population based health promotion strategies and resources. *Eat Up Programme*
2	≥25 < 35 no - co-morbidity	• Local Authority activity & health-based programmes e.g. *Shape up or Live Active* • GP Practice based interventions - programmes led by Community Groups /Voluntary Sector GCWMS accredited or *Eat Up* • Commercial slimming organisations – Weight watchers, Slimming World, Scottish Slimmers
3	≥30+ co-morbidity/ARI ≥35 no co-morbidity	• GCWMS level 3 Multidisciplinary approach combining psychology, physiotherapy, dietetics and pharmacotherapy +/or surgery if clinically indicated
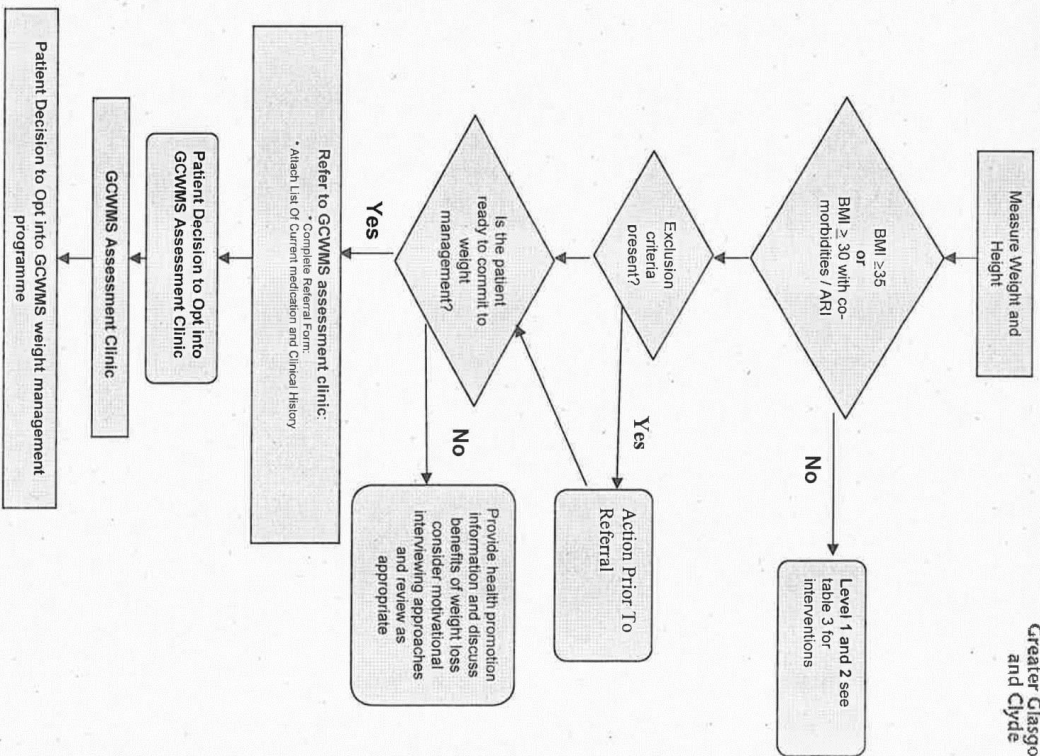
5

Measure Weight and Height

→ BMI ≥35 or BMI ≥ 30 with co-morbidities / ARI

No → Level 1 and 2 see table 3 for interventions

Yes → Exclusion criteria present?

Yes → Action Prior To Referral

No → Is the patient ready to commit to weight management?

No → Provide health promotion information and discuss benefits of weight loss consider motivational interviewing approaches and review as appropriate

Yes → Refer to GCWMS assessment clinic:
• Complete Referral Form:
• Attach List Of Current medication and Clinical History

→ Patient Decision to Opt into GCWMS Assessment Clinic

→ GCWMS Assessment Clinic

→ Patient Decision to Opt into GCWMS weight management programme

Referral Guidance for the Greater Glasgow and Clyde Weight Management Service

- The service is for patients 18 years and over
- Patients referred but deemed unsuitable will be referred back to the referrer with an explanation
- Patients must not have attended GCWMS within the last 12 months. (Unless there has been significant medical or social change.
- Patients with a BMI ≥45or who weigh ≥180kg do not need co-morbidities to be referred and will be sent to the specialist Glasgow and Clyde Weight Management Service
- Patients with South Asian/Chinese/middle Eastern Ethnicity have a lower BMI threshold and can be referred with a BMI of ≥27.5 rather than ≥30.

Referral criteria for GCWMS from 27 July 2016

Self Referral Criteria

BMI	+ one or more of the following co-morbidity
≥30 (27.5)*	Diabetes Heart disease Stroke

GP Referral Criteria

BMI	+ one or more of the following co-morbidity
≥25	Impaired fasting glucose/ Impaired glucose tolerance/High risk of T2DM T2DM
≥30 (27.5)*	T1DM T2DM Existing CVD Dyslipidaemia (High TG (≥3.0mmol/L) Mobility issues Weight loss required pre surgery
≥45	No co-morbidity required
≥180kg	No co-morbidity required

Acute Referral Criteria

BMI	+ one or more of the following co-morbidity
≥25	Impaired fasting glucose/ Impaired glucose tolerance/High risk of T2DM T2DM
≥30 (27.5)*	T1DM T2DM Existing CVD Dyslipidaemia (High TG (≥3.0mmol/L) Sleep Apnoea NAFLD Psoraisis Renal CKD4+ Hypertension Mobility issues Weight loss required pre surgery
≥45	No co-morbidity required

Referral Guidance for the Greater Glasgow and Clyde Weight Management Service

- The service is for patients 18 years and over
- Patients referred but deemed unsuitable will be referred back to the referrer with an explanation
- Patients must not have attended GCWMS within the last 12 months. (Unless there has been significant medical or social change).
- Patients with a BMI $\geq$40or who weigh $\geq$180kg do not need co-morbidities to be referred
- Patients with South Asian/Chinese/middle Eastern Ethnicity have a lower BMI threshold and can be referred with a BMI of $\geq$27.5 rather than $\geq$30 or with a BMI of $\geq$22.5 rather than $\geq$30 or if they have Type 2 diabetes or are at risk of developing type 2 diabetes.

Referral criteria for GCWMS from [Most recent]

Self Referral Criteria

BMI	+ one or more of the following co-morbidity
$\geq$25 (22.5)*	Type 2 diabetes
$\geq$30 (27.5)*	Diabetes (Type 1 and Type 2) Heart disease Stroke

Health Professional Referral Criteria

BMI	+ one or more of the following co-morbidity
$\geq$25 (22.5)*	Impaired fasting glucose/ Impaired glucose tolerance/High risk of T2DM T2DM
$\geq$30 (27.5)*	T1DM T2DM Existing CVD Mobility issues Weight loss required pre surgery
$\geq$30 (27.5)*	**Being seen in secondary care for:** Sleep Apnoea NAFLD Psoraisis Renal CKD4+ Hypertension
$\geq$40	No co-morbidity required
$\geq$180kg	No co-morbidity required

* Patients with South Asian/Chinese/middle Eastern Ethnicity have a lower BMI threshold

Appendix 15: Participant information leaflets for Phase 4

University | Institute of Health
of Glasgow | & Wellbeing

Improving Access to Weight Management

The ATTAIN study

Access To weighT manAgement IN primary care: a case study

Information about the research

You are being invited to take part in a research study. Before you decide whether to take part we would like you to understand why the research is being done and what it will involve for you.

The study aims to understand how people access NHS weight management services. We would like to do this by speaking to people who have been referred to an NHS Weight Management Service about their experience. A £20 gift voucher will be provided for your time.

Why have I been chosen?

You have previously attended the Glasgow & Clyde Weight Management Service (GCWMS). The GCWMS is helping us with our research by sending information about our study to adults aged 18 years or older with obesity.

Do I have to take part?

No, it is up to you to decide if you want to take part or not. Please read this information sheet to help you decide. Your current or future care will not be affected whether you decide to take part or not.

To find out more about the study, or tell us that you are interested in taking part, please return the form in the reply paid envelope or contact:

David Blane

General Practice & Primary Care

Institute for Health and Wellbeing

1 Horselethill Road,

University of Glasgow, G12 9LX

Telephone: 0141 330 5765

Email: David.Blane@glasgow.ac.uk

This study is sponsored by:

NHS
Greater Glasgow and Clyde

This study is funded by:

CHIEF SCIENTIST OFFICE

If you have **any concerns** about the research:

Professor Frances Mair

General Practice & Primary Care

Institute for Health and Wellbeing

1 Horselethill Road,

University of Glasgow, G12 9LX

Telephone: 0141 330 8312

PIL v2.1

04/03/15

Why is the study being done?

There are a number of health benefits to losing weight if you are overweight or obese. People with obesity often see their GP or practice nurse about their weight, or with problems that may be related to their weight. Some studies have shown that there is considerable variation in these consultations and the options that are presented to patients. We know, for example, that most people with obesity who may benefit from specialist NHS weight management services do not ever access them.

We want to find out about the experiences of patients who have been referred to a specialist NHS weight management service. We also want to speak to their GPs (or practice nurses) about their views on this referral process, so we can learn ways to improve it.

What will happen to me if I take part?

Participating in this study involves an audio-recorded interview that will **last approximately one hour.**

If you agree to take part a researcher will contact you to arrange a date and time that is convenient for you. The interview can take place either at your home, or at the weight management service. Or, if you prefer, we can do the interview over the phone.

At the interview, you will be asked about your experience of the weight management service, including the conversations that resulted in a referral being made and your reasons for seeing the GP or practice nurse on the day that the referral was made.

You will also have the opportunity to add any extra comments about your health, your weight, and your experience with weight management to date.

We will ask your permission to access the records held by the Glasgow & Clyde weight management service.

Will I benefit from taking part?

The information gathered from this study should help to improve the future care of people with obesity. There may be no direct benefits to you for taking part, although **you will receive a £20 gift voucher as a token of appreciation for your time.**

Could I come to harm by taking part?

This study will take up some of your time, approximately 60 minutes. There are no identifiable risks to you taking part in this study. In order to keep your personal information safe we will follow strict procedures, as below.

Will other people find out I am taking part in this study?

With your permission, we would like to inform your GP that you are taking part. This is because we are also wanting to speak to GPs and practice nurses about their experience of making referrals to the weight management service. Other than your GP no one else will find out. We have strict ethical and legal practices we must adhere to. All information which is collected about you during this study will be kept strictly confidential. Any information about you will have your identifiable details removed so you cannot be recognised.

What will happen to the results?

We will use the information from the study to write up reports. We will share the findings with other researchers and interested groups. These reports will not include any information which would allow you to be recognised. We can send you the results of the study if you are interested.

What do I do if I want to take part?

If you decide you might like to take part please fill out the reply form, and post it back in the reply paid envelope. If preferred you can phone or email the researcher (details overleaf).

What do I do if I don't want to / cannot take part?

Nothing. You may receive a follow-up letter but you can ignore this also.

Who is running the study?

The study is being conducted at the University of Glasgow. It is funded by the Chief Scientist Office (CSO) Scotland, and is sponsored by NHS Greater Glasgow & Clyde.

![University of Glasgow | Institute of Health & Wellbeing]

Improving Access to Weight Management

The ATTAIN study

Access To weighT manAgement IN primary care: a case study

Information about the research

You are being invited to take part in a research study. Before you decide whether to take part we would like you to understand why the research is being done and what it will involve for you.

The study aims to understand how people access NHS weight management services. In particular, we want to explore the barriers and facilitators to referral from primary care. We are doing this by speaking to patients who have been referred to weight management and to those involved in the referral process (i.e. GPs and practice nurses) about their experience. You will be reimbursed for your time.

Why have I been chosen?

A patient from your practice has recently attended the Glasgow & Clyde Weight Management Service (GCWMS) and has been interviewed by the research team about their experience. We are keen to speak to a GP or practice nurse who has been involved in this or other referrals to GCWMS. Patients have given us permission to contact their practice.

To find out more about the study, or tell us that you are interested in taking part, please return the form in the reply paid envelope or contact:

David Blane

General Practice & Primary Care

Institute for Health and Wellbeing

1 Horselethill Road,

University of Glasgow, G12 9LX

Telephone: 0141 330 5765

Email: David.Blane@glasgow.ac.uk

This study is sponsored by:

![NHS Greater Glasgow and Clyde]

This study is funded by:

![CHIEF SCIENTIST OFFICE]

If you have **any concerns** about the research:

Professor Frances Mair

General Practice & Primary Care

Institute for Health and Wellbeing

1 Horselethill Road,

University of Glasgow, G12 9LX

Telephone: 0141 330 8312

GPIS v2.1

04/03/15

Why is the study being done?

There are a number of health benefits to losing weight if you are overweight or obese. People with obesity often see their GP or practice nurse about their weight, or with problems that may be related to their weight. Studies have shown, however, that there are a number of barriers to talking about weight and wide variation in options that are presented to patients. We know, for example, that most people with obesity who may benefit from specialist NHS weight management services do not ever access them.

We want to find out about the experiences of patients who have been referred to a specialist NHS weight management service. We also want to speak to their GPs (or practice nurses) about their views on this referral process, so we can learn ways to improve it.

What do I do if I want to take part?

If you decide you might like to take part please fill out the reply form, which you received along with this information leaflet, and post it back in the reply paid envelope. If preferred you can phone or email the researcher Dr David Blane directly (details overleaf).

What will happen to me if I take part?

If you are interested in taking part we will contact you to arrange a date and time that is convenient for you. Participating in this study involves an audio-recorded interview that will **last approximately 45 minutes (one hour maximum).**

The interview can take place either at your practice, or at another location of your choice. Or, if you prefer, we can do the interview over the phone. We will start by going over the consent form, to answer any queries you might have and to ensure that it is signed.

At the interview, you will be asked about your experience of the weight management service, including any barriers or facilitators to making referrals to the service. You will also be asked to reflect on consultations that resulted in a referral being made. You will also have the chance to talk generally about the management of obesity, or other aspects of health behaviour change.

Interviews will be audio-recorded, so that a transcription can be typed, at which point all identifying details will be removed.

Do I have to take part?

No, it is up to you to decide if you want to take part or not.

Will I benefit from taking part?

The information gathered from this study should help to improve the future care of people with obesity. There may be no direct benefits to you for taking part, although the practice will be re-munerated for your time (if during working hours). If taking part in your own time, **you will receive a gift voucher as a thank you.**

Are there any risks involved?

There are no identifiable risks to you taking part in this study.

Will other people find out I am taking part in this study?

No. All information which is collected about you during this study will be kept strictly confidential. Any information about you will have your identifiable details removed so you cannot be recog-nised.

What will happen to the results?

The information we gather will be used to inform relevant policy makers. We plan to publish the results in relevant medical jour-nals, so that other researchers and practitioners can learn from the study. We will also write reports for other interested groups (e.g. the study funder). All information used will be anonymised so any report or journal articles published will not identify you or any other individual taking part. We can send you the results of the study if you are interested.

What do I do if I don't want to / cannot take part?

Nothing. You may receive a follow-up letter but you can ignore this also.

Who is running the study?

The study is being conducted at the University of Glasgow. It is funded by the Chief Scientist Office (CSO) Scotland, and is spon-sored by NHS Greater Glasgow & Clyde.

Appendix 16: Coding framework for Phase 4

<div align="center">

Coding framework

Phase 4 interviews

</div>

Hierarchical Name	Nickname
Nodes\\1) Access - candidacy constructs	
Nodes\\1) Access - candidacy constructs\Adjudication by professionals	Adjudication
Nodes\\1) Access - candidacy constructs\Asserting candidacy	Asserting
Nodes\\1) Access - candidacy constructs\Identification of candidacy	Identification
Nodes\\1) Access - candidacy constructs\Local production of candidacy i.e. context	context
Nodes\\1) Access - candidacy constructs\Navigation of services	Appearing
Nodes\\1) Access - candidacy constructs\Offers of or Resistance to services	Resistance
Nodes\\1) Access - candidacy constructs\Permeability of services	Permeability
Nodes\\2) Patient factors	
Nodes\\2) Patient factors\concerns related to weight	
Nodes\\2) Patient factors\Cultural factors	
Nodes\\2) Patient factors\diet	
Nodes\\2) Patient factors\expectations of WMS	
Nodes\\2) Patient factors\Experience of GCWMS this time	
Nodes\\2) Patient factors\impact on function	
Nodes\\2) Patient factors\importance of timing	
Nodes\\2) Patient factors\influence of family	
Nodes\\2) Patient factors\motivation to lose weight	
Nodes\\2) Patient factors\patient characteristics	
Nodes\\2) Patient factors\Patient co-morbidities & other health behaviours	
Nodes\\2) Patient factors\Patient co-morbidities & other health behaviours\co-morbidities	
Nodes\\2) Patient factors\Patient co-morbidities & other health behaviours\co-morbidities\cancer	
Nodes\\2) Patient factors\Patient co-morbidities & other health behaviours\co-morbidities\diabetes	
Nodes\\2) Patient factors\Patient co-morbidities & other health behaviours\co-morbidities\mental health	
Nodes\\2) Patient factors\Patient co-morbidities & other health behaviours\co-morbidities\musculoskeletal problems	
Nodes\\2) Patient factors\Patient co-morbidities & other health behaviours\other unhealthy behaviours	
Nodes\\2) Patient factors\Patient co-morbidities & other health behaviours\other unhealthy behaviours\alcohol	
Nodes\\2) Patient factors\Patient co-morbidities & other health behaviours\other unhealthy behaviours\smoking	
Nodes\\2) Patient factors\physical activity	
Nodes\\2) Patient factors\Prev experience of GCWMS	
Nodes\\2) Patient factors\previous attempts to lose weight	
Nodes\\2) Patient factors\raising or framing the issue	
Nodes\\2) Patient factors\sources of support	

Nodes\\2) Patient factors\stigma or shame

Nodes\\2) Patient factors\views on bariatric surgery

Nodes\\2) Patient factors\weight history

Nodes\\3) Role of primary care

Nodes\\3) Role of primary care\expectation of GP

Nodes\\3) Role of primary care\GP access

Nodes\\3) Role of primary care\GP or PN responsibility

Nodes\\3) Role of primary care\previous experiences with GP

Nodes\\3) Role of primary care\previous experiences with GP\Continuity

Nodes\\3) Role of primary care\previous experiences with GP\Counterweight or KeepWell

Nodes\\3) Role of primary care\previous experiences with GP\Orlistat (Xenical)

Nodes\\3) Role of primary care\previous experiences with GP\Practice or Practitioner factors

Nodes\\3) Role of primary care\previous experiences with GP\Process issues e.g. EMR

Nodes\\3) Role of primary care\previous experiences with GP\Structure issues e.g. size

Nodes\\3) Role of primary care\referral process

Nodes\\3) Role of primary care\referral process\Factors influencing referral

Nodes\\3) Role of primary care\suggestions for change

Nodes\\4) Wider factors

Nodes\\4) Wider factors\Education or School interventions

Nodes\\4) Wider factors\Food environment

Nodes\\4) Wider factors\health (mis)information

Nodes\\4) Wider factors\Normalisation

Nodes\\4) Wider factors\Other, e.g. breastfeeding, genetics

Nodes\\4) Wider factors\sedentary lifestyles

Nodes\\4) Wider factors\socioeconomic factors

Nodes\\4) Wider factors\Sugar tax

Nodes\\4) Wider factors\Targeting resources

Nodes\\5) Practitioner factors

Nodes\\5) Practitioner factors\Barriers to Attendance

Nodes\\5) Practitioner factors\Barriers to Referral

Nodes\\5) Practitioner factors\Other services used

Nodes\\5) Practitioner factors\Practitioner perspectives

Nodes\\5) Practitioner factors\Practitioner perspectives\Awareness of service

Nodes\\5) Practitioner factors\Practitioner perspectives\responsibility

Nodes\\5) Practitioner factors\Role of primary care

Nodes\\5) Practitioner factors\Role of primary care\Discussing weight

Nodes\\5) Practitioner factors\Role of primary care\Documenting weight or obesity in notes

Nodes\\5) Practitioner factors\Suggestions for change

Nodes\\communication with primary care

Nodes\\communication with primary care\feedback

Nodes\\communication with primary care\ideas for the future

Nodes\\communication with primary care\meetings

Nodes\\communication with primary care\training

Nodes\\Comparison with Smoking Cessation

Nodes\\Interviewee characteristics

Nodes\\Interviewee characteristics\explanatory model of obesity

Nodes\\Interviewee characteristics\interviewee roles

Nodes\\Weight management service

Nodes\\Weight management service\access to bariatric surgery

Nodes\\Weight management service\changes to service

Nodes\\Weight management service\competing demands

Nodes\\Weight management service\Ethnic minorities

Nodes\\Weight management service\funding issues

Nodes\\Weight management service\Other services

Nodes\\Weight management service\policy docs

Nodes\\Weight management service\principles or theory

Nodes\\Weight management service\structure of service

Nodes\\Weight management service\structure of service\access

Nodes\\Weight management service\structure of service\drop out or attrition

Nodes\\Weight management service\structure of service\eligibility

Nodes\\Weight management service\structure of service\flexibility

Nodes\\Weight management service\structure of service\gaps in service

Nodes\\Weight management service\structure of service\gender balance in groups

Nodes\\Weight management service\structure of service\governance

Nodes\\Weight management service\structure of service\governance\evaluation

Nodes\\Weight management service\structure of service\mode of delivery

Nodes\\Weight management service\structure of service\staffing issues

Nodes\\Weight management service\structure of service\targeting

Nodes\\Weight management service\structure of service\triage

Nodes\\Weight management service\tailored services for co-morbidities

Nodes\\Weight management service\tailored services for co-morbidities\diabetes

Nodes\\Weight management service\tailored services for co-morbidities\learning disability

Nodes\\Weight management service\tailored services for co-morbidities\mental health

Nodes\\Weight management service\use of orlistat

Appendix 17: Patient Journey through GCWMS

Glasgow & Clyde Weight Management Service
GCWMS - Patient Journey

NHS
Greater Glasgow and Clyde

Patient is referred by GP or Hospital doctor

Patient **opts in to service** and makes a choice appointment for an assessment

Assessment Session
A clinical interview assessing mood, activity, dieting history and readiness to change. Patients are directed at this point to the psychological and activity intervention to match their needs.

Assessment **date & clinic venue sent** with questionnaires to complete
If weight less than 120Kg seen in community or more than 120Kg seen in main base

Psychology
Assessment prior to group if indicated e.g. purging, excessive binging / other psychological concern

Patient Opts in (within 6 months)
1. Choose group location and placed on group waiting list
2. Offered additional physiotherapy / pyschology if appropriate
3. Lettered 2 weeks prior to group starting

Patient **does not opt in** within 6 months - **Discharged**

With or without additional Psychology

Discharged or referred to appropriate service

16 weeks
Patient attends 9 x fortnightly group sessions of 1.5 hour
Sessions include behaviour change / diet & activity discussion at each session

End of Phase 1 - Options
- Further weight loss through lifestyle, use of medication, low calorie diet
or
- Maintain weight loss

(If not achieved 5Kg weight loss)
Continue Programme using option not yet tried

3 Months
Continuing programme
4 monthly sessions of 1 hour's duration following one of the above options to achieve further weight loss

MAINTENANCE
Monthly for 12 months

BARIATRIC SURGERY
- if not achieved 5kg weight loss
- BMI > 40 no co-morbidity
- BMI > 35 + co-morbidity
- < 60 years
- maintained weight or not gained 5kg
- Final decision by surgeon
- Criteria currently undergoing National review

MAINTENANCE
Monthly for 12 months

Discharged and signposted to community programme re referral > 12 months
Completed Programme

Discharged and signposted to community programme re referral > 12 months
Completed Programme

MIS 249539