THESIS

Obesity Monitoring in Schools

Submitted for the degree of Doctor of Philosophy (Public Health)

Medical Sciences Division, University of Oxford

Karina McHardy
Wolfson College, University of Oxford
Trinity Term 2012



DECLARATION OF AUTHORSHIP

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ABSTRACT

Background

Population level child measurement is an established international practice. However, there is limited clarity around the protocol and roles of school-based child measurement programmes (CMPs). Furthermore, questions remain about the positive and adverse outcomes associated with CMPs, as well as their longer-term sustainability. This research contributes new information by addressing these key unanswered questions.

Methods

This thesis describes a three-part, mixed methods research project incorporating: a systematic literature review of existing CMPs; an in-depth case study of England's National Child Measurement Programme; and the development, pilot implementation and evaluation of a CMP in Guernsey. This research was conducted sequentially; individual components informed and guided subsequent work.

Results

Routine child measurement is a popular, complex and adaptive practice and offers significant epidemiological value. The principal roles of CMPs are delivery of local prevalence data and assessment of longitudinal trends. However, CMPs are often tasked with additional, diverse and changing roles that do not translate to acknowledged outcomes. Specifically, feedback of individual results represents an unproven programme element. Programme roles can evolve according to political, logistical, or other influences, without consideration of available evidence or wider-reaching implications. There is no evidence of short-term harm from CMPs. Evaluation of the pilot CMP in Guernsey demonstrated that these programmes are perceived to be feasible, acceptable and sustainable.

Conclusions

To maximise the broader utility of CMPs, there should be clarity and consistency around their aims, roles and outcomes. Overall, surveillance reflects the preferred programme type. All CMPs should incorporate a standardised, rigorously applied protocol and routine evaluation. These features are essential to ensure the accuracy and comparability of resultant data, as well as programme credibility. Population level CMPs should not function in isolation; instead, they should be integrated into comprehensive strategies for obesity management. This research has important implications for CMP stakeholders and the wider public health arena.

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TABLE OF CONTENTS

Page

Declaration of authorship ii

Abstract iii

Acknowledgements v

List of figures xiii

List of tables xv

List of abbreviations xvii

Chapter One – Introduction **1**

1.1 OVERVIEW OF THIS RESEARCH 2

1.1.1 Research aims 3

1.1.2 Outline of research components 4

1.1.3 Structure of this thesis 9

1.2 OVERVIEW OF THE ISSUE 11

1.2.1 Obesity 11

1.2.2 Childhood obesity 13

1.2.3 Definitions of childhood overweight and obesity 16

1.2.4 Benefits and limitations of BMI 20

1.2.5 Alternatives to BMI 23

1.3 SURVEILLANCE AND SCREENING 27

1.4 POPULATION LEVEL CHILD MEASUREMENT PROGRAMMES 30

1.4.1 Background 30

1.4.2 The case for routine child measurement 31

1.5 SUMMARY 38

Chapter Two - Systematic Literature Review **40**

2.1 INTRODUCTION 41

2.2 METHODOLOGY 42

2.2.1 Research aims …… 42
2.2.2 Search strategy ……... 43
2.2.3 Inclusion and exclusion criteria …… 45
2.2.4 Software ……..... 47
2.2.5 Screening …… 47
2.2.6 Risk of bias assessment …… 48
2.2.7 Data extraction …… 49
2.2.8 Updated searches ……... 49
2.3 RESULTS …… 51
2.3.1 Presentation of results ……..... 51
2.3.2 Overview of included articles …… 51
2.3.3 Study information …… 54
2.3.4 Programme design …….. 55
2.3.5 Measurement protocol ……..... 57
2.3.6 Analysis of collected data ……... 62
2.3.7 Programme outcomes …… 65
2.4 DISCUSSION ……. 70
2.4.1 Overview of existing literature ……... 70
2.4.2 Overall programme aims, design and outcomes ……..... 73
2.4.3 Features of measurement protocols …… 77
2.4.4 Limitations …… 84
2.5 SUMMARY …….. 87

Chapter Three - Case Study: The National Child Measurement Programme (NCMP) ……... **90**

3.1 INTRODUCTION …… 91
3.1.1 The National Child Measurement Programme: Background ……... 92
3.1.2 Additional background and contextual information…… 98
3.2 CURRENT STUDY …… 101
3.2.1 NCMP: Existing literature ……...…….……... 101
3.2.2 Research aims ……..……..…… 106

3.2.3 Methodology ……. 108
3.3 RESULTS …… 118
3.3.1 Presentation of results ……... 118
3.3.2 Category: 'Programme' ……... 119
3.3.3 Category: 'Utility' (NCMP) …….. 133
3.3.4 Category: 'Threats' …….. 155
3.4 DISCUSSION …… 172
3.4.1 Overview of central findings …….. 172
3.4.2 Comparison with existing literature ……... 175
3.4.3 Limitations of the study ……... 179
3.4.4 NCMP in the future …….. 181
3.5 SUMMARY …….. 183

Chapter Four – The Guernsey Child Measurement Initiative: Development and Implementation ……..... **186**

4.1 INTRODUCTION …… 187
4.1.1 The Bailiwick of Guernsey …….. 187
4.1.2 Healthcare in Guernsey …….. 189
4.1.3 Primary education in Guernsey …… 190
4.1.4 Comparability with the UK …….. 191
4.1.5 Obesity in Guernsey ……... 192
4.1.6 The Obesity Strategy for Guernsey …….. 193
4.2 CURRENT STUDY …… 195
4.2.1 Research aims …… 195
4.2.2 Methodology: Pilot programme …… 196
4.2.3 Methodology: Analysis of anthropometric data ……... 214
4.3 RESULTS …… 216
4.3.1 Study population …….. 216
4.3.2 Participation rates ……..... 216
4.3.3 Requests for feedback of individual results …… 219
4.3.4 Adherence to GCMI measurement protocol ……... 219

4.3.5 Initial response to measurements …… 220
4.3.6 Public and media involvement in the GCMI ……... 221
4.3.7 Analysis of anthropometric data ……... 221
4.3.8 Assessment of agreement between repeat measurements …… 232
4.3.9 Overview of programme costs ……... 233
4.4 DISCUSSION …… 234
4.4.1 Weight status of Year 1 and Year 5 children in Guernsey ……... 234
4.4.2 Weight status classification by different reference curves ……... 236
4.4.3 Weight status classification by different digit rounding methods …… 238
4.4.4 Distinctions between the GCMI and NCMP protocols ……... 239
4.4.5 Limitations of the study ……... 240
4.5 SUMMARY …….. 243

Chapter Five – The Guernsey Child Measurement Initiative: Evaluation ……. **247**

5.1 INTRODUCTION …… 248
5.2 CURRENT STUDY …… 250
5.2.1 Research aims …… 250
5.2.2 Methodology …… 251
5.3 RESULTS …… 270
5.3.1 Overview ……... 270
5.3.2 Presentation of results: interviews and focus groups ……... 270
5.3.3 Category: 'Utility' (GCMI) ……... 271
5.3.4 Category: 'Pilot programme' …….. 293
5.3.5 Category: 'Programme development' ……... 307
5.3.6 External review of the GCMI …….. 323
5.4 DISCUSSION …… 328
5.4.1 Summary findings, including recommendations regarding the future of the GCMI ……... 328
5.4.2 Limitations of the study ……... 332
5.5 SUMMARY …….. 337

Chapter Six – Discussion **340**

6.1 SUMMARY OF THIS RESEARCH 341
6.1.1 Review of research aims and components 341
6.1.2 Unique contributions of this research 343
6.2 SUMMARY OF CENTRAL FINDINGS 346
6.2.1 Central findings relating to primary research aims 346
6.2.2 Central findings relating to secondary research aims 354
6.2.3 Comparison of central findings against existing literature 356
6.2.4 Core findings of this research 362
6.3 LIMITATIONS OF THIS RESEARCH 365
6.4 RESEARCHER REFLECTIONS 369
6.5 RECOMMENDATIONS ARISING FROM THIS RESEARCH 373
6.6 RECOMMENDATIONS FOR FUTURE RESEARCH 375
6.7 CONCLUSION 377

References 381
Appendices 416

LIST OF FIGURES

Note: numbering format is x.y, where x = chapter number and y = number within chapter.

Number	Title of figure	Page
1.1	Summary timeline of all research components	8
2.1	Summary of search strategy for systematic literature review	50
3.1	Summary timeline of the NCMP case study	107
3.2	Summary of methods – NCMP case study	116
3.3	Summary of themes – ‘Programme’	131
3.4	Summary of themes – ‘Utility’ (NCMP)	153
3.5	Summary of themes – ‘Threats’	168
3.6	Summary theme map – NCMP case study	171
4.1	Map of the Bailiwick of Guernsey	188
4.2	Summary timeline – Guernsey Child Measurement Initiative	198
4.3	Location of participant primary schools within Guernsey	202
4.4	Summary of GCMI measurement process	208
4.5	Summary of GCMI feedback process	211
4.6	Summary of GCMI participation process	218
4.7	Weight status classification – all	222
4.8	Weight status classification – by age, gender and school	222
4.9	‘Non-healthy’ weight status – by age, gender and school	224
4.10	Healthy and ‘non-healthy’ weight status – by different reference curves	228
4.11	Weight status – by UK90 population/clinical thresholds	228
4.12	Weight status – by different digit rounding methods	230

Number	Title of figure	Page

4.13	Assessment of agreement between BMI results	233
5.1	Evaluation framework – GCMI	254
5.2	Summary of themes – ‘Utility’ (GCMI)	292
5.3	Summary of themes – ‘Pilot programme’	306
5.4	Summary of themes – ‘Programme development’	321
5.5	Summary theme map – GCMI evaluation	322

LIST OF TABLES

Note: In the main thesis, the numbering format is x.y, where x = chapter number and y = number within chapter. In the appendix, the format is Ax, where A = appendix and x = number within appendix.

Number	Title of table	Page
2.1	Inclusion and exclusion criteria for systematic literature review	46
2.2	Overview of included CMPs (systematic literature review)	53
2.3	Summary of features of all included CMPs	68
2.4	Suggested features of measurement protocols for CMPs	83
3.1	NCMP case study – Recommendations (Part One)	132
3.2	NCMP case study – Recommendations (Part Two)	154
3.3	NCMP case study – Recommendations (Part Three)	169
3.4	Summary of central findings from NCMP case study	175
4.1	Feedback requests – by age, gender, school and weight status	219
4.2	Centile results for anthropometric variables – by age and gender	223
4.3	Centile results for anthropometric variables – by combined age and gender	223
4.4	Percentages of combined overweight and obesity in Guernsey and England	225
4.5	Percentages of overweight and obesity in Guernsey and England – by combined age and gender	225
4.6	Weight status classification – by different reference curves	227
4.7	Mean BMI centiles – by different digit rounding methods	231
4.8	Assessment of agreement between repeat height and weight measurements – Intra-class correlation coefficient	232
6.1	Summary recommendations for CMPs	373
A1	Summary tables – systematic literature review	442

Number	Title of table	Page

A2	All documented school-based CMPs	452
A3	Headings and Themes – ‘Programme'	462
A4	Headings and Themes – ‘Utility’ (NCMP)	472
A5	Headings and Themes – ‘Threats’	495
A6	Headings and Themes – ‘Utility’ (GCMI)	531
A7	Headings and Themes – ‘Pilot Programme’	552
A8	Headings and Themes – ‘Programme Development’	567

LIST OF ABBREVIATIONS

BBC	British Broadcasting Corporation
BIA	Bio-electrical Impedance Analysis
BMI	Body Mass Index
BP	Blood Pressure
CDC	Centers for Disease Control and Prevention
CI	Confidence Interval
CME	Continuing Medical Education
CMP	Child Measurement Programme
COSI	Child Obesity Surveillance Initiative
CRB	Criminal Records Bureau
DALY	Disability Adjusted Life Year
DH	Department of Health
DOB	Date of Birth
DXA	Dual Energy X-ray Absorptiometry
GCMI	Guernsey Child Measurement Initiative
GDP	Gross Domestic Product
GP	General Practitioner
HPU	Health Promotion Unit
HSE	Health Survey for England
HSSD	Health and Social Services Department
IOTF	International Obesity Task Force
MeSH	Medical Subject Heading
MRC	Medical Research Council
NCD	Non-Communicable Disease

NCMP	National Child Measurement Programme
NCOD	National Child Obesity Database
NHS	National Health Service
NHS IC	National Health Service Information Centre
NOO	National Obesity Observatory
NR	Not Reported
OSG	Obesity Strategy Group
PCT	Primary Care Trust
PE	Physical Education
PHE	Public Health England
PHO	Public Health Observatory
PSA	Public Service Agreement
PR	Public Relations
SDS	Standard Deviation Score
SES	Socio-Economic Status
SOA	Super Output Area
UCL	University College London
UK	United Kingdom
UK90	United Kingdom 1990 Reference Population
US	United States
USPSTF	United States Preventive Services Task Force
VAT	Value Added Tax
WHO	World Health Organization

“Information is a beacon, a cudgel, an olive branch, a deterrent – all depending on who wields it and how.”

- from ‘Freakonomics’ (SD Levitt and SJ Dubner, 2006)

Chapter One

Introduction

1.1 OVERVIEW OF THIS RESEARCH

Obesity is associated with an increased risk of the development of multiple, significant medical conditions that can necessitate intensive treatment over a substantial portion of adult life. Childhood obesity is a strong, modifiable determinant of obesity in adulthood. This condition reflects a present and growing public health challenge. In response to the burgeoning problem, the World Health Organization (WHO) has called for annual body mass index (BMI) measurements to be conducted in school-aged children.

In line with this recommendation, school-based population level child measurement is now an established international practice. However, there is limited information and clarity around the protocol and intended and actual roles of child measurement programmes (CMPs). Furthermore, questions remain about the positive and adverse outcomes relating to such programmes and the factors that may promote the continuance, or sustainability, of CMPs in the longer term. In the context of ever-increasing demands on limited resources, it is imperative to identify the opportunity for impact that these programmes afford and highlight how collected data can be applied to effectively contribute to broader strategies for obesity management.

This research seeks to address these key unanswered questions. First, this research identifies and offers critical analysis of existing practices in the area of population level child weight status measurement. In addition, this research analyses the utility of and outcomes produced by CMPs and considers how, in

the context of current challenges, their sustainability may be enhanced. Finally, possible unintended adverse consequences of CMPs are explored. Fundamentally, this research examines the apparent and actual contribution of population level data to the public health domain. Therefore, whilst this research considers childhood obesity, conclusions may be relevant and transferable to multiple public health issues.

Conclusions arising from this research are directed to policy makers, programme coordinators, researchers, public health practitioners and other stakeholders engaged with CMPs.

The following sections describe the aims and discrete components of this research, followed by an outline of the structure of this thesis.

1.1.1 Research aims

This research has four primary aims:

1) Identify current evidence to establish best practice for CMPs;
2) Explore the roles, outcomes and challenges of these programmes, together with factors that may impact on their longer term sustainability;
3) Identify potential adverse outcomes associated with the introduction of CMPs; and
4) Examine the perceived utility, feasibility, acceptability and sustainability of a CMP within a specific local setting.

This research addresses multiple and diverse aims that cannot be achieved by a single study or approach. Therefore, these aims are considered across three individual research components, each of which adopts different methods. This triangular approach can enhance the richness and depth of eventual findings [1-4].

This research was conducted in distinct, progressively informative stages and incorporated:

1) A systematic literature review of existing CMPs;
2) An in-depth case study of an acknowledged, operative programme: England's National Child Measurement Programme (NCMP); and
3) The pilot implementation and evaluation of a unique CMP in the Bailiwick of Guernsey: the Guernsey Child Measurement Initiative (GCMI).

Each of these three individual components has further defined research aims, which are described in the relevant sections of this thesis. Ultimately, these additional or 'secondary' aims are intended to contribute to the broader primary aims of this research.

1.1.2 Outline of research components

In this section, all three components of this research are briefly outlined and related back to the primary research aims described above.

This research was conducted in a sequential manner: individual elements were intended to guide and inform subsequent parts. The components of this research were designed to build on and complement each other; however, all components also contributed independent information and value. A detailed description of and justification for methods used in each research element is provided within chapters pertaining to these three components.

First, the systematic literature review provides the foundation and justification for the overall research project. It offers a broad overview of current evidence and practices in the area of child measurement, thereby highlighting knowledge gaps and facilitating the development of research aims and methods. This review identifies current international school-based CMPs and explores the rationale behind their introduction. This work also collates and compares details of measurement protocols utilised by recognised programmes. In addition, this review highlights and reflects on uses for the collected data. A central aim of this analysis was to synthesise and critically assess current evidence for best practice for CMPs.

Second, this research transitions from a wide-reaching view to a more focused approach: a case study of a specific CMP. The NCMP was selected as the example programme for in-depth examination as it reflects a large, established and internationally-recognised CMP. Furthermore, pragmatic considerations influenced this decision: this CMP is based in England, which allowed this research to be conducted within various resource and logistical constraints.

The NCMP case study examines key stakeholder views around the programme's roles and perceived utility. Furthermore, this research explores perceptions of the positive and adverse outcomes, including possible unintended harm, associated with the NCMP. This case study also considers current challenges facing the NCMP, as well as factors that may threaten or enhance the sustainability of this programme.

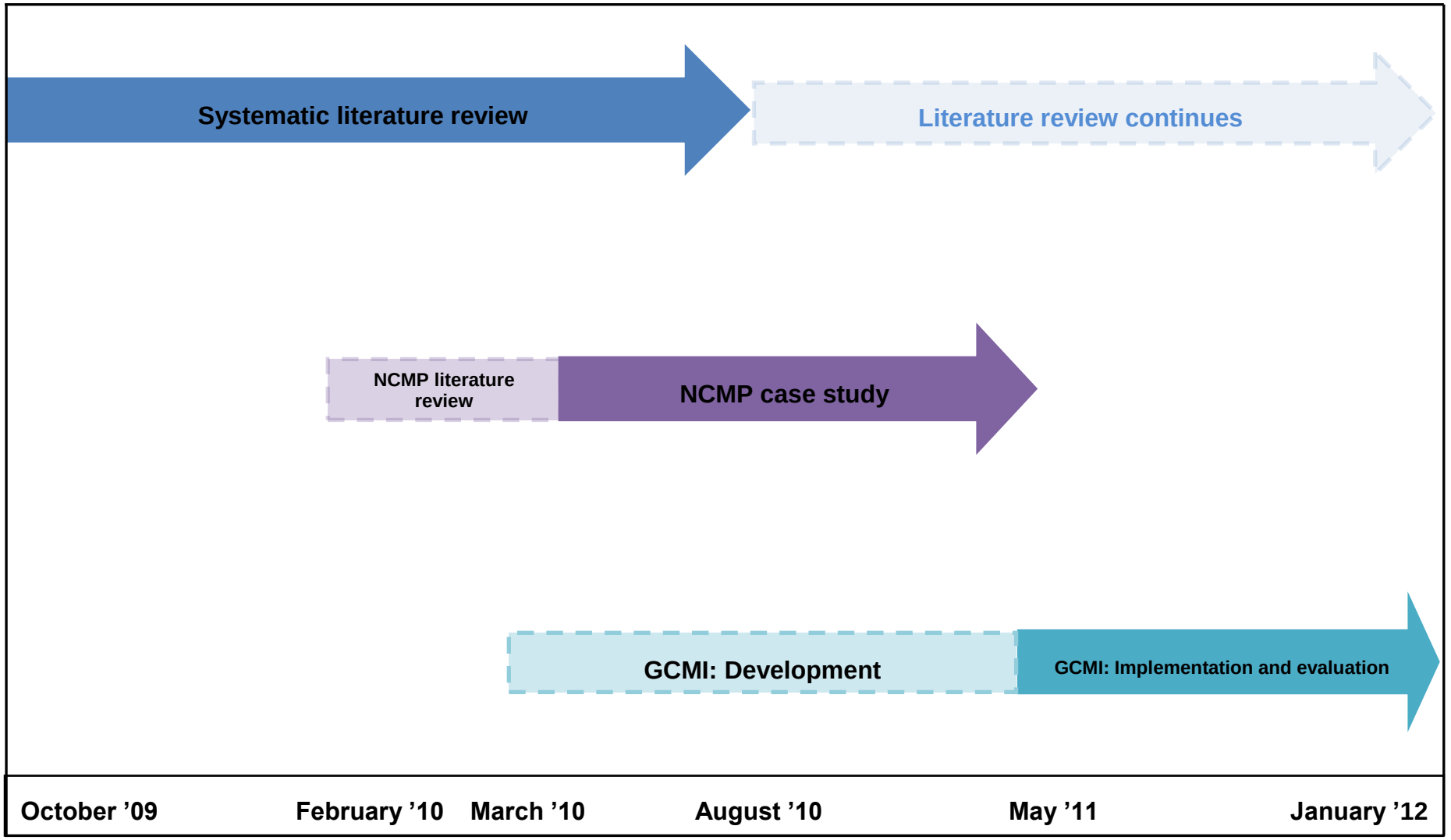
Previous research has considered the views and experiences of stakeholders functioning at the periphery, or delivery end, of CMPs. To date, there has been limited research that examines these programmes from an alternative viewpoint: that of centrally-positioned stakeholders, who are responsible for determining the vision, protocol and overall coordination of CMPs. In order to fill an identified knowledge gap, the NCMP case study adopts the latter approach.

The third and principal component of this research involves the development, implementation and evaluation of a unique pilot CMP: the GCMI. The GCMI was designed to address all primary aims of this research. The GCMI incorporates and builds on earlier research components by allowing for the application and further assessment of identified best practice for population level child measurement. This research also examines the perceived roles and outcomes of a CMP in a distinct context and location. Moreover, the GCMI evaluation explores factors influencing the feasibility, acceptability and sustainability of this new programme.

The Bailiwick of Guernsey (henceforth ‘Guernsey’) was selected as the setting for the GCMI. Guernsey reflects a small, stable and comparable population where obesity is now recognised as a public health priority. However, there is currently limited data available on local obesity prevalence in either children or adults. Finally, the GCMI represented the first step toward implementation of Guernsey’s Obesity Strategy, thereby facilitating analysis of how up-to-date epidemiological data might influence policy and practice at the local level.

A summary timeline for this research is presented in Figure 1.1. This figure demonstrates the sequential nature of all three research components.

Figure 1.1: Summary timeline of all research components



1.1.3 Structure of this thesis

The structure of this thesis displays close alignment with the original research design. Therefore, each component of this work is presented in chronological order as a distinct, complete study. Specifically, discrete components are presented in individual chapters, with each of these chapters including: an introduction; description of methods; presentation of results; discussion, including limitations; and summary. This structure facilitates demonstration of the unique, stand-alone impact of each component, whilst also emphasising that component's critical contribution to addressing primary research aims. In addition, this approach enables clear description of how conclusions drawn from earlier parts of this research were utilised to inform subsequent work.

The systematic literature review is presented in Chapter Two. Findings from this literature review identified current knowledge gaps and, as a consequence, helped to shape and underpin aims explored in the ensuing components of this research. Furthermore, this literature review provided context and comparison for subsequent conclusions.

Chapter Three is dedicated to the case study of the NCMP. This case study was conducted after completion of the literature review. This chapter includes relevant background information on the NCMP and, following description of key findings, offers recommendations for stakeholders engaged with this programme, as well as other CMPs.

The GCMI is discussed across two full chapters: the programme's development and implementation are outlined in Chapter Four. This chapter also includes description and analysis of the prevalence of excess weight in a representative sample of Guernsey schoolchildren. This analysis was based on the dataset produced by the GCMI. The processes and results detailed within this chapter did not directly align with identified primary research aims. However, they were essential to facilitate exploration of the perceived utility, feasibility, acceptability and sustainability of this programme.

On that note, evaluation of the GCMI forms the focus of Chapter Five. The GCMI was conducted as a pilot feasibility programme; therefore, this chapter also includes recommendations regarding the future of this CMP.

The sixth and final chapter of this thesis brings together central findings from all three components and highlights these against the primary research aims. Summary conclusions and recommendations are also presented. Furthermore, this chapter describes limitations of the overall research project and includes my own reflections on this work.

Up until this point, the current chapter has provided an outline of this research and thesis. The chapter now continues by introducing the issue addressed by this research: childhood obesity. Next, key issues in defining, measuring and diagnosing excess weight in children are highlighted. This chapter concludes by examining different programme types and exploring the rationale for the practice of school-based population level child measurement.

1.2 OVERVIEW OF THE ISSUE

1.2.1 Obesity

Obesity is a medical condition characterised by excess body weight that is stored as body fat [5-10]. Obesity results from a basic energy imbalance. If the amount of energy consumed is greater than the energy expended, the remainder is stored within the body as fat. Whilst the immediate cause of obesity appears straightforward, there are a plethora of complex factors that may contribute to both the development and maintenance of obesity [6,8,11]. The evidence is incomplete, but current research suggests that these convoluted and multi-faceted factors, which include diet [12-15], physical activity [16-19], psychological stress [20-23], and genetics [24-26], may vary between different social, economic, ethnic and geographical groups [6,8,9,27-29]. These factors generally lead to a decrease in energy expenditure, an increase in energy consumption, or a combination of the two.

Obesity is an important public health issue with numerous well-established consequences that can have a considerable, negative impact on health at all stages of the life cycle [5-10,30-33]. The WHO has formally recognised obesity as an epidemic [6]. Globally, approximately 1.6 billion individuals are currently overweight or obese [10,34]. In multiple international settings, the number of individuals with excess weight exceeds those who lie within the bounds of a healthy weight classification [7,8,27,35]. Furthermore, whilst undernutrition remains a significant public health issue in many geographical areas, there are

now more overweight and obese individuals than those classified as underweight [36,37].

Obesity impacts on individuals across all ages and ethnicities [6,38,39] in both developed and developing regions [29,40-42]. In addition, there is now a well-established association between the development and maintenance of obesity and economic inequality. Whilst in the past excess weight status was linked to affluence, evidence from developed countries now clearly reflects an inverse relationship between socio-economic status (SES) and both body weight and adiposity [29,39,43-45].

Obesity is directly linked to disability and excess mortality [27,35]. In 2004, the WHO estimated that obesity accounted for more than 36 million disability adjusted life years (DALYs[α]) [27]. In the same year, obesity was identified as a major risk factor for mortality with 2.8 million attributable deaths [Ibid]. There are fears that rising obesity prevalence will single-handedly reverse successes achieved in reducing the burden of cardiovascular disease [31]. Indeed, average life expectancy may fall as a direct result of this epidemic [49-52].

The costs associated with this epidemic also merit consideration. These costs extend beyond direct healthcare expenses alone to incorporate broader productivity losses. Recent estimates predict that, when considered alone, increasing obesity will add £7.7 billion to the annual healthcare budget in the

[α] Disability-adjusted life years, or DALYs, reflect the number of years lost as a result of illness, disability or premature death and are used as a measure of overall disease burden. One DALY represents one lost year of 'healthy' life [46-48].

United Kingdom (UK) by the year 2050 [8]. This figure approaches £46 billion when the wider costs of obesity are considered [Ibid]: an amount that will undoubtedly challenge available resources. On this point, it is important to note that the broader social and economic costs of obesity are largely underestimated [53-57].

Therefore, addressing the obesity epidemic is a public health priority. Urgent, sustained action is required to minimise the social, economic, environmental and health impact on each of individuals, communities and healthcare systems.

1.2.2 Childhood obesity

Globally, the International Obesity Task Force (IOTF) estimates that over 200 million school-aged children are either overweight or obese [34]. In the European Union, up to 20% of all children aged between 5-17 years meet the criteria for these conditions [Ibid]. Epidemiological trends over the last several decades have been a cause for concern with increasing numbers of children of progressively younger ages becoming overweight or obese [7,33]. This is an important consideration because recent research has demonstrated that the duration, together with the extent of obesity, are important predictors for later illness [58-62]. Therefore, younger children are at greater risk of developing the long term adverse health outcomes associated with excess weight.

In recent years, evidence has emerged to suggest that prevalence rates of childhood obesity in certain countries, including but not limited to Australia,

Greece, France, the Netherlands and the United States (US), have started to stabilise [63-66]. However, this apparent plateau in prevalence of childhood obesity is less obvious amongst lower socio-economic groups [66] and the condition continues to increase in other countries [66-68]. Furthermore, total figures confirm that excess weight in children remains a significant public health challenge [65,67,68].

Childhood obesity is a strong, acknowledged and modifiable determinant of obesity in adulthood [8,32]. The risk of adult obesity is increased if obesity is evident in childhood. Indeed, up to 80% of obese children aged between 10-14 years will be obese as adults [32]. Furthermore, earlier research has revealed that up to 22% of adult obesity is directly explained by excess weight status in childhood [69]. Similar studies display more conservative figures but consistently show a clear association between weight status in child and adult populations [70,71]. Across both genders, a BMI reflecting excess weight status in adulthood is typically found at rates that are three times higher in individuals who were overweight or obese as children [72,73].

In addition to the known correlation between excess weight status in child and adult populations, childhood obesity is independently associated with an increased risk of multiple, significant medical conditions [74-77]. These conditions include but are not limited to: diabetes mellitus; cardiovascular disease; asthma and other respiratory illnesses; eating disorders; skin infections; depression; and certain musculoskeletal disorders [68,74-78]. Even

when considered alone, the anticipated direct healthcare costs associated with this epidemic will be substantial [8].

Excess weight in children is a complex phenomenon: typically, it cannot be explained by isolated causes or factors relating to individuals alone [8,11,67]. Once developed, childhood obesity is difficult to reverse [79]. Overall, there is limited available information regarding the long term impact of existing interventions. However, a recent Cochrane review concluded that family-based interventions that combine to address each of diet, physical activity, and other behaviour change may produce success [Ibid]. Of note, these studies are often based on small scale initiatives conducted in research rather than 'real world' environments, meaning that outcomes may not be generalisable to wider population groups. Therefore, significant uncertainty still surrounds the management of this condition.

This challenge, together with the severity of potential health and other consequences of childhood obesity, strongly indicate that priority must lie with initiatives aimed at primary prevention [67,80]. Here, best available evidence in this area highlights the importance of considering the effectiveness, affordability, sustainability and potential harm of interventions for obesity prevention.

1.2.3 Definitions of childhood overweight and obesity

Body mass index is calculated by dividing weight in kilograms by height in metres squared. It is an internationally recognised measure used to classify individuals according to weight status [9,81-83]. At the population level, BMI is identified as the best available tool for measuring adiposity, or the presence of excess body fat, in both adults and children [82]. With exceptions, an adult BMI value ranging from 25kg/m^2 to 30kg/m^2 is associated with the clinical definition of overweight, whilst a value exceeding 30kg/m^2 defines obesity [10,34]. These definitions are widely utilised in adult populations and form a standard reference for researchers.

However, there are currently no single, universally agreed definitions of either overweight or obesity in childhood [84-86]. Resultantly, researchers have a restricted ability to compare documented prevalence rates in different study populations. Moreover, inconsistent definitions limit the capacity to monitor population prevalence trends over time [Ibid].

The difficulty associated with establishing definitive classifications for these conditions arises for a number of reasons. First, there are marked changes in mean BMI values and body composition throughout childhood [81,84,87]. Measures of variability in BMI, such as standard deviation, fluctuate according to age in this population subgroup. Second, definitions of childhood overweight and obesity should be adjusted for gender as body composition differs according to this variable [87]. Third, it is likely that BMI in children varies by

ethnicity, though further research is needed [85,88,89]. Finally, political considerations can influence which definition is applied, as distinct classifications can produce disparate measures of prevalence [85,90,91].

Numerous definitions appear in the literature, but there are currently three major international systems of classification. These are summarised below.

The IOTF definitions of childhood overweight and obesity were published in the year 2000 and have been widely quoted since that time [81,84]. Using this system of classification, childhood overweight and obesity are identified when age- and gender-specific BMI translate to values of at least 25kg/m^2 and 30kg/m^2 at age 18 years, respectively. The definitions are based on age-specific thresholds and were devised using data obtained from a large sample across six representative populations [Ibid]. This technique suggests that the IOTF system is applicable to the broader international community; yet, researchers continue to employ a range of definitions.

The Centers for Disease Control and Prevention (CDC) definitions of childhood overweight and obesity were formulated from the 2000 Growth Charts for the US [81,87,92]. The BMI result is plotted relative to values on the CDC growth charts for individuals aged between 2-19 years. These BMI-for-age percentiles classify children as either underweight, normal weight, overweight, or obese. The following thresholds are applied for the latter two categorisations:

- A BMI equal to or above the 85th percentile but lower than the 95th percentile (for children of the same age and gender) defines an overweight child;
- A BMI greater than or equal to the 95th percentile (for children of the same age and gender) defines obesity.

The decision to apply these numerical cut-offs was grounded in pragmatic statistical considerations, rather than established associations between these precise thresholds and future health risks [85]. The CDC definition is limited in that it relates to a dataset obtained from a single country [84].

The 2007 WHO growth curves use the number of standard deviations from the population mean to establish childhood weight status [90]. These definitions are designed to translate to BMIs of ≥25kg/m^2 and ≥30kg/m^2 at age 19 years, respectively. Multiple international populations were used to devise the reference curves; however, they are criticised for being heavily influenced by US population figures [Ibid]. For that reason, American children may be over-represented in these data. The WHO definitions of childhood overweight and obesity do not currently reflect the dominant system of classification. This is likely due to their recent appearance in the public health arena.

An important question arises as to the degree of comparability between these three major systems of classification. The WHO and CDC curves produce similar overall estimates of childhood obesity. However, the threshold used in the IOTF definition is higher; therefore, this definition produces a slight, yet

significantly reduced level of prevalence [90]. When we consider childhood overweight, the CDC and IOTF cut-offs for childhood overweight are closely related but the WHO threshold is lower. The outcome is that a greater proportion of children are classified as overweight according to the WHO definition [93]. Indeed, an absolute difference of up to 15% higher prevalence of childhood overweight is evident with this system, when compared to estimates obtained using either CDC or IOTF definitions [90]. The principal argument in support of lower thresholds is that they allow for earlier identification of a larger number of subjects with weight problems. Consequently, there is greater potential for intervention at an earlier stage.

A further important classification system is the United Kingdom 1990 Reference Population (UK90) [94,95]. This system was developed using data obtained from UK children in the 1990's and is widely utilised at individual, community and national levels within the UK [92,95]. The UK90 growth charts are not used as the principal growth reference for children in locations external to the UK. At the population level, thresholds are analogous to those applied by the CDC system; however, distinct definitions are used in the clinical setting[*].

To date, there is no published research that has directly compared the rates of prevalence of childhood overweight or obesity in a given population according to each of these four outlined systems of classification (IOTF, CDC, WHO and UK90). Acknowledging the impact of using different systems of classification for weight status in childhood is important to correctly interpret and facilitate

[*] In a clinical setting, children whose BMI lies above the 91st percentile for age and gender according to the UK90 growth charts are classified as overweight, whilst those children with a BMI above the 98th percentile for age and gender are obese [92,94,96].

comparison of population level prevalence estimates. Therefore, this question is addressed as a secondary aim within one component of this research (Chapter Four).

1.2.4 Benefits and limitations of BMI

Body mass index is currently the most commonly applied measure of weight status at the population level. The measurement is fast, safe, easy to perform and calculate, inexpensive, and widely understood and applied. Also, BMI shows strong correlation with levels of adiposity and the risk of cardiovascular disease in adult and child populations [81,86,97-105]. Generally speaking, the required equipment is readily available, affordable, portable and simple to maintain, despite a need for regular calibration. A further benefit is that BMI is non-invasive: height and weight measurements may be obtained without requiring physical contact. Moreover, these measurement processes are not associated with physical discomfort or other possible harm [105,106]. This is relevant when considering options for weight status assessment tools at the population level [106]. Here, painless and non-intrusive measurement procedures may be more likely to satisfy ethical requirements.

Whilst there are numerous benefits associated with the use of BMI, it is recognised as an imperfect test [81,83,86,98,103]. Most importantly, BMI does not differentiate between lean mass and fat mass. This can result in ‘false positive’ and ‘false negative’ tests. For example, a muscular athlete can have a high BMI and be classified as obese, in the absence of excess fat mass.

Conversely, an individual with low muscle mass could return a BMI within the normal range, but in fact have levels of adiposity well above average [104]. From these examples, we see that BMI is not necessarily a valid measure across all population subgroups; therefore, some caution must be applied in its interpretation [98,103-105]. Additionally, BMI alone does not reflect physical fitness, which is itself a direct determinant of later disease in both children and adults [107-110].

Despite the apparent simplicity of assessing BMI, it is susceptible to measurement error and difficulties in interpretation of results, particularly in children [81,103]. There is also challenge associated with translating a continuous measurement (BMI) into a discrete measurement (weight status). This is because the equation used to calculate BMI leads to a situation whereby small fluctuations in either height or weight in children can have an appreciable impact on final weight status.

Little evidence or other guidance exists around appropriate digit rounding procedures for the individual height and weight measurements that contribute to BMI. At present, multiple distinct processes for the rounding of recorded anthropometric measurements are used in research studies; most apply rounding to either 0.1cm/0.1kg or 0.5cm/0.5kg, or some combination of this approach [111-116].

The potential impact of various digit rounding procedures is demonstrated in the example below.

Scenario A:

- Female, date of birth: 01/11/1999
- Height: 145.0cm
- Actual weight: 47.41kg
- Rounded weight: 47.4kg (rounded to 0.1kg)
- BMI: 22.5 (94% for age and gender [UK90 growth reference])
- Weight status: **Overweight**

Scenario B:

- Female, date of birth: 01/11/1999
- Height: 145.0cm
- Actual weight: 47.41kg
- Rounded weight: 47.5kg (rounded to 0.5kg)
- BMI: 22.6 (95% for age and gender [UK90 growth reference])
- Weight status: **Obese**

In this example, a difference of just 0.1kg has led to a significant change in the overall weight status of the child. Therefore, digit rounding processes for anthropometric measurements should be considered an important issue for researchers working in this area. However, there has been limited consideration of the impact that different digit rounding procedures may have on prevalence figures relating to childhood overweight and obesity at the population level [117]. Accordingly, this specific question is considered by this research in Chapter Four.

Finally, as with any isolated point-in-time assessment, a single BMI measurement does not necessarily reflect long term health outcomes [104,105].

Therefore, whilst there are numerous, clear benefits associated with BMI, there are also limits to its application and interpretation. A common view is that BMI should not be used in isolation to provide a definitive clinical diagnosis of overweight or obesity in either children or adults [83,85,97,98,118]. Here, individual level interpretation is vital.

1.2.5 Alternatives to BMI

Other than BMI, there exist a number of approaches and methods available for assessing weight status; each with distinct uses, benefits and levels of practicality. This section outlines a select number of recognised alternatives to BMI.

Bio-electrical impedance analysis (BIA) measures electrical signals as they pass through various tissues and components of the body, such as adipose tissue, lean muscle mass and water [81,119-121]. The BIA method is commonly used to determine body composition and offers a safe, rapid and simple method of assessment [81,119-123]. However, this method is vulnerable to changes depending on recent fluid and food intake, skin temperatures and other variables [120,121]. Therefore, reproducibility of results is limited. In addition, BIA may not provide an accurate indication of changes in body composition over time [124,125]. Finally, BIA does not distinguish between visceral fat and

subcutaneous fat [126]. This is important because visceral fat is a strong, independent predictor of a range of health conditions [127-130].

Skinfold thickness estimates body fat by measuring the depth of skin folds at various locations on the body [81,105,120,121]. These measurements reflect the amount of adipose tissue under the skin and are converted to an estimate of total body fat, after consideration of age and gender. However, comparability of findings is limited because multiple different testing sites, equations and thresholds are used [105,131,132]. Furthermore, measurements are tester dependent, meaning that the inter-rater reliability is suboptimal [81]. Nevertheless, the equipment is portable and cheap; the method is safe; and results can be highly accurate [81,131].

Waist circumference is common, non-invasive, safe, fast and, in adults, particularly predictive of future cardiovascular risk [81,102,133-139]. Waist circumference is a useful measure of adiposity as it correlates well with absolute measures of visceral fat [140,141]. Population level thresholds for children are now being developed, although multiple reference curves are currently available and in use. Inter- and intra-rater reliability are concerns and it is unclear whether, on its own, this measurement offers sufficient information on both weight status and body composition in children [81,137].

There is mixed evidence [142,143]; however, a large, recent prospective cohort study concluded that waist circumference does not demonstrate stronger association with cardiovascular disease risk in adolescence when compared to

BMI alone [102]. This finding is supported by other studies which have concluded that combining waist circumference and BMI measurements does not add significant information to help recognise children at risk of cardiovascular disease risk clustering, as compared to BMI on its own [144-146].

Waist-hip ratio has been found to be less helpful when compared with either BMI or waist circumference [133,136,139]. This ratio relies on obtaining two discrete recordings, both of which are vulnerable to measurement error. In addition, prediction of future weight status or later health risk using this reference measure is difficult at the pre-pubertal stage, prior to the typical development of the bony pelvis. Overall, waist-hip ratio is less predictive of adult adiposity than BMI [139]. More information is needed before a wider implementation of this measurement is applied.

Neck circumference is correlated with adiposity in adulthood and is now also recognised as a tool to identify children with excess weight [147]. Again, internationally accepted population cut-off values are not yet available. Neck circumference is simple, cheap and fast but could result in discomfort and imperfect inter-rater reliability [Ibid]. Resultantly, this measurement is best used to complement and validate results, rather than as a stand-alone tool.

Finally, dual energy x-ray absorptiometry (DXA) scanning employs relatively recent technology and is commonly used to assess bone density [120,123,148]. The procedure is fast, non-invasive, involves low radiation exposure and is

precise, with high inter-rater reliability [120,148]. However, whilst useful as a reference measure, DXA is expensive and impractical at the population level.

When critically considered against each of these other alternatives, BMI emerges as the most valuable screening tool for monitoring childhood weight status at the population level [82,83,99,102]. In particular, BMI offers the greatest number of benefits, whilst minimising both the resource requirement and potential harm. The evidence remains incomplete, but available literature suggests that the additional benefit of further anthropometric measurements in children – those other than BMI - is minimal [102,144-146]. More assessment does not necessarily contribute further advantageous information relating to relevant long term health outcomes. Furthermore, introducing extra or more invasive procedures at the population level adds a layer of complexity to ethical considerations.

1.3 SURVEILLANCE AND SCREENING

In general, population level child weight status measurements contribute to either surveillance or screening programmes. There are differences in the aims, scope and vision associated with each of surveillance and screening programmes; both types are seen to provide distinct benefits, whilst also demonstrating particular challenges. The principal, defining features of these distinct programme types are summarised below.

Surveillance is the systematic and on-going collection of data, followed by analysis and interpretation of these data [149]. When used in relation to health, surveillance usually refers to the monitoring of a given condition within a specified population [83,150,151]. Surveillance also involves the dissemination of obtained data to stakeholders engaged with disease prevention and management [152]. It is generally accepted that the overriding objective of surveillance is to facilitate provision of information that can subsequently be used to inform further action on an issue [Ibid].

Surveillance may be conducted at either the whole population level or across representative samples. All of unaffected, lower risk, higher risk and affected individuals are included. Data collection normally occurs on a regular basis. There is no single defined interval for this process because this will vary according to the health condition considered, as well as other context-specific factors such as resource availability. Data are usually anonymised and this programme type does not incorporate routine feedback of individualised results.

Furthermore, surveillance systems do not typically include a formal link to treatment as the primary functions are simply to quantify prevalence and enable longitudinal analysis. Therefore, surveillance programmes tend to require less time and fiscal resource.

In contrast, screening programmes include an explicit intention to prevent and also reduce the prevalence of an identified health-related condition [153-155]. Here, the primary aim is to identify the condition prior to the onset or recognition of symptoms; thereby allowing for either complete prevention, earlier treatment, or delayed progression of illness. This represents a major distinction in the scope and objectives of screening compared with surveillance programmes. In the context of school-based BMI screening programmes, parents are provided with individualised feedback on the weight status of their child(ren).

Screening may permit acquisition of additional detailed data but must be considered a more resource intensive process than surveillance. Screening involves greater bureaucracy and, as data are linked to individuals, concerns around privacy and confidentiality are heightened. Also, whilst feedback may offer useful information, the risk of causing distress to individuals whose results lie outside the healthy range is a valid consideration [154].

Therefore, screening is not without risk. As a consequence, there are certain criteria that must be satisfied in order for a screening initiative to be recommended and introduced. The Wilson and Jungner criteria [155] are commonly applied. Much debate remains as to whether or not childhood obesity

satisfies all required criteria, with a systematic review from Westwood et al (2007) [156] concluding that there is insufficient evidence to support routine screening for this condition. Nevertheless, selected organisations currently endorse this practice, including the United States Preventive Services Task Force (USPSTF) [157][†]. A separate evaluation of this issue falls outside the scope of this research.

The term 'monitoring' is also commonly used in public health. According to the Oxford English Dictionary, to monitor is *"to observe and check the progress or quality of (something) over a period of time"* [158]. In the public health domain, the term is inconsistently applied, but is often used interchangeably with screening and/or surveillance. However, this term is occasionally used to describe initiatives that do not meet exact criteria for either programme type, but instead include a combination of features. For example, a programme might make individual results available, but provide these to individuals on a request-only basis [159,160]. Therefore, monitoring can reflect a broad area. In this thesis, 'monitoring' is used as a hypernym, thereby encompassing all programmes that incorporate some form of on-going, systematic review of a particular health condition.

[†] This recommendation from USPSTF reverses an earlier position on the issue of screening for childhood obesity [100]. The updated USPSTF recommendation was that children aged over six years should be screened for obesity by clinicians and offered appropriate follow-up [157].

1.4 POPULATION LEVEL CHILD MEASUREMENT PROGRAMMES

1.4.1 Background

Child weight status monitoring programmes have attracted attention in the literature in recent years, but such monitoring does not represent a modern practice. However, the primary condition considered by these programmes appears to have developed over time. At present, the focus lies with identification of excess weight, whilst earlier programmes typically emphasised quantifying the burden of undernutrition [161-165]. This shifting purpose is explained, at least in part, by considering that previous CMPs were often based in developing regions or countries engaged in conflict.

Previous analysis has identified a number of diverse roles for these earlier monitoring programmes. These included: assessment of progress against stated goals for tackling undernutrition; review of effectiveness of established interventions; a warning system for impending nutritional crises; and identification of areas with an urgent requirement for aid [161]. In particular, Morgan (1985) [166] describes that child weight status monitoring was used to target supplemental feeding resources to areas of greatest need in Botswana.

These reflect important functions; however, previous programmes were hindered by poor data quality, inadequate staff training, limited resources, and insufficient evaluation [161,165]. Furthermore, where evaluation was conducted, summary results suggested that programmes designed to monitor prevalence of

underweight did not reach their potential maximal utility as there was insufficient clarity around both their intended roles and the distribution of collected data [161].

Nutritional and anthropometric surveys specifically intended to recognise and measure acute or chronic undernutrition continue in several parts of the world but are not considered further in this current research.

1.4.2 The case for routine child measurement

A health-related condition cannot be effectively managed without first measuring the extent to which it affects a particular population. Put another way, in order to guarantee a comprehensive yet efficient approach to management, all obesity-related prevention and treatment strategies should be established at a level that is proportional to the true local burden of the problem. Complete, reliable, accurate, timely and accessible data are required to acknowledge the burden of excess weight in children: population level CMPs produce data that may satisfy these criteria.

The Lancet Non-Communicable Disease (NCD) Action Group and NCD Alliance recently recommended monitoring as one of five overriding priority actions to address the current NCD crisis [167]. In 2004, a WHO review revealed that less than one-third of countries demonstrated evidence of growth measurement programmes for children aged over six years [168], therefore highlighting the need for further information within this age group. A lack of universally agreed

criteria for defining childhood weight status and the absence of standardised reference data were recognised as principal barriers underlying this low figure. This same review formally recommended regular assessment of anthropometric indices in all children under 18 years of age.

The American Academy of Pediatrics, the Institute of Medicine and the USPSTF have also called for routine, annual BMI measurements to be conducted in school-aged children [157,169,170]. In line with these recommendations, CMPs are now an established international practice. Commonly, these programmes are school-based.

This section now describes the evidence that underpins the rationale for development and certain features of these programmes.

1.4.2a Issue

First of all, as outlined in section 1.2.2, childhood obesity represents an important public health issue.

1.4.2b Measurements

Next, the question arises as to why weight status should be measured. Excess weight is one of the most visible health issues facing society today [171]. Nevertheless, current evidence suggests that, in the absence of formal measurement procedures, there are deficiencies in our ability to accurately

identify childhood overweight and obesity [172-176]. It follows that if overweight and obesity are not recognised in children, these individuals will be less likely to access possible treatment options. Furthermore, the peculiarity of weight status misclassification is projected to worsen over time [171]. This is because the number of normal weight individuals proportionately decreases as overweight and obesity increase. Therefore, an individual with excess weight may eventually no longer appear overweight simply because, due to high prevalence, larger body size will constitute the norm [171,177,178].

West et al (2008) [172] showed that over 60% of parents of overweight children underestimate their child's weight status. Doctors and other healthcare professionals are more likely than parents to correctly identify childhood overweight and obesity. Yet, without the aid of regular anthropometric measurement, there is consistent underestimation of BMI in the clinical setting, rather than a situation where excess adiposity is over diagnosed [173,174,176]. Routine, population level CMPs may contribute to improved recognition of the true burden of this issue.

1.4.2c Population subgroup

Third, it is important to justify why these programmes target children. It is assumed that children are more amenable to behavioural modification than adults; meaning that it is not only easier to enact change in this age group but that this change is also more likely to apply over a longer time period [63,179,180]. This is also relevant as we recall that the duration of obesity is an

independent risk factor for various health conditions [58,60,61]. Assessment and intervention in childhood may be more efficient and effective than in the adult period; a valid consideration in times of increasingly pressured resources.

Additionally, programmes conducted in the child population may facilitate benefits that extend to other members of the family through the opportunities for engagement, empowerment and education that they afford. This population is accessible, with the school setting enabling contact with the majority of individuals without the need for significant additional resource [83,181]. Finally, height and weight measurements are important basic parameters relating to a child's growth and development [168].

1.4.2d Setting

Child measurement programmes are commonly conducted in schools, although other options are available. The rationale for this approach is that it affords comprehensive, though not complete, access to the target study population simply because most children attend school. In England for example, education is compulsory for children aged between 5-16 years [182] and close to 95% of children attend a state-funded primary school [183]. As a result, any CMP based in schools would be expected to reach most eligible children. However, as with any method, perfect coverage is not possible. Children may be home educated [184], may be absent or not enrolled at school [185], or may attend an institution that does not participate in a given programme, such as a privately-funded or special needs school [186,187].

When contemplating the location of CMPs, the principal alternative to schools is a healthcare setting, such as a primary care practice. Monitoring of BMI in children is currently under-used in this setting, with a minority, in some cases only 5%, of children offered regular assessment [188-195]. Additionally, childhood obesity is commonly under-diagnosed and under-reported within the medical setting; trends that are evident across all healthcare provider types [Ibid]. Limited training, time and other resource, together with inadequate knowledge of current national screening guidelines, can all impact on actual engagement in this area.

Measurement programmes can only produce population level results if the collected data will be shared for the purpose of analysis. However, this is not always a valid assumption in a medical setting, particularly in situations where healthcare is provided on a user-pays, rather than state-funded basis [188,194]. Ultimately, CMPs will not achieve representative results unless anthropometric measurements are performed, documented and shared.

Furthermore, within the medical setting, there is significant scope for participation bias that can impact on data validity. Healthy children may not see their doctor on a regular basis. In this situation, these children would effectively be ‘excluded’ from the study population. Next, healthcare consultations are more common in winter months, a period when weight can be higher than at other times of the year [196]. In this instance, a possible net outcome is skewed BMI distribution. Additionally, if anthropometric measurements are timed to coincide with a healthcare visit that has an alternative purpose, the data can be

influenced by an underlying illness [197-199]. There are also issues relating to inequality of access to healthcare services [200-206].

These factors combine to produce concern that results obtained from anthropometric measurements conducted in the medical setting may not be accurate or representative of the true burden of childhood overweight and obesity in a given population. Therefore, on balance, schools appear to be the preferred option for programme location.

1.4.2e Age group

Finally, the question arises as to the ideal age at which anthropometric measurements, that can be used to predict future health risk, should be performed. On this point, issues of reliability, efficiency and practicality are all relevant. Actual BMI, together with the rate of increase in BMI in the early childhood period, are both associated with adult adiposity [139,207-210].

Overall, current evidence indicates that BMI tracking is valid and predictive of weight status in adulthood from age six years onwards [211]. Importantly, adiposity rebound generally occurs by the age of six years, after the nadir of the BMI curve [212]. However, there is also a case for earlier monitoring. Reagan et al (2010) [213] showed that in children who tracked from normal weight to overweight, changes in BMI percentile were most prominent between the ages of two and six years. Moreover, although the association is less consistent, a

relationship exists between birth weight and the incidence of later obesity [214-216].

Therefore, current evidence does not provide a single, conclusive answer in relation to the ideal age at which anthropometric measurements should be conducted. However, there are consistent findings suggesting the validity of BMI measurements in the pre-adolescent, or primary school-aged population.

In summary, CMPs are endorsed by multiple key healthcare organisations. These programmes appropriately target pre-adolescent children and are best placed in the school setting. There is evidence to support use of actual, versus self-reported, height and weight measurements. Additional questions relating to specific aspects of measurement protocols are addressed in future chapters.

1.5 SUMMARY

This chapter presented an overview of this research and outlined and provided justification for the structure of the thesis. This chapter also introduced and demonstrated the public health importance of childhood obesity and identified challenges associated with the definition and measurement of this issue. Finally, the background and rationale for school-based population level CMPs were examined.

Obesity represents a significant public health threat. Population level child measurement is an established international practice and is becoming acknowledged as an important tool in the escalating fight against childhood obesity. However, despite the growing prominence of CMPs, it appears there is insufficient information and clarity with respect to best practice and the overall utility, challenges and long term sustainability of these programmes. In addition, questions remain around possible unintended harm associated with CMPs. This research seeks to address these key unanswered questions.

This research aims to: (1) identify current evidence to establish best practice for CMPs; (2) explore the roles, outcomes, challenges and sustainability of these programmes; and (3) identify potential adverse outcomes associated with their introduction. Finally, this research aims to examine the perceived utility, feasibility, acceptability and sustainability of a CMP in a specific local setting.

In this research, these diverse aims are addressed by adopting a mixed methods approach. Therefore, this research incorporates a three-part, progressively informative project. This approach is also intended to add richness and depth to eventual findings. All individual components of this research have been designed to offer independent information and, more broadly, contribute to the realisation of primary research aims. In this thesis, these research components are presented across individual chapters, and in the order in which they were conducted.

Whilst this research examines childhood obesity, findings may be relevant and transferable to other public health issues. Therefore, at its core, this research examines both the perceived and tangible contribution of population level data to broader strategies to address public health issues. This research is intended to inform policy makers, programme coordinators, researchers and other stakeholders engaged with CMPs.

The following chapter examines current practices in population level child measurement through a systematic review of the literature in this area.

Chapter Two

Systematic Literature Review

2.1 INTRODUCTION

This chapter describes the first phase of this research: a systematic literature review examining available peer-reviewed literature on international school-based CMPs.

Recent research has outlined existing CMPs in certain country-specific settings [156,217-220]; however, to date no publication has identified or compared programmes now in place on the global scene. In addition, there has been little examination or critique of measurement protocols utilised by these CMPs. As a consequence, the degree of congruence and standardisation evident between methods employed by distinct CMPs has not been assessed, meaning that effective comparisons of outcomes and/or thorough evaluations of these programmes have been limited. Furthermore, whilst the potential roles and impact of screening and surveillance programmes are widely acknowledged, actual applications and effectiveness of this practice remain uncertain.

The structure of this chapter aligns with that utilised in all subsequent chapters, other than the final discussion. Therefore, research aims and methods are described, followed by detailed presentation of results. The chapter concludes with a discussion of key findings from this review, together with a summary explanation of how these findings were used to inform subsequent research phases.

2.2 METHODOLOGY

2.2.1 Research aims

This review aimed to systematically examine and critically assess the available literature on CMPs in the school setting. Specifically, the aims of this review were to:

1) Identify school-based CMPs described within the peer-reviewed literature;
2) Collate available evidence on the details of measurement protocols utilised by existing CMPs and assess comparability between these programmes;
3) Examine current evidence around the potential roles and positive and adverse outcomes associated with CMPs;
4) Identify factors that may promote success and sustainability of CMPs, together with potential challenges facing such programmes; and
5) Identify key knowledge gaps in the area of population level child weight status monitoring.

In the context of the overall research project, the primary aim of this systematic literature review was to identify current evidence to establish best practice for CMPs. Furthermore, this review was intended to inform and guide the development of subsequent elements of this research.

2.2.2 Search strategy

This systematic literature review followed the protocol recommended by the 'Cochrane Handbook for Systematic Reviews of Interventions' [221]. I designed and conducted all searches over a period of four weeks in February-March 2010. Six electronic databases were searched:

1) PubMed
2) Embase
3) CINAHL
4) Cochrane Database of Systematic Reviews
5) ERIC
6) Global Health Library

2.2.2a Search terms

Searches were performed on combinations of both medical subject headings (MeSH) and free text keywords. Search terms focused on five main areas: (1) the study population; (2) location; (3) weight status; (4) anthropometric measures; and (5) monitoring programmes. Results from searches in these five discrete areas were subsequently combined using the 'and' term.

The study population was children and searches incorporated multiple, pertinent variations of this term. The principal location of interest was schools, whilst search terms relating to weight status concentrated on overweight and

obesity. Here, a variety of free text terms including but not limited to ‘adiposity’, ‘excess weight’ and ‘weight gain’ were used in various combinations, in addition to MeSH terms. Search terms relating to anthropometric measurements were considered in a distinct category to those associated with weight status in order to appropriately refine search results. The terms ‘diet’ and ‘fat’ were not included as they are too broad and do not explicitly address research aims. Finally, searches incorporated both screening and surveillance programmes. Where applicable, MeSH search terms were exploded.

A detailed summary of all search terms for each electronic database, together with resultant outcomes, are provided in Appendix I.

2.2.2b Limits

Additional limits to searches were generally not employed to avoid inadvertently omitting important, relevant publications. Where utilised, limits varied slightly between the six electronic databases as these databases did not offer the possibility of an identical approach. However, consistency was prioritised wherever possible.

The start date for searches was at the earliest record. Limits were applied in order to restrict results to human subjects only and to ensure that the appropriate age ranges were included. Results were not limited by year of publication, study type or language.

2.2.2c Other sources

Reference lists of relevant articles were inspected to identify other eligible studies. Additionally, through 'Google' (2010), the Internet was used to search for material relating to childhood weight status monitoring programmes. Search terms that matched those used for the electronic database searches were utilised. The first 100 results were reviewed to look for additional relevant articles. Results were scanned until the point of 'saturation', where it was clear that marked repetition was occurring and that no new articles were discovered.

A number of relevant research articles were identified from the 'Google' search; however, only one article (which was later excluded) was a non-duplicate. This article was published after the time of the original database searches; therefore it was not detected by earlier searches. Nine articles were identified from 'related article' searches, six of which met inclusion and exclusion criteria.

For completeness, grey literature was also examined. This material was identified from reference lists, internet searches, and direct recommendations from my supervisor and other colleagues. The main aims of this analysis were to review reference lists for relevant additional publications and to isolate documents associated with CMPs identified from electronic database searches.

2.2.3 Inclusion and exclusion criteria

Inclusion and exclusion criteria for this review were devised and detailed in the

study protocol prior to commencement of electronic searches. Included studies were restricted to those examining CMPs in a school setting. Studies conducted at both national and sub-national levels were included and were not restricted to particular regions of the world. Studies were not excluded on the grounds of low participant numbers. Inclusion and exclusion criteria are detailed in Table 2.1.

Table 2.1 Inclusion and exclusion criteria for systematic literature review

Inclusion criteria	Exclusion criteria
• **Topic:** CMPs conducted in schools	• Studies that discuss prevalence based on cross-sectional data alone, rather than data obtained from a surveillance/screening system
• **Age group:** Children aged between 3.0-18.0 years	• Studies that consider obesity screening or surveillance in adult populations alone
• **Outcomes:** Childhood obesity or overweight classified from anthropometric measurements according to accepted definitions	• Anthropometric data obtained through self-report only
• **Setting:** Primary and/or secondary schools	• Studies based in a non-school setting
• **Population:** Studies conducted at the population level, or intended to represent the population being studied	• Study population examined individuals with underlying significant medical conditions that affect weight status, rather than generalisable samples
• **Programme types:** Screening and surveillance, or initiatives combining elements of both programme types	• Studies or publications that considered anthropometric techniques or measures alone, outside the context of a school-based measurement programme
• **Types of articles:** All	• Studies that primarily examined risk factors or effectiveness of obesity-related management initiatives, other than child measurement

2.2.4 Software

Search outcomes from the PubMed, CINAHL, Embase, ERIC and Cochrane Library databases were uploaded to the software programme 'RefWorks'. Outcomes from remaining database and all other sources were manually entered into a dedicated review database. Each study was assigned a unique identification number; duplicate studies from the assorted databases were identified and removed.

2.2.5 Screening

All articles underwent a three-phase screening process prior to final inclusion. To ensure consistency, I was the sole reviewer responsible for determining appropriateness for inclusion. I was not blinded to author names, institution or journal of publication. In the first screening phase, the title and keywords of all identified individual publications were evaluated. Phase two incorporated reviews of abstracts of all remaining publications. Finally, full text articles were obtained and evaluated in the third screening phase.

A study was excluded if one or more inclusion criteria were not met, or if one or more exclusion criteria were evident. If there was any uncertainty around eligibility, the study was included and continued to the next screening phase. Duplicate articles and studies that were not published as full text articles in English were removed. Additionally, several otherwise-eligible review articles

[156,217,218] were excluded prior to data extraction to prevent replication of data.

2.2.6 Risk of bias assessment

I developed and applied a methodological screening form to all articles to assess risk of bias (Appendix II) [222]. This process determined whether or not the aims, study design and methods were clearly and consistently defined. Additionally, attention was paid to recruitment methods, consideration of limitations, and validity and representativeness of individual studies. Certain questions on the methodological screening form were assigned greater weight as these questions provided a more robust indication of a given study's overall quality. These questions were allocated two points, whilst all other questions on the forms merited one point.

In accordance with pre-defined criteria, articles did not need to attain a minimum score in this screening process for inclusion in the review. Instead, the total number of points was converted to a percentage of the maximum possible score and this result was used to categorise publications as lower (<40%), average (40-70%), or high (≥70%) quality. This classification inversely translated to risk of bias, which could aid interpretation of findings from this review. Here, the intention was that outcomes from higher quality studies; those that demonstrated lower risk of bias, would be allocated greater priority when final conclusions were drawn.

2.2.7 Data extraction

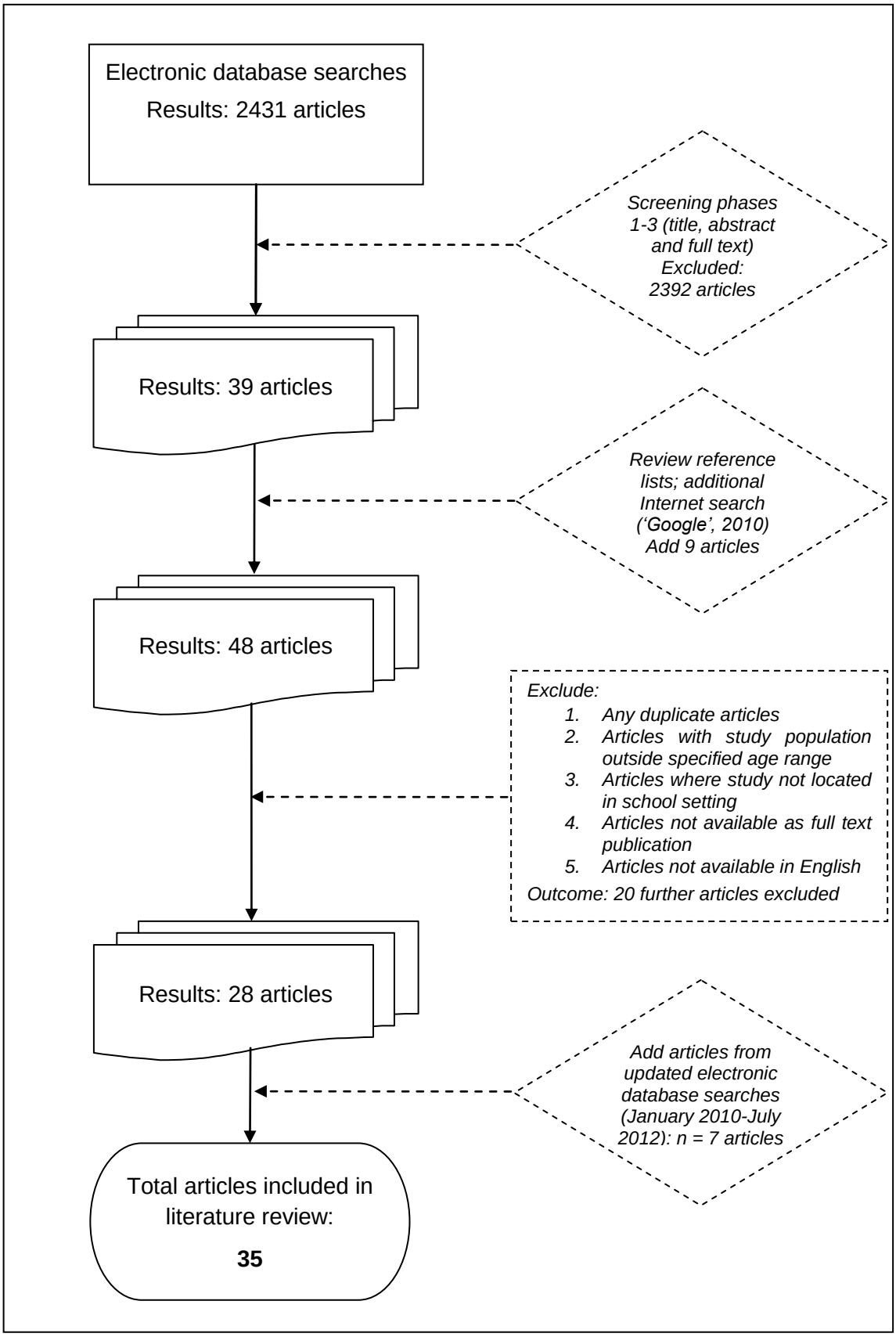
Data extraction was completed using a standardised form consisting of 42 questions (Appendix III). I developed and applied this form and all results were entered into an Excel database. The data extraction form was pilot tested with a sample of articles to ensure that it was comprehensive and provided information relevant to the aims of this review. Where applicable, background or supplementary literature relating to programme methodology or results was also obtained. Information gathered from these reports was used to validate material available within the articles themselves. Contact with one author [223] was required on a single occasion during data extraction to confirm that anthropometric measurements had been performed within schools.

2.2.8 Updated searches

As outlined in Chapter One, this systematic literature review was performed prior to commencement of other elements of the overall research project. However, I updated all electronic database searches in July 2012 using identical criteria, search terms and subsequent screening processes. These later searches were limited to the period from January 2010 to July 2012. Seven further eligible articles were identified from these later searches [63,223-228].

A flow-chart summary of the complete search strategy applied in this review is provided in Figure 2.1.

Figure 2.1: Summary of search strategy for systematic literature review



2.3 RESULTS

2.3.1 Presentation of results

This section commences with a general overview of the included studies to provide context for further analysis. Next, principal findings are discussed under five summary headings: (1) study information; (2) programme design; (3) measurement protocol; (4) analysis of collected data; and (5) programme outcomes. There was heterogeneity across the aims, methods and outcomes considered by the included studies. Meta-analysis was not performed as this was not appropriate and was not required to achieve stated research aims. A descriptive summary of main findings was most suitable.

All included articles were incorporated into the final analysis described below. Of note, information extracted from the seven publications identified from the updated searches did not directly contribute to ensuing research phases as these articles were critically assessed only after completion of all other data collection and analysis. However, for completeness and to enhance the depth of findings, these articles are reported below.

2.3.2 Overview of included articles

The 35 articles described 28 different CMPs. Articles describing identical CMPs were included if distinct, relevant aspects of the programme were documented within the publication. In the instance of duplicate material, articles with a higher

quality score were selected for inclusion and other articles (with lower quality scores) were excluded. All 28 included CMPs are summarised overleaf in Table 2.2.

Included articles were published in 29 different journal titles covering a range of school, nursing, public health, obesity and paediatric literature. The year of publication ranged from 2000 to 2012 and the study period covered by the articles spanned over three decades: 1980-2011. The majority of studies were conducted over a one-year period. However, nine articles reported data arising from research conducted across a series of cross-sectional studies, therefore enabling analysis of various time-related trends. A range of ethnicities and socio-economic backgrounds were included in the study populations of described programmes.

Pilot programmes, as identified by study authors, were described by seven articles. In two instances, an expanded version of this pilot programme was detailed in a subsequent article. These later publications addressed distinct aspects of the programme, therefore justifying the inclusion of both articles in this review.

Table 2.2: Overview of included CMPs (systematic literature review)

Number	Location	Associated publication(s)	Design
1.	Chile	Stanojevic et al (’08) [196]	National (sample)
2.	Denmark	Krue et al (’10) [223]	Regional
3.	England	Ells et al (’08) [229] Levine et al (‘08) [159]	Regional (sample)
4.	England	Levine et al (‘09) [160] Rudolf et al (’06) [230]	City-wide (sample)
5.	England	Routen et al (’11) [224]	National
6.	Greece	Tambalis et al (’09) [63]	National
7.	Iran	Kelishadi et al (’12) [225]	National (sample)
8.	Kuwait	Al-Mousa et al (’00) [231]	National (sample)
9.	Scotland	Armstrong et al (’03) [232]	National (sample)
10.	Seychelles	Bovet et al (’06) [233]	National (sample)
11.	Sweden	Lager et al (’09) [111] Sjoberg et al (’08) [112] Werner et al (’06) [234]	Regional
12.	United States (US): Arkansas	Justus et al (’07) [235] Raczynski et al (’09) [236] Thompson et al (’09) [113]	State-wide
13.	US: California	Madsen (’11) [226]	State-wide
14.	US: Florida	Evans et al (’09) [237]	State-wide
15.	US: Kansas	Filbert et al (’09) [238]	County (sample)
16.	US: Massachusetts	Chomitz et al (’03) [239] Kalich et al (’08) [240]	State-wide (sample)
17.	US: Minnesota	Stoddard et al (’08) [114]	State-wide (sample)
18.	US: New York	Berger et al (’11) [227]	State-wide
19.	US: Ohio	Conrey et al (’09) [241]	State-wide (sample)
20.	US: Ohio	Montgomery-Reagan et al (’09) [228]	Regional (sample)
21.	US: Oklahoma	Moore et al (’06) [242]	Regional (sample)
22.	US: Texas	Brosnan et al (’08) [181]	State-wide (sample)
23.	US: Texas	Hoelscher et al (’04) [186]	State-wide (sample)
24.	US: Utah	Nellist et al (’09) [243]	State-wide (sample)
25.	US: West Virginia	Demerath et al (’03) [115]	Regional (sample)
26.	US: West Virginia	Northrup et al (’08) [244]	State-wide sample
27.	US: Wyoming	Smith et al (’08) [245]	State-wide sample
28.	Wales	Jones et al (’05) [246]	Regional (sample)

2.3.3 Study information

2.3.3a Programme location

Eleven countries were represented by the measurement programmes, but 24 locations (including a range of countries, states and cities) were described by the 28 different CMPs. Programmes were conducted in developed and developing country settings.

In total, 19 articles detailed 16 different BMI measurement programmes in the US, covering a range of states within this nation. Multiple articles described current or former CMPs based in England. Three articles related to a single CMP in Sweden, but considered the programme across different time periods. Furthermore, these three articles described various elements and outcomes of the same programme. Other countries represented by these articles included Chile, Denmark, Greece, Iran, Kuwait, Scotland, Seychelles, and Wales.

2.3.3b Study setting

Measurement programmes were reported as being conducted exclusively in a rural setting in six articles (21%). An urban location was detailed in seven programmes (25%), whilst six publications did not detail the setting. At least nine programmes (33%) were carried out in both rural and urban settings. Articles describing two CMPs communicated that measurements were performed in both state- and privately-funded schools. However, most

programmes either did not report this information or outlined that the CMP was confined to state-funded schools alone.

2.3.3c Participants and participation rates

The number of children included in the various programmes ranged from 70 to approximately 450,000 per year. Seven studies had less than 1,000 participants, whilst 11 included over 10,000 children. Total sample size was not outlined in three articles.

Participation rates varied significantly between different programmes (range: 4-96%) and exhibited a clear association with the programme type and consent model used. Participation exceeded 80% in 11/28 programmes (39%) and was reported as less than 50% in 2/28 programmes. Rates of participation were not documented in articles describing 9/28 programmes (32%).

2.3.4 Programme design

2.3.4a Design

Six programmes (21%) reflected a national level CMP, whilst the remainder were established within an individual state, region or city. Representative sampling, as opposed to a method whereby anthropometric measurements were collected and recorded from all eligible children within a given population, was the favoured approach. Twenty of 28 programmes (71%) described this

method. Of the eight programmes employing a whole population approach, two were national level; four were state-wide; and the remaining two were conducted in specific regions.

2.3.4b Programme type

Thirteen of 28 (46%) identified CMPs reflected a screening programme, whereas 14 (50%) were described as surveillance programmes. Levine et al (2009) did not define the programme type, simply labelling it a *"monitoring"* exercise. Furthermore, information around provision of feedback to parents was not detailed within this publication.

2.3.4c Consent model

'Opt out' or passive consent means that participation ensues unless a parent or child expressly withdraws from the programme. Opt out consent alone was used in six programmes (21%), whereas an 'opt in' consent model was utilised in 5/28 (18%) programmes. Fourteen of the 28 CMPs (50%) did not detail the consent model used.

Both opt in and opt out methods of consent were described by three different programmes (11%). Northrup et al (2008) reported that the CMP outlined by their study shifted to passive consent as a result of poor participation rates with the alternative model. In remaining programmes, responsibility lay with individual schools to determine which option they wished to pursue. Here,

passive consent was the preferred approach with 80% of participant schools adopting this model.

2.3.4d Frequency of data collection

Where reported, the majority of CMPs collected data on an annual basis (18/28, 64%). An alternative approach was described by four programmes (14%), with most of these electing to collect data every two years. However, at least one programme reported collecting data from all included children on several occasions over the course of each year.

2.3.5 Measurement protocol

2.3.5a Age range

The ages of children included in the various CMPs ranged from 0-19 years. Most programmes included children across multiple ages and school grades. However, five programmes focused on a more defined study population, measuring only a single year group. The most common ages of measurement across all CMPs were ages 5-6 years, 8 years, and 10-11 years. Eighteen programmes (64%) included children aged 5-6 years whilst 17/28 programmes (61%) measured 10-11-year-old children.

Two programmes included children under age five years and Northrup et al (2008) described a cardiovascular disease risk factor screening programme

developed for both children and their parents. With few exceptions, articles did not provide explanation or justification for why certain age groups were selected for inclusion in the respective programmes.

2.3.5b Data collectors

Publications describing 22/28 programmes (79%) included detail around who was responsible for collecting anthropometric measurements. A range of personnel were used; however, school nurses were most often involved in this process. Ten programmes (36%) detailed that school nurses had participated in performing measurements. Nursing or other students participating in higher education courses were involved in obtaining anthropometric data in four programmes (14%), but were often supervised whilst obtaining measurements. Additionally, researchers or other project staff conducted the measurements in several instances. In the CMP described by Stoddard et al (2008), this was done in addition to measurements performed by school nurses for the purpose of data validation.

Individuals associated with a range of different job descriptions performed measurements in 8/28 programmes (29%), though this was generally in instances where data other than basic anthropometric measurements were obtained. On the other hand, measurements were conducted by a single group in 14/28 programmes (50%).

2.3.5c Training procedures

Procedures for training individuals responsible for data collection were described by 10/28 programmes (36%). Where outlined, little detail of these procedures was provided by the authors, with most simply noting that training had occurred. There was no description of re-training processes for individuals engaged with CMPs extending over multiple years.

2.3.5d Clothing

Articles describing 15 programmes (54%) included information about clothing worn by children at the time of measurement. Where specified, CMPs required that children wore light clothing and removed their shoes (or a similar variant). No study provided further detail or indicated the extent to which students adhered to these specifications. Moreover, no article documented any attempt to account for the weight of various items of clothing in the analysis. Of note, Lager et al (2009) detailed that clothing worn by children varied between sites due to the lack of a consistent measurement protocol.

2.3.5e Timing of measurements

Four studies (14%) specified that measurements were conducted in the morning hours. Routen et al (2011) conducted measurements at multiple time points to assess the potential impact of height and weight changes throughout the day. This study concluded that measurements should be conducted in the

morning due to evidence of slight height reductions in older children in the afternoon. Information regarding the time of day at which measurements were collected was not reported for 24/28 programmes (86%).

Eight programmes (29%) detailed the period when data collection occurred. Where programmes outlined this timing and completed all measurements within a single seasonal period, there was no consensus around when measurements should be conducted. Instead, measurements were conducted across all four seasons with no clear trend. In several instances, authors noted that the timing had been purposely chosen to align with a school's pre-stated preference or to avoid busy periods in the school term. Of note, Stanojevic et al (2008) described a programme in which participants were measured at three different time points over the course of the year. This approach enabled comparison of children's age-adjusted weights and determined that, in that sample, BMI was higher in winter and the immediate post-winter months.

Information regarding the time of year at which the anthropometric measurements were collected was not provided for 20/28 programmes (71%).

2.3.5f Measurement equipment

Of the CMPs detailed by included articles, 17/28 (61%) reported the type of scale and stadiometer used. Here, portable stadiometers and class III scales were commonly utilised. The CMP described by Stanojevic et al (2008) used a

combined scale and stadiometer. Equipment used to obtain anthropometric measurements was not specified by 11/28 programmes (39%).

Calibration procedures were described by seven articles. Where provided, this description typically confirmed that procedures were incorporated into the protocol and indicated the frequency of calibration.

2.3.5g Other details of measurement protocols

Other aspects of measurement protocols were reported inconsistently across included articles.

Measurements were conducted within schools in all programmes; however, the actual site within schools was often not detailed. Where specified, the range of settings included school gyms, nurse's clinics, classrooms and school hallways. In these instances, the use of a privacy screen was commonly described.

Limited detail was provided around how height and weight measurements were collected and recorded. Again, there was no consensus approach across different CMPs: some CMPs recommended two height and single weight measurements, whilst others preferred the reverse approach. Where two measurements were taken, an average of the recordings was used in the subsequent analysis. Overall, no clear association was evident between the scale of a programme and the degree of detail applied to its associated measurement protocol.

Finally, most articles did not include information regarding exclusion criteria for the respective CMPs. However, where this detail was described, protocols outlined that children were excluded from measurement if not able to stand independently or if they had limb casting.

2.3.6 Analysis of collected data

In general, included articles did not include comment on or examination of the overall accuracy and validity of collected data.

2.3.6a Growth reference

Eighteen programmes (64%) used the CDC growth reference, including three programmes based outside the US. The IOTF criteria for childhood overweight and obesity were utilised in seven different CMPs (25%), often in combination with a different reference. Four programmes used the UK90 reference population; the WHO (2007) system was applied in one programme; and two programmes used other growth references. In total, five CMPs calculated and analysed results according to more than one growth reference to enable enhanced comparability of findings.

2.3.6b Rounding procedures

Numerical rounding practices for height and weight data were specified in 18/28 programmes (64%). Overall, there was a lack of homogeneity evident in digit

rounding processes adopted by various CMPs. Digit rounding to 0.1kg and 0.1cm (or imperial system equivalents) for weight and height recordings, respectively, was reported for 11/28 programmes (39%). Other approaches were described by articles covering seven further programmes. Assessment of the extent to which these procedures were applied was either not performed or not reported.

2.3.6c Other information

Almost all articles (23/28, 82%) detailed that information on both age and gender was collected by the respective programmes. Information on ethnicity and SES was collected in both surveillance and screening programmes, though was more commonly obtained in the latter programme type. Seven programmes (25%) documented collection of information on each of age, gender, ethnicity and SES. Diverse markers of SES, including parent reports, postcode of residence, school location, and eligibility for free school meals were utilised.

Detail around other information collected was not reported by articles describing four different CMPs (14%).

2.3.6d Other measures

All programmes included height and weight measurements and subsequent calculation of BMI. In addition to BMI, waist circumference was included in three distinct CMPs. Of these, one programme also incorporated assessment of body

composition using BIA. Additionally, Sjoberg et al (2008) advocated use of waist circumference in CMPs, but did not substantiate this recommendation or incorporate this measure in their own protocol. No study detailed the use of more invasive or expensive measures, such as DXA scanning.

In several instances, screening for other conditions coincided with collection of anthropometric data, either because BMI measurements were incorporated into an existing screening programme or because systems were developed in parallel. Anthropometric data collection was coupled with blood pressure (BP) in four different programmes. Three programmes also included blood tests for comprehensive assessment of cardiovascular disease risk. Multiple additional measures were reported by five CMPs.

2.3.6e Data sharing

Overall, the approach to dissemination of data obtained from different CMPs was poorly described or, if outlined, displayed substantial variation. Articles covering 15/28 programmes (54%) did not include this information. Where reported, results were communicated to varying combinations of the following: parents, schools, the media, school districts, local governments, state and Departments of Health.

2.3.7 Programme outcomes

2.3.7a Feedback

Details of feedback processes were described by articles relating to 8/13 CMPs identified by authors as screening programmes. Four screening programmes did not include detail around feedback processes. Furthermore, Conrey et al (2009) reported on a screening programme but explicitly noted that individual level feedback was not available to families or schools. On the other hand, Levine et al (2008) described a surveillance programme but expressed that feedback was a featured element of this CMP. However, this was only provided if parents requested their child's results.

In general, feedback processes were poorly described with little information provided around: content of feedback letters; method of delivery; availability of support services or other follow-up; and/or other details. However, certain CMPs reported elements relating to their feedback protocol. In West Virginia, feedback was only offered to participants who recorded abnormal results; children whose results fell within the healthy weight range did not receive notification of their recordings. In addition, one state (Utah) utilised a protocol that enabled individual schools to determine whether and how results were provided to parents. This meant that different feedback practices were evident within a single system. Finally, Chomitz et al (2003) considered different approaches to feedback and compared outcomes of delivering either personalised, general, or no feedback on individual results in three otherwise

comparable groups. Here, personalised feedback was found to be time consuming and intensive, and there was no evidence to suggest that this practice altered weight-related lifestyle behaviours.

2.3.7b Assessment of unintended harm

Many studies (25/28, 89%) did not incorporate assessment of unintended harm resulting from CMPs. Where evaluated, there was no evidence to suggest that these programmes had led to unintended, adverse outcomes. Measurement processes were noted to be comfortable, private and acceptable [114,240]. Other analysis concluded that there had been no increase in weight-based teasing or the proportion of underweight children in included study populations [236,240]. Furthermore, there were no reports from the clinical community to indicate that CMPs had resulted in an unmanageable requirement for their services. Instead, limited reports suggested that demand had stayed within the capacity of healthcare systems [236].

2.3.7c Programme costs

Overall, cost and cost effectiveness were under-reported across all included articles. Only three articles (11%) reported any assessment of costs, with the estimated cost per child ranging from £1.50 to approximately £18.00. One of these programmes was a combined BMI and BP screening initiative, which raised the overall cost per child [181]. Where BMI measurement was considered alone, reported costs were less than £2.00 per child [113,159].

Typically, authors did not identify the method for assessing how costs were calculated and there was no itemised description of included costs.

2.3.7d Other outcomes

The intended applications of obtained data were incompletely and inconsistently reported in the included articles. Where reported, data collected by CMPs were put to various uses. The two common applications included measuring prevalence and assessing longitudinal trends. Furthermore, data were utilised to: justify management initiatives; highlight the issue of excess weight to parents, schools and healthcare professionals; identify high-risk population subgroups; allow communication between stakeholders; and secure research grants and other funding.

Additionally, several articles described pilot projects that were later expanded to include broader populations. Finally, both Filbert et al (2009) and Moore et al (2006) outlined intervention initiatives that were developed as a direct result of findings from the associated CMPs.

Summary findings relating to all outlined programme elements are presented in Table 2.3. In addition, individual articles included in this review are summarised and presented in alphabetical order (by lead author) in Appendix IV.

Table 2.3: Summary of features of all included CMPs (n = 28)

Programme feature	Detail	Not reported	Other
Location	24 locations within 11 different countries	0	Includes both developed and developing country settings
Setting	Rural and urban: 9/28 (32%); rural only: 6/28 (21.5%); urban only: 7/28 (25%)	6/28 (21.5%)	---
Participation rates	Range: 4%-96%. ≥80% in 11/28 (39%), < 50% in 2/28 (8%)	9/28 (32%)	Where participation ≥80%, 7 (of 11, 64%) were surveillance programmes
Programme design	Sample: 20 (71%); population level: 8 (29%)	0	National: 7; State-level: 12; 'Other' (e.g. regional): 9
Programme type	Surveillance: 14 (50%); screening: 13 (46%); 'monitoring': 1 (4%)	0	---
Consent model	Opt in: 5/28 (18%); opt out: 6/28 (21%); mixed model: 3/28 (11%)	14/28 (50%)	---
Frequency	Annual: 18/28 (64%); 'other': 4/28 (14%)	6/28 (21%)	If reported and not annual, programme typically every 2 years
Age range	Range: 0-19 years. Ages 5-6yrs: 18/28 (64%); 8yrs: 12/28 (43%); 10-11yrs: 17/28 (61%)	0	Five programmes (18%) measured only a single age group
Data collectors	School nurses: 9/28 (32%); students: 4/28 (14%); 'other': 8/28 (29%)	6/28 (21%)	Single group of collectors: 14/28 (50%); multiple groups: 8/28 (29%)
Training procedures	Little discussion of detail of training procedures	18/28 (64%)	No discussion of re-training protocol or methods
Clothing	Light clothing, no shoes (or similar variant): 15/28 (54%)	13/28 (46%)	In some programmes, different practices were used
Timing	Time of year: spring/summer: 5/8; autumn/winter: 3/8	20/28 (71%)	Time of day reported in 4/28 (14%). Where reported, all in morning

Programme feature	Detail	Not reported	Other
Equipment	Details of scales/stadiometers provided in 17/28 (61%)	11/28 (39%)	Calibration procedures described in 7 articles
Growth reference	CDC: 18/28 (64%); IOTF: 7/28 (25%); UK90: 4/28 (14%); WHO 2007: 1/28 (4%); 'other': 2/28 (8%)	1/28 (4%)	Multiple growth references used in 5/28 programmes (18%)
Rounding	0.1kg/0.1cm (or equivalent): 11/28 (39%); other protocol: 7/28 (25%)	10/28 (36%)	In some cases, rounding protocol provided for only one variable
Other information	DOB/gender: 23/28 (82%); ethnicity: 9/28 (32%); SES: 11/28 (39%); 'other': 12/28 (43%)	4/28 (14%)	All of DOB/gender/ethnicity/SES collected/reported in 7/28 (25%)
Other measures	Waist circumference: 3/28 (11%); BIA: 1/28 (4%); BP/bloods: 5/28 (18%); 'other': 3/28 (11%)	20/28 (71%)	Multiple other measures collected/ reported in 5/28 (18%)
Data sharing	Results to parents: 8/28 (29%); 'other': 8/28 (29%)	15/28 (54%)	'Other' included: Schools; states, nurses; researchers; local authorities; media, etc.
Feedback processes	Results to all parents: 6/13; results only if abnormal: 1/13; mixed approach: 1/13; results not provided: 1/13	4/13 (31%)	Of surveillance programmes (n=14), 1 programme gave results if requested by parents; 1 gave results to schools, but not parents
Unintended harm	Reported for 3/28 programmes (11%). No significant harm reported in any programme as a result of measurements or feedback processes	25/28 (89%)	Included consideration of: bullying or teasing; unhealthy dieting behaviours; eating disorders; prevalence of underweight
Programme costs	Reported for 3/28 programmes (11%). Costs per child ranged from £1.50-£18.10 (latter figure included BP screening)	25/28 (89%)	Majority of total expense attributed to personnel costs. Where BMI measurement alone performed, cost was less than £2 per child

2.4 DISCUSSION

This review revealed that multiple CMPs are currently in place in diverse international settings. This discussion is divided into four sections: (1) overview of existing literature, including literature external to this review; (2) analysis of overall CMP aims, design and reported outcomes; (3) examination of specific features of measurement protocols; and (4) limitations of this review. Within the first three sections, current knowledge gaps are highlighted.

2.4.1 Overview of existing literature

This section offers a general overview and critique of literature included in this review, together with consideration of other publications pertaining to this topic.

Overall, literature describing school-based CMPs is increasing: a trend that parallels the expansion of these programmes around the world. Nevertheless, this literature is notably US-centric with relatively few studies detailing CMPs in other countries. This is unsurprising given that the majority of recognised programmes are located in the US. To date, no publication has considered the range of CMPs in place on the international scene or offered comparisons between the protocols, outcomes, and challenges of CMPs functioning outside the US. The prominence of US-based CMPs in existing literature presents a limited, even distorted view of these programmes. This is because distinct settings often dictate different approaches due to various demographic, legal, administrative, cultural, resource, and other considerations.

This review found approximately equal numbers of acknowledged, operative surveillance and screening programmes. However, critical opinion pieces and other publications external to this review [171,220,247-249] have placed greater emphasis on the latter programme type. The reasons for this disproportionate reporting are unclear. One possible explanation is that surveillance is a less controversial undertaking than BMI screening and therefore offers fewer new angles for analysis. Moreover, studies have tended to address experiences and observations of individuals placed at the delivery end of CMPs, including nurses, parents or participant children [240,250-261]. To date, this analysis has not been complemented by reporting of the perspective of centrally-placed stakeholders, such as those responsible for the overall vision and coordination of a given programme. Regardless of the reasons, these outcomes do not facilitate an inclusive, comprehensive approach to exploration of key issues associated with CMPs.

Literature that covers the topic of CMPs has emphasised outcomes relating to obesity prevalence or various risk factors associated with excess weight in childhood. There has been little consideration of CMP development or evaluation across distinct programme stages. Therefore, there is insufficient information available to stakeholders engaged with these programmes regarding certain practical considerations or challenges. Furthermore, despite growing pressure on public health resources in many international settings, the available literature has not yet considered factors that may either threaten or promote sustainability of CMPs over time. This reflects a significant current knowledge gap.

In general, existing CMPs appear to be either under-reported or inconsistently reported in the literature, a finding also highlighted by other authors [219,220]. For example, the WHO Regional Office for Europe launched the 'Childhood Obesity Surveillance Initiative' (COSI) in 2007 [262,263]. However, results or other discussion directly relating to this programme are yet to appear in peer-reviewed literature. This programme is a Europe-wide system for collecting anthropometric data from nationally representative samples of children aged between 6.0-9.9 years [263]. Thirteen countries[ϕ] were involved in the first round of data collection with participation from additional member states anticipated for subsequent monitoring rounds. At present, these monitoring rounds are designed to occur at two-yearly intervals [262].

Furthermore, articles that did not meet inclusion criteria for this review acknowledged additional school-based CMPs in select US states [217-220]. Of note, these articles did not provide further information relating to these other programmes that was relevant to this study. Moreover, several distinct reviews that intended to summarise US-based CMPs reported different programmes, though substantial overlap was evident.

For completeness, other CMPs identified by these additional papers have been combined with findings from this review. Therefore, a full list of school-based CMPs currently documented in the peer-reviewed literature is summarised in Appendix V.

[ϕ] Countries included in the 2007-08 data collection round included (in alphabetical order): Belgium, Bulgaria, Cyprus, Czech Republic, Ireland, Italy, Latvia, Lithuania, Malta, Norway, Portugal, Slovenia, and Sweden [262].

2.4.2 Overall programme aims, design and outcomes

It is essential that CMPs have defined, realistic and explicitly communicated aims and that these programmes are both designed and later evaluated with this vision in mind. However, the roles and broader effectiveness of CMPs are currently under-reported within available literature relating to these programmes. Often, it appears uncertain whether aims were established prior to programme introduction or whether the planned uses and distribution of collected data were identified in advance. Where documented, outcomes from these CMPs were vague, unsubstantiated, or often related to prevalence trends alone.

One exception is the screening programme in Arkansas, which identified clear aims and incorporated evaluation processes, thereby enabling assessment of the programme's broader utility [113,235,236,264]. However, this CMP incorporates multiple elements in addition to BMI screening, meaning that it is difficult to identify the independent effect of measurements. Given the diverse approaches adopted by discrete CMPs, together with the various settings in which they are based, further evidence - including findings from different CMPs - is required for a more comprehensive understanding of the actual contribution of these programmes. However, many CMPs described within existing literature are either new or recently introduced. Therefore, information regarding CMP outcomes may not yet be available.

This review incorporated articles reporting on both screening and surveillance programmes. Interestingly, in some instances these terms were loosely applied: several ‘screening’ programmes failed to provide any information regarding feedback processes or overtly stated that individual results were not returned. Moreover, certain surveillance programmes detailed that feedback was provided to either schools or individual parents [159,243]. Therefore, direct comparison of screening and surveillance programmes was difficult as definitions of programme types were not consistent across various studies.

Currently, childhood obesity does not meet established criteria for screening programmes [156,171]; yet, no included articles either acknowledged this fact or recommended against this approach. On initial examination, no preferred option arose: instead, the decision to pursue a screening or surveillance programme appeared context dependent and associated with availability of fiscal and other resource, including follow-up support. However, further analysis of identified programme roles, participation rates and evidence relating to feedback processes suggested a trend in favour of surveillance.

First, programme roles recognised within included articles, together with external literature relating to child weight status monitoring, suggest that the primary purposes of CMPs are to obtain prevalence data and assess longitudinal trends [63,111,217,223,232,233,238,246,262,263,265]. These key roles may be achieved by surveillance alone, without the need for additional complications that can be associated with screening. Second, participation rates reported by included articles indicated that there is typically lower

inclusion seen with screening programmes. Of 11 CMPs with participation rates over 80%, only three were screening programmes. This trend could also be influenced by the consent model adopted by a given CMP (see next section). However, it is important to recognise that consent models may in fact be determined by programme type.

Third, a defining feature of screening programmes is the provision of individual feedback. Further evidence is now appearing in relation to this feature, but at present it remains incomplete. Nevertheless, where available, current evidence does not support this practice [217,226,239,247,254,264,266,267]. Indeed, studies described within and external to this review have failed to demonstrate that this information alters obesity prevalence, lifestyle behaviours, engagement with weight management services, or other health outcomes, at least in the short term. Importantly, these studies have considered the impact of a single feedback letter (or similar). It is possible that provision of repeat letters over time, coupled with follow-up support, may exhibit a different degree of effectiveness.

As a further point, literature describing this process currently suggests that there is inadequate guidance available regarding appropriate content of feedback letters. A recent detailed review [268] of existing letter templates used in the US found that many letters omitted *"vital"* information, failed to provide context for the results, and did not offer links to local support services. Therefore, these letters were felt to be confusing to parents and risked harm due to possible misinterpretation.

Overall, current evidence does not indicate clear benefits associated with feedback and, more broadly, suggests that surveillance programmes may reflect the preferable option for programme type. However, further examination of this research question is required.

This current review aimed to examine evidence relating to adverse outcomes resulting from CMPs. However, similar to the under-reporting seen in relation to positive outcomes from these programmes, information regarding possible unintended harm was only considered by a minority of publications. Where described, the evidence suggested that measurements were private and comfortable and there was no reported increase in weight-related teasing or bullying [159,236,240]. Moreover, more extreme consequences, including an increase in harmful eating disorders, excessive exercise, or medically unsupervised and inappropriate diet-related activity had not emerged as a consequence of CMPs [236].

Despite these results, significant knowledge gaps remain in this area, particularly with respect to adverse outcomes that may become apparent in the longer term. This lack of evidence lends itself to a situation whereby the literature around possible unintended harm is over-reliant on critical opinion pieces, which can be strongly influenced by personal preference or hypothesised (rather than actual) outcomes. This conclusion reinforces that thorough, on-going systems of evaluation must be integrated into all CMPs.

Finally, few papers included in this review included even nominal analysis of programme cost or cost effectiveness of either screening or surveillance, despite clear calls for this information [79]. However, regardless of this lack of formal cost analysis, several CMPs were reported as *"inexpensive"* and able to be introduced and conducted without significant disruption or challenge to existing services or resources.

2.4.3 Features of measurement protocols

This review did not reveal definitive conclusions regarding best practice for school-based CMPs. These programmes are now widespread and often include large numbers of participants. However, different CMPs outlined diverse methods that were incompletely described and offered restricted comparability across distinct regions. Where described, few authors provided any evidence-based justification for protocol-related decisions. Furthermore, included articles did not offer comment on general adherence to a stated protocol or consider potential implications of poor adherence, though this latter question is addressed elsewhere [117]. In spite of these limitations, certain clear trends for best practice emerged. Also, this review highlighted the role and importance of standardised measurement protocols.

First, if CMPs intend to prioritise representativeness of collected data, opt out consent models are preferable to methods that require active consent [106]. Programmes using opt out consent demonstrated higher participation rates when compared with programmes where opt in consent was required.

Specifically, participation rates in CMPs that adopted opt out consent were consistently over 80%, often rising above 90%. At relatively low levels of child involvement, participation bias is likely to impact on the validity of results. Importantly, some programmes that required active, written consent from parents also included other measurements, such as BP or blood samples. Therefore, participation rates may have been influenced by the need for additional and at times invasive tests. However, lower participation is a commonly observed consequence of opt in consent models and findings from this review support this consensus opinion.

This review revealed that CMPs primarily intended to deliver accurate information regarding prevalence of excess weight in particular populations. This aim would suggest that high participation rates reflect a prominent concern for programme coordinators, thereby enhancing the case for opt out consent models. One exception is in instances where representativeness of data is valued below collection of more detailed information on select population subgroups. Here, the alternative approach would likely be required. It seems reasonable to assume that selected consent models were at least in part dictated by local ethical and/or legal restrictions. However, these practical restraints received minimal attention within included publications. Such discussion would assist stakeholders engaged in CMPs to be aware of possible challenges, as well as identified solutions in this area.

Across all identified CMPs, the most common ages at which child measurement was performed were 5-6 years, 8 years and 10-11 years. Of note, most CMPs

measured at multiple age points, but few authors offered justification for the choice of age group(s) studied. In many instances, the chosen population followed existing CMPs, allowed for convenience sampling in schools, or ensured representation across a range of school-aged children. Several articles made recommendations for the appropriate or ideal age for BMI measurements in children based on their results [63,112,186,231]. However, these recommendations were at best moderately defended by the authors. Literature external to this review supports the notion that BMI measurement at the three age points identified above is valid and can track through into adulthood [69-71,73,90,139,211].

Multiple authors reflected that the inclusion of secondary (high) school students in CMPs was associated with organisational difficulties. Additionally, authors commented that the lower participation rates commonly reported in this population subgroup did not facilitate acquisition of a representative dataset or a smoothly executed programme [159,186]. Therefore, whilst more data from older age groups may provide additional useful information, this approach involves compromise in other areas.

Seasonality may impact on results obtained by CMPs, but mixed and limited evidence prevents definitive recommendations regarding timing of data collection within the school year. However, available data arising from this review suggests that children should be measured outside the winter months [196]. Measurements should also be timed to minimise disruption to schools and other stakeholders. Furthermore, few publications specified when in the

day measurements were conducted. Where documented, authors recommended measuring in the morning to moderate the potential impact on BMI due to changes in height and weight over the day [196,224].

This review, together with other available evidence, confirms that it is appropriate for CMPs to be based in schools, given the comprehensive coverage afforded by this setting. Across all publications, the most common clothing protocol consisted of appropriate light attire and no shoes: a practice that appears reasonable on multiple levels. In addition, children should be measured on a one-by-one basis in a situation of auditory and visual privacy [114,159].

Additionally, this review highlighted the lack of consensus across different CMPs regarding what information should be collected, as well as what should be measured. Overall, there was no consistency around the approach to collection of information other than height, weight, age and gender. Where used, BIA scales were found to be impractical and were not recommended [160,230]. In particular, Rudolf et al (2006) suggested that further research into the utility of BIA was needed before this measurement tool could be incorporated into large-scale CMPs.

The question of whether to include waist circumference measurements also remains unresolved; however, most CMPs do not currently incorporate this measure. Furthermore, recent evidence does not support the idea that waist circumference adds significant useful information regarding weight status in

children [102,144-146]. This addition may also introduce possible ethical and/or legal considerations, which can impact on the consent model employed by given programmes. Notably, this consideration was not explicitly addressed within included articles. In the context of population level CMPs, changes to the consent model may reflect an unacceptable trade-off. Therefore, on the whole, BMI appears to be a sufficient, common and pragmatic single measure of weight status for these programmes.

As discussed in Chapter One, varying systems continue to be used to define childhood overweight and obesity, despite the significant attention paid to this issue in the literature over the last decade. As a consequence, numerous distinct growth references were utilised by different CMPs. Selected growth references often demonstrated association with the country or region in which a programme was located. In the absence of single, accepted definitions of childhood overweight and obesity, BMI results should be interpreted according to multiple growth reference curves. This may facilitate greater comparability of data obtained across CMPs set within various countries.

A further element for consideration within measurement protocols relates to the particular groups that collect data for subsequent analysis. Upon review, it emerges that several different groups are able to carry out anthropometric data collection: there is currently no conclusive evidence to promote use of one group over another. The final decision as to where responsibility will lie will depend on available resources and other practical considerations relating to discrete CMPs. However, to promote consistency, it seems reasonable to

recommend that individuals within a single job category (for example, school nurses) should assume this role.

Finally, training procedures for data collectors also emerged as an area for attention and improvement [114]. Multiple publications outlined that standardised training protocols had been developed. However, little information was offered to confirm whether individuals completed the training or whether refresher courses were offered to individuals involved in CMPs spanning several years. Furthermore, inter- and intra-observer validity was typically not assessed.

Overall, current evidence reveals insufficient clarity around processes used to assess the accuracy, reproducibility, and comparability of results from CMPs [226]. Surprisingly, with few exceptions [117,171,226,237], authors have not identified this as an issue of concern.

The suggested key features to be incorporated into the measurement protocols of all CMPs are summarised overleaf in Table 2.4. These features reflect best practice and are based on current evidence identified by this review. Consideration of these features of measurement protocols is important to ensure acquisition of accurate, valid and comparable data that will continue to be of use to programme coordinators, other stakeholders and the broader public health community.

Table 2.4: Suggested features of measurement protocols for CMPs

Programme feature	Details
• **Consent model**	• Opt out consent
• **Age range**	• Primary school children • Measure children after age of BMI rebound • Children from at least two school year groups should be measured
• **Timing**	• Annual data collection • Measure outside winter months • Conduct measurements in the morning
• **Setting**	• Conduct measurements within schools • Children should be measured one at a time in a setting of auditory and visual privacy
• **Clothing**	• Light clothing, no shoes • Remove jumpers, belts and other items of bulky clothing • Remove hair accessories that may impact on the accuracy of the height recording
• **Anthropometric measurements**	• Height and weight measurements, converted to BMI • Additional measurements are not required at the population level • All measurements should be obtained using standardised, accepted and calibrated equipment
• **Programme types**	• Surveillance programme • If feedback provided, this should be by parental request only
• **Growth reference**	• Data should be analysed and presented according to more than one growth reference • Preferably, one international growth reference and one national growth reference should be used
• **Data collectors**	• Individuals within a single job category (for example, school nurses) should assume this role • All data collectors should undergo regular training procedures

2.4.4 Limitations

Certain limitations must be considered when interpreting these results. These may be broadly divided into: (1) limitations of this review; and (2) limitations imposed by findings from the available evidence.

First, this review was conducted by a single individual. Therefore, there was no external validation of articles deemed appropriate for inclusion in the review. However, a clear and rigorous study protocol assisted in ensuring a consistent approach.

Second, all articles included in this review were published in or after the year 2000. However, data utilised in the studies was collected in the range from 1980-2011. Data collected in the 1980's or 1990's may no longer be representative of or relevant to current obesity prevalence or anthropometric measurement techniques.

Third, recent studies may not have been referenced in electronic databases when searches were conducted, meaning that these searches could have missed otherwise eligible material. However, search terms were comprehensive and search methods were rigorous, inclusive and applied consistently across a range of recognised electronic databases. In addition, other extant CMPs, including programmes associated with the WHO's COSI in Europe, were not covered by this review. Publications pertaining to this programme have yet to appear in the peer-reviewed literature; therefore they were not eligible for

inclusion in this analysis. Finally, CMPs based outside the school setting are known to operate [188,192,194], but were not considered by this review.

The obesity epidemic has gathered much attention; however, recommendations concerning annual child BMI measurements have only recently appeared in policy and position statements. Prior to this, discussion concerning CMPs did not feature prominently either within the literature or wider public health arena. Therefore, the relative paucity of available evidence on this topic was expected. This consideration, together with possible publication bias, can influence both which articles are published and also how findings are presented. Newly established programmes are inevitably under pressure to demonstrate effectiveness, impact, and minimal associated harm in order to justify their existence and on-going funding. Research article content is not immune to such influences; therefore, subjective or selective reporting may have impacted on overall results.

In addition, many included studies were cross-sectional and related to data or outcomes from a single year, which restricts establishment of the broader utility or long term outcomes of CMPs. There is a clear need for further research in this area.

All studies underwent a risk of bias assessment. The original intention had been to allocate greater priority to findings from higher quality studies when final conclusions were drawn. However, upon review, risk of bias scores demonstrated little alignment with the quantity or value of data extracted from

the respective articles. Therefore, it was not appropriate to assign greater consideration to studies that did not necessarily communicate detailed information relating to the aims of this review.

As outlined earlier, this review included and presented findings across all studies identified from searches up to July 2012, though original searches and analyses were conducted in early 2010. Overall, findings from publications added from the updated searches did not contribute new or contrasting information. Instead, these publications added depth, completeness and provided validation of summary findings from the original review.

Finally, where described, there was variation between measurement protocols described within included publications. Heterogeneity was also evident in programme objectives, as well as the setting and scope of the various studies. Furthermore, the research aims of the included articles were distinct from the defined aims of this systematic literature review. These considerations could limit the generalisability of resultant conclusions and did not enable direct comparison across different CMPs.

2.5 SUMMARY

This chapter described a systematic literature review of international school-based CMPs. This represented the first review to collate information on all CMPs in place on the global scene that have been documented in the peer-reviewed literature. In addition, this review was unique in that it offered detailed examination of the measurement protocols and reported outcomes, including unintended harm, resulting from these programmes.

The literature relating to school-based CMPs is not substantial but has rapidly expanded in recent years, thereby confirming that this reflects a topical issue in public health. Unsurprisingly, this increased volume of available literature coincides with the proliferation of existing CMPs, which parallels both the continued growth of the obesity epidemic and the release of recommendations endorsing this practice. Overall, it appears that routine school-based child measurement is becoming an essential feature of any comprehensive plan to address the issue of excess weight in children.

This review included 35 articles covering 28 distinct CMPs across 11 countries. These programmes were of varying scope and incorporated national, state-level and city-based programmes. Also, a range of settings were represented as documented CMPs were established in both rural and urban locations within developed and developing countries. However, the majority of CMPs were based in the US.

This review identified several critical findings. First of all, with few exceptions, analysis revealed a lack of standardisation in the collection, analysis and subsequent reporting of anthropometric data, together with the approach to training of involved personnel. Furthermore, few included studies provided any evidence of assessment of data quality. In general, comparability of methods reported by discrete CMPs was limited.

This review applied rigorous, consistent methods to searches, data extraction and data synthesis. Despite this approach, included articles did not provide sufficiently detailed information to enable establishment of best practice guidelines for population level child measurement in schools. However, numerous trends for best practice were identified and summarised in table form. In particular, there is reasonable consensus around the consent model, age groups, clothing, digit rounding procedures and included measures utilised by CMPs. Furthermore, broader analysis suggests that surveillance rather than screening may represent the preferred programme type. The latter option is associated with lower participation rates and includes an unproven practice: feedback of individual results.

Next, articles emphasised discussion of straightforward prevalence data and possible causes or correlates of childhood obesity. Conversely, aims, other observed outcomes, and processes for evaluation of CMPs were often poorly described. Therefore, the wider utility and impact of these programmes was difficult to assess. Additionally, this review highlighted that current evidence does not suggest that CMPs are associated with significant unintended harm;

however, longer term evaluation is required in this area. Finally, the challenges facing CMPs, together with factors that may impact on their future sustainability, have received only minimal attention in the existing literature. These four identified areas (programme roles; outcomes, including unintended harm; challenges; and sustainability) warrant further investigation.

In conclusion, this systematic literature review provided the rationale for the broader research project. By identifying current knowledge gaps, this review led to the development of primary research aims. These research aims were detailed in the preceding chapter (section 1.1.1) and align with the four areas noted directly above. It follows that these aims directly informed the approach used in subsequent research components.

In addition, this review provided summary recommendations regarding key features of measurement protocols for all CMPs. These recommendations were used to provide context and a point of comparison for the measurement protocol used in the NCMP (Chapter Three). Importantly, the recommendations also drove development of the measurement protocol for the CMP in Guernsey (Chapter Four). Overall, findings from this review offered guidance and evidence for approaches used in further research phases and provided a valid platform against which subsequent results could be compared.

Chapter Three

Case Study: The National Child Measurement Programme (NCMP)

3.1 INTRODUCTION

This chapter describes the second component of this research: a case study of the NCMP. This case study (hereafter 'study') allowed for focused exploration of the roles, outcomes, challenges and sustainability of a CMP. The NCMP was selected for in-depth examination as it is a large, operative and well-recognised programme. Furthermore, this CMP is based in England. Therefore, this research was able to be conducted within various logistical constraints.

This study used qualitative research methods to explore the views of key centrally-positioned stakeholders on the development, outcomes and overall utility of the NCMP. This study aimed to highlight the internal and external factors, including the changing political climate, that impacted on the NCMP's introduction and subsequent evolution. This study also examined perceptions around the challenges and long term sustainability of the NCMP.

At a time of austerity and significant restructuring within the National Health Service (NHS), this study facilitates analysis of the purpose and contribution of this significant, resource-intensive programme. These questions are applicable to other CMPs and explore current opinions concerning the fundamental contribution of population level data to the public health domain. Conclusions and recommendations arising from this study informed and guided development of the pilot CMP in Guernsey and contributed to addressing primary research aims.

This chapter starts with an outline of the NCMP and details the programme's aims, protocol, current results, and overall administration, together with an overview of how the NCMP has developed over time. To provide context for this study, the introduction also includes a brief description of the Health Survey for England (HSE) and the reforms to NHS practices and commissioning responsibilities. The chapter continues with a summary of existing literature relating to the NCMP, followed by comprehensive reporting of research methodology and results. Recommendations arising from this study are also outlined. Finally principal findings are presented and compared against current NCMP literature.

3.1.1 The National Child Measurement Programme: Background

In England, childhood obesity has been recognised as an issue requiring priority action at both national and local levels [8,269]. In 2008, *Healthy Weight, Healthy Lives: A Cross-Government Strategy for England* [270] laid out the Government's ambition to be *"the first major country to reverse the rising tide of obesity and overweight in the population by enabling everyone to achieve and maintain a healthy weight"* [Ibid, page xi]. Specifically, healthy growth and healthy development of children was one of five identified themes included in this strategy. This inclusion reinforced commitment to the 2007 Public Service Agreement (PSA) target to improve child health and well-being at the national level [271]. This target aimed *"to reduce the number of obese and overweight children to 2000 levels by 2020"* [Ibid, page 98]. At the local level, Primary Care

Trusts (PCTs) and local authorities play a pivotal role, with PCTs currently responsible for establishing approaches and goals to address this issue [272].

The NCMP was first introduced in 2005 and forms one component of the Government's strategy to address the issue of excess weight in the population [270,273,274]. The NCMP is a school-based, census level monitoring programme and involves collection of height and weight data on all eligible primary school children within the included age ranges [187,275]. The programme was initially known as the National Child Obesity Database (NCOD) though the title was changed the following year [276].

Currently, individual PCTs are responsible for funding and delivery of the NCMP in their area [265]. Participation in the NCMP is required for all non-specialist state-maintained primary schools and is on a voluntary basis for other types of schools, such as independent schools [187]. The NCMP was initially met with hesitation, concern and even outright criticism [276,277]; however, the programme is now recognised as a robust source of national, regional and local data and holds UK National Statistics status [274,275,278].

The original primary purpose of the NCMP was to provide population level information on weight status in children [275,276,279]. Together with local authorities, PCTs used NCMP data to firstly establish and then assess performance in relation to locally-determined goals for obesity prevalence [265,279,280]. Whilst the NCMP was intended as a surveillance exercise, it was not necessarily perceived or understood as such. Early evidence revealed that

parents and their children held different expectations for the programme: many felt that individual results either would or should be provided on a routine basis [281].

Moreover, in December 2006, a Parliamentary Select Committee report questioned the utility of the NCMP and communicated that: *"In light of concerns raised by the Committee that failing to tell parents that their child is dangerously overweight could lead to the risk of serious illness and possibly early death, the Departments are now considering how and when information on their child's weight can be offered to parents"* [282]. Therefore, the Committee recommended that: *"The Department [of Health] should move quickly to disclose the information in ways that will help parents to address the dietary and exercise needs of their children"* [Ibid].

Following this, the programme's remit was extended in 2008-09 with the introduction of routine feedback of individual results to parents/carers (hereafter, 'parents'). From that year onwards, national guidelines from the Department of Health (DH) have encouraged all PCTs to deliver feedback to parents of participant children [265,283]. A review conducted in 2011 [279] found that approximately 75% of local areas reported providing individual results to parents. Despite this feature, the NCMP is not designated as a screening programme [265].

In addition, national programme guidelines from 2009-10 onwards have suggested that local areas offer proactive follow-up to families of children

whose BMI results lie outside the bounds of a healthy weight classification [265,284]. Here, proactive follow-up is defined as a telephone call, which may be supplemented by an in person meeting, to offer information, support, and in some instances referral to a weight management service [265,274,279,285]. Many local areas now report that they offer proactive follow-up to families of participant children [279].

3.1.1a NCMP: Aims

Operational Guidance for the 2012-13 school year states that the current aims of the NCMP are:

1) *"To provide child population public health surveillance data on weight status: these data are used to understand obesity prevalence and trends at local and national levels, and to inform policy and practice on tackling obesity and its wider determinants; and*
2) *To provide parents with feedback on their child's weight status: to help them understand their child's current health status, and support and encourage behaviour change"* [265, page 2].

3.1.1b NCMP: Protocol

The NCMP Operational Guidance recommends that all measurements are obtained according to an established, standardised protocol in order to maximise data accuracy and precision [265]. Accordingly, detailed guidance

and other resources are provided for: appropriate measurement equipment and equipment calibration; training procedures for data collectors; and the measurements themselves [280,286-290].

Height and weight measurements are collected on all eligible children in Reception (5-6 years) and Year 6 (10-11 years) and converted to a single result: BMI [187,273,291]. Measurements are conducted within the school setting at any time in the school year and are typically, but not universally, recorded by school nurses [279,292]. The NCMP uses an opt out consent model (defined in Chapter Two) [187].

The BMI centiles for age and gender are calculated according to UK90 population growth reference charts [265,278,291]. For summary population and local area results, population level BMI thresholds are applied; whereas for individual feedback letters, clinical cut-offs are used[#]. The NCMP also collects information from school records on participant ethnicity and area of residence [187,275,293]. This latter variable is used as a proxy marker for SES. Home postcodes are included in data collected at PCT level; however, this information is translated to the appropriate super output area (SOA) in the national dataset.

3.1.1c NCMP: Programme coordination and data management

Currently, PCTs hold legal responsibility for programme funding and delivery and are responsible for compiling local area data over the course of the school

[#] The UK90 population and clinical BMI thresholds were described in Chapter One.

year [187,265,294]. Using a data capture tool, PCTs also provide an anonymised, validated local dataset to the National Health Service Information Centre (NHS IC) on an annual basis for subsequent analysis [187,275]. The NCMP is supported and coordinated at national and regional levels by a central team at DH, together with regional Obesity Leads. These regional leads assist local leads in programme implementation and promote dissemination and use of available educative and delivery guidance and tools [279,280,290,295].

The NHS IC was commissioned to coordinate data collection and analysis from the 2006-07 academic year [275]. This Centre produces an annual report which incorporates summarised key results from the national programme, together with an online database of results organised according to PCT [278,296]. The National Obesity Observatory (NOO) provides further detailed analysis using the national dataset and issues guidance to Public Health Observatories (PHOs) with the aim of enabling regional and local analysis of collected data [28,279,291,292,296,297].

3.1.1d NCMP: Results

The most recent NCMP data are from the 2010-11 school year [278]. In that year, over 93% of all eligible children participated in the NCMP, meaning that over one million height and weight measurements were obtained across included age groups [265]. This figure is well above the stated target of 85% of eligible children and enables robust data analysis with extremely narrow 95% confidence intervals at the national level (+/- 0.1%) [278].

In the 2010-11 school year, 22.6% of children in Reception were overweight or obese. This figure rose to 33.4% for children in Year 6, with over 19% of 10-11-year-olds classified as obese [Ibid]. When these results are compared with those from previous years, a few interesting trends become apparent. Overall, there is a statistically significant, though small, downward trend in prevalence of overweight and obesity combined in Reception-year children. However, in Year 6 children, both mean BMI and obesity prevalence are increasing [278,293].

Obesity prevalence trends for different ethnic and socio-economic groups are also available [265,278,293,298,299]. Over the time period for which NCMP data are available, there is little change in obesity prevalence by different ethnic backgrounds in Reception-year children. For Year 6 children, obesity prevalence is significantly rising in all White and Asian girls, with a similar but non-significant trend also apparent in boys. The NCMP data also suggest a pattern of widening disparity when measurements collected across the years are considered. There is evidence of increasing obesity prevalence in both boys and girls in Year 6 living in the most deprived parts of England, whilst prevalence figures remain stable for children in less deprived areas. Similar trends are evident for Reception-year children [265].

3.1.2 Additional background and contextual information

This section summarises important background information that provides context for the current study.

3.1.2a Health Survey for England (HSE)

The NCMP is not the only initiative to produce national level information on weight status in children [291]. The adult HSE started in 1991, with children aged 2-15 years included in the surveys since 1995 [291,300-302]. The HSE aims to quantify the *"health and health related behaviours in adults and children living in private households in England"* [300, page 3]. Information collected in HSE is intended to be used to inform, improve and evidence health-related policies.

In contrast to the NCMP, HSE uses representative sampling methods and consists of an interview and follow-up nurse visit [291,303]. Height and weight measurements form core elements included in the annual surveys. In 2010, approximately 2,000 children aged between 2-15 years were included in the general HSE sample [300]. Data from HSE have been applied at the national level to assess progress against both the aim outlined by the Cross Government Obesity Unit in 2008 and the PSA target on child health and well-being [265,270,274].

3.1.2b NHS transition: Public health

The election of a new UK government in April 2010 initiated a period of transition and significant reform to NHS practices and commissioning responsibilities. Key proposed modifications to public health were laid out in the White Paper from November 2010, *Healthy Lives, Healthy People: our strategy*

for public health in England [304]. This publication detailed the Government's ambition to transfer public health responsibilities to local authorities.

Within the new organisational structure, public health services in England will be commissioned, developed and delivered by local authorities from 2013, with overarching support at the national level from a new core public health service: Public Health England (PHE) [265,304,305]. Until this time, the NHS Operating Framework confirms that the NHS remains accountable for delivery of existing public health programmes [294].

Local authorities are also responsible for establishing Health and Wellbeing Boards, which will play a key role in overseeing local public health strategy and commissioning decisions [265,294,306]. These Boards are currently functioning in shadow form and will accept their full statutory roles from April 2013 [306].

3.2 CURRENT STUDY

3.2.1 NCMP: Existing literature

This section summarises the available literature that relates to the NCMP. In this context, the term ‘literature’ is used to encompass both published and unpublished written works, including official reports, commissioned reviews, independent research projects, and various other documents.

The systematic literature review described in Chapter Two was performed prior to the commencement of this study. However, that original review revealed few articles that included direct comment on or examination of the NCMP. This was because most publications pertaining to this programme are not found within the peer-reviewed literature. Therefore, a separate literature search was deemed necessary for this study: one that employed an inclusive, less structured approach.

3.2.1a NCMP literature review: Aims and methods

This NCMP literature review aimed to: (1) provide essential background information on the NCMP, including details of current programme administration and protocol; (2) recognise current knowledge gaps in order to guide development of research aims associated with this study; and (3) identify key stakeholders for possible inclusion in this study.

Four electronic databases were searched: PubMed; Embase; CINAHL; and ERIC. Search terms included, but were not limited to 'National Child Measurement Programme', 'NCMP', and 'England'. No limits were applied to these searches. Next, reference lists of relevant articles were inspected to identify other related material. Additionally, through 'Google' (2010), the Internet was used to search for material relating to the NCMP. Finally, individuals with a direct involvement in the NCMP offered suggestions of literature and other resources, including web-based videos, connected to the programme.

This literature search was initially conducted between February-April 2010 and was updated in the period April-May 2012.

3.2.1b NCMP literature review: Summary

A series of small-scale reviews have been commissioned by DH and conducted by external agencies in the years since the NCMP was introduced [279]. These reviews include case studies and qualitative research projects and have been used to change or develop both the operational guidance for the programme and provision of additional support services. For example, information obtained through this work contributed to the decision to moderate language used in the feedback letter [254,279,288,307,308]. In addition, independent research projects that have featured examination of or comment on the NCMP have been published in various forms in recent years. Together, these reviews and other projects have considered the NCMP from different angles, focusing on different stakeholder perceptions as well as discrete programme elements.

Specifically, these reports have included comment on and/or examination of how school nurses, parents or children have viewed and received the NCMP and the former group's reflections on its overall impact on weight status in children in England [256-261,309]. Next, perceptions of the feedback process have been studied both before and after the introduction of this programme element [254-256,281,307]. With exceptions, routine feedback of results to parents of participant children has been shown to have been generally well-received.

However, there is currently no evidence to suggest that this practice has led to subsequent behavioural modification or a reduction in obesity prevalence in England [247]. Whilst some parents have reported an intention to alter various lifestyle factors that influence weight status, this intent has not translated into actual behaviour change [254]. Moreover, the literature does not suggest that routine feedback, on its own, alters uptake of available weight management services in local areas [267].

A small number of case studies of proactive follow-up have also been released, with mixed results [265,274,279,285]. In Wirral [265], there were indications that proactive follow-up increased referrals to appropriate follow-up services. On the other hand, outcomes were less positive in Nottingham with only 7/37 (19%) of eligible children actually attending the arranged appointment [279]. Due to the relatively recent introduction of this feature of the NCMP, assessment of its impact will inevitably be limited.

Finally, DH organised a 'Rapid Review' (henceforth 'Review') evaluation of the NCMP in 2011 [Ibid]; immediately after data collection for this current study was completed. This Review was conducted over a six-week period and consisted of: (1) a document review; (2) interviews with stakeholders across multiple levels; and (3) an electronic survey of NCMP leads. The Review addressed questions regarding aspects of programme delivery and arguably reflects the most comprehensive piece of work relating to the NCMP that is currently available. The aims of the Review included the identification of key issues in the delivery model and also to *"suggest actions that will help to ensure that the NCMP effectively transitions into the new public health system"* [Ibid, page 12].

The Review concluded that the NCMP has undergone significant transformation since its introduction. It found that the NCMP produces valuable data that has contributed to building partnerships in local areas and has also facilitated improved service planning for the issue of childhood obesity. There was evidence of marked variation in practice across regions, for example differences in the content and delivery of feedback letters. The Review also identified financial and staff resources as key current challenges to the programme.

Furthermore, divided views emerged on the introduction of and outcomes produced by routine feedback. Whilst some felt this element to be an ethical imperative, others reported that feedback was inappropriate for this issue. Finally, this Review predicted an uncertain and challenging future for the NCMP and identified a lack of clarity around how the programme might survive and succeed given the current economic climate and planned healthcare reforms.

Seven years on from the NCMP's initial introduction, an increasing volume of programme-related research is now emerging. Overall, literature pertaining to the NCMP reflects small scale reviews that have not been widely distributed. Previous research has often considered a single programme element, such as proactive follow-up, from the viewpoint of a select stakeholder group. Also, focus has been directed toward practical considerations relating to the NCMP.

There has been strong emphasis on examining experiences of those based out in the community, such as school nurses or parents. However, this has not been complemented by input from individuals responsible for the NCMP's fundamental design and central coordination. As a result, available evidence has placed disproportionate focus on the views of and outcomes witnessed by those functioning at the 'periphery' of the programme. This approach risks an incomplete picture. Furthermore, the short time scales and restrictive methods, such as electronic surveys, used in earlier research limit the depth, generalisability and impact of resultant conclusions.

To date, there has been minimal explicit reflection on the wider vision and observed utility of the NCMP, despite the programme's large scale and marked evolution over time. In particular, there has been no in-depth study that has considered perceptions of the development, actual and intended roles, challenges, and sustainability of the NCMP from the viewpoint of those with a direct involvement in the programme's introduction, organisation, and future. Therefore, this NCMP literature review provided further justification for research aims addressed by this study.

3.2.2 Research aims

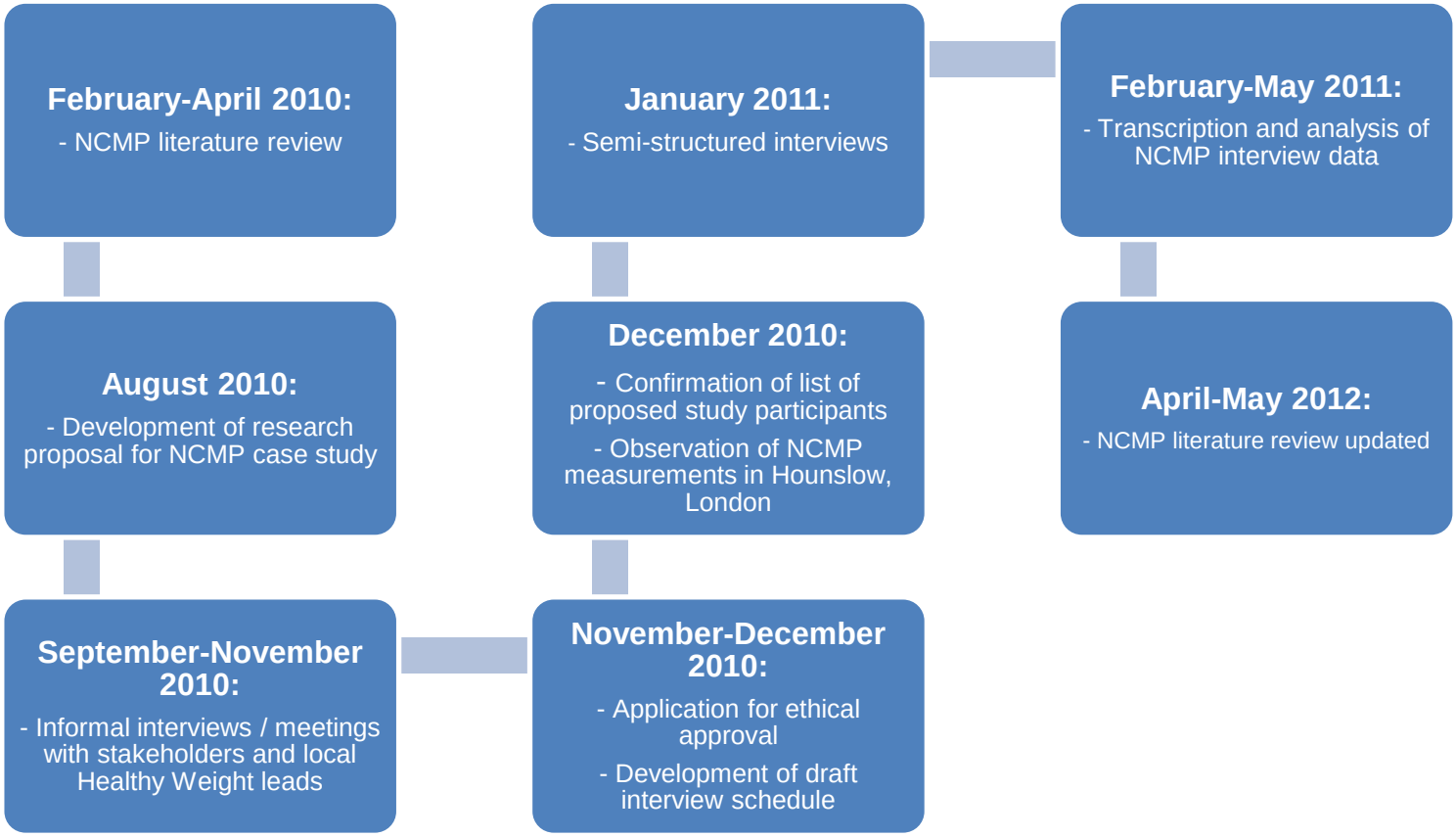
The three principal aims of the NCMP case study were to:

1) Explore the beliefs, opinions and observations of key stakeholders in relation to:
    a. the development, protocol and administration of the NCMP;
    b. the roles and outcomes of the programme; and
    c. challenges facing the programme that may impact on its long term sustainability;
2) Highlight issues for further consideration and develop recommendations for policy makers, project coordinators, researchers and other stakeholders engaged with CMPs; and
3) Provide comparison between the NCMP, other international CMPs, and the pilot programme in Guernsey. Furthermore, results and recommendations arising from this study were intended to inform and guide development of the new CMP in Guernsey.

More broadly, this study was designed to contribute to two primary research aims: (1) explore the roles, outcomes, challenges and sustainability of CMPs; and (2) identify potential adverse outcomes associated with their introduction. This study also examined the NCMP measurement protocol and aimed to add further depth to findings from Chapter Two around best practice in this area.

A summary timeline for this study is provided in Figure 3.1.

Figure 3.1: Summary timeline of the NCMP case study



3.2.3 Methodology

3.2.3a Study design

The research design was qualitative and this research was conducted by means of a series of one-to-one, semi-structured in person or phone interviews.

Semi-structured interviews were felt to represent the most appropriate method to facilitate achievement of stated research aims. The study included a small number of key stakeholders with specialised knowledge and experience of the NCMP. Study participants were predominantly based in London or surrounding areas meaning that, with two exceptions, in person interviews were a feasible option. Moreover, as stakeholders were typically civil servants or researchers, these individuals were accustomed to participating in interviews.

Semi-structured interviews offer an appropriate, adequate tool for the deep exploration of a topic [310-314]. They allow for the analysis of views and themes that might otherwise lack clarification or remain entirely undiscovered [315]. Unlike questionnaires, the information collected is neither limited nor established a priori [311,312]. This format is flexible and offers the option of incorporating multiple distinct materials, for example personal anecdotes or drawings [315]. Generalisability may be limited with one-to-one interviews, but the results can still be transferable [310,311,313]. Possible additional concerns with this method include limited reliability and reproducibility of the findings.

Furthermore, misinterpretation of findings and researcher bias may impact on results [314,315].

Standardised questionnaires were not used in this research component as there was concern that this method might limit the depth of the expressed views [312]. Poor response rates are a further potential limitation association with this method [316]. This study used a defined group of stakeholders. In this context, a low response rate would have introduced bias and, as a consequence, had a severe impact on the quality of this research. Furthermore, this method can limit the breadth of responses to the preconceived priorities of researchers, therefore risking exclusion of important beliefs or observations [312]. Overall, it was felt that questionnaires would not add significant information to that garnered from semi-structured interviews.

In this study, group interviews or focus groups were decided against as semi-structured interviews offer greater privacy and confidentiality than either of these alternatives [317]. There was concern that discussion conducted amongst peers might limit the openness and directness of responses. Here, a specific consideration was that candor may be reduced given that hierarchical relationships existed between various participants. Finally, study participants each held distinct, specialised roles within the NCMP: responsibilities associated with these positions do not entail significant overlap. Also, participants worked in different geographical areas. These factors reflected logistical limitations which did not favour group interviews or focus groups for the study design.

3.2.3b Study participants

This study involved individuals and representatives of key organisations involved in the development, central coordination and administration of the NCMP. The final list of nine proposed research participants was confirmed after completion of the NCMP literature search and discussion with individuals that held a prominent role, either past or current, in the NCMP.

All proposed participants were contacted by either telephone or e-mail. All proposed participants responded to the initial invitation and 8/9 (88.9%) agreed to participate in the study. The remaining individual replied to say that they did not have direct involvement in the NCMP and therefore did not feel able to contribute to the study. The final list of participants included representatives from DH, NOO, PCTs, and PHOs, as well as healthcare professionals. The job title and affiliated organisation for each participant involved in this study is provided in Appendix VI. All interviews were conducted on the basis that responses were non-attributable by name or job title. Individual interview participants did not receive financial or other compensation for their participation in this study. The participant information sheet and consent form can be found in Appendices VII and VIII, respectively.

3.2.3c Interviews

Each interview was scheduled during working hours and lasted between 60-80 minutes. I conducted all interviews alone. Seven of the eight interviews were

conducted in person at either the participant's working base or a meeting room within my department; the remaining two interviews were held over the telephone. Interviews were audio recorded, transcribed in full and later analysed for themes. In addition, written notes were taken contemporaneously during each interview and were used to validate interpretation of the interview data.

Questions included in the interview schedules were designed to align with the research aims of this study, as outlined in section 3.2.2. These research aims were, in turn, informed by findings from the systematic literature review and NCMP literature review, both of which highlighted current important knowledge gaps. Open-ended questions were used to encourage participants to express themselves as openly as possible. Also, I used neutral, straightforward language when phrasing the questions to promote clarity and to avoid leading participants to answer in a particular way.

Interview schedules were peer-reviewed and pilot tested with a Healthy Weight lead and the former assistant director of Public Health in Hounslow, London to ensure relevance, completeness and comprehensibility. Each interview schedule was designed for individual participants to ensure that questions concentrated on themes that were most relevant to the experiences and background of each participant. Therefore, there was no single, standardised interview schedule. Instead, distinct questions were asked of the various participants, depending on their particular role and contribution to the NCMP. However, whilst interview schedules emphasised variable points, the overarching themes explored were consistent across all interviews. A list of

sample interview questions that outline the broad themes of this research can be found in Appendix IX.

All interviews incorporated validating questions to enhance internal consistency. Moreover, comprehension of responses was assessed by use of member checking; a technique used to establish the validity and credibility of an account [318]. Here, I summarised, repeated or paraphrased participant responses to confirm what had been said and also to consider whether responses had been understood as intended. Member checking allows participants the opportunity to, where necessary, correct a researcher's interpretation. This technique also facilitates provision of additional information in follow-up responses [Ibid].

3.2.3d Analysis of interview data

This section describes the systematic approach to analysis of the interview data. The aim of this analysis was to examine, describe and compare key stakeholder's observations and perceptions around the NCMP. This analysis also aimed to identify recurrent issues across the range of individual responses. Together with analysis of the themes from interview transcripts, themes or issues that did not arise in participant responses were considered [319-321]. These themes or issues may have been highlighted by other participants or identified from the literature review. Interview data, rather than any personal or pre-existing views, were utilised to inform the analysis to minimise the impact of researcher bias.

A framework was established prior to commencement of analysis of compiled interview data to ensure a consistent, systematic approach [319]. Thematic analysis was undertaken broadly based on methods described by Braun and Clarke (2006) [322]. This method reflects an acknowledged, rigorous, yet flexible approach to qualitative data analysis. Qualitative data software programmes were not used. This decision was made because the case study included a relatively small number of interviews.

The three themes for exploration in this study were identified following the systematic literature review, NCMP literature review, and discussions with individuals involved in the NCMP. As noted above, questions in prepared interview schedules were specifically designed to allow exploration of these themes. Interviews were semi-structured; therefore, the flow of questions was flexible and adjusted to participant's responses to allow for further discussion around key issues or other relevant observations [310,312-315]. However, there was significant overlap in the questions posed to various participants as themes remained consistent across all interviews.

Transcription of interview data was performed by a single professional transcriptionist. Before transcription commenced, this individual was provided with a general overview of this research. This included detail of how interview data would be used, together with a summary of relevant key terms and abbreviations. Therefore, clear requirements for this process were outlined in advance to help minimise possible transcription error [323-325].

Interviews were transcribed to the level of ‘intelligent verbatim’. This means that a full, accurate account of each interview was provided, but transcription did not include every audible sound, such as repetitive ‘ums’ and ‘ers’. However, all basic non-verbal activity, including laughs and pauses, and all repeated sentences and full words were preserved to capture the tone and flow of the original interviews.

Following transcription of all interview data, transcripts were read through twice in full and cross-checked once against the original audio recordings. I checked all transcriptions for accuracy and completeness, after also having conducted all interviews. A small number of minor errors in individual words were detected in select transcripts, likely due to background noise in the audio recordings. I subsequently corrected these identified errors.

Next, responses from all participants were grouped together by question; questions were assembled into ‘headings’; and ‘headings’ were clustered according to three overall ‘categories’. These ‘categories’ directly aligned with the priority areas for exploration defined in the first research aim (section 3.2.2).

Responses to each question from all participants were analysed line-by-line and corresponding comments were developed. Comments highlighted key words, patterns or associations within the data and, wherever possible, used quoted words or short phrases. For each question, all comments were collated, reviewed and organised into groupings. Following further review, these groups

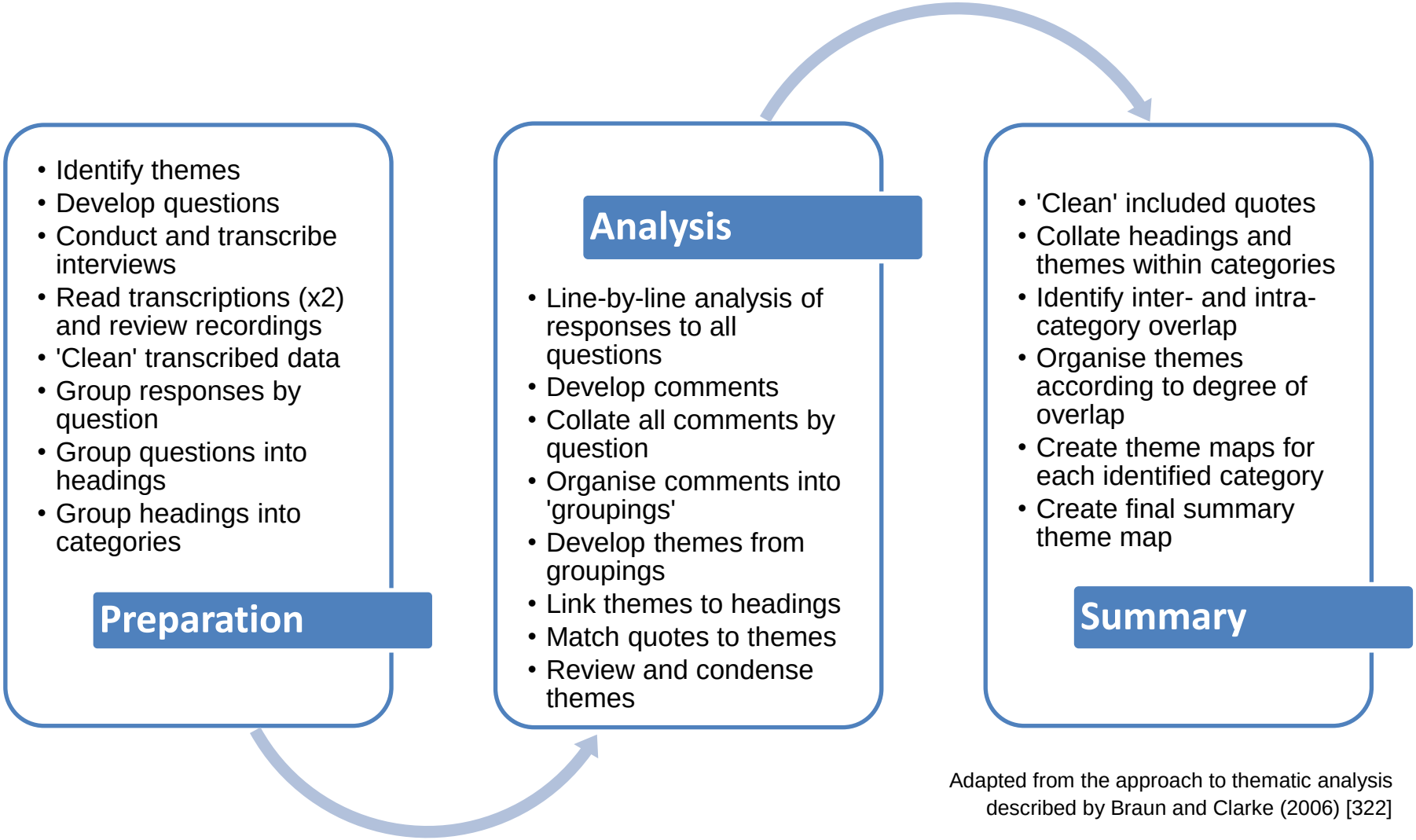
were developed into ‘themes’ [319,320,322]. Quotes were subsequently matched to the identified ‘themes’.

Next, all headings and themes were assembled by category and overlapping themes, both within and between distinct categories, were identified. Themes were then organised by assessment of aggregation; those that repeatedly presented across multiple headings and/or categories were assigned as ‘core themes’. Those that did not display the same degree of recurrence were classified simply as ‘themes’. Of note, this distinction was applied only once findings across all three categories were combined.

I produced summary figures for each individual category in order to provide diagrammatic representation of the analytical framework and findings from the interview data. These figures were designed to demonstrate overlapping themes within categories (Figures 3.3-3.5). As a final step, a summary theme map incorporating key study findings across all three categories was created (Figure 3.6) [326]. This map demonstrates the distinction between ‘core themes’ and ‘themes’.

An outline of the methods used to systematically analyse the interview data is provided overleaf in Figure 3.2.

Figure 3.2: Summary of methods – NCMP case study



Adapted from the approach to thematic analysis described by Braun and Clarke (2006) [322]

3.2.3e Additional information

In addition to the interviews and NCMP literature review, supporting information was gathered from informal meetings with study participants, multiple public health professionals from a PCT in London, and a current cross-bench member of the House of Lords. A full day site visit to a state-maintained primary school in the London Borough of Hounslow was also arranged to observe NCMP measurement and data entry procedures. This visit was conducted prior to the commencement of interviews (December 2010) and aimed to add context to this study, together with further insight into general NCMP processes. No data collection took place during this site visit, though extensive notes were recorded. This visit did not contribute to development of the interview schedule.

Information obtained from the site visit, extra meetings, and informal discussions was intended to provide further background knowledge and a point of comparison for the interpretation of interview data. Therefore, findings from these undertakings are not formally presented or discussed in the results section of this chapter.

A week-long course, 'Introduction to Qualitative Research Methods', was undertaken at the University of Oxford's Department of Public Health in January 2010. This training course covered the theory and practice of qualitative data collection, analysis and presentation. This research was funded by a research student grant administered by Oxford's Department of Public Health. This grant covered all travel and transcription costs incurred by this research.

3.3 RESULTS

3.3.1 Presentation of results

Results from the semi-structured interviews are presented according to the three principal categories defined in the first aim of this study: the development, protocol and administration of the NCMP ('Programme'); roles and outcomes produced by the programme ('Utility'); and main challenges facing the programme, including factors that may impact on its long term sustainability ('Threats').

Within each category, themes are grouped by their associated heading and discussed using supportive quotes from interview data. A comprehensive selection of anonymised quotes relating to all identified themes within each category is presented in summary tables (Appendices X-XII). The length of the complete transcripts precludes their inclusion; however, full participant responses to each question are available on request.

Each section includes an associated summary discussion and diagrammatic representation of key findings relating to the three distinct categories. Furthermore, all three sections conclude with resultant recommendations for action.

3.3.2 Category: ‘Programme’

Headings within this category comprise: an overview of the NCMP; the NCMP protocol; comparisons with other CMPs; and strategic advice for stakeholders engaged in similar programmes.

3.3.2a Overview of the NCMP

All participants reported a similar summary description of the basic structure and protocol of the NCMP. This description aligned with that outlined earlier in this chapter.

Responses incorporated observations around the justification for the initial development of the NCMP. Within the theme of development, participants emphasised two principal reasons that underpinned the introduction of population level anthropometric data collection: (1) performance management at the local level; and (2) provision of support and information to drive local level action on childhood obesity. Participants also highlighted change in the programme’s function over time, noting the role of political influence. Overall, responses stressed the programme’s original function as a surveillance tool.

> *“It was set up for two reasons really, or at least the NCOD was, which were performance management of Primary Care Trusts, to check that they were achieving the appropriate trajectory towards meeting the child obesity target set under the previous government, and secondly to support and inform local level action. And those were the reasons that drove the Department of Health to set it up.”*

"It's a surveillance tool principally. I think it was introduced as a surveillance tool, and I think that's still principally what it is…."

"…. when it was first introduced it was purely a surveillance programme at that point, and results weren't routinely shared with parents. So it was set up really to give us that population level data on obesity in children …. it gives quite accurate data down to a local level …. and then after the programme had been in place for a couple of years …. there was pressure really to introduce the routine feedback element. …. people, ministers and people at DH and also some practitioners as well, thought if we're collecting this information it's wrong not to be sharing it with parents, and they should be informed about their child's result."

A clear theme arose from the NCMP's emphasis on and capacity to produce local level data. This outcome was discussed as a key driver and also as the distinguishing feature of the programme. Furthermore, respondents highlighted that functions enabled by the provision of local level data aligned with the then current political approach.

"Why it [the NCMP] was introduced is I think initially was… basically there was a focus from the government on local obesity monitoring. And I think we already had local obesity targets or at least a national target which you wanted to check local areas were adhering to or contributing towards…."

"I think basically we had the Health Survey for England data for children, but that's only at regional level, and I think the government wanted local level surveillance data to actually get some kind of handle on what the prevalence of child weight status was at a local level, to help inform service planning and delivery."

"So, it was introduced in order to encourage local health authorities to tackle the problem with obesity, to understand the problem of obesity in their area, and to motivate them and to help them tackle it. It was also, under the previous Government, a tool for the

performance management of local areas …. so national surveillance and, at a local level, performance management."

3.3.2b NCMP protocol

Participants discussed details of the established NCMP protocol and outlined their perceptions of relevant factors in relation to the protocol's original development and current management. Participants acknowledged the role and importance of both standardisation and flexibility within the protocol.

"…. we weren't prescriptive about the way in which it had to be done. … There was a minimum standard they had to meet, but beyond that it was pretty flexible."

"In terms of timing during the school year, we say at the moment that it can take place at any point in the school year, and areas just do what suits them really, and I think we needed to allow that flexibility without making it too difficult for areas…. I think it's a trade-off again and I think probably to be very prescriptive might reduce coverage and things like that, and we'd lose quality somewhere else."

The use and importance of collaboration and engagement in the process of protocol development was also highlighted:

"…. when we were setting up the NCMP I ran a series of workshops around the country that I got as many of the local obesity people as possible to turn up to, and we made it very clear that this was genuine consultation. We weren't just telling them what was going to happen. We were telling them what we had learnt, what we had thought and what we were proposing, and wanting to see what they thought of it. ... I think they could see and they could feel that this was genuine consultation; we were really listening to them. We took advice from the people who were actually having to do this in the field."

Respondents detailed limits and challenges of the existing protocol, together with their perceptions of the consequences. Specifically, participants communicated concerns around how the measurement protocol may be viewed and applied. Participants also noted the potential for inconsistent measurement practices across different regions.

> *"…. you pick up enough problems with the data, really simple problems like rounding to one decimal place and things like that. Also a lot of problems inputting the data from the PCTs, so that personally I would have some concerns over the training that's going on and how the people collecting the measurements actually perceive the protocol."*

> *"I do think that there probably is a huge variation locally in terms of how they do it and whether guidance is fully followed. We don't go out and check what they're doing!"*

3.3.2c Comparison with other programmes

Participants were asked to discuss their thoughts on how the NCMP compares with HSE and other CMPs. Responses considered each of the roles, aspects of the measurement protocol, and limits of the discrete CMPs. Here, both similarities and differences were identified.

Key themes in this heading included programme protocol and the data's level of use. Participants highlighted distinctions in sample sizes and described subsequent implications on outcomes produced by the various programmes. In particular, responses focused on the NCMP's ability to deliver local level data and the associated utility of this function. Participants acknowledged that HSE

tends to have a higher profile than the NCMP at the national level as it has existed for a longer period. Furthermore, HSE data are typically applied at the national level. Overall, the NCMP was felt to provide a *"much richer data source"*, when compared to HSE. However, participants also acknowledged that the scale of the NCMP placed inevitable restrictions on the measurement protocol itself, as well as the impact of outcomes produced by NCMP data.

> *"Well, obviously the Health Survey for England doesn't give us data that we can scrutinise down to a local level. …. Also, with the NCMP, we can interrogate the data into quite small groups …. And so essentially it's very much about the level of details that we can get into in relation to the data and usefulness of the data locally; it's [NCMP] far more useful locally than HSE is."*

> *"[D]efinitely the biggest advantage of the NCMP for me is just the huge numbers that lead to… you'd be able to do some quite powerful calculations. Now, the limit on that is obviously that we have two select age groups so we can understand very well …. between 4 and 5 and between 10 and 11 [years], and there's a void on anything which happens in the middle, which is a little bit frustrating."*

Respondents detailed distinguishing elements of the respective protocols and related these features to their intended function. Together with the recognised similarities between existing programmes, participants defined differences in included age groups, sample size, sampling processes, and the level and perceived accuracy of collected data.

> *"The Health Survey for England I guess is seen as a real gold standard but I feel like NCMP is the gold standard. I guess they do different things, because the Health Survey for England is a much smaller sample size especially in children, so it doesn't give that richness of data down to local area level, like NCMP does. …. But it's [HSE] seen as being more robust I guess, in terms of the way it's*

conducted. I think they probably do two measurements and things like that, whereas NCMP is only one measurement."

(Speaking about the WHO's COSI)

"…. I think there is less focus on huge numbers and more a focus on rigorous methodology and careful sampling, etc. ….I've not read anywhere else where they just do quite what we do, like go out and measure such huge numbers but actually, because it's set up purely for surveillance, we don't really pay that much attention to getting the individual measurements as right as they are in most research based studies. So I think for me, that's the big difference really."

Participants stressed the unique features, aims, and broad model of the NCMP. Participants were swift to highlight the unmatched scale and vision of the NCMP. However, certain challenges associated with this approach were recognised, including the inability to follow an existing model and the resultant requirement to employ an unproven method.

"I don't think there are that many programmes that are similar. …. So that has been one of the challenges of NCMP in a way; that we haven't necessarily had somewhere to copy. …. there isn't that good evidence base to go by or other countries to follow. It's been pretty much introducing things, speaking to stakeholders in the NHS and other health practitioners and academics, but we've had to go out really and just do our own thing to a certain extent: be bold!"

"You do come across papers where they're trying to utilise school measurements, but I don't think they were set up specifically under the aim of collecting population monitoring data. …. So, although other countries have measurement programmes, [there's] nothing really on the scale of the NCMP and nothing that I'm really aware of that was actually set up with the specific aim of population monitoring."

3.3.2d Advice to stakeholders engaged with CMPs

Participants were asked to reflect on advice they would offer to those establishing a similar programme regarding any aspect of the NCMP. Respondents identified what was believed to have worked well, as well as elements that were perceived to be either missing or insufficient in the NCMP's development and current functioning. Here, engagement was a clear theme and encompassed participation across multiple factions including the media, politicians and other stakeholders involved in programme delivery.

> *"Probably my biggest advice would be engage with your stakeholders really closely. They're really valuable. … if you can demonstrate that you have actually listened to them, you've taken on board their views, their comments, and incorporated that into the programme, I just think you can't really beat that."*

> *"I would engage politicians in the process of developing it, so that they get to understand the complexity of the problem. So to engage politicians in the process of a) seeing that this is a complex problem and b) following on from that, seeing that data in this sense are there to drive action. I think there is value in engaging the decision makers in a process…"*

> *"You're going to want to relate to the newspapers at some point as it were. Do it early on and do it positively."*

Participants reflected on the importance of consistent messages and approaches to addressing childhood obesity and detailed concerns around how the issue was understood and managed within the primary care domain. Participants also noted that irregular or shifting communication had the capacity to challenge the credibility and, consequently, the potential impact of the NCMP.

"…. one of the big problems we also get is they'll get a letter saying they're overweight and then they go to the GP[ϖ] and the GP says, 'No, you're absolutely fine, it's not a problem.' …. I must say that a lot of GPs really just don't even understand how child height and weight is actually then translated into BMI, then into BMI centiles. …. And this is a very awful thing to say, but the strap line is usually, 'They'll grow out of it; it's a bit of puppy fat'."

"Well, GPs just think it's [BMI] done the same as it's done with adults …. and so when they say that back to an individual or a parent who's come in worried about it and they just dismiss it, it totally undermines the whole programme…."

Furthermore, respondents underscored the importance of evaluation across different stages of a programme and communicated that this did not feature in the NCMP's development, due to various logistical constraints. However, despite this limitation, the NCMP was suggested as an appropriate point of comparison for stakeholders developing new CMPs.

"Try to introduce things in a staggered way, which means you can do proper evaluation …. rather than just a blanket roll out of everything straight away, that would be fantastic."

"I think … look at the NCMP, 'cause I do think it's a good programme, and I think when you go round to conferences and stuff like that round the world, people are interested in it and people that are trying to set things up are interested in looking at the experience of setting up the NCMP and how they can utilise it."

[ϖ] General practitioner

3.3.2e Summary: ‘Programme’

Within this category, participants provided an overview of the NCMP and discussed their views on why and by what means the programme was introduced. Participants considered various elements of the measurement protocol and wider programme and offered observations on how the NCMP compares with existing programmes. This comparison enabled participants to define the distinct roles and contribution of the NCMP in relation to other programmes. Key findings from this category are summarised below.

The main rationale for the NCMP’s introduction was identical to its principal distinguishing feature: a national census level measurement programme that delivers accurate local data on the issue of excess weight in children. Of note, participants did not stipulate for which stakeholder groups or target audience the NCMP was originally developed.

When considering the NCMP’s development, participants described that it was initially designed to produce information on prevalence of childhood overweight and obesity in England, but that its function subsequently shifted to include provision of individual results to parents of participant children. This shift occurred without accompanying modifications to the measurement protocol or training procedures and was widely believed to be politically-driven. Responses highlighted that the change to include routine feedback was led by political figures and was felt to increase alignment of programme outcomes with then current political priorities.

Participants acknowledged that there was no evidence to underpin this decision and several also admitted the belief that, on its own, provision of information does not alter health behaviour. Whilst details relevant to quality control and data accuracy were identified, participants communicated that measurements were intended to provide a general overview of population level prevalence of excess weight in children. The method for data collection was not designed for the purpose of either research or determining individual diagnoses. In fact, the NCMP protocol was felt to produce results that were not sufficiently robust at the individual level; therefore creating possible errors, misinterpretation and tension.

These outcomes were felt to ultimately detract from the programme's overall credibility. As a result, participants summarised that the change from pure surveillance to a mixed surveillance and screening programme reflected suboptimal, even inappropriate use of collected data.

Responses emphasised the practical constraints under which the NCMP was developed and highlighted that the programme was introduced by a defined, small team of individuals within a narrow timeframe. A pragmatic approach was employed: whilst standardisation was emphasised, protocol features were minimised in order to promote ease of delivery and programme acceptance.

Participants also stressed the role and importance of engagement in the development of the NCMP. Consistent communication and collaboration across multiple levels and programme stages was believed to be essential to the

programme's perceived success. However, engagement also represented a challenge for the NCMP, as responses outlined concerns around the application and adequacy of both training and protocol adherence.

The final key theme within this category was evaluation: responses consistently raised the issue of a lack of assessment of the NCMP protocol. Without opportunity for review or comparison of processes for local data collection and utilisation, the fear was that local areas may risk ill-informed or inaccurate use of available data. The NCMP protocol is clearly defined in programme documentation. However, in this study there was significant uncertainty around what was occurring 'on the ground' with respect to data gathering and usage. Despite calls from participants to add to the existing knowledge base on this topic, there was little indication of commitment to an evidence-based approach in the NCMP. Instead, political priorities and inevitable practical considerations appeared to take precedence over the need for evaluation of adherence to protocol and/or data utilisation at the local level.

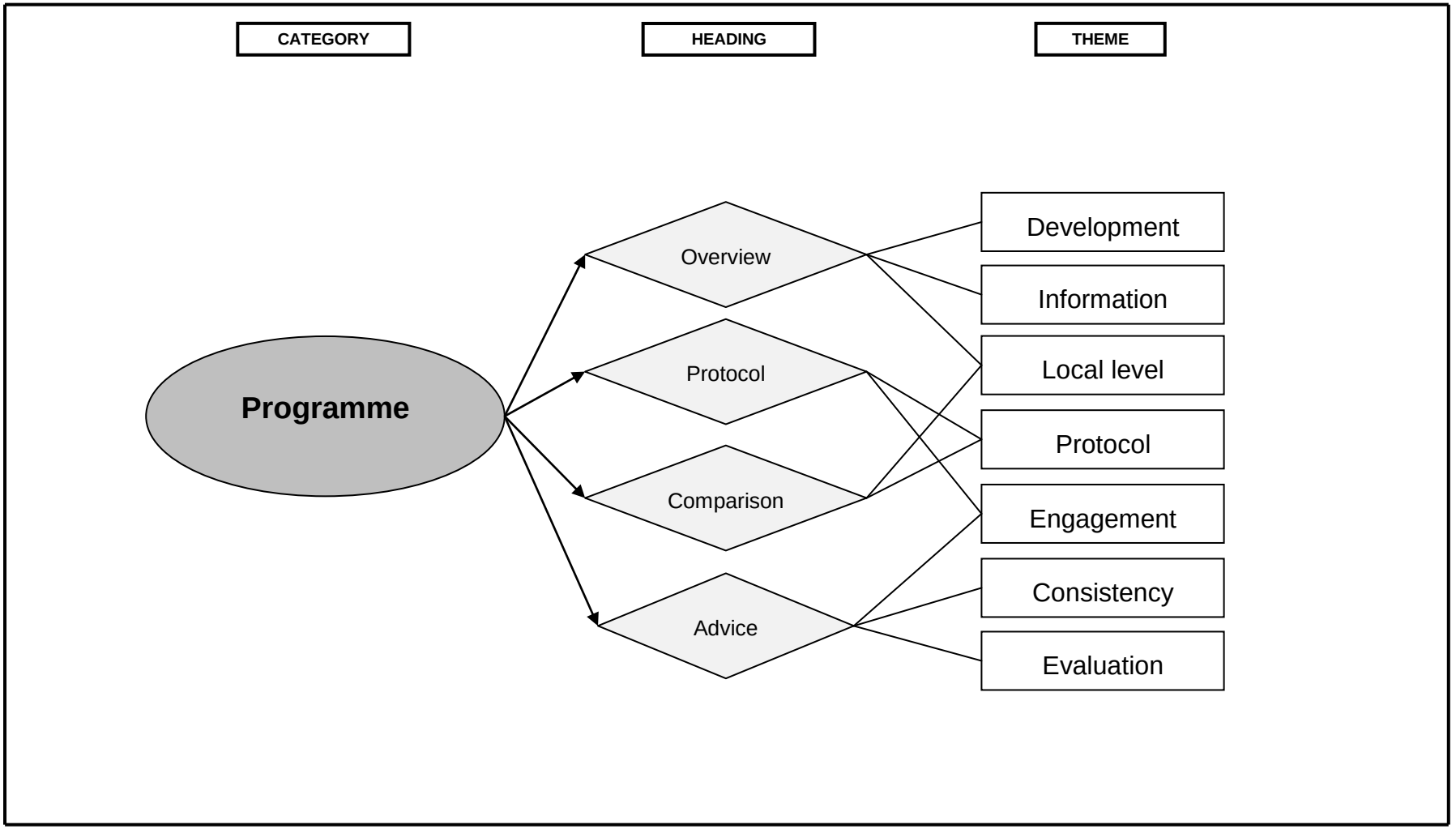
At the time of writing, this was the first study to compare perceptions of the details and broader utility of the NCMP and other data sources on childhood obesity, including HSE. This study found that, at both national and international levels, the NCMP is seen as a unique programme. This feature reflects both an asset and an area of challenge for the programme. Here, the challenge is that there exists no similar model for the NCMP to emulate and/or refine. This finding offers further explanation for the lack of evidence to underpin certain features of the NCMP. Interestingly, the NCMP was suggested as an

appropriate point of comparison for stakeholders developing new CMPs, despite the perceived lack of evaluation of programme outcomes. This suggestion communicated general approval of the programme.

The NCMP and HSE were both felt to offer distinct contributions to obesity management in England. Principal differences between these two programmes include their respective sample sizes, measurement protocols and levels of data utilisation. Participants highlighted particular strengths of the NCMP but suggested that HSE has a higher profile at the national level. Also, HSE was felt to adhere to a more robust system for anthropometric data collection. These findings may be explained by considering that the NCMP is the more recent programme and obtains census level data on children across narrow age bands. Furthermore, at present NCMP data are typically applied at local levels.

A summary of key themes within this category is presented in Figure 3.3.

Figure 3.3: Summary of themes – 'Programme'



3.3.2f Recommendations (Part One)

The following table includes recommendations for action pertaining to issues identified within this category. These recommendations are intended for policy makers, project coordinators, researchers and other stakeholders engaged with CMPs.

Table 3.1: NCMP case study - Recommendations (Part One)

- Produce guidelines for local areas around appropriate use of available NCMP data, including information and provision of relevant cautions relating to recognised limits of these data.
- Conduct an audit to assess: (1) whether and when those engaged in obtaining height and weight measurements for the NCMP underwent recommended training in anthropometry; and (2) current measurement practices across local areas, incorporating evaluation of degree of adherence to the NCMP protocol.
- Each new academic year, re-emphasise the rationale for and importance of observing the established measurement protocol to schools, school nurses, and others engaged in NCMP data collection.
- Highlight areas of overlap between the aims and protocol of the NCMP and other existing international CMPs to consider where useful and appropriate comparisons may be drawn. This may facilitate reflection and refinement of measurement and analytic processes, and ultimately broaden the NCMP's potential use.

- Acknowledge the potential contribution of proactive public relations (PR) and work with local areas to identify case studies of either schools or individuals that may help communicate positive aims and outcomes of the NCMP, thereby promoting engagement.
- Prioritise communication and liaison with GPs to improve knowledge of the NCMP and the diagnosis and management of childhood obesity. Together with the recommended actions for training and media relations, this may enhance the perceived credibility of the NCMP by helping to increase consistency in messages delivered to parents.

3.3.3 Category: 'Utility' (NCMP)

Headings within this category comprise: perceived roles of the NCMP; routine feedback of individual results; programme outcomes; and unintended harm associated with the NCMP.

3.3.3a Perceived roles of the NCMP

All participants reflected on the past and current roles of the NCMP. Responses indicated that the NCMP currently performs multiple roles and that intended roles have evolved over the course of the programme's development. Participants communicated that the NCMP is tasked with delivering diverse roles. However, responses consistently stressed a single primary function: provision of national, regional and local data on prevalence of excess weight in

children in England. There was significant overlap in responses regarding perceptions of the NCMP's various roles.

Overall, five key roles were identified: (1) provision of information on current prevalence of excess weight in children; (2) engagement with stakeholders; (3) a driver for development of services to address childhood obesity; (4) evaluation; and, (5) through delivery of routine feedback, intervention.

1). Information:

> *"Well, essentially it's a really valuable source of population data for the Department of Health and also for the NHS at large. It gives a really good, rich source of information about what's happening in relation to obesity trends…… So it very much does provide an extremely rich source of information and data."*

> *"I think we are hugely privileged to have a dataset that looks at over a million kids a year, is able to tell us things you simply are not able to glean from smaller datasets. So for example, yeah, we know that there's a socio-economic relationship but we can really look at that in quite a lot of detail. We are able to look at relationships with ethnicity in a way that I don't think has been possible in any other context …. nothing else is going to have the numbers to be able to pick that kind of thing out. …. So I think there's huge epidemiological value…."*

2). Engagement:

> *"And then I would say there is a use as a strategic tool which is to remind people that it is an important topic and to engage people in that topic. And by people I would mean the organisations and the professions that we need to work with, as well as the members of the public. So I would say that's a use of data which is often not quite articulated properly."*

3). Driver:

> *"We use it to inform policy and programmes … and also it's got a really valuable use locally in terms of helping to form local policy and local programme development and … to help local areas make the case for investment in services and to identify whether or not overweight and obesity needs to be more of a priority locally…."*

> *"At the moment, it is very much a population surveillance tool to help inform service planning and delivery. And certainly from my experience within the Northeast, it has definitely helped to inform service planning and delivery."*

4). Evaluation:

> *"Then there is something around, 'How does my data compare to your data?' You know, people start looking at each other's results and comparing …."*

> *".... as we now get a relatively stable dataset with a consistently high response rate, I think there is potential for using as a research tool to assess the impact of interventions."*

5). Intervention:

> *"There is the one that's the high profile one of course: the feedback of the data to parents. So there is the use of it as a behaviour change tool, whether you feel that it is appropriate or not."*

> *"I think the other thing is that you've got to recognise that the NCMP actually is an intervention because it does have a letter sent out to parents, and so I think in that capacity actually it is an intervention. Whether it's being used to its fullest in an intervention sense is another question, but by informing parents … I think it does act as an intervention as well."*

Additionally, participants defined and emphasised the NCMP's capacity for application at local levels. Possible unique benefits resulting from delivery of

local level data were considered; these included efficient resource allocation and identification of risk factors relevant to a particular area. However, responses also acknowledged potential associated challenges of this approach, such as inappropriate overuse of collected data.

> *"Well, I think we can get down to targeting on a local level. We can really find actually at the local level where the associations are with obesity and where we need to target health promotion interventions and where we need to target funds …."*

> *"We don't actually know what local areas are doing with it [the data]. … There is too much going on; there is no way anyone is ever going to know all of that stuff …. And whether the people that are doing that have the knowledge and skills to do it and to interpret what they've got … is a big concern actually, I think."*

Participants further explored ideas concerning consistency and alignment between the programme's design and intended roles, as well as the utility of outlined functions. Responses implied that there is discrepancy between current expectations for the programme and roles the NCMP is realistically able to perform. This perceived inconsistency was attributed to changing programme roles, knowledge gaps in the areas of obesity and epidemiology, and divergent stakeholder priorities. Participants also communicated concern that pressure on the NCMP to deliver on multiple, diverse roles risked creating a situation whereby the overall vision for the programme may be forgotten or lost.

> *"It is quite a difficult area, this sort of thing. I think it serves a lot of functions. I don't think it is designed for a lot of functions but it certainly serves a lot of functions. … I don't know whether it is actually physically possible to design something which can meet all these needs, because the different needs require different types of information, but you can't have all of that so you've got to make do.*

… And I think the NCMP is a really good example of where you've got data being pulled in multiple directions actually."

"I think my biggest concern with it has always been it sort of sits between so many different worlds, this programme, in terms of being surveillance but also there's the feedback and also there's use in other areas, that I don't know whether we really sometimes remember what it is and what it is for….."

When contemplating the value of recognised programme roles, participants communicated mixed views. Responses highlighted the strength and distinctive nature of the NCMP's contribution to obesity management in England. On the other hand, potential discrepancies between theoretical and actual benefits were also recognised.

"If you can see that some small areas are, obesity prevalence is decreasing and in others it was increasing, clearly this is the sort of useful information that can help us understand how better to tackle it. So, you can see how in theory it would provide very useful information for that. Now in practice whether it can be used in that way …. I'm never sure whether we want to be targeting anything really."

"If we only had the Health Survey for England we'd be in a much weaker position. There's no doubt about that."

3.3.3b Routine feedback of individual results

In addition to roles identified above, the process of providing routine feedback of individual results to parents was explored in further depth. A number of important themes arose within this heading, many of which displayed overlap within and across other categories.

First, participants reflected on the development of the feedback process and defined factors that were felt to underpin and justify its introduction. Responses outlined that development of feedback processes resulted in a shift in the intended function of the NCMP, compared with the role initially defined. The perceived role of political influence was repeatedly noted and considered against the lack of evidence in support of this practice.

(Question: Why do you think the feedback process was introduced?)

> *"It was initiated because there was a political view that there was a moral and ethical obligation if you're collecting this kind of information that you should share it back with families."*

> *"Purely because it was popular amongst ministers and why that is I'm not quite sure…."*

> *"Ministers were quite keen on it so I think in a way it was a policy decision from them, rather than being a particularly evidence-based decision. Because, as we've talked about, there isn't a lot of evidence on this …. so I think it wasn't necessarily an evidence-based decision, but pragmatically it was thought to be the right thing to do."*

> *"So at my most cynical I'd say it was put into place to divert political flack ….."*

Participants articulated concerns regarding current feedback processes. In particular, responses focused on the belief that childhood obesity does not meet accepted criteria for screening, together with concerns around the paucity of evidence to justify either its introduction or continuation. Furthermore, some participants felt that the NCMP was not designed to deliver routine feedback

and communicated uncertainty as to whether this reflected an appropriate role for the programme.

> *"…. so we have the paradox of an intervention that is politically popular that has face validity; it makes sense to people that if you give them information that they will act on it... but you have something that ends up being a de facto screening programme that meets none of the criteria of a screening programme. And no evidence to tell us one way or the other what's going on here."*

> *"Wilson and Jungner's criteria for a screening programme say that a screening programme should have a disease that we know we can influence, a test that we know will be reasonably discriminating, there is an effective treatment available and the programme is theoretically practical and affordable and so on. This fails on all four."*

> *"Well it's interesting, because parental feedback is now a role; [it] probably wasn't initially, therefore the system was not particularly designed in order to do that…. So it's a very odd role in my point of view for endless reasons. Like not even questioning whether it's useful or not to give feedback …. Quite possible it is; possibly isn't, who knows? But if you're doing it, it should be based on accurate data."*

The outcomes and perceived utility of providing feedback were explored within responses. Several participants communicated that the introduction of this process was *"a good thing"* and that benefits of feedback generally outweigh possible adverse outcomes. Of note, these participants subsequently asserted that this view was grounded in assumption alone. Overall, the reported intended functions of feedback were two-fold: raising awareness and behaviour change.

However, when considering outcomes of routine feedback, responses were typically uni-dimensional and focused on whether parents demonstrated an

appreciative or angry response to the letters. There was little assessment of whether the process had achieved the intended outcomes outlined immediately above. In instances where these outcomes were discussed, participants reported discrepancy between expected and actual outcomes of delivering routine feedback. Participants also communicated uncertainty around the overall effectiveness of this process.

> *"…. the political lay community seem to think that feedback of this information is somehow going to create a miracle of change in weight in children, which it's clearly not and I think that's the big tension."*

> *"…. the difficulty is, we know that just providing people with information doesn't actually affect behaviour change and, as I say, we don't really know what the impact has been of providing routine feedback to families. So I guess they're the tensions that we need to balance. There's a bigger question: should we be providing routine feedback? … we don't know what the impact of sharing this information is, we don't know how much damage or harm it might be causing and we don't know what benefits or positives it might be causing."*

Responses suggested mixed views relating to possible unintended harm arising from feedback processes. In this context, participants discussed their beliefs and observations around possible adverse implications for individuals and families, and the NCMP itself. On the latter point, potential implications resulting from returning incorrect data to parents were outlined. Participants then reflected on probable consequences for the image and credibility of the NCMP.

> *"…. every coverage in the media where you get another child that doesn't look fat …. and gets a 'fat letter', weakens the strength of the intervention."*

> *"My concern is …. the way the measurements are taken is very quick and dirty and that's fine for surveillance, but I just really think it's not accurate enough to be putting these things in a letter that looks like it comes from the NHS. And I think that when you start getting people's weights completely wrong … which I bet does happen from time to time; that just does not instil confidence in the NHS."*

Other respondents incorporated discussion of existing evidence when contemplating the impact of unintended harm resulting from feedback processes. Whilst some participants concentrated on the dearth of available evidence on this topic, others highlighted that current evidence, though limited, does not support the idea that feedback is associated with significant harm.

> *"But certainly my understanding of the evaluations that have been done, and I think they've been rather poor-quality, small, biased evaluations. Nevertheless, my understanding is that many of the concerns about the harms … may have been overstated and it may well be that actually it's fine and doesn't do any harm and it might do some good."*

> *"…. although the newspapers focus on this, we don't actually have many complaints and I think the evidence that we have … is that most families are happy to hear the information about their child."*

Finally, when considering the utility of feedback in the NCMP, participants emphasised the need for and contribution of evaluation of programme outcomes. Such evaluation was felt to offer a means through which identified questions or challenges may be addressed. Indeed, responses included a suggestion to prioritise further evaluation of routine feedback. Moreover, participants acknowledged that there is currently limited evidence relating to feedback processes in the NCMP.

"There is also a genuine concern about what is realistic for an intervention of that type to actually achieve and we are really keen to sort of go back to basics and rethink some of these things ourselves. I think the time is probably right to do that as well …."

"I would be looking hard at the feedback process. I mean I am not against doing it as such, I just think it needs to be studied a bit more. There certainly isn't enough …. we would love there to be more evidence on sort of ways of doing it and the best way of doing it…"

"…. I wouldn't be confident about saying we have this information that feedback is necessarily a good idea. I mean, it obviously seems to be. Common sense suggests that it is because we know that parents misjudge the degree to which children are overweight. …. But I couldn't put my hand on my heart and say that we have the evidence."

3.3.3c Programme outcomes

Participants were asked to define outcomes produced by the NCMP. Overall, there was close alignment between reported roles and outcomes; four of five identified roles also arose as themes within this heading. These four key outcomes of the NCMP were summarised as: (1) information; (2) engagement; (3) a driver for policy development or additional services; and (4) evaluation. Despite suggesting that the NCMP could function as an intervention, participants did not offer information on outcomes relating to this proposed role.

First, information was seen as a critical outcome of the NCMP. In this context, information arising from this programme extended beyond expected prevalence data to include research outputs and improved understanding of the issue of childhood obesity.

"I think the surveillance aspect … in the early days some local areas were really on board but some needed convincing; they felt it was just a measurement programme … what's the real benefit? But now I think that attitude has really changed and … areas are really telling us how fantastic the data is in informing their work … it's helped to prioritise obesity and enable them to put programmes in place and get the money for it and get people to take obesity seriously. I think that's different to other things. There are other policy areas within DH where there isn't the data, so actually making the case for investing locally in it is much more difficult."

"[NCMP data] shows a clear gradient against deprivation, and it also shows that different ethnic groups have significantly different levels of prevalence. Now the national data does show that as well, but I think because the NCMP has such a large number of data points; it is very convincing. …. I think that's something we've said to ministers and people like that, but I really think it is really hard evidence that there is an issue, for child obesity anyway, around the link between deprivation and levels of obesity."

However, responses also communicated a sense of surprise and disappointment at the perceived lack of achieved outcomes, therefore suggesting that the NCMP has not fulfilled its potential.

"I am kind of more surprised that lots of things haven't got done. If you'd asked me three or four years ago what I'd have done with NCMP data by now …. I'd have had loads more exciting things and I haven't really. It's all like the same sort of thing …. So, I think I'm more surprised that things haven't been done given what is there."

Second, improved engagement with stakeholders was acknowledged as an outcome of the NCMP. On this point, participants discussed the impact of the NCMP on multiple stakeholders, including schools, industry, politicians and members of the public. This theme also encompassed outcomes associated with advocacy and improved awareness of the issue of childhood obesity.

Responses emphasised the importance of local ownership and outcomes in securing and maintaining stakeholder engagement with the NCMP.

> *"And certainly the NCMP has been an amazingly useful tool just to keep schools engaged in this and to remind the local health people that they have this as an issue and give them an advocacy tool. To say, 'This is our latest data, this is what's going on,' to all the people that they are trying to encourage to work with them."*

> *"…. it's keeping it on the table. It's keeping obesity on the agenda as a high-profile, important problem that we do really need to do something about. …. I just think that there is something about local ownership of data and local engagement in the programme … and if each PCT, or in the future, each local authority didn't have its own figures, then it might not be seen as that much of a problem over which they'd have ownership."*

Third, participants expressed a range of opinions on how the NCMP had performed as a driver for development of policy or additional services for childhood obesity. Some participants acknowledged this as a potential outcome of the NCMP, but were uncertain as to whether this had eventuated. Therefore, this might represent a further area of unfulfilled potential in the NCMP. However, others were clear that the NCMP had both justified and facilitated action on childhood obesity.

> *"At the moment I don't know how much it is going into influence at the policy level. I think it can do, but whether it's having that impact at the moment, I think is another question. …. I'm not entirely sure that it is. …. it could be influencing them [Department of Health], but I'm not entirely sure that we've actually seen it."*

> *"And actually it acted as a bit of a catalyst really for local areas, getting weight management services and care pathways in place …*

they might have had services, but they weren't joined up. …. So one effect of this policy was that actually areas then thought, 'Well, right, we need to do routine feedback, we need to get proper service in place for these children.' … that's been quite a positive impact in a few areas."

"[W]e're driving people, staff, to get trained and to put weight management programmes and other services in place and get their care pathway properly written up … what else would drive them to do it, if not this? Maybe it just wouldn't happen."

The final outcome that displayed direct alignment with identified roles was evaluation. Again, discrepancy between actual and potential outcomes was acknowledged. Also, participants emphasised evaluation outcomes at local, rather than national levels.

"I think it's [evaluation] a potential role, and I think people feel it [the NCMP] has that role but I don't think it's been properly assessed as such."

"…. it made us think as a region what we're providing. What kind of top tier services do we have in place for children that might be coming through our system through routine parental feedback? What do we have that can accommodate them?"

"Well, it was part of a performance management system. So I think in that sense we encouraged local health authorities first of all to collect the data and secondly, once they've collected the data, to do better than their neighbours and to do better than they had done in the past."

When contemplating programme outcomes, participants described who they were designed to reach. Typically, responses did not identify either schools or parents as the intended audience. Instead, outcomes appeared to be targeted

toward professional and political stakeholders, including ministers, service commissioners and providers, and researchers.

3.3.3d Unintended harm associated with the NCMP

Participants articulated views on possible unintended harm resulting from the NCMP. First, participants discussed specific adverse outcomes resulting from or associated with the NCMP. Possible individual-level and programme-wide harms were identified, although these outcomes were recognised as either isolated or purely theoretical.

> *"You hear anecdotal [examples]…. I heard of one case where a group of girls hadn't eaten for the last two days or something because they knew they were going to get height and weight measured, and that's just the kind of circumstances that we want to absolutely avoid."*

> *"Now of course there is one of the impacts could be an impact on the programme itself. The biggest epidemiological risk and challenge to the programme is one of selection bias, and there is both endless anecdotal and actually some analytical evidence that tells us that it's the heavy kids who tend to opt out. …. Now if that gets shifted even more because you're pissing off the parents of the overweight kids, so they then don't want to participate … then you're going to get less useful results from the programme itself."*

Next, participants outlined approaches and programme features that were assessed as protective against possible harm. Here, the recurrent themes of protocol and engagement were again apparent. In particular, responses accentuated defined measures within the protocol aimed at preventing possible negative effects of child measurement.

"Well, I think there's like recommendations in there in terms of, like, children to be measured in a screened off area so you're not measured in front of others; children shouldn't be told their BMI ….. So there's quite a bit of stuff in the guidance to try and stop individual children feeling picked on or pressurised … There is a load of cautions [sic] around that."

Finally, responses stressed the contribution of evaluation of outcomes to this issue. Once again, participants suggested that the present degree of evaluation was inadequate and detailed that evaluation of potential harm associated with the NCMP represented a priority area for future research. Where available, participants felt that limited results from available evaluations did not support assertions of harm.

(Question: Are you aware of evidence suggesting unintended harm associated with the NCMP?)

"Not that I can think of and also I have to admit I sort of think there's a bit of a fuss over nothing…."

"I don't think we are aware really. We get people writing into the Department nationally … and there have been cases like that in the media. … We don't really know, so I think that is one thing we really want to look at. … should we even be doing this if we haven't properly evaluated it? Maybe not, but these things, in the real world they happen and you can't always wait for the evidence."

"I don't know. There may well be some [evidence]. Certainly my recollection of the evaluations that have been done is that there isn't much evidence of it and it's a theoretical objection and it's actually not the case in real life."

3.3.3e Summary: ‘Utility’ (NCMP)

This category encompassed programme roles, feedback processes, outcomes and possible unintended harm associated with the NCMP.

Evaluation presented as the key theme under these headings. Evaluation was identified as both a possible role and outcome of the NCMP. Also, evaluation was discussed as a method by which feedback processes could be justified and improved. Furthermore, responses suggested that evaluation of the NCMP could contribute to quantifying and minimising possible unintended harm.

Participants articulated that the capacity to evaluate external initiatives signified a theoretical, rather than standing function of the NCMP. Also, evaluation of the programme itself was felt to be inadequate. Of note, evaluation of outcomes of existing childhood obesity management strategies is not a defined role of the NCMP according to current operational guidelines [265]. Overall, evaluation reflected an area of unfulfilled potential within the NCMP.

The remaining identified roles of the programme were information, engagement, a driver for action, and intervention. These roles are consistent with aims described in the programme’s operational guidance. There was significant overlap across responses from the various participants and also across responses to questions on both roles and outcomes of the programme. However, whilst clear alignment was evident, it is important to note that this discussion centred on roles and outcomes relating to the NCMP’s original

function as a surveillance tool. Participants also highlighted that the NCMP enabled application of collected data at local levels, thereby suggesting the importance of considering identified roles in the context of their functional setting.

In this study, participants did not identify outcomes that linked to the programme's later role as an intervention, such as a reduction or stabilisation in obesity prevalence or improved awareness of actual weight status. Furthermore, participants did not acknowledge examination of longitudinal data trends as an outcome of the programme. This omission may be due to the relatively recent introduction of the NCMP, the programme's current inability to link individual records, or another reason.

Responses were consistent across interviews, but participants recognised the numerous, diverse roles of the NCMP. Participants also communicated uncertainty around whether all identified roles were realistic, suitable, or achieved programme functions. There was some challenge in distinguishing actual outcomes from those the NCMP was simply assumed to deliver: many participants were not able to cite examples of stated outcomes.

Participants did not define the programme's original proposed target audience when discussing development of the NCMP. However, as participants contemplated outcomes delivered by the NCMP, responses identified the groups they were designed to reach. In general, the indication was that

outcomes outlined in this study were directed at professional or political stakeholders, rather than parents or schools.

Two important points arise from this finding. First, this audience again reinforces the NCMP's core role as a population level surveillance tool, as opposed to a programme that aims to target individuals or particular groups. Second, it is notable that previous small scale reviews of the NCMP have placed emphasis on how school nurses, parents and children have viewed and received the programme, despite this acknowledgement that NCMP outputs are not generally directed at these groups. Engagement of all stakeholders is critical to programme success, particularly given that this programme relies heavily on high participation from the eligible population. However, this finding highlights an area of potential incongruity and acts as a reminder that evaluation should be designed to address a programme's primary audience.

The existing literature stresses that the NCMP functions as one small part of the Government's strategy for obesity management [265,272,274,327]. Yet, indications from this current study are that collected data and wider programme features are expected to deliver multi-level, multi-factorial outcomes. On this point, participants communicated that diverting focus across numerous discrete areas may compromise the overall vision of the programme. The suggestion was that by creating a situation whereby data were expected to achieve multiple and often unrelated outcomes, there is a risk that stakeholders may lose sight of the programme's original and most valued purpose. However, outlined roles

were valued and showed direct linkage with intentions established at the time of the programme's development.

In this study, significant discussion centred on the feedback process and reinforced previously articulated views that its introduction was politically driven. The introduction of this feature represented the most controversial element of the NCMP and was believed to have received a mixed response from various stakeholders. A common message was that there was flawed alignment between the NCMP's design and intended functions. Additionally, participants outlined views on supposed aims of the feedback process but did not indicate that these aims had translated into outcomes. In fact, some participants explicitly stated that aims were not realistic and had not been achieved.

Numerous concerns around the feedback process were described, including concern regarding: the accuracy of individual level data; resource requirement; insufficient evidence in support of this practice; potential for and public perception of resultant unintended harm; inconsistent and incomplete follow-up services; and impact on NCMP participation rates and programme credibility. This latter point was designated as a potential threat to fundamental programme functions. Participants did offer positive reflections on the utility of routine feedback; however, dominant messages were of doubt and uncertainty.

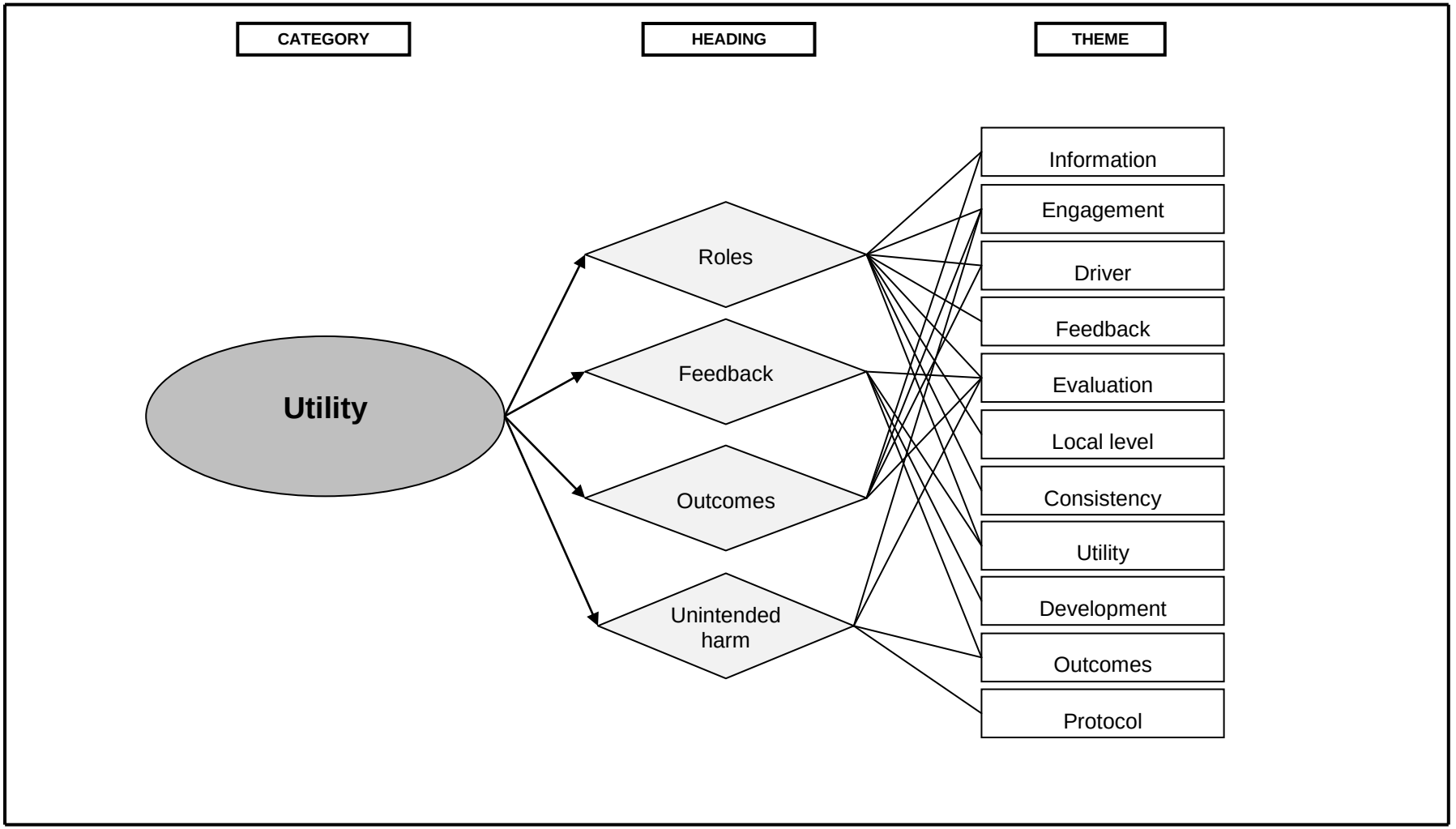
Overall, outlined programme roles and outcomes were broad, varying and non-specific. This cautious approach creates a situation whereby it seems unlikely that programme aims remain unrealised, thereby offering hypothetical

protection against accusations of failure. Furthermore, this method appears to preserve flexibility within the system, thereby allowing roles to be modified as required to reflect current political or other preferences.

However, it is also important to consider that this approach could result in a situation whereby programme success is more difficult to verify. This outcome may leave the NCMP vulnerable to criticism and have implications for its viability in the longer term. This is because it may become difficult to justify continued provision of significant resources to this programme, without proof of achievement of defined aims.

A summary of key themes within this category is provided in Figure 3.4.

Figure 3.4: Summary of themes – 'Utility' (NCMP)



3.3.3f Recommendations (Part Two)

Table 3.2: NCMP case study - Recommendations (Part Two)

- Define and communicate programme priorities and the vision of the NCMP and ensure that programme design facilitates achievement of the stated vision and roles.
- Identify roles that have not translated to recognised outcomes. Where appropriate, adjust proposed programme functions to exclude those that are not realistic for the programme to deliver, given the nature and scope of collected data.
- The criteria for defining overall programme success should be clearly delineated. Routine evaluation should be incorporated into the programme to measure and demonstrate progress in this area.
- The utility and long term outcomes of the programme should be prioritised over shifting political preferences. Health policy and health-related programmes are inevitably subjected to political priorities. However, greater clarity and communication the NCMP's vision and purpose may moderate the programme's vulnerability to this influence.
- Define who the NCMP is for and communicate which specific programme aims are directed toward which stakeholder group.
- Evaluation of unintended harm resulting from the programme should be conducted and the results disseminated to stakeholders. If minimal evidence of unintended harm is demonstrated, this process may assist in countering arguments from existing media reports.

3.3.4 Category: 'Threats'

Headings within this third and final category comprise: challenges facing the NCMP; programme sustainability; limitations of the NCMP; and possible solutions to identified issues.

3.3.4a Challenges facing the NCMP

A number of distinct themes were evident as participants discussed challenges faced by the NCMP. The greatest concern lay with plans for restructuring within the NHS and the envisioned implications for the on-going administration of the NCMP. Participants reflected on how the planned dissolution of PCTs and other changes might impact on the programme. They concluded that there was significant uncertainty and vulnerability surrounding the programme's future as crucial questions regarding priorities, coordination and basic logistics remained unanswered.

> *"I think the main challenge is probably the new government and the changes from the new government…. I think the issue, or one of the major issues is that, at the moment, data collection is coordinated by PCTs and PCTs will cease to exist in two or three years, and what happens then is anyone's guess. How is the data collection then going to be coordinated? I think that's a massive issue. I mean, once the PCTs have gone the whole nature of the NCMP is going to change."*

> *"Oh, absolutely the main challenge is the massive reorganisation of public health. …. There is apparently a strong government commitment to the NCMP. Ministers like it; they want to see it there. …. I have had strong indications that it's something that will continue,*

but we're seeing the abolition of Primary Care Trusts; public health moving into local authorities; talk of ring-fenced budgets …."

Responses also highlighted the importance of changing trends and political ideology in determining the purpose and durability of the NCMP.

"Erm <laughs> Nationally I think the main challenges are very much around the changing political view of the role that government has to play and what government can ask of local areas or tell local areas …. Also the fact that, to some extent, the function of the programme is up for discussion because of all the transition and the change in policy direction."

A further challenge included potential loss of consistency in the national programme. Participants expressed concern that the current emphasis on local responsibility for programme delivery may impact on the NCMP's capacity to deliver a nationally representative dataset. On this point, potential variations in protocol adherence, resource allocation, and/or priority setting were identified as significant threats to the vision of and outcomes produced by the NCMP.

"I think there is potentially an issue around will local areas choose to implement NCMP? Obviously up until now, every area in the country has been doing it, so we've had this fantastic national dataset, but going forward this government doesn't like to mandate areas to do anything; it's very much locally led decisions. So going forward, if areas start to not do it …. either they might not measure at all or their coverage might drop, and …. if one or two areas drop out, that really affects the whole dataset."

"I was very clear from the start that we didn't mind how it was conducted locally …. it ought to be something that fits with the current way of doing things, but I think the level of autonomy that is being promoted may be too great to allow good enough consistency for a programme like this."

Next, participants spoke of challenges presented by a possible situation of diminished engagement in the programme, citing the need to ensure that schools and parents remain committed and consented to continuing involvement. Responses focused on the potential threat to engagement posed by negative programme perceptions, which may arise from media reports or adverse individual experiences with measurement processes.

> *"…. last summer there seemed to be almost every day in the press for a few weeks this child who'd been told they were overweight and who didn't look particularly overweight in the pictures in the newspaper. So I do think that kind of thing, the negative publicity, is a threat to the programme. I think it may be that parents will then withdraw their children and say they don't want them to be included."*

> *"….I think it's also parents who might have had a child measured in Reception and then the child's come into Year 6, they might not want them measured. Or, they have a child who's been measured and then they have a bad experience and the next child they withdraw. … I think it's something we're always aware of: that we are reliant on parents really being open to having their child measured and not withdrawing."*

3.3.4b Programme sustainability

Multiple themes were apparent as participants considered factors that may enhance the sustainability of the programme; however, elements directly relating to the NCMP's protocol and outcomes were dominant. Participants outlined the perception that detailed local data are crucial to the programme's longer term survival. Unique features and outputs of the NCMP were viewed as protective, but responses also highlighted the importance of using programme

outcomes to inform and shape the broader obesity agenda. This was felt necessary to help defend against possible external threats to the NCMP.

(Question: How can the sustainability of the programme be enhanced?)

> *"I think it's using the information, because there is a focus on local level health now, so I think it's using this data on a local level. And also if it can become embedded into systems on a local and national level, where that data is used to inform say the commissioning of services and things like that, and make it really valuable in these decision-making processes, then I think it will sustain because of that."*

> *"…. [The] data that it is currently producing is really valuable. There isn't a dataset like it in the world and it's just a really robust data source…"*

> *"I think at the moment one of the dangers of the NCMP is it seems to sit out on its own a little bit. But if you can actually put it in as an important part of the system where it's used for commissioning services on a local level, or even on a national level, then I think actually it becomes more valuable and then it actually protects it slightly."*

Next, participants discussed the contribution of programme structure to its longevity. Flexibility within the NCMP's structure was identified as crucial in allowing the programme to meet changing needs, therefore promoting sustainability. However, the programme's long term structure was felt to be a challenge due to the difficulty of communicating advantages of future data to current funders.

> *"…. certainly the model's not stood still; it's evolved and changed continuously depending on the demands locally and nationally. ….*

So for it to be sustainable, it has to make sure it meets the current needs and I think we need to accept that all projects go through a life cycle and, at some point, come to a conclusion."

"…. certainly from our point of view, the pressure to show that this type of data collection is not just for data's sake …. is really strong and it is also incredibly hard to do. How can you justify value for money out of a data collection exercise when the value might come 10-20 years down the line? But if you can't show that, the chances of keeping these programmes, I would say, are increasingly small."

Engagement arose as a further theme when considering programme sustainability. Participants acknowledged challenges associated with attaining and maintaining stakeholder engagement, but also communicated its importance. In particular, participants stressed the role of positive interaction with schools and the perceived benefits of communicating and promoting the credibility of the NCMP.

"I think if you can involve the schools….. if the school has got something out of it, if they just felt that they were partners in the process, I think that may be enough to protect the programme."

"…. if we can say there's this public health ambition and there's an indicator and you need to be reducing prevalence kind of thing; the stronger we can say that, the stronger local areas are likely to make it a priority for them as well."

In addition, participants discussed how data utilisation might impact on programme sustainability. Responses suggested the need to maximise use of available data by linking it with other datasets and also through using NCMP data to contribute to a wider strategy for obesity management in England. The

difficulty in defining and communicating short term gains from the NCMP data was also explored as a possible challenge to sustainability.

> *"In order to get the maximum value and use out of the data, you need to be able to look at it in parallel with other data that you have about your patch and interpret that."*

> *"I think if we can engage schools more, maximise the use of the data, provide practical resources and programmes to help schools …. I just think if we bring it [the NCMP] more into the broader obesity agenda and use it as a lever to help facilitate change; I think that will help in terms of its sustainability."*

Finally, participants recognised the need for evaluation to help justify specific programme elements, as well as the very existence of the NCMP. Evaluation of programme outcomes was portrayed as a fundamental tool to secure support from programme funders and deliverers. Therefore, evaluation was perceived to be relevant to the NCMP's longer term viability.

> *"I think certainly if we could demonstrate what the impact of the [NCMP] model has been in affecting behaviour change would be the key other aspect to it, both nationally and locally, because locally if there's clear evidence that taking that approach is going help support behaviour change in the local population and get people into services and helping to contribute to a reduction in prevalence, then there's a much stronger business case for them to be supportive and to actually deliver it and use it as part of a care pathway."*

> *"I think also getting evidence for a positive effect, so we are wanting to evaluate routine feedback a bit more and hopefully if that shows that it does have a positive impact then that again will make it easier for local areas to make the case to be doing it. I think at the moment if there's not evidence for why it's beneficial, then arguably they're not going to want to fund it."*

3.3.4c Limitations of the NCMP

Participants discussed limitations of the NCMP. Here, the validity and reliability of the programme's protocol and outcomes were considered, together with gaps in available information that may restrict eventual applications of collected data.

First, participants identified aspects of the NCMP protocol that were felt to limit accuracy and use of the data, therefore impacting on wider programme utility. Responses highlighted concerns with a range of elements including the current age groups, data variables, feedback letter, type of data, and defined method of anthropometric data collection. However, participants also acknowledged that initial decisions around protocol specifics were made in the context of logistical constraints and competing priorities.

> *"So age bands is a clear issue; they're probably not the age bands I would have chosen. There was a notion, again I think a rather naïve one, that if you measured kids at the start and end of primary school this would tell you what primary school was like as an intervention …. without thinking through the vast number of other confounders that are affecting kids at those times."*

> *"The main limitation, which is unavoidable I think, is that you collect from a huge number of individuals but you collect very little information on them, which as I say is unavoidable. It's an ethical issue and it's time constraints and stuff like that, but it's really height and weight measurements. …. So I think that's the main limitation of the data."*

> *".... the reason we couldn't get this done as a longitudinal dataset in the first place was because of issues of consent and the fact that I had four months to sort the whole thing."*

Second, limitations on outcomes produced by the NCMP were identified; these displayed close association with aspects of the protocol outlined directly above. Responses centred on the inability to link collected data either within the NCMP itself or to other datasets.

> *"Well, we only get two years of children, the first year and the last year of primary school. They're anonymised I think at anything above PCT level, which means we can't follow children through and, in particular, in a couple of years' time we can't measure them a second time because …. they'll be a different set. They'll be the same set, but we won't be able to match them up with the measurement before."*

> *"…. one of my biggest bugbears is the fact that the data isn't identifiable and we aren't actually able to link the data with other datasets. So that limits what we can do in terms of looking at it from an epidemiological perspective. … That would just give us huge strength in terms of what we could actually learn from the data."*

Finally, the impact of gaps in available information on programme outcomes and utility was discussed. Participants articulated that the dataset's current ability to enhance obesity-related knowledge was restricted when compared against its potential application, thereby reflecting unrealised capability. On this point, participants communicated that current programme design and priorities for data analysis may limit the NCMP's capacity to contribute further information and understanding on the issue of childhood obesity.

> *"So, I can definitely see how thorough analysis of the NCMP data should help inform what we do to tackle child obesity, but I think people use it to look for too easy answers. …. So I think there is a lot of potential for it to provide it, but I think unfortunately the pressure is on people say, producing maps of obesity prevalence …. which to me is missing a lot of the point really."*

"We're measuring children at a point in time; we're not measuring how they get to that point. …. there is the whole question of the dynamics; it doesn't get to the bottom of the dynamics at all, so that's a limitation. So if we've measured every year or if we had a longitudinal study, we would be discovering something different."

3.3.4d Possible solutions to identified issues

Possible solutions to identified challenges were also considered. First of all, responses explored views on alternative approaches to the NCMP protocol. Participants proposed diverse methods, with suggestions to incorporate parameters that were either different from those currently collected, or in addition to the present system. Generally, the rationale that underpinned suggested changes was that new information would improve understanding of childhood obesity and/or enhance the depth and accuracy of results produced by the NCMP. There was no consensus opinion on the feasibility of possible modifications to the protocol, with participants expressing views ranging from achievable to impossible.

Whilst some participants spoke with enthusiasm of the need for change to included data parameters, others felt that the best approach would be for the NCMP to continue unchanged, or even to decrease the volume of collected information. Here, the principal justifications concerned potential cost implications and hesitancy to change an established, functioning system.

"…. I think the issue is the cost of changing it. I mean the NCMP as far as I'm concerned has been set up with minimum expenditure really in utilising funds that have already been there or haven't been

used. So I think from that point of view, I'm not entirely sure I would necessarily feel the need to change a great deal."

(Question: Is there any other data that you would like to see collected in this programme?)

"Personally, no I don't. I don't think so and actually I think going down to one year group would be a better approach as well…"

Ultimately, participants questioned the purpose of collecting data without first identifying how it would be used and outlined a summary view that established systems are functional.

Participants also communicated opinions on possible ways to address certain challenges posed by providing routine feedback. Responses highlighted that further evaluation of this process is required to justify its continuation. Certain responses extended to include the suggestion that feedback should be removed from the NCMP altogether, citing concern around possible adverse outcomes and unproven benefit.

"Like, at the minute the other danger is possibly that parents all of a sudden start to get really angry about this. ….. if anything like that does start to happen and participation starts to drop, can we trust our figures anymore? …. So, I think I'm worried about big disruption and disturbance of which I see parental feedback as being the big issue …. So, for me, I'd like parental feedback to be dropped because I think that would help the system."

"I just think this should just be a routine thing that happens …. that children should be getting weighed and measured. It should be put into a health system and we should be able to analyse the information, so I think keeping it away from all this feedback and things would be the best way."

"I don't know about the feedback side of things, because I think it is seen as being quite resource intensive …. and I know in a lot of areas they haven't seen that conversion from sending the result and then increased numbers going into weight management programmes. And many areas are actually really struggling to recruit onto programmes …. I think therefore they won't necessarily see a benefit of routine feedback."

"Feedback is only advantageous because they don't fully appreciate epidemiology. …. I really don't think the letters add to it."

Together with discussion around possible alterations to collected parameters and the feedback process, responses explored suggestions for data utilisation. Participants repeatedly communicated the view that the capacity to link NCMP data to results from previous years and other datasets would expand the use and epidemiological value of the programme. Whilst ethical concerns were acknowledged, participants also proposed that current practice within certain PCTs would, in theory, support data linkage.

"I would like someone not to have put in place the regulations that are currently in place though in the implementation of the National Child Measurement Programme; they're horrendous. They limit data sharing; they're prohibitive beyond need…"

"The other thing that would be good actually, which would be incredibly difficult, would be linking it to something like the child NHS number or something like that, so that it then could be linked to future ill-health or even past measurements and things like that. That would be really good. … it makes a massive ethical issue I'm sure, but that would be really useful on a public health level."

"I know some of the PCTs do store that NCMP data on their child health systems, so that potentially would give rise to the possibility of linking it with other information that's stored on the child health system."

3.3.4e Summary: ‘Threats’

The dominant themes arising from headings included in this category included: engagement; protocol; outcomes; and evaluation.

First, participants acknowledged that the programme’s existence relies on the continued *“goodwill”* and active engagement of schools and parents. Engagement was recognised as a potential promoter of longer term programme viability. However, participants also highlighted challenges associated with achieving such commitment, given the diversity of stakeholders involved with the NCMP. The NCMP was believed to reflect an example of a programme that has demonstrated successful engagement with its varied audience. Of note, participants did not articulate details of how this had been achieved.

The NCMP exhibits a longer term vision and structure. This feature was described as a unique advantage but also a distinct threat to the NCMP due to expected pressure from programme funders to prove current outcomes and benefits. Participants argued that existing elements of the protocol may detract from the wider utility of the NCMP, limiting short and longer term outcomes and threatening overall sustainability. Restrictions on data use and sharing and the resultant lack of a longitudinal dataset were identified as key limitations of the NCMP. Participants expressed frustration with data management restrictions that were unclear, excessive, and felt to limit potential outcomes.

Many participants proposed ideas for alterations to the existing protocol.

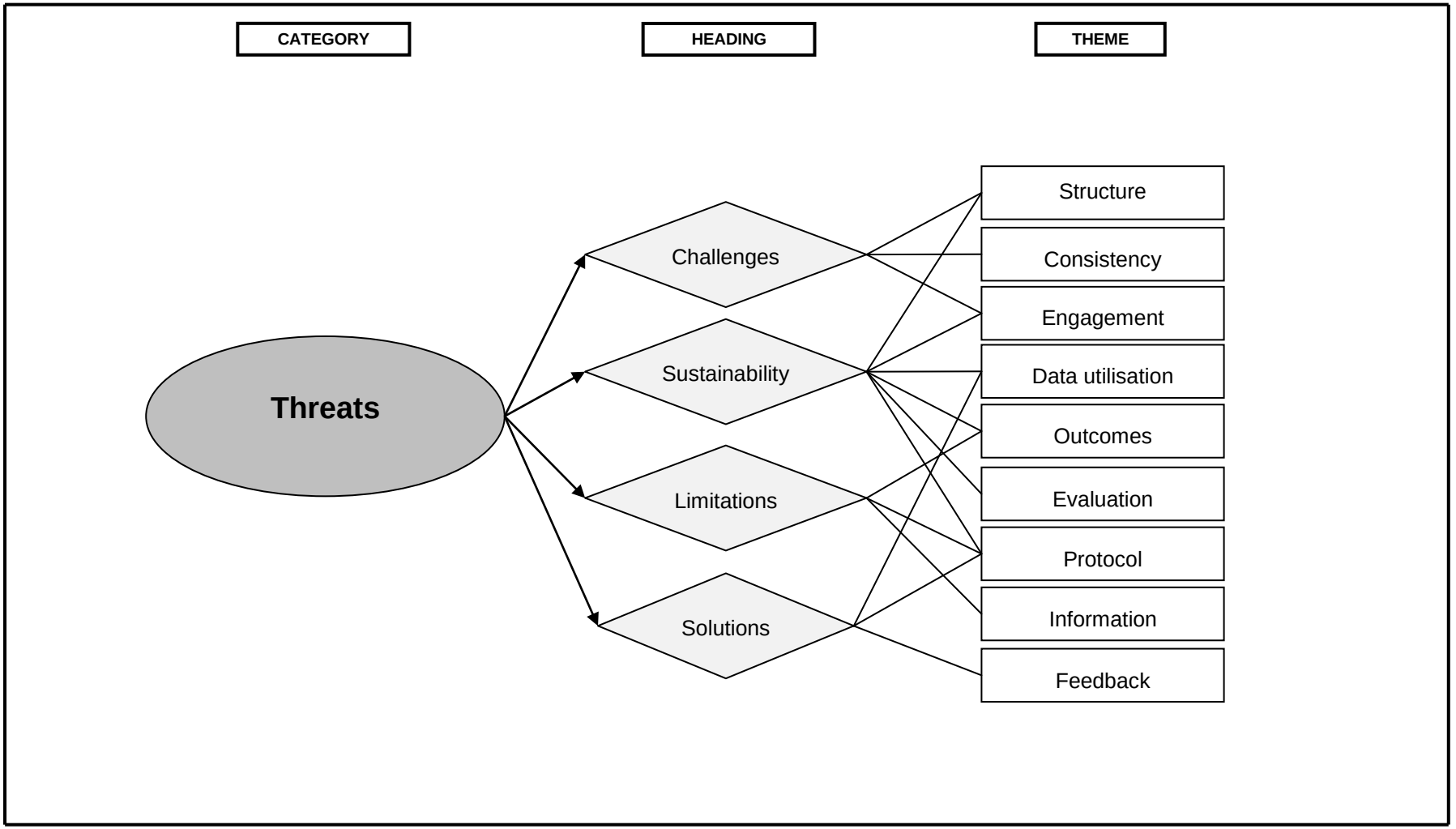
However, no consensus opinion emerged with respect to the feasibility of modifications to the current protocol or the details of such changes. Inconsistency in responses with respect to how to shape or refine the NCMP spoke more broadly to an apparent lack of clarity around the extent of the programme's remit and planned vision for the future. These dissimilar views also likely reflected differing stakeholder priorities for the NCMP, which are at least in part contingent on areas of individual interest.

The outcome of local prevalence data was described as essential for programme sustainability. This output was viewed as protective for two reasons: (1) it represented a unique feature of the NCMP; and (2) it displayed direct alignment with current political priorities. Participants stressed the need to maximise use of available data and communicated that integrating the NCMP into a broader strategy for obesity would help to defend the programme against possible external threats. Attention was also drawn to the lack of matched longitudinal data as this restricted the programme's capacity to contribute new and useful information. This possible outcome was perceived as a realistic but unrealised goal and, ultimately, represented unfulfilled potential in the NCMP.

Finally, evaluation was portrayed as a vital tool to garner support from programme stakeholders and was believed to play an important role in securing longer term sustainability. This could be achieved by providing justification for chosen methods and allowing appropriate programme streamlining or reform.

A summary of key themes within this category is provided in Figure 3.5.

Figure 3.5: Summary of themes – 'Threats'



3.3.4f Recommendations (Part Three)

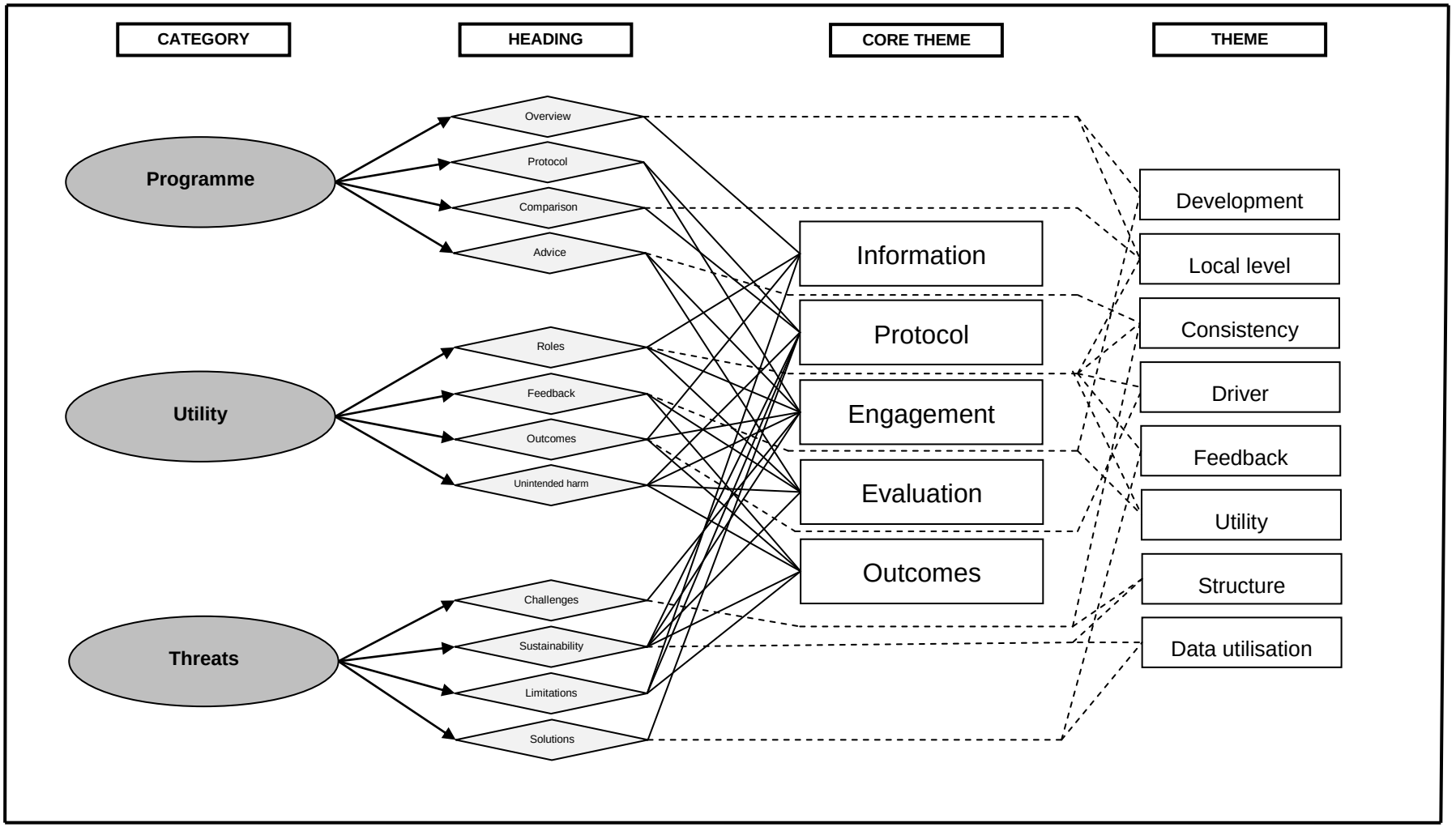
Table 3.3: NCMP case study - Recommendations (Part Three)

- Comprehensive evaluation of the feedback process should be prioritised and should include assessment of unintended harm, acceptability, required resource commitment, and resultant impact.
- Data management guidelines should be re-visited with the view to establishing longitudinal data linkage within the NCMP and other child health records.
- To maximise engagement with GPs and encourage collaboration across public health and primary care, NCMP data should also be made routinely available to GPs. No matter the eventual decision, there should be consistency, clarity and repeated communication around procedures for and restrictions on data sharing.
- In light of planned NHS re-structuring, procedures for programme administration within local areas should be finalised and disseminated in advance. Where possible, these should be standardised.
- There should be clarity and agreement around when NCMP data are used. To maximise the NCMP's role as a driver for the introduction, expansion and continuation of services, these data should be used wherever possible at both local and national levels to help justify and preserve the NCMP and solidify its contribution to obesity management.

- Existing longitudinal datasets pertaining to other significant public health issues, such as smoking, may be used as examples to highlight advantages of longer term epidemiological data, by demonstrating their value and persistent utility.
- Following routine evaluation, identified outcomes should be communicated to key programme stakeholders each year. This may support continued engagement and demonstrate where the programme has been successful in accomplishing stated functions, therefore helping to protect sustainability.

The full summary theme map from the NCMP case study is presented in Figure 3.6.

Figure 3.6: Summary theme map – NCMP case study



3.4 DISCUSSION

This section includes an overview of central findings, together with a comparison of findings from the current study against those described in existing literature relating to the NCMP. Next, relevant limitations of this study are considered. Finally, I summarise recent developments that have implications for the future of the NCMP. Comparison of findings from this study and those arising from the systematic literature review are considered in Chapter Six.

3.4.1 Overview of central findings

This study examined the beliefs and observations of centrally-positioned stakeholders regarding the roles, outcomes, challenges and sustainability of the NCMP. Overall, five core themes were identified: (1) information; (2) protocol; (3) outcomes; (4) engagement; and (5) evaluation. Of note, the third outlined aim of this study was that results would be used to inform development of the final component of this research: a pilot CMP in Guernsey. Therefore, central findings from this study, as outlined immediately below, acted as key learning points to underpin and shape the design and conduct of the ensuing pilot programme.

First, the central and most valued role of the NCMP is provision of current, accurate data on weight status at the population level. Therefore, similar programmes should be designed to prioritise and publicise this principal

function above other potential roles. This information can be used for a variety of purposes, including improved understanding of a public health issue in a local setting. Consequently, it is critical to identify in advance how obtained data will be communicated, distributed and eventually utilised. If individual results are delivered to parents, the underlying intention of this feedback process should be to provide information, rather than alter weight-related behaviours.

Second, a clearly defined, routinely adopted protocol was revealed as a critical factor in helping to deliver an accurate, standardised and credible programme. Consistent training processes, clear communication of the features of and rationale for existing procedures, and regular assessment of adherence to protocol were all identified as important for programme success. Furthermore, measurement protocols should be tailored to their intended setting and level of functioning. This can promote enhanced ownership and allow development of context- and culture-sensitive CMPs.

Third, planned programme outcomes should be specified in advance, together with their intended audience. Delivery of local outcomes may increase perceptions of the accuracy, precision and relevance of results, therefore offering opportunity for enhanced stakeholder engagement. Proposed programme outcomes should be realistic given the nature of the collected data and should demonstrate alignment with the nominated programme design and stakeholder priorities. As noted above, the outcome of greatest overall value is the delivery of current, accurate surveillance data. However, capacity to examine longitudinal trends, particularly between individuals and individual

groups, also reflects a prized programme function. To maximise programme sustainability, data utilisation should enable both short and longer term results.

Next, engagement should be prioritised at every stage of a programme's development and administration and should encompass consistent communication and collaboration with diverse stakeholders, including parents, participant children, schools, politicians, service commissioners, and the media. Engagement within and across distinct stakeholder groups is an independent potential outcome of CMPs. Engagement is also a feature that promotes attainment of other key programme functions, such as provision of representative population level data.

Finally, evaluation is a fundamental element of CMPs. Evaluation of external initiatives can represent a distinct outcome of these programmes, therefore adding to their overall utility. Evaluation of CMPs themselves can also assess and validate planned outcomes and facilitate justification and continued enhancement of programme methods.

These five central findings represent broad principles that should underpin and guide the establishment of the protocol and wider strategy of CMPs. Whilst the systematic literature review facilitated development of specific recommendations for measurement protocols of all CMPs, this study offered recommendations pertaining to the overall vision and administration of these programmes. However, central findings from this study complement and validate the key messages of the systematic literature review. Outcomes from

both research components contributed to the approach used in the pilot CMP in Guernsey. The central findings of this study are summarised in Table 3.4.

Table 3.4: Summary of central findings from NCMP case study

Core theme	Implication for practice
• **Information**	• The principal role of CMPs is provision of current, accurate data on weight status at the population level • It is critical to identify in advance how obtained data will be communicated, distributed and utilised
• **Protocol**	• A clearly defined, routinely adopted protocol is critical to the delivery of an accurate and credible CMP • Measurement protocols should be tailored to their intended setting and level of functioning
• **Outcomes**	• CMP outcomes should be specified in advance, together with their intended audience • CMP outcomes should be realistic and should align with programme design and stakeholder priorities • CMPs should facilitate delivery of short and long term outcomes
• **Engagement**	• Engagement with stakeholders should be prioritised at every stage of CMP development and administration • Engagement within and across distinct stakeholder groups is an independent potential outcome of CMPs
• **Evaluation**	• Evaluation is a fundamental element of CMPs and incorporates evaluation of external initiatives as well as the programme themselves

3.4.2 Comparison with existing literature

This section commences by highlighting the distinct approach utilised in this study, therefore accentuating the unique contribution of this research to the existing knowledge base.

Previous research relating to the NCMP (outlined in section 3.2.1b) has typically focused on examining experiences of programme participants, such as parents and children, or those responsible for programme delivery, including school nurses. Until this point, the viewpoints of those responsible for the programme's design, development and central coordination have received little attention. A further observation is that earlier work has emphasised aspects of programme delivery, for example routine feedback or proactive follow-up. This targeted approach may come at the expense of a broader programme overview. Here, a possible consequence is that important but more subtle considerations are overlooked. These subtle considerations may include the programme's overall vision, the degree of alignment between roles and outcomes, and areas of unfulfilled potential.

In contrast, this current study adopted a distinct approach, thereby providing an alternative view. This study examined the beliefs and observations of individuals with centrally-positioned roles in the NCMP; those usually responsible for commissioning, reviewing and responding to other work. This approach enabled greater consideration of the rationale behind current programme structure and elements, which contributes to improved understanding of the NCMP's functions, contribution, potential, and limits.

This study retraced the development and evolution of the NCMP with those leading or directly engaged in these processes. In doing so, this study highlighted the paucity of robust evidence in support of key programme features. This study also recognised that significant assumption, rather than

evidence, underpins accepted beliefs regarding certain programme outcomes, such as the impact of delivering routine feedback. This finding is an important consideration when interpreting earlier research pertaining to the NCMP.

Next, key similarities and differences between results from this study and findings identified from earlier work are summarised.

The current study found that stakeholders placed strong focus on and assigned great value to the NCMP's primary role as a source of data on childhood overweight and obesity across multiple levels. The 2011 'Rapid Review' [279] also highlighted the utility of the national and local datasets and suggested that the NCMP's greatest value was found in outcomes relating to the surveillance aspect of the programme. Furthermore, this Review identified concerns surrounding the perceived lack of clarity around whether the NCMP represents a screening or surveillance programme. Again, these findings display direct alignment with conclusions from this current study, which emphasised the need for clear identification and communication of the programme's intended direction, aim(s) and target audience.

However, notable distinctions in findings from the two studies are also evident. The Review identified that principal challenges facing the NCMP related to staff and financial resource. On the other hand, this current study found that the restructuring of public health in England and the potential loss of consistency and stakeholder engagement reflected key current challenges for the programme. The difference in these respective conclusions may be explained

by considering the diverse participant groups included in the studies. Also, the Review placed particular emphasis on examination of issues relating to the NCMP's delivery model, whilst the current study employed a broader approach.

Previous reports and studies indicate that routine feedback has been well-received by stakeholders and suggest that the primary driver for this practice was grounded in an ethical obligation to provide results to parents [255,279,281,282,307]. In contrast, findings from this current study identified that political preferences played an important role in the introduction of routine feedback. This study also revealed marked uncertainty around the perceived utility of routine feedback. In particular, there was ambiguity concerning definitive outcomes achieved by delivering feedback to parents; a result less evident in earlier work.

A further distinct finding from this current study was that the NCMP protocol was not designed to prioritise delivery of results that are robust at the individual level. Therefore, routine feedback may represent inappropriate use of the collected data. Ultimately, this feature could detract from the programme's overall credibility. However, a consistent theme across distinct studies is that there is little evidence to suggest that unintended harm resulting from the NCMP is a significant concern.

As described above, previous research has focused on views of the NCMP from the perspective of school nurses [257-261]. Findings from these studies indicate mixed conclusions, but typically revealed apprehension regarding impact on

workloads and overall effectiveness of the measurements. Conversely, a common theme in this study was that the NCMP was now generally accepted and smoothly embedded in existing systems. These contrasting findings may be explained by considering that distinct stakeholder groups might hold different views, due to varied experiences and observations of the programme. A further important point is that the distinct studies were conducted at different time points. Earlier work may have been set in a period before NCMP processes and outcomes were firmly established.

Previous studies have not compared perceptions of the details and wider utility of the NCMP and other data sources on childhood obesity. This current study revealed that the NCMP is the only programme of its type on the international scene. Also, through the provision of robust data at the local level, the NCMP is perceived to make a distinct and valued contribution to obesity management in England. Finally, earlier work has not directly acknowledged the potential contribution of evaluation to CMPs, whereas this represented a principal finding from this current study.

3.4.3 Limitations of the study

There are a number of important limitations associated with this study. First of all, this study included a deliberately-selected sample of key stakeholders. Therefore, sampling bias is a potential consideration. The findings may not be generalisable or able to be extended to other groups engaged with the NCMP, such as parents, children, service commissioners, and school nurses or other

healthcare professionals. This research explicitly sought to explore views from a distinct group of stakeholders as this reflected a notable gap in the current literature. For that reason, ensuring generalisability of eventual findings was not prioritised when finalising the study design.

The study sample included all potential participants identified as having a direct role in the initial development of the NCMP, as well as other key individuals responsible for its continued administration. However, despite this inclusive approach, the study involved a defined group of participants. Consequently, results should be considered within the context of the relatively narrow scope of this work.

Next, transcription error [325] and/or selectivity [324] are possible issues to consider when using transcribed interview data. In this study, transcription quality and trustworthiness were maximised by using a single professional transcriptionist [323,328] who was provided with an overview of the research and clear advance information regarding the intended use of interview data. Furthermore, having already conducted all interviews, I also cross-checked transcriptions against the original audio recordings.

Analysis of interview data may be subject to alternative interpretation and researcher bias, which are established limitations of qualitative methods [314,315]. Where appropriate, member checking was utilised to ensure that my interpretation was consistent with intended messages. Furthermore, researcher bias was moderated by using interview transcripts to establish eventual

findings, rather than preconceived views. Researcher reflexivity was also utilised throughout processes of data collection and analysis.

Limited reproducibility and reliability are further concerns when qualitative methods are used. In this study, interview schedules included validating questions to enhance internal consistency. Here, participants communicated comparable responses to similar questions.

Finally, this study was conducted during the NHS two-year transition period. This temporal limitation may have contributed to an apparent lack of conviction in certain responses regarding the future direction of the NCMP. The selected timing was unavoidable due to logistical constraints imposed by this research.

3.4.4 NCMP in the future

In *Healthy Lives, Healthy People: A call to action on obesity in England* [272], the Government outlined an on-going commitment to address overweight and obesity in the population. Continued delivery of the NCMP, which was also reaffirmed in the earlier Public Health White Paper (November 2010) [304], forms one component of the strategy to manage this significant public health issue. Additionally, DH's proposed 'strategic high impact changes' for childhood obesity have endorsed the importance of building local intelligence on this issue [329]. Therefore, there has been a clear signal of political support for the NCMP and its demonstrated functions of producing local level data to inform action on childhood overweight and obesity.

Accordingly, delivery of the surveillance component of the NCMP will be a mandated task of local authorities from April 2013 [265,327]. Currently, this requirement does not extend to include either provision of routine feedback or proactive follow-up services. In addition, local authority public health budgets will be defined and protected from April 2013, with the aim of ensuring provision of adequate resource for local programme delivery [265,294,305]. Until this time, legal responsibility for programme delivery will remain with PCTs [187]. However, work to secure successful transition of public health responsibilities to local authorities is expected to occur in this interim period.

Two further developments are relevant to the future functioning of the NCMP. First, after transition, the intention is that NCMP data will be used to measure progress against the public health outcome indicator relating to excess weight in children [265,330]. This approach may help to protect the NCMP in the future by establishing a direct link between programme outcomes and the wider strategy for obesity management.

Second, DH has now commissioned a longitudinal study on the impact of providing feedback letters to parents of participant children. Results from this study are expected in late-2012 and are intended to inform decisions and practice at both local and national levels [265].

3.5 SUMMARY

This chapter described a case study of the NCMP. This study was informed by and also contributed further depth to results arising from the systematic literature review discussed in the previous chapter. To provide context for this study, the chapter began with an overview of the NCMP. The introduction also incorporated an outline of HSE, as well as current and planned reform to NHS practices and commissioning responsibilities.

This research used qualitative methods to explore key stakeholder perceptions around the NCMP's development, protocol, utility, outcomes (including unintended harm), and sustainability. In addition, this study highlighted issues for further consideration, offered recommendations for improvement, and guided the development of a unique CMP in Guernsey. Therefore, this study contributed to achievement of primary research aims, whilst also addressing aims specific to this research component.

This study differed from existing work as it reflected on the rationale behind the current NCMP structure and elements, rather than targeting defined aspects of programme delivery. This approach facilitated analysis of subtle considerations, including the degree of alignment between programme design, roles and outcomes, together with areas of unfulfilled potential in the NCMP.

With respect to the first point, this study revealed perceptions of flawed alignment between the programme's design and intended functions. Questions

remain as to whether all identified programme roles reflect realistic, suitable, or achieved programme functions. Currently, there is no evidence to suggest that certain potential programme roles have translated to verified outcomes. Overall, outlined programme roles and outcomes were numerous and valuable, but also broad, non-specific and fluctuant. This flexible approach offers hypothetical protection against potential claims of failure, but also creates challenges in proving programme success.

With regard to the second point, this study identified three main areas of unfulfilled potential in the NCMP. First, there has been inadequate evaluation of the programme and little use of the NCMP as a tool for evaluation of external initiatives. Second, current data restrictions limit the ability to link collected data to other information sources or previous NCMP results; thereby reducing the programme's overall utility. Finally, NCMP data was identified as a potential driver for policy development. However, to date, limited results have been achieved in this area. These three findings, together with restructuring of the NHS and challenges to stakeholder engagement, were identified as key threats to the NCMP's sustainability. Furthermore, this study also exposed concerns regarding inadequate standardisation and inconsistent application of the measurement protocol. In this event, the accuracy, comparability and credibility of resultant data could be placed under suspicion.

This study confirmed the urgent need for clarity around the extent of the NCMP's remit and the planned vision and strategy for the programme's future development. Without explicit prioritisation of outcomes, and with competing

stakeholder priorities, the overall vision of the NCMP may be compromised. Here, it is critical that stakeholders maintain sight of the programme's original and most prized purpose: delivery of population level information on weight status in children.

Consistent with other (though limited) evidence, there was no suggestion of significant adverse outcomes resulting from the NCMP. Nevertheless, this issue remains a relevant consideration for stakeholders as longer term unintended harm has not yet been assessed. Moreover, there is concern that isolated incidences or negative media reporting may have a sizeable impact on participation rates. Any significant decrease in total participation could threaten the credibility of the NCMP, as well as the programme's ability to deliver a nationally representative dataset.

As a final point, this study also highlighted the lack of available evidence to underpin signature features of the NCMP, such as routine feedback or proactive follow-up. In fact, findings from this study suggested that key decisions affecting the programme's structure and broader vision were influenced by political and logistical considerations, rather than definitive evidence. Overall, the NCMP was revealed as a pragmatic and adaptive programme.

Findings from the systematic literature review and this study were synthesised and subsequently used to inform the pilot introduction of a new CMP in Guernsey. In particular, the five central findings from this case study guided the approach to the development, communication and evaluation of the GCMI.

Chapter Four

The Guernsey Child Measurement Initiative:

Development and Implementation

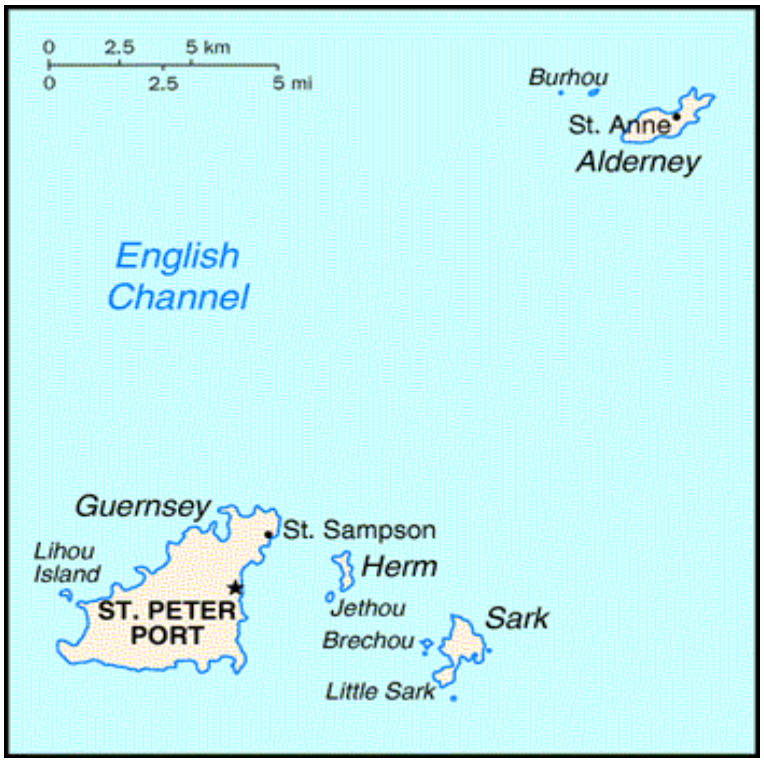
4.1 INTRODUCTION

The principal component of this research was the development, pilot implementation and evaluation of a new CMP in the Bailiwick of Guernsey: the Guernsey Child Measurement Initiative (GCMI). The GCMI was designed and introduced following completion of the systematic literature review and NCMP case study. The GCMI was conducted in multiple phases, which are presented across the following two chapters. This current chapter starts with a summary of the basic demographics and systems of politics, education and healthcare in the Bailiwick. This is followed by description of the development and pilot implementation of the GCMI, including analysis and interpretation of collected anthropometric data. Evaluation of the GCMI is discussed in Chapter Five.

4.1.1 The Bailiwick of Guernsey

The Bailiwick of Guernsey (henceforth 'Guernsey') is located 30 miles off the coast of France and consists of the islands of Guernsey, Herm, Sark, Alderney, Lihou, Jethou and Burhou [331,332]. Together with the Bailiwick of Jersey, it forms a grouping commonly referred to as the Channel Islands. Guernsey is a dependency of the British Crown and is not currently a member of the European Union [332]. Guernsey is not presided over by the UK parliament; however, the UK Government is responsible for the islands' international representation [331]. Guernsey was occupied by Nazi Germany during World War II, from June 1940 until liberation in May 1945. A map of the islands is shown in Figure 4.1.

Figure 4.1: Map of the Bailiwick of Guernsey



Source: www.wikipedia.org (image not subject to copyright)

Guernsey currently has an estimated 62,915 permanent residents, with approximately 13,239 individuals (21.2%) under the age of 19 years [332,333]. More than one in five residents (22.9%) is aged over 60 years [332]. The population shows significant ethnic homogeneity, with greater than 95% of residents being of either British or Norman descent. In addition, immigration and emigration levels have declined over the last four years to 2011 [333]. In the same year, the median age of the population was 41 years and average life expectancy at age 65 was 18.9 years for men and 21.7 years for women [332]. The equivalent figures in the UK are 17.8 years and 20.4 years, respectively [334]. There are no residents living below the international poverty threshold but relative poverty remains an issue on the islands [332]. A Gini index is not available for Guernsey.

The estimated Gross Domestic Product (GDP) per capita is currently £30,853.00 and, as of March 2011, unemployment was at 0.9% (International Labour Organisation standards) [332]. There are no political parties in Guernsey. Instead, a Chief Minister is selected from the elected Deputies to head Guernsey's Parliament, known as the 'States of Deliberation' [331].

4.1.2 Healthcare in Guernsey

Guernsey has a self-governing healthcare system; it does not fall under the auspices of the NHS in the UK [335]. The Health and Social Services Department (HSSD) is allocated the largest budget of any sector in Guernsey [332]. One third (33%) of total revenue expenditure was directed to this Department in 2010 and it represents the largest single employer in Guernsey [336]. Despite recent slowing in total growth and GDP, the health sector has continued to demonstrate expansion and is one of only two sectors in Guernsey to witness an increase in overall employment since 2007. The HSSD does not provide work for doctors in training [335].

Primary care is solely funded by end-users; however, if secondary or other specialist care is required, this is provided free of charge in Guernsey's only public hospital. Secondary care in Guernsey is funded by a healthcare insurance payment that is compulsory for all persons in paid employment. Additionally, individuals may opt in to private insurance schemes, which cover a variety of primary care, pharmacological, emergency care and private specialist services [Ibid].

There are three primary care practices in Guernsey and all charge consultation fees as recommended by the British Medical Association. Currently, the standard charge for a single consultation is £52.35 [337]. Whilst immunisations are provided free to all children on the islands, all primary healthcare practitioners charge a nominal fee for the administration of these vaccines. Similarly, basic screening tests including cervical smears currently incur an additional cost to patients [Ibid]. The disease profile in Guernsey is broadly similar to that evident in the UK, with health conditions affecting the circulatory system constituting the leading causes of mortality [332,338]. This group of conditions is also the main cause of hospital admissions in Guernsey [332].

4.1.3 Primary education in Guernsey

Guernsey offers free compulsory education to all students from ages 5-16 years [331,339]. In Guernsey, ‘public schools’ refer to those that receive public funding, whilst the term ‘private school’ reflects an independent or non-state school that is supported by tuition fees. Public primary schooling is assigned according to catchment areas so that the school a child attends depends on the Parish in which they reside [335]. There are a total of 19 primary schools across Guernsey, comprising:

- Thirteen public primary schools;
- Three private primary schools;
- Two ‘infant’ schools, for children aged between 4-7 years;
- One special needs school [332,339].

Approximately 3,750 pupils attend public primary schools in Guernsey [332]. At any given time of the academic year, there are close to 540 individuals in each of the seven years that constitute primary education [Ibid]. There are ten full-time school nurses employed on the islands [C. Jewell, personal communication. 14 October 2010]. Eight of these ten nurses are placed across all mainstream public and private schools. The remaining two individuals work exclusively in special needs schools.

4.1.4 Comparability with the UK

Guernsey demonstrates a significant degree of comparability with the UK. The language, education system, IT infrastructure, and disease profile, together with many cultural factors are each broadly similar [331-333,335,338,340]. However, there are also a few notable differences between these two settings.

In addition to pre-acknowledged dissimilarities in the healthcare systems and ethnic profiles of the respective populations, Guernsey is distinct from the UK in that it does not levy value added tax (VAT) on any retail products, including food and beverages [331]. Furthermore, Guernsey's per capita GDP is higher than in the UK; the islands do not have any franchised fast food restaurants; and, despite the small geographical area, there is a high dependence on personal automobiles [340]. In fact, there is more than one car registered per adult resident in Guernsey [Y. Le Page, personal communication. 12 October 2010].

4.1.5 Obesity in Guernsey

Consistent with UK trends, the issue of obesity is now recognised as a public health priority in Guernsey [338,341]. However, despite this acknowledgement, there are limited available data on local obesity prevalence in children or adults.

The 2007 Guernsey Young People Survey found that the self-reported anthropometric measurements of close to one in four (23%) children aged between 10-17 years did not lie within the bounds of a healthy weight classification [342]. The Young People Survey from 2010 also found that 23% of males in Years 8 (12-13 years) and 10 (14-15 years) were underweight, overweight or obese, according to self-reports [343]. This figure was felt to underestimate true prevalence due to the high proportion of children that did not respond to this question [Y. Le Page, personal communication. June 2011]. Furthermore, up to 60% of adult males and 48% adult females in Guernsey are estimated to be overweight or obese [344]. The latest indication within the local setting is that the annual direct health costs pertaining to the obesity epidemic will total approximately £5.4 million: a daunting and unsustainable figure [341].

At present, routine child measurement is frequently though not uniformly conducted in the pre-school age group in Guernsey [Ibid]. However, there is no system to ensure standardisation or continuance of these measurements, or to collate population level data on this issue. Furthermore, all current information and data pertaining to the burden and economic cost of obesity in Guernsey have either been extrapolated from UK studies and reports, or relate to self-

reported anthropometric recordings [J. Cataroche, personal communication. 25 August 2010]. As noted in an earlier chapter, this latter approach is known to underestimate the prevalence of individuals with an unhealthy weight classification and, resultantly, the full extent of the impact [345-348].

Anthropometric data obtained in Guernsey's primary healthcare practices are not available to the HSSD due to practices' policy around data sharing [J. Cataroche, personal communication. 25 August 2010]. In the past, school nurses in Guernsey regularly performed height and weight measurements on a single year group of primary-school aged children. However, this practice was never applied consistently across the islands. Furthermore, this data collection lacked centralised coordination, it did not have an established purpose, and it eventually halted [C. Jewell, personal communication. 14 October 2010].

4.1.6 The Obesity Strategy for Guernsey

In mid-2007, the States of Guernsey approved the development of a new local Obesity Strategy for Guernsey (hereafter 'Strategy') [341]. This Strategy examined the existing evidence and proposed 27 distinct recommendations. These recommendations were for interventions to address the emerging problems associated with obesity in the local setting. Enhanced monitoring of excess body mass was amongst these recommendations:

> ***"Recommendation 1:***
> *That monitoring of levels of overweight and obesity in Guernsey and Alderney be maintained and improved.*

Recommendation 10:
All children should have their BMI measured at regular intervals when undergoing other health screenings and the results should be given to parents, together with information on healthy eating and appropriate physical activity. Consideration should be given to adopting the National Child Measurement Programme (NCMP)."
[Ibid, pages 2662 and 2665]

Guernsey's multi-disciplinary Obesity Strategy Group (OSG) was responsible for the production of the Strategy. The OSG indicated that enhanced epidemiological surveillance of this condition in children should be granted precedence over other initiatives [341]. The States of Guernsey approved the Strategy in November 2009; however, no additional resource was allocated to its implementation at that time. Therefore, at the commencement of this research, all proposed recommendations were yet to be instituted. A dedicated, though limited, budget was secured and made available from mid-2011 [Y. Le Page, personal communication. 12 October 2010].

The OSG's Strategy led to broad agreement amongst local stakeholders that a Guernsey-specific population level database would be useful to quantify the extent of the problem of childhood obesity within the local setting. Also, it was felt that this database may enable informed planning of future management initiatives. Therefore, the pilot GCMI was formally approved and endorsed by the HSSD and reflected the first step toward implementing the Strategy's overall recommendations.

The GCMI was timed such that the evaluation phase of this research coincided with the commencement of funding for the broader Strategy.

4.2 CURRENT STUDY

4.2.1 Research aims

The GCMI involved the development, pilot implementation and evaluation of a CMP for Guernsey. The aims of this study were to:

1) Estimate the current burden of overweight and obesity in a representative sample of Guernsey primary school children;
2) Compare overweight and obesity prevalence figures according to four recognised reference curves: UK90, IOTF, CDC, and WHO (2007);
3) Compare overweight and obesity prevalence figures according to two distinct rounding procedures: 01.cm/0.1kg and 0.5cm/0.5kg;
4) Examine the feasibility, acceptability, and sustainability of a population level CMP in Guernsey;
5) Determine (a) the perceived utility of the GCMI and (b) the factors which may impact on the programme's longer term viability;
6) Contribute to development of a summary recommendation to the OSG regarding the potential expansion of the GCMI to reflect a Guernsey-wide programme; and
7) Enable comparison with central findings from the NCMP case study.

The first three outlined aims are considered within this chapter, whilst the remaining aims are addressed in subsequent chapters. Specifically, aims (4) through (6) identified above are considered within Chapter Five, which includes

description and analysis of the GCMI evaluation. Key findings from this study and the NCMP case study are compared in Chapter Six.

This research component contributed to overall primary research aims by establishing the programme that later enabled exploration of the roles and outcomes, including possible unintended harm, of CMPs. Furthermore, the development and implementation of the GCMI facilitated examination of the feasibility, acceptability and sustainability of a CMP within a local setting. Of note, aims (1) through (3) outlined above did not align directly with the primary research aims described in Chapter One. However, these secondary aims addressed identified current knowledge gaps.

4.2.2 Methodology: Pilot programme

The Medical Research Council's (MRC) framework for developing and evaluating complex interventions (2008) [349] was used to guide the selection and implementation of key programme elements at each stage of the GCMI.

4.2.2a Development of measurement protocol

The GCMI measurement protocol was developed following: (1) the systematic literature review; and (2) analysis of central findings from the NCMP case study. Moreover, there was significant consultation with stakeholders in Guernsey.

In particular, the systematic literature review led to the development of a

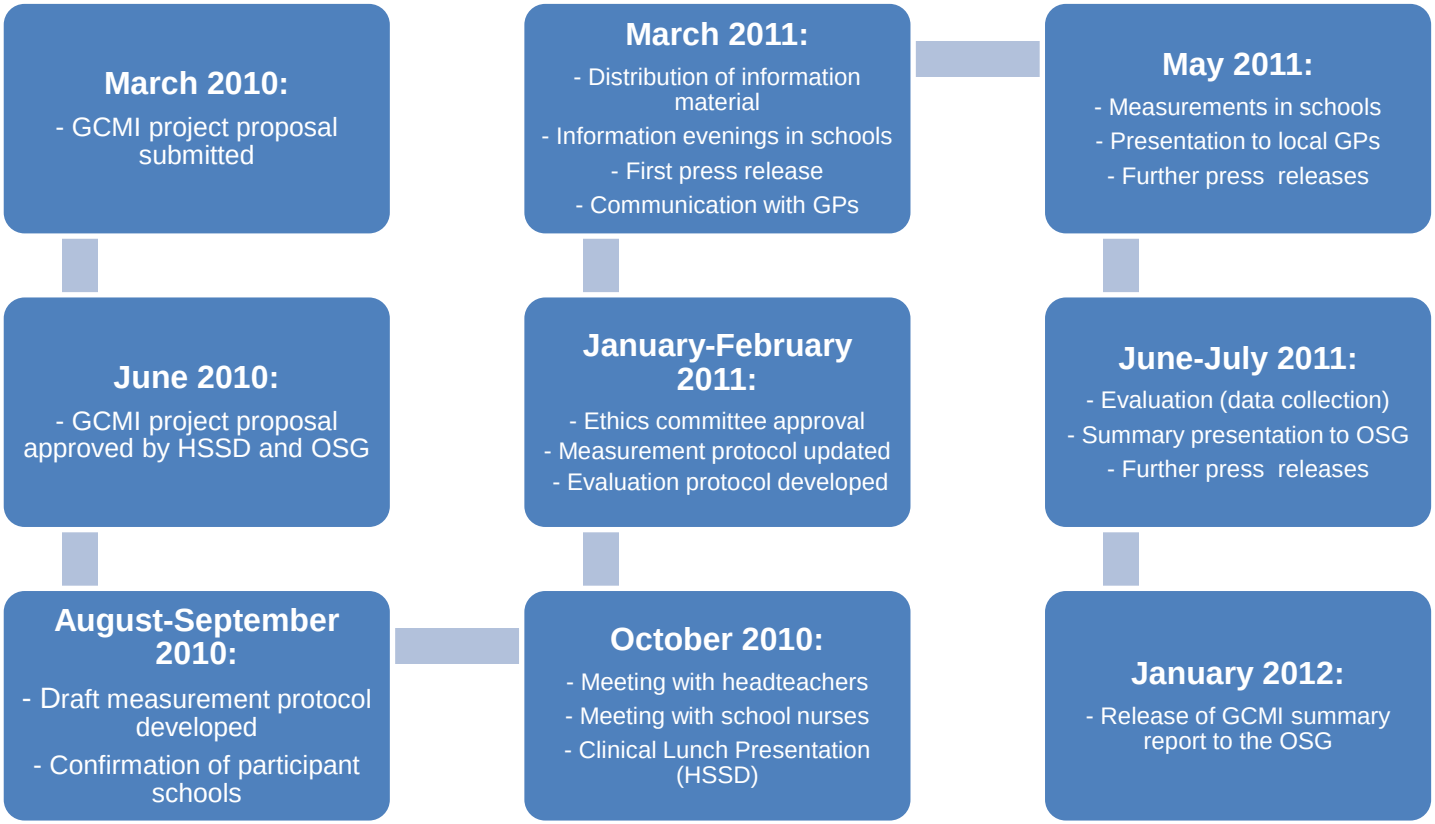
summary checklist of suggested key features of measurement protocols for all CMPs. These features, as presented in Chapter Two (Table 2.4), were subsequently incorporated into the GCMI measurement protocol. Therefore, findings from the systematic literature review offered primary justification for the approach to measurement used in the GCMI.

The NCMP case study also contributed to development of the GCMI measurement protocol. Features of the NCMP measurement protocol displayed close association with features included in the checklist described immediately above. Therefore, the case study provided further validation of the measurement protocol developed for use in the GCMI. Also, local stakeholders indicated that their preference was for close comparability between the CMPs in Guernsey and England; an outcome that was in part ensured by the case study. Furthermore, the specific approach used to develop, communicate and evaluate the GCMI protocol was informed by central findings of the NCMP case study. These central findings were summarised in Chapter Three (table 3.4).

Finally, local stakeholders contributed to the final GCMI measurement protocol. A proposed protocol was prepared following completion of the review and case study, together with preliminary discussions with local stakeholders. This protocol was presented to local stakeholders, who reviewed the document and offered feedback and comments. No significant changes were suggested.

The GCMI was conducted over a 23-month period from March 2010 until January 2012. A summary timeline is provided in Figure 4.2.

Figure 4.2: Summary timeline – Guernsey Child Measurement Initiative



4.2.2b Participants

The GCMI collected cross-sectional data. Measurements were conducted on all eligible children aged six years (Year 1) and ten years (Year 5) within participant primary schools. Target age groups were determined upon completion of the systematic literature review and were selected to align with local priorities. Furthermore, these age groups ensure close comparability with existing programmes, including England's NCMP.

The pilot GCMI used an opt out consent model: participation ensued unless a parent/guardian (hereafter 'parent') or child indicated that they did not wish to be involved. This model was adopted based on findings from the systematic literature review and NCMP case study and was supported by the ethics committee in Guernsey. Parents were able to indicate their preference to opt out by letter, e-mail or telephone. Opt out requests received via e-mail were confirmed by a reply message. A sample opt out form is included in Appendix XIII.

Children whose parents elected to opt out of the pilot programme, or children who themselves expressed a wish to opt out did not undergo the measurement process. Furthermore, eligibility criteria for this pilot programme stipulated that, for inclusion, a child must not: (1) require assistance to stand; (2) have significant limb splinting or casting in place; or (3) have a partial or full limb amputation.

4.2.2c Sample size

Two full year groups of students per school were invited to participate in the pilot programme. The total eligible study population across both primary schools was determined to be 220 pupils. Similar programmes that employ opt out consent attain participation rates of approximately 80%-90% [159,160,186,239,240]. Therefore, anthropometric measurements were expected to be recorded on a total of between 175-200 pupils. Sample size calculations performed a priori indicated that a sample of 200 pupils would deliver prevalence percentages with a confidence interval of +/- 5.5, assuming a 95% confidence level. Furthermore, this sample size reflected approximately 15% of the total Guernsey population in the included age groups.

4.2.2d Setting

Guernsey was an appropriate setting for this study as it includes a small, stable and transferable population where obesity reflects a public health priority. Furthermore, the combination of: (1) a lack of accurate local data; (2) the recent introduction of the Strategy, which included a recommendation for enhanced monitoring of BMI in children; (3) engaged local stakeholders; and (4) broad comparability with the UK, allowed for a near ideal location to introduce and evaluate this new CMP.

The GCMI was pilot tested in two public primary schools in Guernsey: Amherst Primary School and St. Martin's Primary School. These schools were

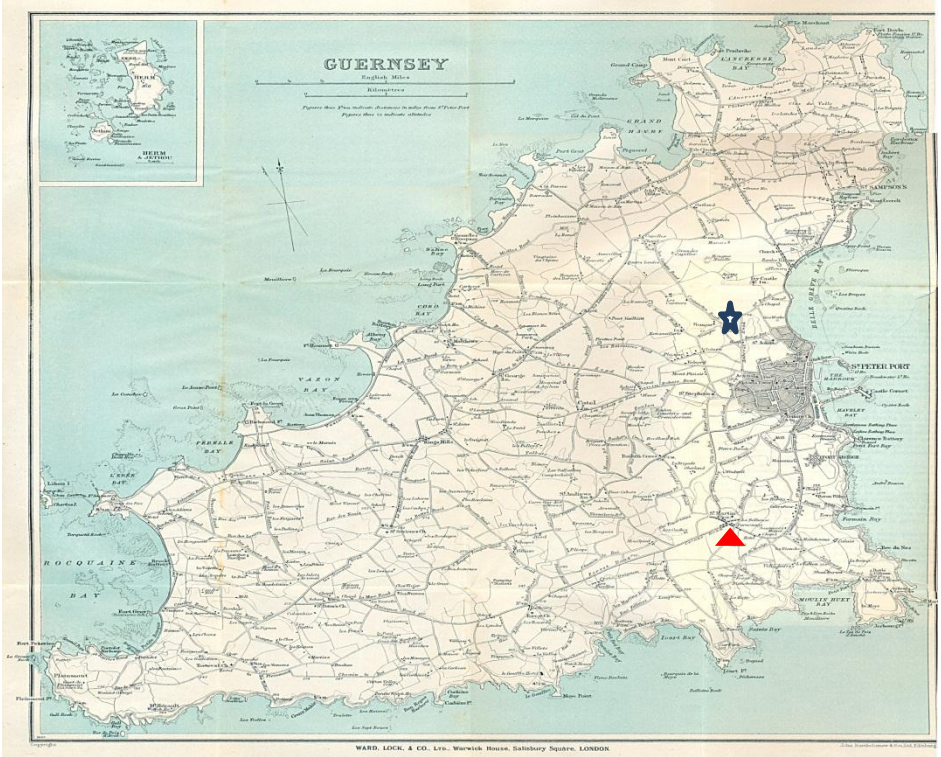
purposively chosen in consultation with Guernsey's Health Promotion Unit (HPU) to identify willing participant institutions that were representative of public primary schools on the islands. Each participant school covered a mixed catchment area in Guernsey, meaning that a diverse range of socio-economic backgrounds was likely to be represented within the student body.

At the time of this study, the two participant schools both held 'Healthy Schools' status. This means that they met more than 40 different criteria looking at aspects of healthy eating, emotional health and well-being, physical activity and health education. In Guernsey, this programme is currently supported by the Education Department and local HPU, but was originally based on the UK's National Healthy Schools Programme [339,350].

St. Martin's Primary School had three-form entry with approximately 25 students per classroom. Amherst Primary had a two-form entry and an average of 20 students per class.

The location of the participant primary schools within Guernsey is indicated on Figure 4.3.

Figure 4.3: Location of participant primary schools within Guernsey



Source: www.probertencyclopaedia.com (image not subject to copyright)

Key: ▲ = St Martin's Primary, ★ = Amherst Primary

All measurements were conducted in a setting of both visual and auditory privacy within the participant schools. Any exposed windows were covered with an opaque material for the duration of the measurements. Pre-measurement testing was conducted every day to ensure that conversation-level speech was not discernible to individuals standing directly outside the room.

4.2.2e Timing of measurements

The data collection period (May 2011) guaranteed that measurements did not occur immediately after school holidays. This was to reduce disruption to school programmes and also to reduce the chance of bias in results due to potential

holiday-related weight changes [196]. Exact programme timing was influenced by findings from the systematic literature review and was subject to the approval of local stakeholders. This latter process was employed in an effort to enhance programme acceptability and maximise both participation rates and the future sustainability of the GCMI.

The intention was that anthropometric measures would be recorded in the morning to reduce bias that may be introduced through daily height and weight fluctuations [196,224].

4.2.2f Measurement equipment

Measurement equipment utilised in the pilot programme met international standards for collection of anthropometric data on primary school children [289]. The digital scale (Seca 899 remote display floor scale, class III) and stadiometer (Leicester height measure) directly aligned with models recommended for use in England's NCMP [Ibid]. The digital scale was purchased with a calibration certificate that guaranteed accuracy for 10,000 uses.

Visual aids were placed on the digital scale to help facilitate correct foot placement. Furthermore, visual aids in the form of brightly coloured stars were placed on the wall opposite the Leicester height measure to assist children in attaining correct head placement and a steady gaze for the duration of the height recording.

The equipment was calibrated each morning prior to use by means of a one kilogram free weight for the digital scale and a one metre measurement stick for the Leicester height measure. No additional equipment maintenance was required.

4.2.2g Training procedures for anthropometric data collection

I am a medical doctor by background and also underwent further training in obtaining height and weight measurements on children prior to commencement of the pilot programme. Standard NCMP [287] and WHO [351] anthropometric training processes were completed and complemented by observation of NCMP data collection in Hounslow, London. Measurement equipment used in the pilot study was also tested locally in Oxford using volunteers.

4.2.2h Measurements

In pre-arranged measurement sessions, all eligible children within a single primary school year group underwent height and weight measurements. These recordings were subsequently used to calculate BMI. Additional anthropometric measurements were not collected as there is no clear evidence to suggest that further measurements in children – those in addition to BMI – offer significant further benefit [82,83,102,144-146,352,353]. Moreover, feedback from the local ethics committee indicated that adding further anthropometric recordings to the measurement protocol would necessitate a fundamental change to processes for obtaining participant consent. In the context of a planned population level

programme, a change to the consent model was deemed to reflect an unacceptable trade-off.

All children in each included form class were addressed as a group immediately in advance of the height and weight measurements. Here, measurement processes were outlined and children were given the opportunity to ask any questions or opt out from the programme.

I obtained anthropometric recordings on all included children with a qualified school nurse present in the room. A brief identification check was carried out prior to conducting the measurements. This was to maximise the possibility that results were recorded against the correct child and to prevent accidental inclusion of individuals that had been opted out of the GCMI. Furthermore, measurement recording sheets were designed to highlight similar or duplicate names, thereby helping to prevent potential incidences of mistaken identity.

Additional input and logistical support came from assistants working outside the measurement room. For each measurement session, either one or two assistants helped to chaperone participant children between classrooms and the measurement area in groups of five students at a time. In addition, assistants prepared children for measurement by helping them with their shoes (where appropriate) and providing information and reassurance about the process. Assistants also communicated with teachers to confirm which children were absent on the day.

Children were measured in their school uniform with shoes removed. For both schools, this uniform consisted of a cotton polo-shirt and shorts. In addition, participants were asked to remove belts, jumpers and any other items of bulky clothing prior to being measured. Similarly, hair pieces or hairstyles that may have impacted on the accuracy of the height recording were managed appropriately prior to measurement.

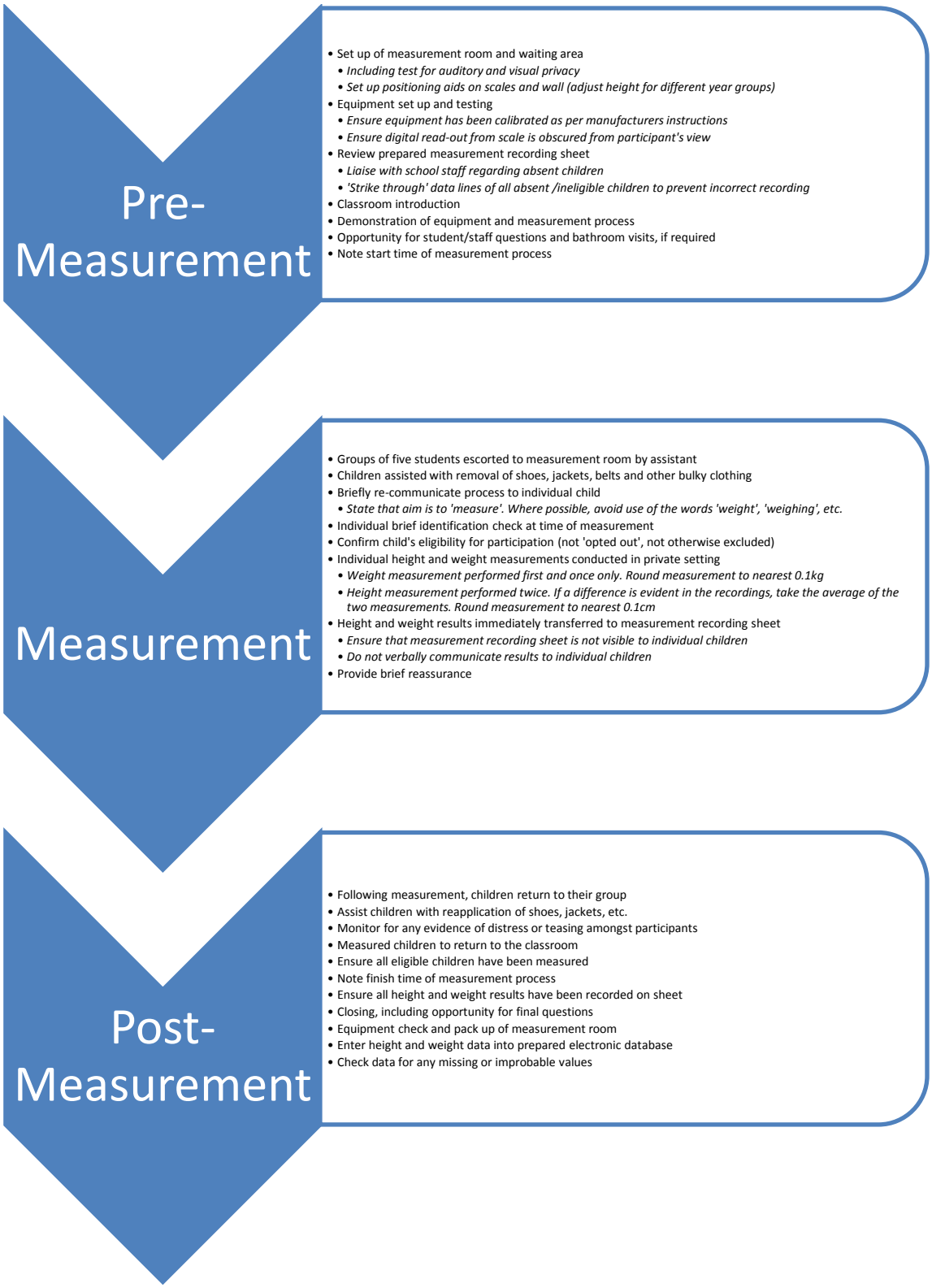
A single weight recording and two height recordings were obtained for each participant, with the exception of pupils included in the 10% re-measurement (see below). Where applicable, an average of the two heights was recorded. Weights were recorded to the nearest 0.1kg and height measurements were recorded to the nearest 0.1cm. All anthropometric results were documented on a paper measurement recording sheet and subsequently transferred to a prepared, anonymised electronic database. A blank sample measurement recording sheet can be found in Appendix XIV.

The measurement protocol featured a number of specific measures to enhance the sensitivity of the process. First, all children were measured on an individual basis. Children were not informed of their recordings at the time of measurement and no participant was able to see their weight as the equipment incorporated a remote read-out system. Furthermore, paper measurement recording sheets were kept out of view of all participants. In order to reduce possible anxiety, children were informed that they were to be “measured”; the word “weight” (and variations of the same) was not mentioned at any stage of the measurement process.

All children received brief reassurance once their measurements had been recorded and were assessed by the school nurse and myself for any evidence of concern before being returned to the classroom. Moreover, teachers and assistants were asked to be attuned to behaviours suggesting acute anxiety or distress. In all instances, weight measurements were obtained before the height recording as the former procedure was considered more straightforward and required less instruction to the child. Here, the intention was to help to put children at ease with measurement processes.

A summary of the measurement process is provided in Figure 4.4.

Figure 4.4: Summary of GCMI measurement process



4.2.2i Repeat measurements

A random selection of 10% of all participant children underwent the measurement process twice to assess precision of the anthropometric recordings. Microsoft Excel (2010) was used to generate a list of random numbers. These numbers were then applied to the full alphabetised list of children in the eligible study population to identify which individuals would have repeat measurements taken. In these instances, a qualified school nurse performed the second set of measurements using the same set of equipment immediately following initial anthropometric data collection. Therefore, children who were randomly selected to have repeat measurements only entered the designated measurement room once. Both data collectors were 'blinded' to results recorded by the other individual as separate measurement recording sheets were used.

4.2.2j Feedback of individual results

Following the literature review and NCMP case study, and in keeping with local preferences, the GCMI was designed as a surveillance programme. Recommendation 10 from the 2007 Guernsey Obesity Strategy stated that *"[BMI] results should be given to parents"* [341, page 2665]. However, local stakeholder opinion at the time of programme development did not support this approach. Therefore, routine provision of individual results was not incorporated into the protocol. However, individual results were made available free of charge to parents upon request.

Parents were advised that they could request their child's results via completion of a feedback request form. Alternatively, parents were provided with my e-mail and telephone details. No time limit was applied to the submission of these requests and all e-mailed requests were confirmed by way of a reply message.

Feedback requests were compiled and noted on measurement recording sheets and the established Excel databases. The GCMI feedback letter was developed following examination of existing examples and templates from the US and UK, including the standard NCMP letter from 2010-11. However, a number of distinctive features were included in the GCMI feedback letter, including links to local websites and services. The GCMI feedback letter was reviewed by local stakeholders and assessed for readability and use of sensitive language prior to use in the pilot programme. A sample feedback letter using fictional data is provided in Appendix XV.

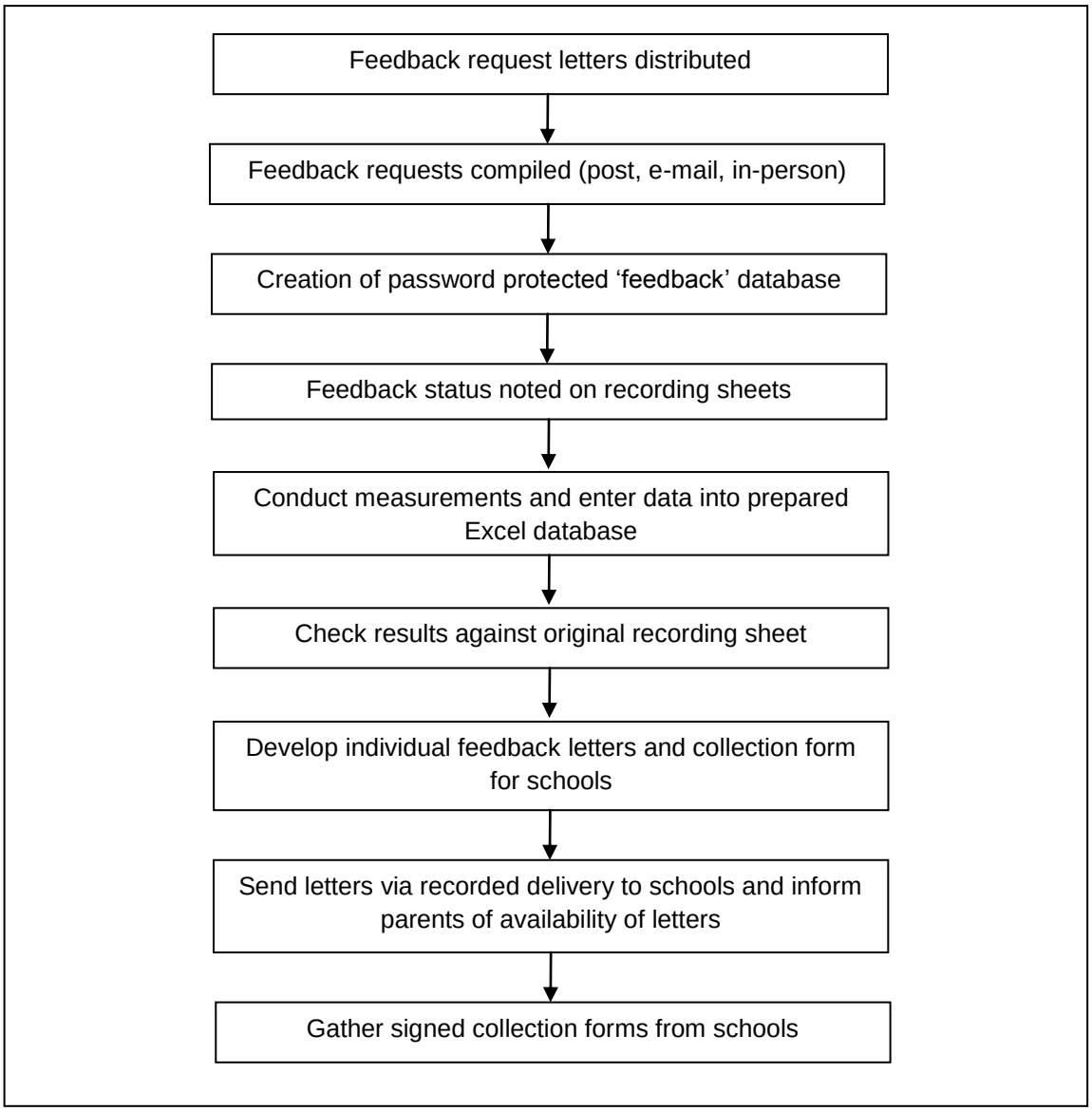
Feedback letters were individually created using manual data entry. All anthropometric data were double-checked against the original measurement recording sheets to prevent unintentional errors in BMI classification. The UK90 growth reference was used to determine the BMI classification outlined in feedback letters. Clinical BMI percentile thresholds were utilised to maintain consistency with England's NCMP.

A number of steps were taken in this process to preserve confidentiality. First of all, letters and envelopes were marked as 'private and confidential'. All envelopes were sealed, stamped with the GCMI logo and labelled for the

intended recipient. Letters were sent to the participant schools by recorded delivery. Parents were informed that they would need to pick up the letters from the school and were asked to sign a collection form to confirm receipt of their requested letter. Finally, school administration staff were instructed that feedback letters should only be released to parents.

The feedback process is summarised in Figure 4.5.

Figure 4.5: Summary of GCMI feedback process



4.2.2k Communication

Information regarding the GCMI was delivered through a variety of means and ranged from individual level through to broad population communication.

Whilst the programme was still in the development stage, there was significant discussion and collaboration between myself and local stakeholders. A formal proposal was submitted to the OSG for review and comments. The GCMI was also outlined in detail to a diverse audience of local healthcare professionals during a scheduled ‘Clinical Lunch’ presentation. Furthermore, I held meetings with head teachers and local school nurses before the measurement protocol was finalised.

Following development of the measurement protocol, information regarding the GCMI was distributed to all parents of eligible children within the participant schools. At one participant school, this information was sent home with the child. The second participant school requested that this information be posted directly to the child’s home. Information packs were distributed six weeks before the start of the measurement process. Each parent received an information pack containing: an opt out form; participant information sheet; information brochure; and feedback request form. Sample copies of these documents are provided in Appendices XIII and XVI-XVIII, respectively.

In addition to information outlined above, a summary outline of the GCMI was included in the newsletter of each participant school approximately six weeks

prior to the scheduled measurements. A reminder notice appeared in school newsletters in the week before measurements took place. Furthermore, parents and school staff were invited to attend an information session at the school. I conducted these sessions at both participant schools and they were timed to coincide with the distribution of information packs. Parents, school staff and other relevant stakeholders were also advised of a GCMI-specific mobile phone number and were provided with my e-mail, telephone and postal contact details.

Primary care services in Guernsey were directly contacted and informed of the planned measurement programme. With permission from practice managers, an introductory letter was prepared and distributed to all GPs. A sample GCMI feedback letter was also included in this communication. All primary care practices agreed to place GCMI information brochures in their waiting rooms and I was asked to deliver a summary presentation at one group's Continuing Medical Education (CME) meeting. All GPs were invited to provide feedback or comment relating to the information received regarding the GCMI.

Finally, local media were informed of the GCMI and provided with briefings outlining relevant progress at various stages of the programme.

4.2.2l Other

Local ethics approval for the pilot programme was granted by the Guernsey Ethics Committee. The principal ethical issues considered were confidentiality, privacy and informed consent. Criminal Records Bureau (CRB) clearance was

obtained, in keeping with local requirements. This research was funded by a research student grant administered by the University of Oxford's Department of Public Health. This grant covered all travel, accommodation, equipment and transcription costs incurred by this research.

4.2.3 Methodology: Analysis of anthropometric data

Collected height and weight data were entered into a password protected and anonymised Microsoft Excel (2010) database. Each child was assigned a unique identifier code and anthropometric data were entered against this code, rather than by name. Age to the nearest month was calculated from date of birth information provided in advance by participant schools. Schools were also assigned a code to ensure that the database included no identifiable data. A separate password protected Excel database linking each child's name to their unique identifier code was created and maintained on a securely stored external hard drive. This second database facilitated data checking and allowed for provision of requested individual BMI results. These measures were decided upon following consideration of ethical issues, local data protection requirements, and guidance from key stakeholders in the NCMP.

All data were cleaned and analysed using Microsoft Excel 2010 and Stata 11. Height and weight data were entered twice using the distinct digit rounding procedures described above. Individual BMIs were computed manually and crosschecked against results obtained from computer-based BMI calculators. Anthropometric results were stratified by age, gender, feedback status, and

participant school, but were not analysed by SES or ethnicity. Guernsey represents an ethnically homogenous population: more than 95% of residents identify as 'White British' [336]. Therefore, stratification of anthropometric results by ethnicity in this sample would not yield additional useful information. Moreover, the GCMI pilot did not seek to identify risk factors for excess weight status in the study population.

The BMI result for each participant was analysed according to four recognised reference curves: UK90; CDC; IOTF; and WHO (2007). The LMS add-in for Excel [354] was used to calculate BMI centiles according to each distinct definition. This tool was also used to determine UK90 height and weight centile results. Furthermore, CDC and WHO (2007) calculations were crosschecked against results obtained from the CDC 'Children's BMI tool for schools' (metric version) and WHO's AnthroPlus, version 1.0.4, respectively. Stata 11 was used to compare prevalence figures in this sample population according to the four different reference curves. The degree of agreement between height and weight measurements obtained by the two data collectors (inter-rater reliability) was assessed by calculating a Fisher's intra-class correlation coefficient.

Statistical significance was determined by non-overlapping 95% confidence intervals (CI) and/or p values less than 0.05. The term 'overweight' was used to represent 'overweight but not obese'. Furthermore, the UK90 population BMI centile parameters were utilised and digit rounding was to 0.1cm/0.1kg, except where otherwise indicated. These approaches ensured consistency and comparability with the NCMP.

4.3 RESULTS

This section describes key findings from the height and weight measurements conducted in mid-May 2011 and includes examination of the measurement process itself, together with final anthropometric results.

4.3.1 Study population

Year 1 students reflected 55.1% of the included study population (109/198, 95% CI: 48.1%-62.0%), which included 87 females (44%, 95% CI: 37.0%-50.9%) across both age groups. The mean age of Year 1 students was 6.2 years; the equivalent figure for Year 5 students was 10.2 years. Students from Amherst Primary School made up 74/198 (37.4%) of the included study population.

4.3.2 Participation rates

The total number of included study participants was 198 children, reflecting 90% of the eligible study population.

Four children (1.8%) were opted out of the programme before measurements took place. Of these, all four were from the same participant school and three were females in Year 5. The other child was a Year 1 male. In all cases, no reason was provided for opting out but one parent specified that the child had stated that they did not wish to participate. No child elected to opt out on the day of measurements. I was contacted by one parent who indicated a

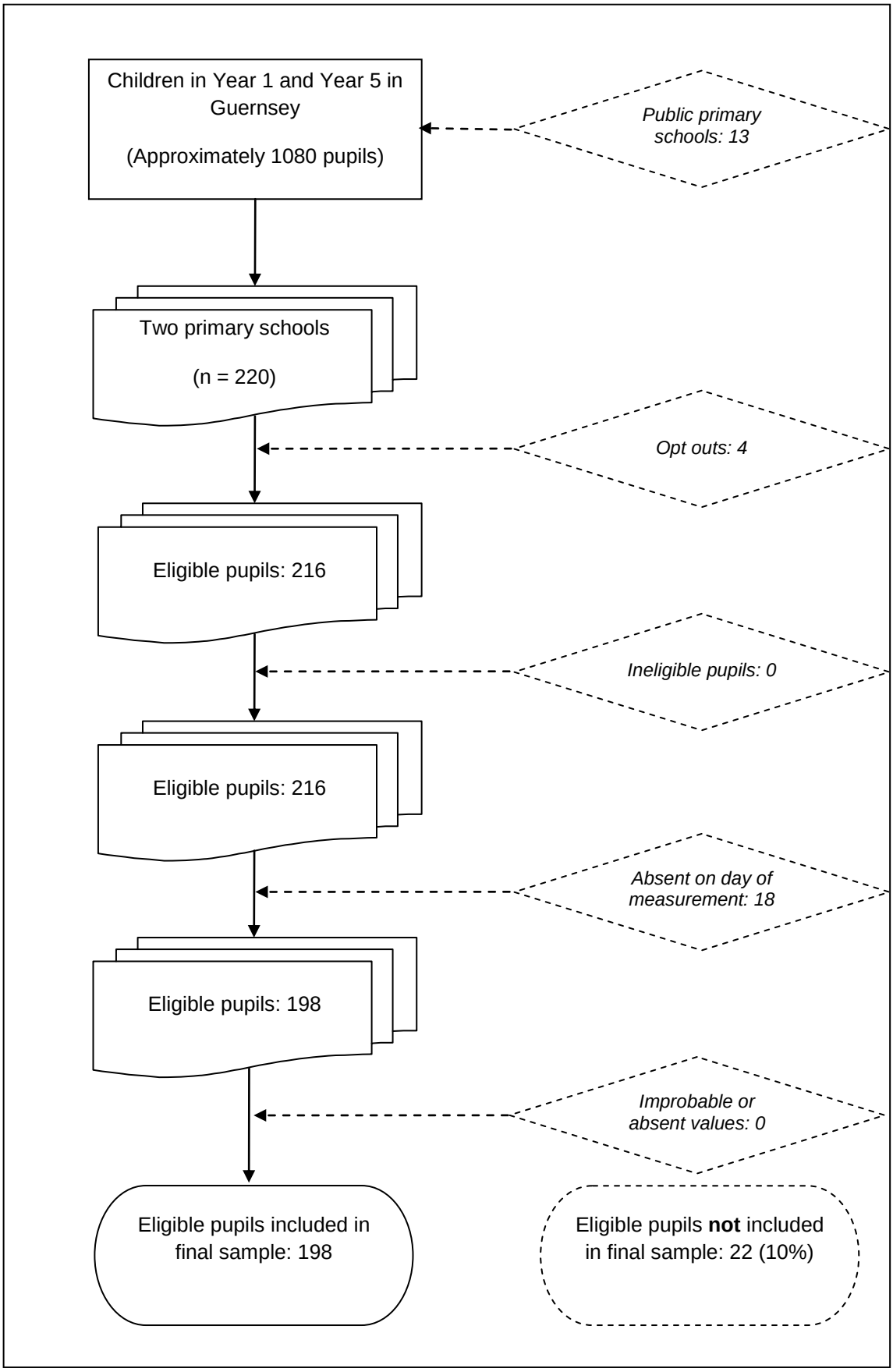
preference to opt out, citing concern that information stored on the main database would not be anonymised. This concern arose as the parent was unclear how data could be anonymous if parents were able to request individual results. However, after data protection procedures were outlined in further detail, the parent withdrew their objection and the child was eventually included in the study sample.

Eighteen children (8.2% of the eligible study population) were absent on their scheduled day of measurement. Verbal reports from head teachers suggest that this figure was not dissimilar to expected rates of authorised absenteeism at that time of year.

All children in the eligible year groups that were present at school on the day and had not been opted out of the programme were able to be measured.

A flowchart summary of the participation process is provided in Figure 4.6.

Figure 4.6: Summary of GCMI participation process



4.3.3 Requests for feedback of individual results

In total, 29 (13.2% of eligible study population) requests for feedback of individual results were received. These requests were received by either post (20/29, or 69%), e-mail communication (8/29, 27.6%), or an in-person request (1/29, 3.4%). Two children whose parents had requested results were absent on the day of measurement. This meant that 27 sets of results (13.6% of included study population, 95% CI: 8.8%-18.4%) were eventually returned. There was no significant difference in the percentage of parents requesting feedback of their child's results according to year group, gender, school, or weight status classification, as displayed in Table 4.1.

Table 4.1: Feedback requests – by age, gender, school and weight status

Parameter	**Percentage requesting feedback (95% CI)**	
Age	**Year 1 (n=109):** 17.4% (10.2%-24.6%)	**Year 5 (n=89):** 7.8% (2.2%-13.5%)
Gender	**Male (n=111):** 11.7% (5.7%-17.7%)	**Female (n=87):** 16.1% (8.4%-23.8%)
Participant school	**Amherst (n=74):** 7.5% (1.7%-13.3%)	**St Martin's (n=124):** 16.4% (10.3%-22.5%)
Weight status classification	**Healthy weight (n=17):** 63.0% (44.8%-81.2%)	**'Non-healthy' (n=10):** 37.0% (18.8%-55.2%)

4.3.4 Adherence to GCMI measurement protocol

A detailed outline of the GCMI measurement protocol was provided in a previous section. Actual procedures followed during the measurement process

were matched against the established GCMI protocol to assess adherence. The sole inconsistency in the process was that, unexpectedly, one participant school was not able to accommodate measurements over the planned two mornings. Therefore, measurements at this school were performed over a single day, with Year 5 measurements completed in the afternoon. There were no practical or other concerns associated with the measurement processes at either participant primary school.

Each element of the measurement sessions was timed to assess the 'time cost' of the programme. A summary of the time requirement for a standard classroom of pupils is provided in Appendix XIX. The average measurement time (height and weight) per child was one minute, including repeat measures.

4.3.5 Initial response to measurements

Initial reflections on the measurement process were positive. No child requested their weight recording; however, many pupils demonstrated an interest in their height. There was no evidence of weight-related teasing and no obvious pre- or post-measurement anxiety was noted in the pupils. The teacher of each included form class was followed-up immediately after measurements were completed to obtain preliminary feedback around particular challenges, disruption or other concerns. Additionally, head teachers were approached for similar comments. There were no reported concerns from either participant school.

4.3.6 Public and media involvement in the GCMI

The programme generated interest and received coverage on local television stations, radio, newspapers and internet news sites. This coverage is discussed further in Chapter Five. However, information sessions at the participant schools were poorly attended. Only one parent attended the evening meeting at St Martin's Primary School and four parents were present at the Amherst event. With the exception of the communication of opt out and feedback requests, no parent or school staff member initiated contact via the stated routes. Additionally, no feedback was received from GPs regarding the GCMI.

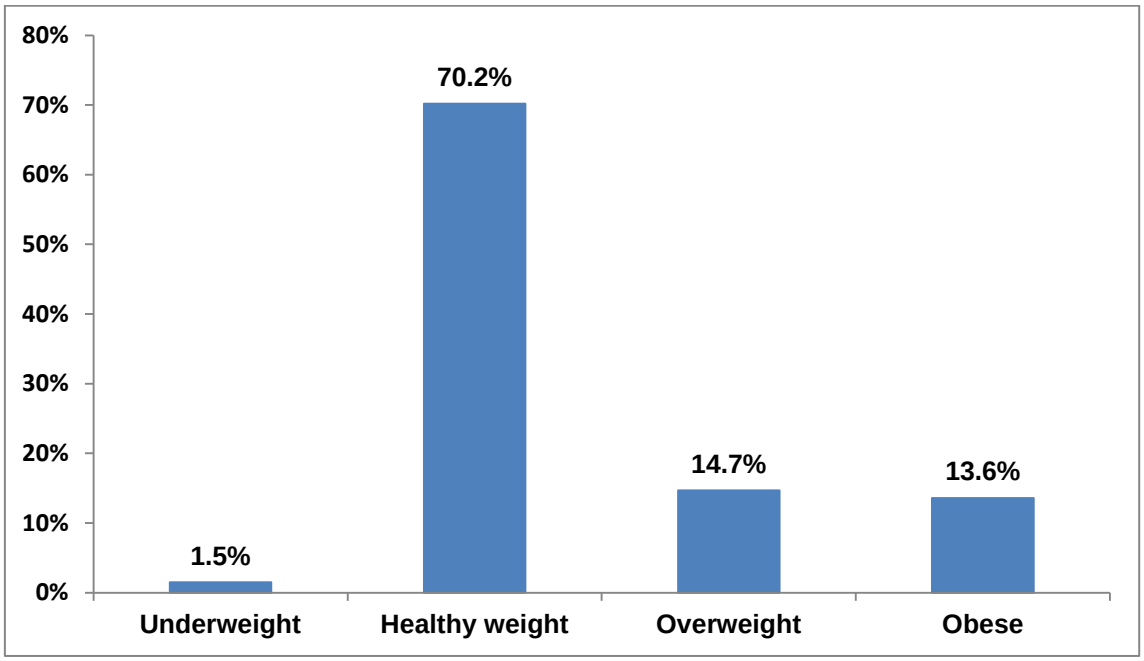
4.3.7 Analysis of anthropometric data

Anthropometric results are presented in graphical and table forms and interpreted in the subsequent discussion. No data were excluded due to erroneous or improbable values. No discrepancies were identified between BMI centile results produced by the different software programmes: LMS growth add-in, CDC Children's BMI tool and WHO AnthroPlus. The BMI results produced by manual and computer-based BMI calculators were identical.

4.3.7a Results: Height, weight and BMI data

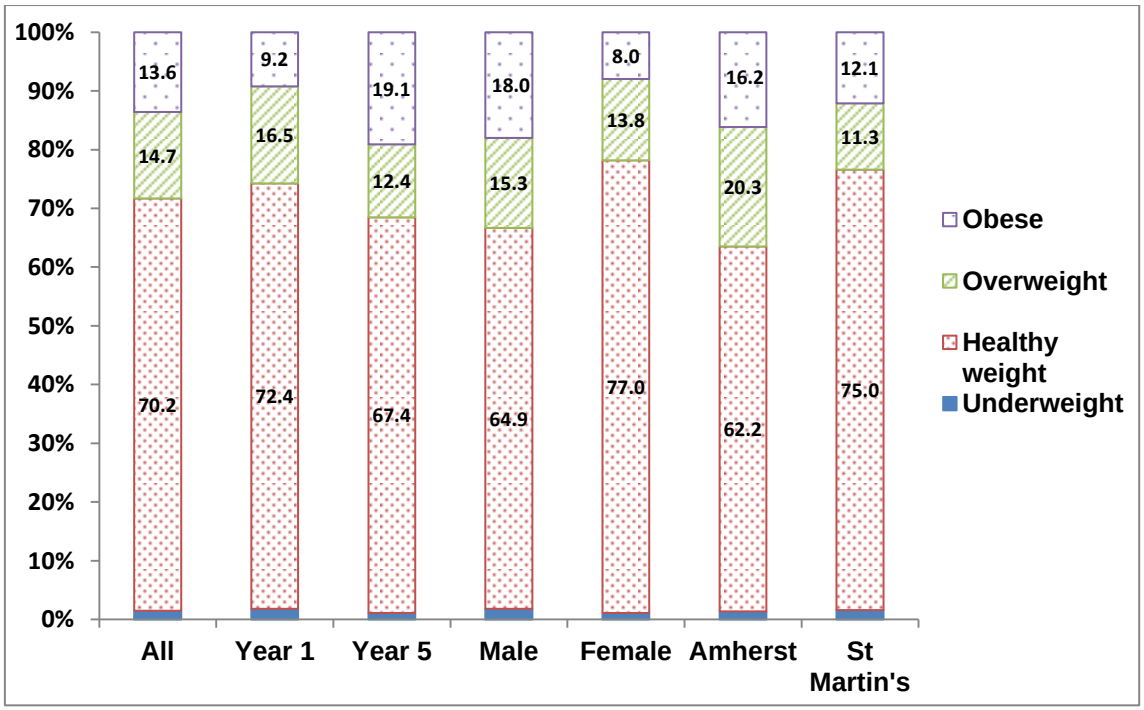
The following two graphs display the percentage of children in each weight status classification by whole study population (Figure 4.7) and stratified according to age, gender and participant school (Figure 4.8).

Figure 4.7: Weight status classification – all (UK90 population reference, n = 198)



95% CI:	0%-3.2%	63.8%-76.6%	9.7%-19.6%	8.8%-18.5%

Figure 4.8: Weight status classification - by age, gender and school (UK90 population reference)



Tables 4.2 and 4.3 present centile results for height, weight, BMI and BMI standard deviation score (SDS) stratified by: (1) age and gender; and (2) combined age and gender. The BMI and BMI centile results did not follow a normal distribution in this sample ($p < 0.001$, 95% confidence level. Skewness Kurtosis test for normality).

Table 4.2: Centile results for anthropometric variables - by age and gender (UK90 population reference)

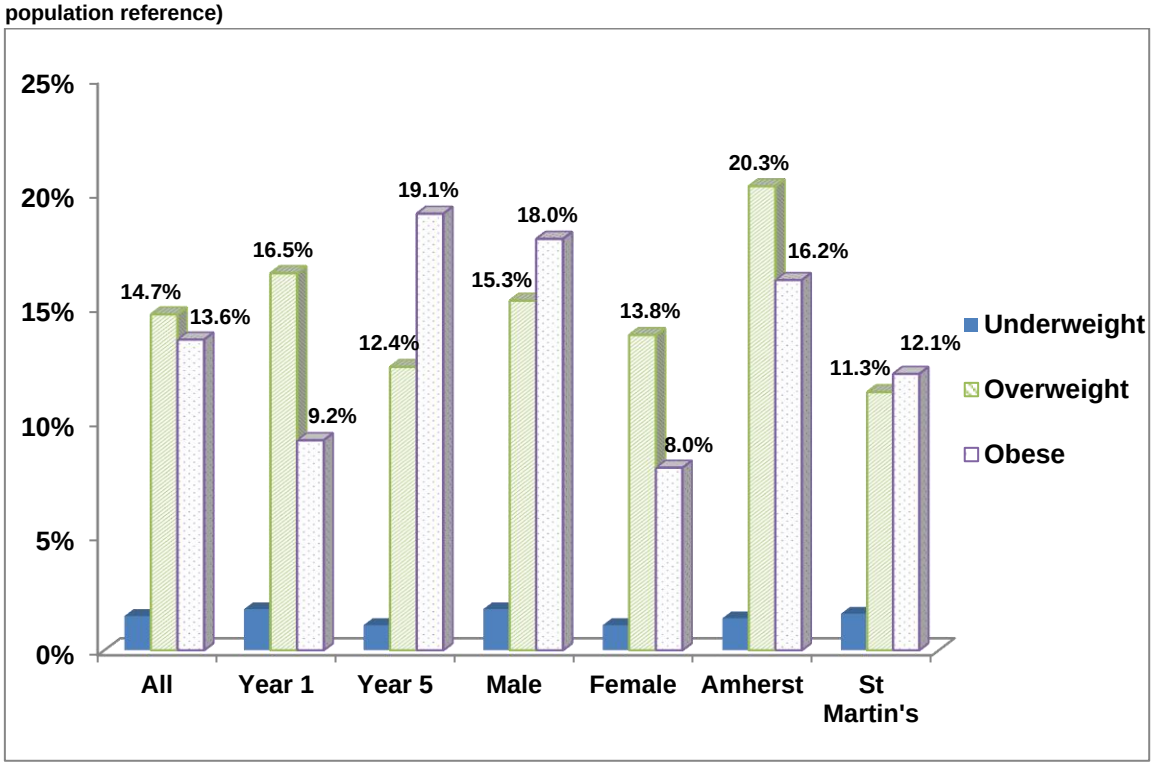
Group	Height - % (95% CI)	Weight - % (95% CI)	BMI - % (95% CI)	BMI SDS (95% CI)
All (n=198)	51.6 (47.5-55.7)	57.4 (53.2-61.6)	59.6 (55.4-63.8)	0.39 (0.22-0.55)
Males (n=111)	56.7 (51.2-62.1)	61.8 (56.2-67.4)	62.9 (57.2-68.6)	0.51 (0.29-0.74)
Females (n=87)	45.0 (39.1-51.0)	51.7 (45.5-57.8)	55.5 (49.1-61.6)	0.22 (0.0-0.45)
Year 1 (n=109)	51.3 (42.0-56.5)	55.9 (50.5-61.3)	56.7 (51.1-62.3)	0.25 (0.05-0.46)
Year 5 (n=89)	52.0 (45.5-58.4)	59.2 (52.7-65.8)	63.1 (56.7-69.5)	0.55 (0.30-0.80)

Table 4.3: Centile results for anthropometric variables - by combined age and gender (UK90 population reference)

Group	Height - % (95% CI)	Weight - % (95% CI)	BMI - % (95% CI)	BMI SDS (95% CI)
Year 1 males (n=61)	54.0 (46.7-61.3)	58.4 (51.1-65.6)	59.0 (51.5-66.4)	0.32 (0.05-0.60)
Year 1 females (n=48)	47.8 (40.4-55.2)	52.7 (44.6-60.8)	53.9 (45.5-62.3)	0.16 (0.0-0.47)
Year 5 males (n=50)	59.9 (51.8-68.1)	66.1 (57.4-74.7)	67.7 (59.2-76.3)	0.74 (0.39-1.09)
Year 5 females (n=39)	41.7 (32.1-51.3)	50.4 (41.0-60.0)	57.2 (47.8-66.6)	0.30 (0.0-0.65)

In Figure 4.9, percentages of children in weight status classifications other than healthy weight are displayed according to age, gender and participant school.

Figure 4.9: 'Non-healthy' weight status - by age, gender and school (UK90 population reference)



There was no statistically significant difference in weight status classification according to whether or not feedback was received. Sixty-three percent (95% CI: 44.8%-81.2%) of participant children in this study for whom individual level feedback was requested had a BMI centile for age and gender that lay within the healthy weight range. The corresponding figure for children whose parents did not request feedback was 71.5% (95% CI: 64.7%-78.3%).

Tables 4.4 and 4.5 compare the percentages of overweight and obese children in Guernsey and England. Prevalence data from England have been sourced from the 2010-11 NCMP dataset [278] using UK90 population thresholds.

Table 4.4: Percentages of combined overweight and obesity in Guernsey and England **(UK90 population reference)**

Weight status	Guernsey (95% CI)	England (95% CI)
Overweight and obese combined - %	**Year 1** 25.7 (17.5-33.9)	**Reception** 22.6 (22.5-22.7)
Overweight and obese combined - %	**Year 5** 31.5 (22.3-40.7)	**Year 6** 33.4 (33.3-33.5)

Table 4.5: Percentages of overweight and obesity in Guernsey and England – by combined age and gender **(UK90 population reference)**

Group	Overweight - % (95% CI)		Obese - % (95% CI)	
	Guernsey	England	Guernsey	England
Year 1 males	14.8 (5.7-23.8)	13.8	11.5 (3.3-19.5)	10.1
Year 1 females	18.8 (7.5-30.0)	12.6	6.2 (0.0-13.2)	8.8
Year 5 males	16.0 (5.7-26.3)	14.3	26.0 (13.6-38.4)	20.6
Year 5 females	7.7 (0.0-16.2)	14.4	10.3 (0.6-20.0)	17.4

4.3.7b Summary: Height, weight and BMI data

The percentages of Guernsey children classified as healthy weight, overweight and obese differed significantly from reference percentages, based on the UK90 population curves ($p < 0.001$, Chi squared test). Furthermore, mean weight and BMI centiles were significantly above reference population level means.

Across the whole GCMI study population, 28.3% of participant children were classified as either overweight or obese. A further 1.5% of participant children were classified as underweight. Therefore, approximately three in ten

participant children (29.8%, 95% CI: 23.4%-36.2%) lay outside the bounds of a healthy weight classification. This result was significantly different from the reference percentage of 17% of participant children (95% CI: 11.8%-22.2%).

There were no statistically significant differences in BMI centile or weight status classification according to: (1) year group; (2) gender; (3) participant school; or (4) feedback status (overlapping 95% CIs). However, a number of clear trends were evident in the data.

First, across both included age groups, the percentage of males classified as obese was exactly ten points higher than the percentage of females in that category (18.0% versus 8.0%, respectively). Second, a similar difference was apparent when comparing percentages of obesity in the two included age groups (Year 5: 19.1%, Year 1: 9.2%). These trends were not seen when comparing percentages of overweight children by either gender or age groups. Third, the percentage of healthy weight children at Amherst Primary School was more than twelve percentage points lower than at St. Martin's Primary School (12.8% absolute difference). Overall, males in Year 5 displayed the highest levels of obesity (26.0%) and the lowest percentage of individuals classified in the healthy weight category (56.0%).

There was no significant difference or trend in BMI centile results from Year 5 children across the two participant schools. This outcome suggests that, at the population level, prevalence figures were not significantly affected by the time of day at which measurements were taken.

Across both year groups and genders, the percentage of overweight or obese children was very similar to summary results from England's NCMP. An important distinction is that the NCMP measures children in Reception and Year 6 rather than Years 1 and 5. Also, 95% confidence intervals for the NCMP are extremely narrow, whilst corresponding figures from the GCMI indicate greater uncertainty. This is due to the relatively small sample size in the GCMI.

4.3.7c Results: Prevalence data by different reference curves

The following table and graph display weight status classification results according to four distinct reference curves. Within the UK90 growth reference, both population and clinical thresholds are applied.

Table 4.6: Weight status classification - by different reference curves (n=198)

Growth Reference / Weight status	UK90 - Population	UK90 - Clinical	CDC	WHO	IOTF
Healthy weight - % (95% CI)	70.2 (63.8-76.6)	78.8 (73.1-84.5)	73.2 (67.0-79.5)	66.7 (60.0-73.2)	73.7 (67.6-79.9)
Overweight - % (95% CI)	14.7 (9.6-19.6)	9.6 (5.5-13.7)	14.7 (9.7-19.6)	17.2 (11.8-22.4)	15.2 (10.1-20.2)
Obese - % (95% CI)	13.6^ (8.8-18.5)	10.1 (5.9-14.3)	10.1 (5.9-14.3)	14.1^ (9.2-19.0)	4.5^ (1.6-7.4)
Underweight - % (95% CI)	1.5 (0.0-3.2)	1.5 (0.0-3.2)	2.0 (0.4-4.0)	2.0 (0.4-4.0)	6.6 (0.0-8.8)

^ Denotes statistical significance ($p < 0.05$).

Figure 4.10: Healthy and 'non-healthy' weight status - by different reference curves (n=198)

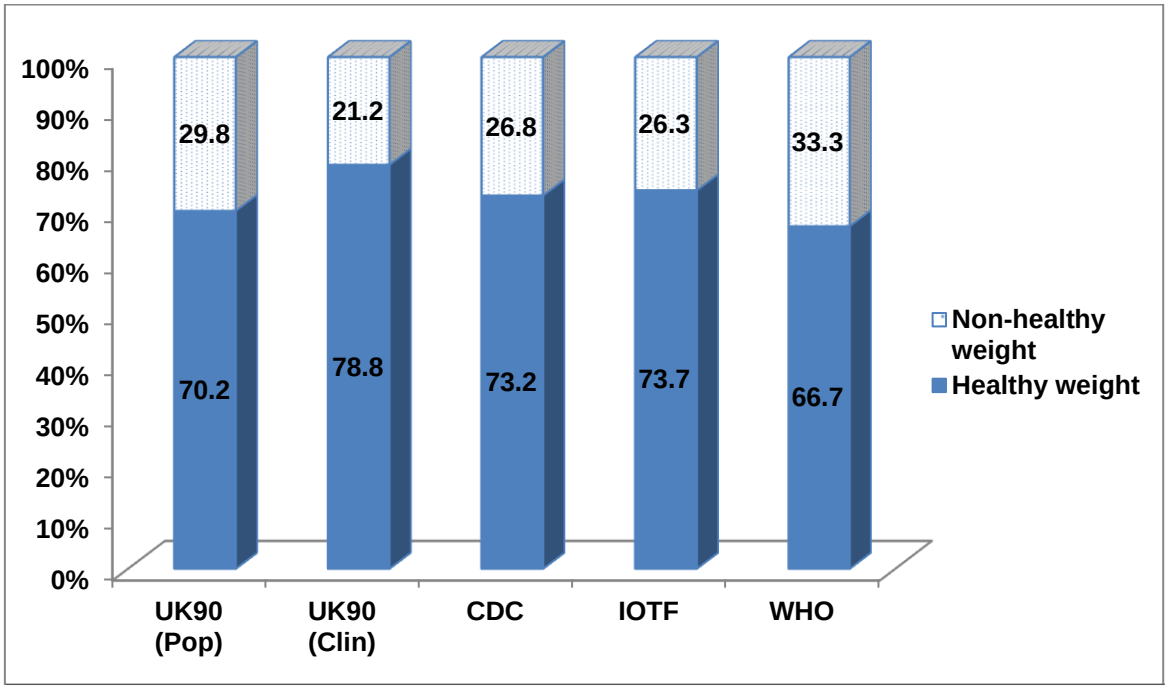
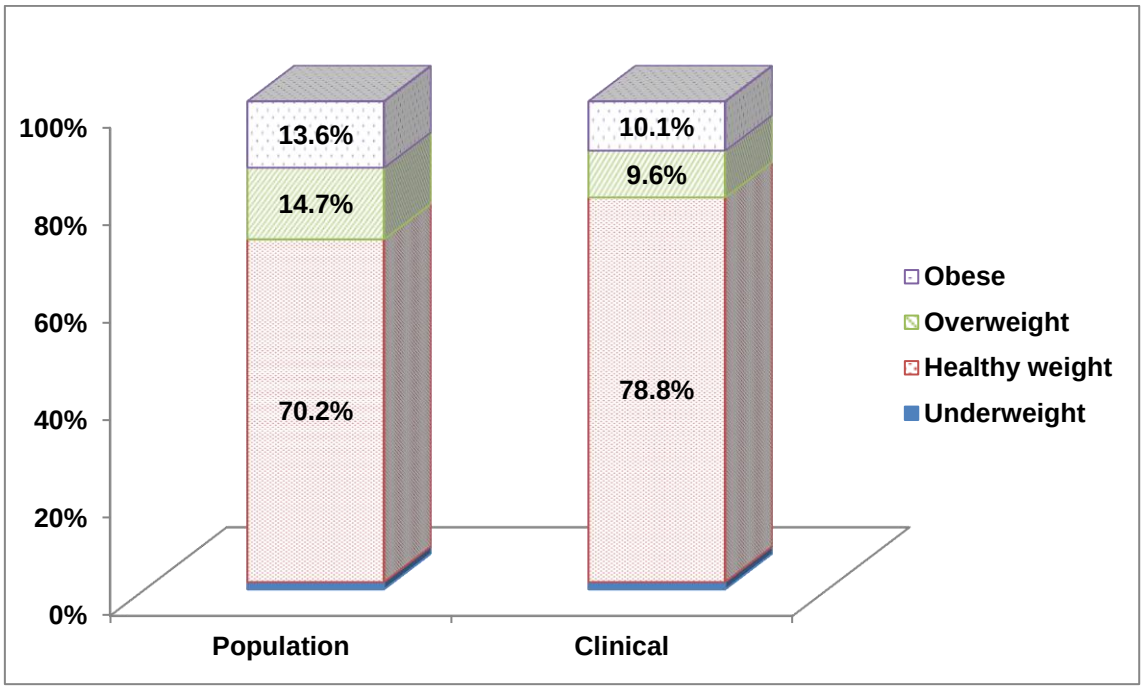


Figure 4.11 demonstrates the percentage of children in each weight status, as determined by UK90 population and clinical BMI centile thresholds.

Figure 4.11: Weight status – by UK90 population / clinical thresholds (n=198)



The BMI centiles applied by the UK90 population threshold resulted in a total of 56 children (28.3%, 95% CI: 22.5%-34.9%) being classified as either overweight or obese in this sample. The corresponding result for clinical thresholds was 39 children (19.7%, 95% CI: 14.8%-25.8%).

4.3.7d Summary: Prevalence data by different reference curves

In this sample, the percentage of children in each weight status classification was broadly similar when compared across different reference curves. However, the percentage of children classified as obese was significantly higher ($p < 0.05$) in both the UK90 population (13.6%) and WHO definitions (14.1%) than the percentage determined by the IOTF system (4.5%). Two further trends emerged. First, there was more than a ten point difference in the percentage of healthy weight children as determined by UK90 clinical reference and WHO systems (78.8% versus 66.7%, respectively). Second, when analysed by the IOTF system, the percentage of underweight children was higher than the percentage in this category seen across other included definitions (6.6% versus range 1.5%-2.0%). However, these differences did not reach statistical significance. Furthermore, when overweight, obese and underweight were combined to a single category, ‘non-healthy’ weight, there were no significant differences between percentages returned by the distinct reference curves.

Across the four weight status classifications, there was no statistically significant difference between percentages determined by UK90 population and clinical thresholds in this sample. This was despite the expected trend for higher

percentages of overweight and obesity according to the former definition. Here, UK90 population thresholds determined that 70.2% (95% CI: 63.8%-76.6%) of children had BMI centile results within the healthy weight range, compared with 78.8% (95% CI: 73.1%-84.5%) of children when UK90 clinical cut-offs were utilised. The greater percentage of healthy weight individuals seen with this latter definition was predominantly adjusted for by a decrease in overweight prevalence: 19/198 (9.6%, 95% CI: 5.5%-13.7%), compared with 29/198 (14.7%, 95% CI: 9.6%-19.6%) using population thresholds. However, obesity prevalence was also reduced with the clinical (versus population) definition.

4.3.7e Results: Prevalence data by different digit rounding methods

Figure 4.12 shows the percentage of children in this sample in each weight status classification as determined by two distinct digit rounding methods.

Figure 4.12: Weight status – by different digit rounding methods (UK90 population reference, n = 198)

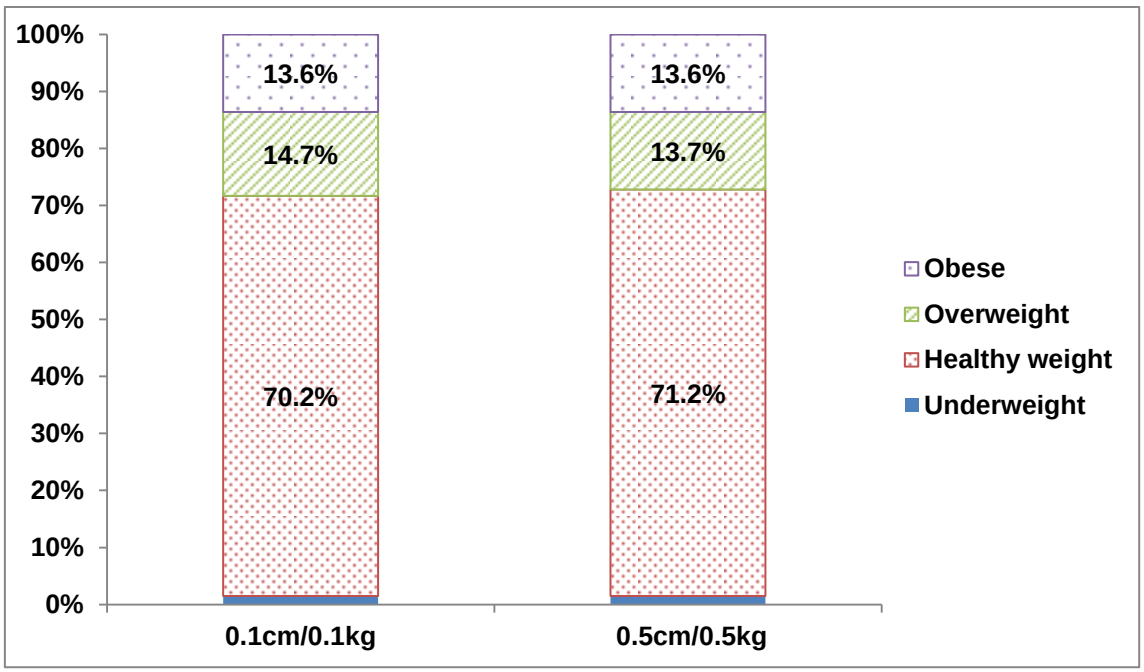


Table 4.7 shows the mean BMI centiles of children in this sample for each digit rounding method. Whole study population results are presented, together with results stratified by combined age and gender.

Table 4.7: Mean BMI centiles – by different digit rounding methods (UK90 population reference)

Group	Mean BMI % - 0.1cm/kg (95% CI)	Mean BMI % - 0.5cm/kg (95% CI)
All (n = 198)	59.6 (55.4-63.8)	59.6 (55.3-63.7)
Year 1 males (n = 61)	59.0 (51.5-66.4)	59.0 (51.7-66.4)
Year 1 females (n = 48)	53.9 (45.5-62.3)	53.7 (45.2-62.1)
Year 5 males (n = 50)	67.7 (59.2-76.3)	67.5 (58.9-76.1)
Year 5 females (n = 39)	57.2 (47.8-66.6)	57.4 (48.1-66.7)

4.3.7f Summary: Prevalence data by different digit rounding methods

There were no statistically significant differences in weight status or mean BMI centile results obtained by different digit rounding methods. The percentages of underweight and obese children in this sample were identical across the two methods. When height and weight results were rounded to 0.5cm/0.5kg, an absolute decrease of 1% in overweight prevalence was evident compared with the equivalent results for the 0.1cm/0.1kg method (13.7% versus 14.7%, overlapping 95% confidence intervals). This decrease was compensated by a corresponding increase in the percentage of healthy weight children.

4.3.8 Assessment of agreement between repeat measurements

In total, 22 children (10% of eligible study population) underwent repeat height and weight measurements in this sample. The degree of agreement between height and weight measurements, together with the subsequent BMI calculation, obtained by the two data collectors is summarised in Table 4.8.

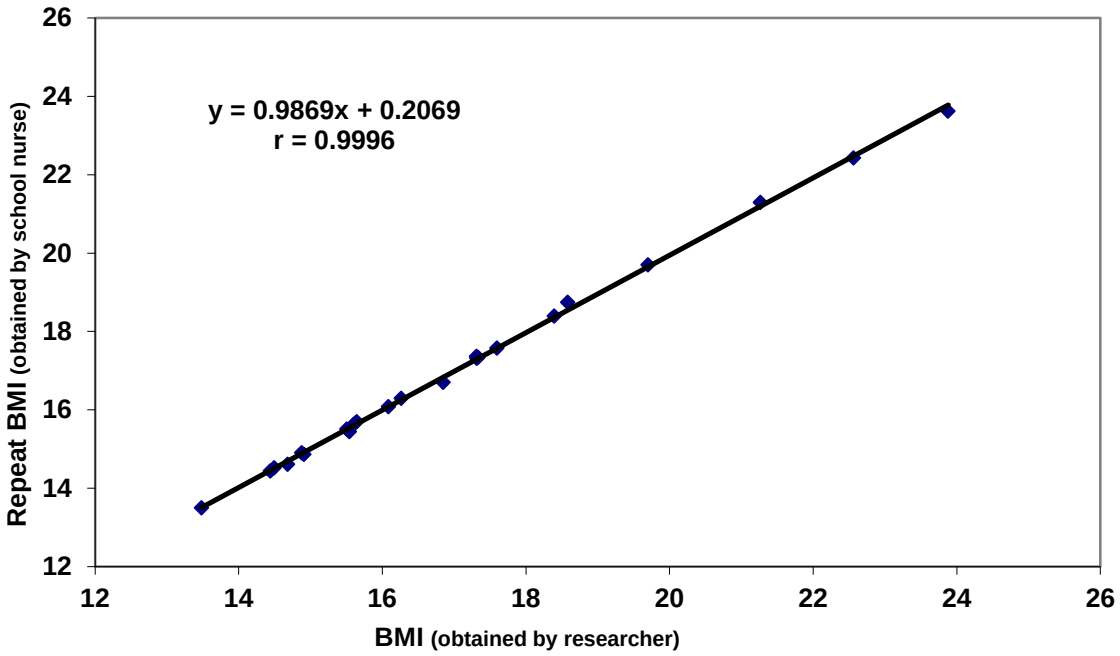
Table 4.8: Assessment of agreement between repeat height and weight measurements - Intra-class correlation coefficient (n = 22)

Measurement	Intra-class correlation coefficient (r)
Height	0.9998
Weight	0.9999
BMI	0.9996

As ‘r’ is very close to 1.0 for each measurement, these results indicate a very strong positive correlation, confirming that height and weight measurements obtained by the two data collectors were essentially identical. Therefore, there was a high level of precision in the measurements. In the few instances where minor disagreement in recordings obtained from the two data collectors was evident, this was apparent in height, rather than weight, measurements.

Assessment of inter-rater agreement of measured BMI is displayed in Figure 4.13.

Figure 4.13: Assessment of agreement between BMI results



4.3.9 Overview of programme costs

All GCMI-related expenses were collated and tabulated to facilitate review of costs associated with this pilot programme. These expenses are summarised in table form in Appendix XX. Overall, outlays were modest, totalling just £742.11. This translates to mean that the cost per included child was approximately £3.75. Of note, new measurement equipment was purchased for the pilot GCMI, which would not represent an annual cost. Furthermore, this pilot included a defined sample of children; therefore, the cost per child was higher than would be expected if a population level approach was adopted.

However, this cost assessment did not account for personnel-related expenses as I coordinated the GCMI and did not receive payment for the work performed.

4.4 DISCUSSION

4.4.1 Weight status of Year 1 and Year 5 children in Guernsey

In this sample, nearly three in ten children in the included age groups lay outside the bounds of a healthy weight classification. This result was significantly higher than reference figures from the UK90 population growth curves. Childhood underweight is often raised by healthcare professionals as a prominent issue in Guernsey [Obesity Strategy Group members, personal communication. March 2010]. However, this concern was not borne out by findings from this study as prevalence of underweight in included age groups corresponded to figures predicted from the UK90 population growth curves.

Prior to this study, accurate and current data on weight status in primary school children in Guernsey were not available. Therefore, it is not possible to consider these findings directly against earlier local results. The closest available comparable figures are, in Guernsey itself, Young People Survey statistics, together with NCMP data from England.

The percentage of children with a BMI outside the healthy weight range for age and gender appeared higher in this study than in the 2007 Guernsey Young People's Survey (29.8% [95% CI: 23.4%-36.2%] versus 23%) [342]. There are a number of possible explanations for this finding. First, the Young People's Survey used self-reported height and weight measurements from a sample of Year 8 and Year 10 children. Second, response rates for the question regarding

weight in the Survey have traditionally been poor [Y. Le Page, personal communication. June 2011], meaning that overweight and obesity prevalence may be underestimated in these results. A third possible consideration is that childhood overweight and obesity have simply increased in Guernsey in the years since 2007.

Overweight and obesity prevalence figures in this study were similar to results from England's 2010-11 NCMP dataset with no statistically significant differences evident across the measured age groups [278]. On one hand, this outcome is expected as the respective settings and measured population subgroups are similar in many respects.

Conversely, there are a number of Guernsey-specific features that may suggest a degree of protection against high prevalence of overweight and obesity. These include: the lack of franchised fast-food outlets [355]; a warmer climate, which may enhance likelihood of participation in physical activity [356,357]; relative ethnic homogeneity; low crime rates [358]; and accessible green-space across the islands [359]. However, an important consideration is the substantial dependency on personal automobiles for transport in Guernsey [340]. This is because a positive association exists between time spent driving and obesity [360]. It is not currently possible to speculate as to whether or to what extent these identified features impacted on prevalence figures found in this study. These represent questions that may be addressed by future research in this location.

Applying IOTF reference curves, 19.7% of children in this study were classified as either overweight or obese. This figure is similar to combined overweight and obesity prevalence statistics[θ] from children of comparable ages in a range of other European countries, including France (females: 17.7% in 2007) [65], Germany (20.1% in 2003) [297], The Netherlands (18.0% in 2003) [Ibid], and Sweden (males: 17.6% in 2004) [112].

Therefore, excess weight status in children appears to be a significant public health issue in Guernsey. Results from this study confirm that prevalence figures are significantly above reference percentages. These results also demonstrate close comparability with records obtained in England and other European nations where childhood obesity is a public health priority.

4.4.2 Weight status classification by different reference curves

James and Lobstein (2009) [90] showed that thresholds used in the IOTF system typically result in lower proportions of childhood obesity in a population, when compared with results from both CDC and WHO (2007) definitions. The current study revealed that the WHO and IOTF definitions produced significantly different levels of obesity prevalence. This outcome was also evident when comparing obesity prevalence by both UK90 population and IOTF definitions. However, in this sample there was no significant difference between obesity prevalence figures returned by IOTF and CDC thresholds, though a trend was apparent.

[θ] Calculated using IOTF reference curves.

Previous authors have suggested that WHO reference curves tend to produce higher proportions of childhood overweight than those seen with other systems [90,93]. In the current study, analysis of results according to WHO reference curves did demonstrate slightly higher prevalence of childhood overweight as compared to other systems (17.2%, versus range 9.6%-15.2%), but this difference did not reach statistical significance. James and Lobstein (2009) found that WHO reference curves produced overweight prevalence figures that were up to 15% higher than CDC figures for the same population. In this sample, a similar result was found with an equivalent figure of 13.2%. Furthermore, in the current study, the percentage of healthy weight children according to the WHO system was more than ten percentage points lower than that seen when UK90 clinical thresholds were applied.

The percentage of children identified as underweight by IOTF reference curves in this study was, at 6.6% (95% CI: 0%-8.8%), greater than that seen with other definitions. However, this was not a statistically significant finding. Notably, as distinct from other reference curves, a total of three grades of thinness are used in the IOTF system. These three grades are then combined to produce the total proportion of underweight children in a given population. This approach may explain the trend for higher prevalence of underweight in this study using the IOTF system.

There was no significant difference between percentages determined by UK90 population and clinical thresholds. This outcome may be a consequence of the relatively small sample size. Another potential explanation is that children's BMI

centile results in this sample did not sit at the lower periphery of denoted thresholds for overweight and obesity. Therefore, as thresholds were raised for the clinical definition, few children shifted across weight status categories.

4.4.3 Weight status classification by different digit rounding methods

Measurement protocols for the NCMP and other international child weight status monitoring programmes currently recommend that individual height and weight data are rounded to the nearest 0.1cm and 0.1kg, respectively. However, as outlined in Chapter Three (section 3.3.2b), there is concern around adherence to this aspect of the measurement protocol in the NCMP. There is also uncertainty regarding the possible effect of inconsistent digit rounding procedures on population prevalence figures [117].

In this study, there was no evidence to suggest that more precise rounding methods had a significant impact on either final weight status classifications or mean BMI centiles across distinct groups. However, statistical significance may emerge in a larger sample. An alternative explanation for these results is that, at the population level, any differences in BMI centiles due to distinct digit rounding procedures are levelled out. This scenario does not preclude the need to apply precise digit rounding methods to individual level results. These results may also provide an additional indication that BMI centile results for children in the overweight and obese categories did not lie on the margins for the respective thresholds in this study.

4.4.4 Distinctions between the GCMI and NCMP protocols

As noted earlier, development of the GCMI protocol was primarily informed by summary findings from the systematic literature review described in Chapter Two. Central findings from the NCMP case study also contributed to the final protocol. Overall, the measurement protocols employed by the GCMI and England's NCMP are closely aligned, thereby enabling comparability of processes and resultant data. However, a few key distinctions are apparent.

First, the NCMP measures children in Reception and Year 6. These age groups were selected on the basis that they reflect the first and final years of primary school. Second, the NCMP has in recent years evolved from a pure surveillance system to one that now routinely provides all parents with feedback of their own child's results. These results are typically returned by post to a parent's home [279]. Third, as noted in the previous chapter, certain areas in England now incorporate proactive follow-up of individual children whose BMI centile results are outside the healthy weight range [265].

Certain elements of the NCMP measurement protocol differ slightly from those utilised in the GCMI: more stringent criteria were applied to the latter programme. For example, two height measurements were obtained from each child in the GCMI and 10% re-measures were performed. For reasons explained earlier, the GCMI did not collect information on SES or ethnicity. Finally, children involved in the NCMP may be measured at any time of the school year, outside of holidays. However, the GCMI protocol stipulated that

children should be measured within a specific time frame within the year, avoiding the winter and immediate post-winter period.

In Guernsey, all parents of eligible children received a detailed information pack in advance of the measurements and were invited to attend information sessions held within participant schools. Moreover, the GCMI was announced by local media, advertised in local primary care practices, and repeatedly documented in school newsletters to maximise awareness of the programme's introduction. This comprehensive approach to communication with the eligible study population differed from that employed by the NCMP at the time of its original inception [H. Rutter, personal communication. 25 January 2011]. This approach also represents one possible explanation for the high participation rate (90%) seen in this study.

A census level approach and opt out consent processes were common across the GCMI and NCMP; however, the GCMI was conducted as a research project. Furthermore, despite endorsement from the local Health and Social Services Department, the GCMI was not a mandated programme.

4.4.5 Limitations of the study

There are a number of limitations to consider when interpreting the results of this study.

The sample size of 198 children was relatively small, despite the fact that this figure represented 90% of the eligible study population and 18.3% of the total public primary school population in Guernsey for the included age groups. This led to a situation whereby results, particularly those that considered particular subgroups within the study population, were accompanied by wide 95% confidence intervals. This, in turn, limited the ability to detect statistical significance within emergent trends.

This was a cross-sectional study, meaning that the issue under consideration (childhood obesity) was able to be quantified but not explained. There are limited existing anthropometric data available in this setting; therefore, it was not possible to compare results from this study with earlier local records. Indirect markers of SES are not available in Guernsey and this study did not collect information on this variable, ethnicity, or other confounding variables. However, the pilot GCMI was intended to provide an estimate of excess weight status in Guernsey primary school children and did not seek to identify specific risk factors in this population.

Height and weight recordings were conducted as one component of a research project. As a result, it is possible that adherence to the measurement protocol was artificially elevated in this study and did not reflect ‘real world’ experiences. There was a high level of precision in the measurements and no missing, improbable or clearly inaccurate values were evident in subsequent analyses. These outcomes might not be replicated under different circumstances. Deviation from the planned protocol occurred when one year group from a

single participant school was measured after lunch rather than in the morning. However, in contrast with other available evidence [224], this aberration did not appear to influence BMI centile results at the population level.

Costs associated with this pilot programme were assembled to provide an overview of the total outlay associated with the GCMI. However, personnel-related costs were not included in this amount due to fact that I conducted this research in my role as a doctoral student. Therefore, full cost effectiveness analysis was not performed and the summary figure presented underestimates the expected cost of a pilot programme performed under different circumstances.

Finally, it is possible that the participant schools were not representative of other primary schools in Guernsey. The included schools were purposely selected for this study as they were felt to include children from mixed socio-economic areas. Also, compared with other schools on the islands, these schools had a relatively large number of students. Nevertheless, in the unlikely event that these schools were substantially different to other equivalent institutions, it may not be possible to generalise findings from this study to other Year 1 and Year 5 children in Guernsey.

4.5 SUMMARY

This chapter described the development and implementation of the GCMI. Summary information pertaining to the basic demographics and systems of politics, education and healthcare in Guernsey was presented to provide context for this component of the overall research project. In addition, this chapter included key findings from analysis of the collected anthropometric data.

The GCMI was developed in close collaboration with local stakeholders following a systematic literature review of existing programmes and the NCMP case study. The MRC framework for developing and evaluating complex interventions (2008) was also used to help guide the selection and implementation of key programme elements at each stage of the GCMI.

The GCMI pilot tested a unique local CMP involving all eligible Year 1 and Year 5 children in two primary schools in Guernsey. Participant schools were purposely selected to be representative of public primary schools in Guernsey, covering mixed catchment areas. The GCMI protocol incorporated best available evidence for population level CMPs and placed strong emphasis on standardisation and sensitivity, whilst preserving consideration of local preferences.

The GCMI was developed primarily for an audience of policy makers and public health professionals and focused on delivery of population level outcomes.

Earlier research (detailed in previous chapters) failed to identify convincing evidence to suggest significant short- or longer-term benefits resulting from routine provision of individual BMI results. Furthermore, there was concern from local stakeholders regarding resource availability and potential for unintended adverse reactions to delivery of individual child results. Therefore, the GCMI was designed as a surveillance system. Costs associated with the development and implementation of this pilot programme totalled approximately £3.75 per child.

Guided by findings from the NCMP case study, a comprehensive and proactive approach to communication of the GCMI was employed. Specifically, there was engagement with a diverse range of public health and other healthcare professionals, school teachers and nurses, politicians, parents, children, and the general public at all stages of the programme. As a possible consequence of this approach, participation rates for the measurements were high (90%), with an opt out rate less than 2%.

Analysis of BMI data suggested that, in this sample of Guernsey school children, overweight and obesity represent prominent public health issues. Close to three in ten children (28.3%) returned BMI centile results above the healthy range for age and gender. The extent of underweight in the study population was consistent with expected figures, based on the UK90 population reference.

There were no significant differences in either BMI centile or weight status classification according to: (1) year group; (2) gender; (3) participant school; or (4) feedback status. However, a number of clear trends were apparent, including higher prevalence of obesity in males compared with females. In addition, obesity prevalence in Year 5 children was close to ten percentage points higher than the equivalent figure for Year 1 children. Overall, males in Year 5 appeared to be at greatest risk of obesity. Furthermore, there was marked absolute difference in prevalence of healthy weight children across the two participant schools. The ability to detect statistical significance was limited by the relatively small sample size in this study.

In this sample, the percentages of overweight and obese children were similar to results from the 2010-11 NCMP dataset from England. Measurement protocols used by the respective programmes displayed close association, therefore facilitating meaningful comparisons.

The percentage of children classified as obese according to both the UK90 population and WHO systems was significantly higher than that seen when IOTF thresholds were applied. This is an important consideration for stakeholders engaged with CMPs. Also, a notable yet non-significant trend was that the percentage of healthy weight children according to the WHO system was less than that determined by all other included reference curves. In this sample, the percentage of children within each weight status group did not otherwise differ significantly according to four distinct reference curves. At the

population level, there was no significant difference in BMI centile or weight status classification results according to two different digit rounding methods.

Overall, this study delivered current, accurate and precise local data on weight status on a representative sample of Guernsey primary school children. This study also achieved all other stated aims relating to the GCMI's development and implementation.

Process and outcome evaluation of the GCMI is discussed in the following chapter.

Chapter Five

The Guernsey Child Measurement Initiative:

Evaluation

5.1 INTRODUCTION

This chapter describes the final phase of the GCMI: evaluation of the pilot CMP. Programme evaluation is the systematic collection and critical analysis of information relating to the implementation, specific features, and/or outcomes from programmes. This information is then used to assess achievement of pre-determined aims, enhance programme functioning, and guide decisions around a programme's future [4,361].

The GCMI evaluation considered perceptions of the acceptability, feasibility, and overall impact of this CMP within the local setting. This study also sought to address research aims concerning: (1) potential roles and expected outcomes of the GCMI; (2) aims and outcomes, including possible unintended harm, associated with the pilot programme; and (3) future development of the GCMI, including perceptions around the scalability and sustainability of the programme. These research aims were guided by findings from earlier research components, which identified current knowledge gaps in this area.

The GCMI evaluation was comprised of a number of different elements to enhance the comprehensiveness and depth of findings. Qualitative research techniques were primarily utilised and evaluation was conducted on an internal basis. However, external elements were also incorporated to provide an alternative perspective on the programme. Findings from the GCMI evaluation were intended to be used for a number of distinct purposes. These included development of a final recommendation regarding the possible expansion of the

GCMI and refinement of the existing measurement protocol. Furthermore, results from this evaluation were intended to inform key local and other stakeholders about possible challenges to engagement and, more broadly, programme sustainability.

Focus groups with each of parents, schoolteachers, school nurses and the local Obesity Strategy Group were conducted and provided a forum for delivering feedback on and suggestions for the GCMI. In addition, a series of six semi-structured interviews with key local stakeholders were held in the months immediately following anthropometric data collection. These focus groups and interviews represented the principal components of the GCMI evaluation. Therefore, this chapter emphasises description and discussion of these elements.

The chapter starts with a comprehensive description of research methods used in the GCMI evaluation, including an outline of the evaluation framework. Next, key findings from semi-structured interviews and focus groups are presented. These findings are complemented by results from all elements of the external review. The chapter concludes with a discussion of the limitations of this study and presentation of overall recommendations regarding the programme's future. These recommendations are directed at key programme stakeholders in Guernsey, as well as other individuals engaged in the development, delivery, coordination and/or evaluation of population level CMPs. Comparative discussion of findings from the GCMI evaluation and other research components is provided in Chapter Six.

5.2 CURRENT STUDY

5.2.1 Research aims

The four principal aims of the GCMI evaluation were to:

1) Examine the feasibility, acceptability and sustainability of a population level CMP in Guernsey;
2) Determine (a) the perceived utility of the GCMI and (b) factors which may impact on the programme's longer term viability;
3) Contribute to development of a summary recommendation to the OSG regarding the potential expansion of the GCMI to reflect a Guernsey-wide programme; and
4) Enable comparison with central findings from the NCMP case study.

The first three aims are discussed within this chapter, whilst the fourth identified aim is considered in the final discussion chapter of this thesis (Chapter Six).

More broadly, the GCMI evaluation also directly contributed to addressing primary research aims. In particular, this research component explored the perceived roles and outcomes of these programmes and examined the feasibility, acceptability and sustainability of a CMP within a local setting. Finally, the GCMI evaluation considered potential adverse outcomes associated with this programme. The systematic literature review and NCMP case study highlighted that these questions are under-examined in the current literature.

5.2.2 Methodology

The GCMI evaluation comprised a combination of distinct methods in order to facilitate deep, robust understanding of identified issues [1-4,362]. The most significant components of this evaluation were the interviews and focus groups, which contributed rich, comprehensive data. Consequently, description and discussion of these interviews and focus groups form the principal focus of this chapter.

Review and assessment measures were performed throughout the duration of the pilot programme, but central elements of the GCMI evaluation were conducted in June-July 2011. A summary timeline of the GCMI was provided in Chapter Four (section 4.2.2a).

The methods used in semi-structured interviews and focus groups aligned closely with those employed in interviews for the NCMP case study. This section summarises the approach used and highlights details that were unique to the GCMI evaluation.

5.2.2a Evaluation framework

The evaluation framework for this research was developed according to the public health planning and evaluation cycle [4,363,364], with overarching guidance from the MRC's framework for developing and evaluating complex interventions (2008) [349]. The evaluation framework proposed by the public

health planning and evaluation cycle incorporates: (1) a needs assessment; (2) development of a logic model; (3) process evaluation; and (4) impact analysis, and is summarised below.

First, needs assessment considers the population that a given programme proposes to target and examines whether and how a specified problem should be addressed [4,364]. Within the Guernsey setting, a needs assessment was completed by virtue of the Obesity Strategy and recommendations for intervention that arose from that analysis.

The second step in the evaluation cycle incorporates development of a logic model, which represents the theory underlying programme design [Ibid]. A logic model elucidates how a programme will realise its planned outcomes and facilitates shared and consistent understanding of methods and aims. Furthermore, it challenges programme coordinators to consider whether judgements and assumptions that underpin a programme's development are realistic and grounded in evidence [4]. In this research, the logic model was developed following completion of a systematic literature review, the NCMP case study and following extensive consultation with local stakeholders.

Third, process analysis evaluates whether an intervention was executed as planned [4,364]. In the context of the GCMI, process analysis was conducted by means of a straightforward comparison of methods outlined in the measurement protocol against those used during the actual data collection[§]. In addition,

[§] This comparison was discussed in Chapter Four (section 4.3.4).

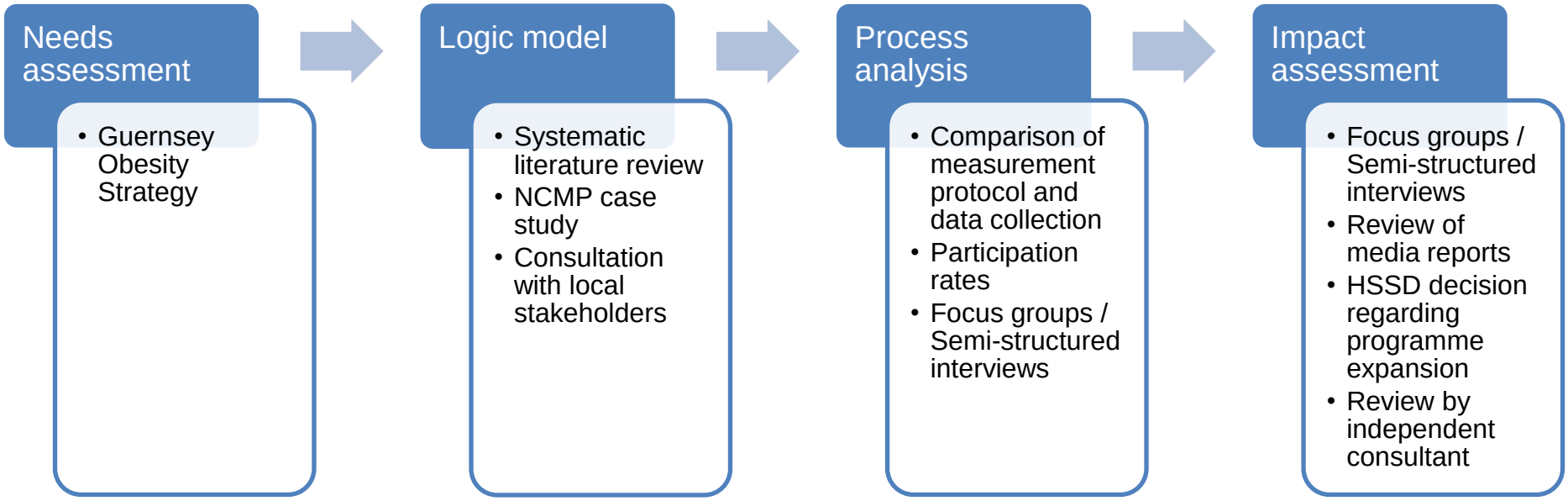
interviews and focus groups with stakeholders explicitly addressed questions relating to whether the pilot GCMI was implemented as expected. Finally, process analysis occurred through review of participation rates. This assisted in ascertaining whether the programme was successful in accessing the identified target population.

Impact assessment represents the final and, in this study, dominant aspect of the evaluation cycle. Here, the aim of impact assessment was to determine outcomes of the pilot GCMI and assess consistency between pre-defined and actual outcomes [Ibid]. Interviews and focus groups answered research questions regarding whether and why the GCMI was perceived to be an acceptable, feasible and sustainable venture for Guernsey.

In particular, this impact assessment addressed research aims concerning: (1) whether the GCMI should be expanded at the population level, including the rationale for this recommendation; (2) whether and how this programme could contribute to other recommendations from the Strategy; and (3) perceptions of unintended adverse outcomes associated with CMPs in this setting. Data from this impact assessment also enabled exploration of research questions regarding the appropriateness and sustainability of the GCMI. This was achieved by considering perceptions of the programme's resource requirement and whether this perceived demand remained within the capacity of existing local resources and systems.

A summary of the GCMI evaluation framework is provided in Figure 5.1.

Figure 5.1: Evaluation framework – GCMI



Developed from the Public Health Planning and Evaluation Cycle
Taken from 'Evaluation in a Nutshell', Nutbeam and Bauman (2006) [364]

5.2.2b Study design

The GCMI evaluation was primarily conducted on an internal basis. Internal evaluation is performed by persons associated with the programme, as distinct from external evaluation processes. Internal evaluation offers benefits including reduced costs and increased knowledge of and familiarity with both the programme and programme stakeholders [4,364]. However, internal evaluation can reduce overall objectivity. Moreover, restricted time availability and the lack of critical input from a neutral observer are further possible limitations arising from this approach [Ibid].

In light of these potential limitations, external review processes were also incorporated into the study design. Elements of the external review were intended to provide an alternative perspective on the GCMI. These elements added important information but were principally intended to complement and add further depth to findings from the more comprehensive internal evaluation. The nature and content of elements included in the external review did not allow for them to contribute significant depth of analysis. Therefore, these elements did not reflect a formal external evaluation. In this study, external evaluation was not undertaken due to time and budgetary restraints. The dearth of available research or other staff was also a strong consideration in this setting and influenced the decision to pursue internal rather than external evaluation.

The external review included analysis of local media reports relating to the GCMI and a report commissioned by HSSD on the Strategy, which was

produced by an independent consultant. This report included direct comment on the pilot GCMI. The final decision from the OSG in Guernsey regarding the continuation of the programme was considered as the third element of the external review. In this study, all three elements of the external review related to the final stage of the public health planning and evaluation cycle: impact assessment.

The GCMI evaluation used triangulation; however, qualitative research methods were predominantly utilised. The main component of this research involved six one-to-one, semi-structured in person interviews and five focus groups. As identified above, these interviews and focus groups contributed to two distinct steps in the broader evaluation framework: process analysis and impact assessment.

The justification for use of semi-structured interviews in the GCMI evaluation is identical to that outlined in relation to the NCMP case study (Chapter Three, section 3.2.3a). Therefore, the rationale for use of this method is not repeated here.

Focus groups were felt to reflect an appropriate method by which aims relating to the GCMI evaluation could be achieved. Focus groups are a dynamic and common qualitative research method [317]. They provide detailed awareness of what people know, what they think, and what they experience [Ibid]. This method makes explicit use of interactions between individuals to highlight attitudes and priorities and encourage participants to explore their own

understanding of and beliefs around an issue [317,365]. Indeed, focus groups can provide richer and more insightful information than either one-to-one interviews or questionnaires. This is because discussion within the group can promote more developed thought than an individual might offer independently [365]. Focus groups can also offer insight into particular cultural values or norms, which is of particular significance when considering how best to implement a locally relevant programme [365,366]. In the context of the GCMI, quantification of participant attitudes was not important as these beliefs were not intended to be representative. Instead, the priority of this interpretive approach lay with understanding participant views and later using this information to provide recommendations regarding the programme's future [366,367].

Focus groups represent an efficient research method, if designed and used appropriately [368]. In particular, focus groups can save time and money compared with other approaches. A further advantage of this approach is that focus groups can offer benefits to participants themselves [317,369]. Specifically, participants may be empowered by the opportunity to work in collaboration with researchers and assist in shaping a local programme [369].

In Guernsey, limited literacy amongst a small proportion of parents was identified as a possible issue [T. Moore, personal communication. 13 October 2010]. Therefore, focus groups represented a useful method to enable inclusion of those who may have been unable to complete a questionnaire or who might not have otherwise engaged in the evaluation [317,365]. Moreover, use of focus

groups in research can encourage input from individuals who, under different circumstances, might not feel they can contribute to a conversation [365]. Childhood obesity is a sensitive issue. With this in mind, a group setting can facilitate discussion through the ‘safety in numbers’ phenomenon: individuals may feel more comfortable about communicating personal views on a delicate topic if they believe their experiences to be shared [365,366]. Further to this theme, focus groups can minimise the impact of moderator bias and foster a safe environment in which critical comments may be voiced [365].

An important note is that, in this context, there was little concern that discussion conducted amongst peers might limit the openness and directness of responses, as the various participants typically did not function within hierarchical relationships. This consideration adds further weight to the argument that focus groups were appropriate for this research in this setting.

Important possible limitations associated with the use of focus groups in this research are discussed in section 5.4.2.

Standardised questionnaires were not used in this research due to concern around possible low response rates. A second potential limitation was that questionnaires can limit the breadth of responses to the preconceived priorities of researchers, therefore risking exclusion of important beliefs or observations. Finally, this method may restrict the depth of expressed views [316]. Overall, questionnaires were not felt to be able to contribute significant further value, in addition to that obtained from methods outlined above.

5.2.2c Study participants: interviews and focus groups

This research involved key stakeholders, incorporating both individuals and groups, with a direct role or involvement in the development, implementation and coordination of the pilot GCMI. Expansion of the GCMI was a possible outcome of this research. Therefore, stakeholders that in the future could be expected to contribute to a Guernsey-wide programme were also approached for inclusion in this study. The final list of proposed individual and groups for inclusion was confirmed after development of the original GCMI project proposal and discussion with local stakeholders. This list reflected a relatively small total number of participants but included all individuals and groups that had been directly associated with the GCMI.

All six proposed interview participants were contacted either in person or by e-mail. All proposed interview participants responded to the initial invitation and all (100%) agreed to participate in the study. The final list of interview participants included representatives from school nursing, health promotion, public health, and HSSD. The job title and affiliated organisation for all interview participants are provided in Appendix XXI.

Five focus groups were planned, representing the following four groups: (1) OSG members; (2) school nurses; (3) school teachers; and (4) parents. Two focus groups including parents were scheduled: one for each participant school. A focus group with participant children was not organised as there were concerns around obtaining access to this population subgroup and the validity

of findings [370,371]. Furthermore, previous research has considered the question of children's perceptions of height and weight measurements, albeit in a distinct locality [240].

Different methods were used to approach proposed focus group participants. At the time of the GCMI evaluation, the OSG had a total of 17 members. The aim was to include as many of those members as possible in the focus group discussion. This reflected a large number of potential participants for a single focus group [369], an approach suggested by Goss and Leinbach (1996) [372]. Members of the OSG hold diverse roles across multiple organisations and States' Departments in Guernsey. An aim of this focus group was to promote interaction and discussion between participants [365]. In this context, there was concern that the focus group discussion could be compromised by limiting the number of participants, or dividing them across multiple groups. Furthermore, due to time restrictions and organisational difficulties, it was impractical to hold multiple focus groups with these individuals.

For all other focus groups, the aim was to recruit between four and eight participants, as endorsed by Kitzinger (1995) [317]. Following discussion with head teachers and the head school nurse in advance of the GCMI evaluation, the expectation was that participation at focus groups from teachers and parents would not exceed these figures. This suggestion was supported by low parent and teacher attendance at the GCMI information sessions held earlier that year. Therefore, there was little concern that these focus groups would be oversubscribed; instead, the approach to recruitment emphasised inclusivity.

Overall, a pragmatic approach was adopted and focus groups were designed and organised to accommodate and be adaptive to those individuals who attended on the day.

For convenience and to maximise participation, it was decided that the OSG focus group would be conducted during one of the Group's regularly scheduled meetings. This plan was approved by the chair of the Group and individual members were subsequently advised of this plan by e-mail, well in advance of the planned meeting. To ensure receipt of this information, individual members were asked to confirm their attendance by reply e-mail. Following this, participant information sheets and consent forms were distributed electronically and were also provided in hard copy form at the time of the focus group. In total, 13/17 (76.5%) OSG members attended the focus group, four of whom were male. The job title of all included OSG focus group participants is provided in Appendix XXII.

Local school nurses were approached to participate in a focus group through the head school nurse. Similarly, school teachers from the included classes were initially informed of the study by head teachers, as per the head teachers' stated preferences. This approach was felt to minimise any unwelcome intrusion and improve participation rates. Again, participant information sheets and consent forms were initially sent via e-mail with hard copies offered before focus groups commenced.

The aim was to recruit all school nurses that had been involved in the development and delivery of the GCMI. All four invited school nurses participated in this focus group. Six of the ten teachers (60%) whose classes had been involved in the pilot measurements agreed to participate in the focus group. In addition, one teaching assistant who worked with a single Year 1 form class also attended this group, meaning that seven individuals contributed to the discussion. All participant school nurses and teachers in this study were female.

Individual interview participants, school nurses, teachers, and OSG members did not receive financial or other compensation for their participation in this study.

Parents were invited to partake in a focus group through a variety of means, in order to maximise opportunities to recruit participants. First, the planned evaluation was advertised at parent information evenings held at participant schools in advance of the measurements. Second, an invitation for parents of eligible children to the focus group was placed in school newsletters at both participant schools. Finally, information regarding the evaluation process was included with each requested individual feedback letter. Parents were advised that they would receive a £10 voucher in recognition of their time and contribution to the study. Five parents (all mothers) attended the focus group at one participant school and six parents, including one father, attended the focus group for parents at the second school. By coincidence, all parents at the first

school had requested feedback of their own child's results, whilst no parents at the second school had received individual feedback.

All interviews and focus groups were conducted on the basis that responses were non-attributable by name. The information form for participants and consent form for the GCMI evaluation can be found in Appendices XXIII and XXIV, respectively.

5.2.2d Interviews and focus groups

I conducted all interviews and focus groups on my own. All interviews were conducted in person at either the participant's working base or a room within the Guernsey HPU. Focus groups took place either at the participant school or in a meeting room within HSSD. Wherever possible, locations were purposely selected to be familiar to and convenient for participants.

Each interview and focus group was scheduled during working hours and lasted between 45-80 minutes. The focus group with teachers was conducted during a scheduled school assembly and was therefore time-limited to 45 minutes. Focus groups with parents were held either just after the start of the school day, or in the one hour period before final school bell. The focus group with school nurses was scheduled during a planned monthly meeting and 90 minutes were allocated to this session. Two hours were set aside for focus group with OSG members, as a larger number of participants were expected to attend and contribute to this session.

Interviews and focus groups were audio recorded, transcribed and later analysed for themes. In addition, written notes were taken contemporaneously during each interview and were used to validate interpretation of the data. For logistical reasons, notes were written at the conclusion of individual focus groups.

Questions included in the interview schedules were developed using the same approach described in Chapter Three (section 3.2.3c). Interview schedules were pilot tested with the Obesity Officer for Guernsey to ensure relevance, completeness and comprehensibility. Overarching themes explored were consistent across all interviews. A list of sample interview questions that outline the broad themes of this research can be found in Appendix XXV. Further information relating to techniques used in the semi-structured interviews can be found in the corresponding section in Chapter Three (section 3.2.3c).

An outline script was prepared in advance of all focus groups to introduce the session and explain its structure and overall purpose [317]. As suggested by Morgan (1995) [373], each focus group commenced with ‘warm up’ discussion and questions then moved from general to more specific. All groups were asked to respond to approximately ten questions. Questions posed to focus group participants were designed to be relevant to the particular stakeholder group considered. For example, OSG members were questioned in more detail around how the GCMI aligned with the Strategy, whilst school nurses were asked focused questions relating to the measurement protocol. However, common questions were posed to each focus group. These questions covered

the topics of: obesity in Guernsey; general reflections on the pilot GCMI; roles of CMPs; routine feedback; expansion and sustainability of the programme; and, finally, key concerns (including unintended harm).

All focus group participants were given the opportunity to speak with me in private at the conclusion of each session and all were offered the possibility of follow-up communication via e-mail [317]. However, no individuals chose to pursue these options.

5.2.2e Analysis of interview and focus group data

To maintain consistency, the methods used to systematically analyse interview and focus group data were essentially identical to those used in the NCMP case study (described in section 3.2.3d). A summary of these methods is provided in Figure 3.2 in Chapter Three. Of note, there was one difference in the methods used in the NCMP and GCMI studies. This difference related to the approach to transcription.

Transcription of all interview data was performed by the same single professional transcriptionist used in the NCMP case study. Similar to the earlier study, this transcriptionist was provided with a general overview of the research and clear requirements were outlined to minimise possible transcription error [323-325]. This individual also transcribed two of the five focus groups (OSG and school nurses). However, I transcribed the three remaining focus groups. This decision was made for practical reasons: time and budgetary restraints.

Due to the high volumes of interview and focus group data for transcription, it was more time efficient for this task to be shared by two individuals. To maintain consistency with the approach employed by the professional transcriptionist, I transcribed the three remaining focus groups to the level of 'intelligent verbatim', which was described in Chapter Three (section 3.2.3d).

Following the process of transcription, interview and focus group transcripts were read through twice in full and cross-checked once against original audio recordings. This approach was similar to that used in the NCMP case study. In the event that minor transcription errors were detected, I corrected these prior to commencement of further analysis. No significant transcription errors were found.

5.2.2f Analysis of elements from the external review

This section describes the approach to assessment of all three distinct elements included in the external review of the GCMI.

First, local media coverage relating to the GCMI was considered. The GCMI was reported across a variety of media channels, including radio, television, and both print- and web-media. These reports were identified using: (1) web-based searches; (2) direct communication with local press agencies; and (3) information from local stakeholders and other associates. This process was complicated by the fact that, for all identified radio and television reports, I was featured in the item itself. In such instances, analysis was enabled by review of

subsequent collateral produced by the relevant press agency, such as item re-plays or transfer of content to the associated website. Where applicable, television or radio reports were not recorded.

Each individual report was reviewed according to the three levels identified by Fairclough's approach to critical discourse analysis, as described by Smith (2007) [374]. This multi-level approach can be used in social and health research studies and enables in-depth analysis of included reports. Fairclough's approach considers the social context in which an item is developed and released, together with the discourse practice level. This latter term encompasses the method of production, level of distribution and intended audience. Finally, the third aspect of Fairclough's approach includes consideration of the details of actual item content, including themes [Ibid]. A potential concern with this approach is that it may be vulnerable to researcher bias.

Second, a report on the overall Strategy was reviewed. This report was commissioned by HSSD and prepared by an independent consultant. This report was based on examination of the existing Obesity Strategy and a series of interviews with key stakeholders involved in the development and implementation of the Strategy's recommendations. Furthermore, this report included specific comment on and recommendations relating to the pilot GCMI. Review of this report was conducted according to the three aspects of Fairclough's approach described immediately above. This was supplemented by an in person meeting with the author of that report. This meeting was held

after the report's initial release and facilitated further discussion of its key findings.

Third, the external review considered the OSG's final decision regarding the future of the GCMI. This decision was communicated by OSG members to me by e-mail correspondence and by forwarding a proposal prepared by Group members, which was passed at a subsequent OSG meeting. To maintain consistency with the approach used in other elements of the external review, Fairclough's three-levelled approach to critical discourse analysis was used to review this proposal.

5.2.2g Uses of results from the GCMI evaluation

Results from the GCMI evaluation had a variety of uses. First, findings from all four components of the evaluation framework were considered together to form a final recommendation for the OSG as to whether or not the GCMI should be expanded at the population level. This recommendation related to the third aim of this study as outlined in section 5.2.1. Evaluation outcomes were also used with the intention to persuade OSG members to take a position in relation to the support of the summary recommendation. This is known as persuasive utilisation [4].

Next, the evaluation exhibited a direct impact on the GCMI's future as results were used to produce recommendations for subsequent programme development. Finally, results were intended to inform CMP stakeholders about

possible challenges to engagement and wider programme sustainability, thereby reflecting conceptual utilisation of evaluation results [Ibid].

These distinct uses act to highlight the different audiences targeted by the GCMI evaluation. First, outcomes from the evaluation were directed toward me, as findings were used to develop the overall recommendation regarding the future of programme. Second, this evaluation was designed to target local stakeholders. In order to maximise utilisation of obtained results, intended end-users must consider the findings to be plausible and valid [Ibid]. Therefore, this evaluation was required to address questions and concerns about the programme from local stakeholders. Otherwise, the risk was that the final recommendation would not be viewed as credible. Third, outcomes from this evaluation were intended to be relevant to and used by stakeholders engaged with other CMPs.

5.3 RESULTS

5.3.1 Overview

This section includes findings from the process analysis and impact assessment of the GCMI. Certain elements included in the process analysis, including review of participation rates and examination of adherence to planned measurement protocol, were discussed in the previous chapter (sections 4.3.2 and 4.3.4, respectively) and are not repeated here. Therefore, results described below pertain to the interviews and focus groups, together with all elements of the external review.

Interview and focus group results are presented across three sections (sections 5.3.3-5.3.5) and are followed by description of findings from external review processes.

5.3.2 Presentation of results: interviews and focus groups

Interview and focus group results are presented together using the same general approach outlined in Chapter Three (section 3.3.1). All included quotes are anonymised by name, but job titles are included. Moreover, where applicable, extracts taken from focus group discussions are clearly identified. All other quotes are taken from one-to-one interviews.

The three principal categories in this study comprised: the perceived utility of and outcomes produced by CMPs, ('Utility'); the development, protocol and outcomes of the pilot GCMI ('Pilot programme'); and the GCMI's scalability, application and sustainability ('Programme development').

A comprehensive selection of anonymised quotes relating to identified themes within each category is presented in summary tables (Appendices XXVI-XXVIII).

5.3.3 Category: 'Utility' (GCMI)

Headings within this category comprise: perceived roles of the GCMI; routine feedback of individual results; programme outcomes; and alignment of the GCMI with the Strategy.

5.3.3a Potential roles of the GCMI

All interview and focus group participants related their perceptions of the potential roles of the GCMI. Of note, responses related to this particular question returned the greatest volume of data of any heading in this study. Indeed, a total of eight distinct themes emerged. Responses indicated that such a programme would contribute diverse, important roles and was critical to achieving the stated aims of the Strategy. Participants stressed that the central role of the programme would be to enable delivery of accurate, local data at the population level. However, numerous other roles were also identified. Across

interview and focus group data, there was significant overlap in participant responses regarding perceptions of the GCMI's various roles.

First of all, information provision was identified as a potential role of the GCMI. Participants highlighted the current paucity of local data on excess weight status in Guernsey schoolchildren and noted the importance of these data for the purpose of allowing advance planning of future healthcare services. Participants communicated that the programme was believed to be important regardless of the results it returned. Here, actual prevalence figures were of lesser concern than the basic programme function of providing data in the first instance. In contrast to views put forth by all other included stakeholder groups, parents and teachers emphasised the potential role of information at the individual rather than population level.

> *"The first role of it is to find out what we have and then we can start talking about what we do next …. I think the first role is to find out what the problem is."*
>
> - School nurse

> *"It's vital really. All the way through from when we very first started people have been saying, 'So, what's the problem?' and we've had to say, 'Well, we don't really know, we have an idea.' Particularly for the children again, you know, this feeling that there's an issue but we've not been able to prove it. …. We can see it, we think, but we need to prove it. So to have some sort of proper statistics, measured that we know is all the children, it goes right across the board …. I think that will make a real difference."*
>
> - HPU manager

> *"I think knowing what's going on really, because you can't make progress without knowing what's going on. Getting a better picture of what's going on, of course it's not going to give us every piece of*

data, the answers, but shedding light on the problem so we can really properly address it and take it forward."

- Obesity Officer

Second, responses suggested that the GCMI could improve awareness of the issue of obesity across multiple levels, including the general public, schools and politicians. No distinction was made between childhood and adult obesity; these two issues appeared to merge within responses across both interviews and focus groups. Improved awareness of obesity was felt to reflect an important foundational step in driving further health promotion initiatives and could enhance overall understanding of the causes and possible outcomes of this issue. Participants also reflected that, by targeting children, the GCMI could facilitate opportunities for raising awareness of the issue amongst wider groups, such as parents. This was felt to be a unique contribution of the GCMI.

"I think the biggest thing, if we do implement it, will be the fact that we've got a school nurse going in and talking to children, talking to parents, highlighting the issue. …. So, certainly there's a whole addition of education going on around it that wouldn't happen otherwise."

- HSSD staff member

"Personally I think that raising awareness of the issue, making the whole community aware of whether there is an issue and, if there is an issue, it's a community issue. It's not a school issue, it's not just a medical issue; it's an island wide issue with all sorts of strands to it. I think that's really important."

- Head school nurse

The third potential role of the GCMI was that of evaluation, which was typically described as an integral or required function of the programme. In particular, responses from healthcare professionals and OSG members communicated a

sense of responsibility to provide evidence of outcomes from external initiatives relating to the Strategy, which may be achieved by the evaluative role of the GCMI. Participants defined that the programme could be used to evaluate current or planned future obesity-related interventions at individual and population levels. Here, participants acknowledged the long term nature of both the GCMI and this identified role.

> *"I see it [evaluation] as one of its key functions. It can't monitor the individual interventions, but as a trend for Guernsey we can see how a lot of money is being ploughed into the Strategy overall. People and politicians will want to see results from that. Yeah, so I see it as very powerful."*
>
> - Obesity Officer

> *"It's [the GCMI] essential to know how we're doing. It will also be used in a range of issues to reflect back to people what the size of the problem is and how we're doing. And in addition to the Guernsey-wide view, hopefully we'll break it down into smaller areas and reflect that to a range of people to show how they're doing."*
>
> - Director of Public Health

> *"I don't think we're going to see any results for a long time but eventually it would be great to be able to say, 'We started measuring in 2011 and 2012 and in 2020, we can actually see a difference' …. So, eventually I think that sort of evaluation would be great but I'm not <laughs> counting on seeing them soon! <laughs>"*
>
> - HPU manager

Next, justification for further action on the issue was highlighted as a potential role. Participants communicated that the GCMI could function to 'prove' that obesity was an issue in Guernsey. Therefore, the GCMI could validate the role of the OSG and help to drive delivery of other initiatives. On this point, local politicians were identified as the primary audience for this programme function.

"It's about credible proof particularly for our politicians. Yeah, that would be the main thing. …. we need to be able to say, 'This is the problem.' I think a professional will know, but for lay people and politicians we need to actually have some proof and they always want statistics, which we've not been able to give them. So that would be the main one I think: giving us some sort of credibility and the reason why."

- Obesity Officer

"We can't go to politicians and the general public to ask for tax payers' money to spend on various supportive programmes without saying, 'It is because we know or we can now make a very informed assumption as to the levels of obesity.' …. I think if we can actually justify why we're asking for the money …. then we are fulfilling the role of serving the public. Oh, it's all getting very patriotic now."

- Former Obesity Officer

"It provides justification for it, doesn't it? It provides evidence and also it will help justify the roles of the jobs, the people who are actually doing the interventions and being proactive in helping it. So it proves that we do need that service. Otherwise it's almost like us saying, 'well, we've noticed a few of them are a bit plump.' It's not quite the same. This gives it credibility is what I'm trying to say."

- Head school nurse

The GCMI was seen to have a role as a starting point, or platform, from which other obesity-related initiatives could be launched. Participants also outlined the view that the GCMI could function as a base to return to when considering future priorities for the Strategy. However, on this note, participants also stressed that the GCMI formed only one element of the complete Strategy and was not a solution for obesity in Guernsey.

"I guess this can be massive. You can start small and help an individual school or the Education Department, but hopefully it will also feed into a whole range of other things. …. So you can take it

from the smallest factor of a family right up to population strategy, I'd have thought."

- HSSD staff member

"I think the programme is the driver for us to make decisions about the other recommendations. I see it as the basic tool."

- Obesity Officer

"It's a good starting point isn't it? It's somewhere to set off from to begin to build a framework around…."

- Head school nurse

A further identified role was intervention. Here, participants recognised that two discrete elements of the programme could function as an intervention: feedback (by request) of individual results and the measurement process itself. When intervention was mentioned as a possible role of the GCMI, participants related that they were uncertain of the evidence in support of this practice. Finally, participants cited concern that the GCMI might be incorrectly seen as an 'all in one' solution to the obesity issue if required to function as an intervention.

"I think they can have a couple of different roles. One of them is purely for surveillance, for observing trends, and another is for identifying children who might need treatment or to be targeted for treatment or advice or that kind of thing."

- Head school nurse

"Clearly there's a conversation about giving personalised data back to individuals being an important intervention in itself, but I'm not sure how important that is."

- Director of Public Health

"I think there's a danger that parents and even departments might say, 'Well, you're doing it.' By monitoring somehow that leads to a

reduction in obesity levels <chuckles>. I think we've got to be careful to say that this is merely a tool for us to identify a problem that then needs to be tackled so that you don't find people going, 'Obesity: tick.' And I think that that would be one of the major things that would need to be highlighted."

- Former Obesity Officer

Responses also suggested that the GCMI could assist in filling certain knowledge gaps. Specifically, the programme could act as a diagnostic tool at the individual level. More generally, the GCMI could also contribute to improving understanding of the issue in the local setting, particularly around the impact of income inequality on obesity risk and outcomes. Participants with an underlying role in the healthcare arena described the view that current perceptions around weight status in children were flawed, as professionals tend to underestimate BMI when visual assessment alone is used.

"The programme would identify the ones that haven't actually been identified as needing a medical intervention or a health promotion intervention. It would identify that."

- HSSD staff member

"…. you see what you're working with because at the moment we're only working on perception. We're only working on what we can see and it's not proof really. You look at a child and think, 'That child's a bit plump,' but then that's not really a very good way to practice; there's no research in that. Otherwise I think you'll look at a class of people and think, 'Well actually they're all OK,' because I think that's what we do."

- Head school nurse

"I think it could be a very interesting window on inequalities and a window that we don't currently have because we can't really quantify it at the moment. We know kind of intuitively that there are inequality issues but we can't actually quantify that and I think if we were happy

to use these BMI results as a window on that, that would be a really useful tool."

- Public health epidemiologist

Finally, participants described the view that a potential, defined, and important role of the GCMI was to provide local data for Guernsey. Local data were felt to be important for a number of reasons including engagement with stakeholders, as well as improved credibility and overall efficiency. Furthermore, responses identified distinct audiences for the local data including politicians, healthcare staff responsible for driving obesity-related initiatives, and the general public. Participants suggested that local data on obesity would assist in countering predicted arguments against funding or other resource provision and might enable a collaborative approach amongst various stakeholders. Ultimately, the absence of local data on obesity was perceived to be used as an excuse to avoid further direct action on this issue.

(Question: What are your thoughts on the importance of having local data?)

"I think it's very important because [using UK data is] what we've had to do so far. That's all we've had to go on. We are basically saying, 'We think we're like the UK because we're like the UK for lots of other things,' but we're not like the UK for some others …. We have to convince particularly a lot of the local politicians who will say, 'Oh yes but this is Guernsey.' So to be able to say, 'This is Guernsey, these are our figures' …."

- HPU manager

"I think it's a more powerful and persuasive point if you can actually talk to people about their own population. I think if you're talking about data that's not been collected locally there's always a chance that people might think, 'oh well that might actually not be the case for us', whereas if you can present them with data that is definitely

derived from the children living on the island then there's no arguing with that."

- Public health epidemiologist

Nurse 1: *"People like to think that Guernsey's very separate until it's easier to use the UK figures. If you look at lots of our other health issues we are basically the same as the UK, you know? But we do have some differences. Things like our skin cancer rates are different because of where we are and things like that."*
Nurse 2: *"Plus the demographics are different. I mean we are an island and we don't have a huge ethnic population or anything like that."*
Nurse 3: *"It's [obesity] increasing though. Some are wealthy, some not, we do have our poverty, and I think being able to prove a local picture makes more sense."*

- Excerpt from focus group with school nurses

5.3.3b Feedback of individual results in the GCMI

All participants were asked to reflect on the role of providing feedback of individual results to parents in the GCMI. Five distinct themes presented in relation to this heading. First, responses considered the utility of this function; on this point, mixed views were apparent. Where participants indicated that feedback could represent a valued function of the GCMI, there was no consensus opinion regarding its perceived main role. Rather, different participants proposed that feedback could be an educational tool, an intervention for behavioural change, or simply a useful guide for parents. However, other respondents expressed significant doubt over the utility of providing feedback to parents. These respondents indicated a belief that this practice reflected a narrow approach that offered inadequate opportunities for appropriate follow-up.

"…. one of my plusses would be that it's an education event as well. If they don't get the results back then I think they lose out on that aspect of it …. from an education point of view, I think parents should get the results back."

- HSSD staff member

"I think as long as we keep conveying this message that it's not designed to be an individual programme. …. as long as it's emphasised that this is an island wide initiative - it's not designed to be an individual thing - I think it's very clear that parents can't expect to have anything more than a guide."

- Obesity Officer

"I don't think sending someone out a letter saying that your child falls just over the threshold that puts them in the obese category is really managing it very well. I think it's a very reactionary way to hope that it will put people on the right path. It just seems to be quite inflammatory without offering any practical support about how to take steps to alleviate the problem…."

- Public health epidemiologist

In considering the role of feedback in the GCMI, participants discussed the rationale that would underpin its use. Overall, the consistent theme was that this practice was believed to allow fulfilment of any obligation that programme coordinators might owe parents. Specifically, responses highlighted issues of rights and ethical concerns, even as they acknowledged doubt regarding the benefit of feedback at the individual level.

"I do think parents - if we're collecting data - have a right to then have that data on their children if they so want it."

- Director of Public Health

"…. if you stand back and think this is an island wide initiative, we're not looking at individual children so there's no reason why they [parents] should have them, there's no huge benefit to them. …. I

think it's a huge amount of work to give results out to everybody with very little benefit but if you take that opportunity away from parents I'm not sure that's ethically right either."

- HSSD staff member

Participants acknowledged the role of the GCMI protocol in shaping their views on feedback. More broadly, participants also indicated their preferences around eventual programme design. On the first point, responses emphasised the importance of measures to preserve privacy, the use of language in the GCMI feedback letter, and highlighted the value of including information regarding local follow-up services within the letter itself. On the second point, participants offered different views on whether the GCMI should reflect a pure surveillance programme or, like the NCMP, a mixed programme.

Overall, most participants proposed that the programme should make results available on a request-only basis. However, several interview participants put forth the alternative notion that feedback should be routinely returned to parents of children whose results lay outside the bounds of a healthy weight classification. No participant suggested that feedback should be a routine or compulsory process.

Nurse 1: *"I think [the letter's] good. I think if you've got parents out there that may be concerned about their child's weight, be it under or overweight, I think it's very satisfying for a parent to know that there's that protection there; that somebody else isn't going to be privy to your child's information. So yeah, I think that's really important…."*
Nurse 2: *"…. the way it was laid out in just a very simple straightforward mapped way. If we're going to do it [feedback], I think that's a really good way of doing it, without any words of condemnation or judgement about it. It's very simply laid out."*

Nurse 3: *"I think that's good. It's nice and clear, nice and simple, there's an explanation there, and being a parent myself, I wouldn't be offended by any of that content at all, be it good or bad…"*

- Excerpt from focus group with school nurses

"I think it would be a good idea to make the information available on request, but I think that it should really be kept as a surveillance programme and not offered routinely because that kind of takes you into a different set of issues with parents I would imagine …. I think that's probably a better way to do it than just blanket sending out results."

- Public health epidemiologist

"I think [the approach used] was good …. if parents wanted to know, they could know, which was excellent. I think my difficulty would be if we identify a child who's definitely overweight or obese … I think they have to know, but I think there's a way of telling them…."

- Head school nurse

Participants also relayed concerns around possible unintended harm resulting from feedback of individual results. Responses highlighted perceptions regarding potential sources for such harm, including misinterpretation of letter content, schoolyard bullying, or harm through inadequate provision of supportive follow-up services. However, participants did not propose solutions to these speculative issues.

"I think that's got to be treated with care, how that information does literally physically get to a parent. …. I think that's very important, because it's a mean old place in a playground."

- Former Obesity Officer

"I think I would be worried that the programme, if it wasn't treated sensibly and full information conveyed to children and parents about what was going on, would raise the issue but not address the issue."

- Public health epidemiologist

Finally, participants outlined current knowledge gaps in relation to this issue. Participants acknowledged perceptions around the lack of robust evidence in support of routine feedback of results to parents and stated the view that more evidence was needed before pursuing this approach in the local setting.

> *"You might argue where's the evidence for that feedback doing things and I'm not sure yet. I don't know the standard of evidence and whether other research is required on that."*
>
> - Director of Public Health

> *"I'd want to see some actual data that indicated that telling people in the general population, 'Look, you're all fat, do something about it,' actually results in some change because if it doesn't, then there is no point us putting it out. …. unless you've actually got some data [to say] that changes behaviour, it just makes people feel bad. You'd be sacrificing your uptake rates for the next year for what purpose?"*
>
> - HSSD staff member

5.3.3c Expected outcomes for the GCMI

Participants were asked to discuss their thoughts on outcomes the GCMI would be expected to deliver. The key deliverable that was identified was provision of local prevalence data on the weight status of Guernsey schoolchildren. Responses also identified the outcome of longitudinal data, therefore enabling comparisons over time. These two outcomes were combined under the broad theme of 'information'.

> *"I think just getting the results is the biggest; I think actually having a picture of what's going on out there is basically the important thing."*
>
> - HSSD staff member

"Annual statistics on the BMIs of children in those specific age ranges and on-going statistics of comparison that we can see the progress forward … I think the programme is the driver for us to make decisions about the other recommendations …. It's a tool; I see it as the basic tool."

- Director of Public Health

Second, responses outlined that the GCMI would be expected to raise the profile of the issue of obesity, thereby promoting education across multiple levels. Participants described that the regularity of the programme would play an important part in achieving this outcome.

"I think initially you'd be raising awareness; you'd be educating and gradually, hopefully, you'd see a halting. But I think if you raise awareness; if you can give regular messages out; if the nurses are on the case; that could help."

- Head school nurse

"I think we don't know what the nature of the problem is until we know what the nature of the problem is."

- Obesity Officer

Together with being described as a central role for the GCMI, evaluation was also identified as a key deliverable critical to overall programme success. Participant's communicated the perception that this indirect outcome was an area through which the GCMI could contribute greatest value.

OSG 1: *"I think its only value is if it helps guide our initiatives and enables us to show whether those initiatives which have as an aim to reduce rates of obesity, are effective. If we can use it for that, then it's valuable."*
OSG 2: *"So perhaps you see its principal role as an evaluative tool?"*
OSG 1: *"Yeah. If it doesn't guide us to do that then…. it isn't helpful."*

- Excerpt from focus group with OSG members

Finally, participants defined that the GCMI was simply required to deliver high participation rates and maintain positive public perceptions of the programme, thereby suggesting that the programme must be acceptable to stakeholders. This outcome was consistent with the finding that the preferred central role of the GCMI was population level surveillance, as acceptability was viewed as a prerequisite for achieving sufficient levels of engagement to produce accurate, representative data.

> *"I think all it needs to deliver is having a high uptake rate because in some ways what you find out about the weight status of the kids is immaterial. …. So I think it's important that we separate our concerns about the results with the question of do we value having a population surveillance tool? And I think, yes, we do. So I think making sure that people participate in it …. I think the main thing is that we actually get people agreeing to be weight measured."*
>
> - Public health epidemiologist

> *"…. good uptake; good coverage; good feedback from parents so that we don't end up with problems from that point of view….."*
>
> - Director of Public Health

5.3.3d Alignment of the GCMI with the Obesity Strategy for Guernsey

All interview and focus group participants other than parents and teachers had direct or indirect involvement with the Strategy. The GCMI was, in part, developed to pilot test a programme that would fulfil recommendations pertaining to this Strategy. Therefore, all participants that had some involvement in the Strategy were asked for their thoughts regarding the possible contribution of the GCMI to the Strategy. Overall, responses indicated that the GCMI

showed direct and significant alignment with the vision and specific recommendations detailed in the Strategy.

Importantly, the GCMI was felt to contribute to the Strategy by producing data that would justify further action on the issue of obesity, as well as action on the Strategy itself. Participants described the perceived value of having quality data to drive progress and maintain current initiatives and communicated that the lack of such data impacted on the credibility of the Strategy.

(Question: How do you think the GCMI can contribute to the Obesity Strategy for Guernsey?)

> *"I think it is probably the best argument that we can have …. I think people are always quick to say, 'Oh but…' but if we've got answers to the 'but', then I would say that this is probably one of the best justifications of using the money [for the Strategy] that we will have."*
>
> - Former Obesity Officer

> *"We have to have this sort of data in order to justify training and supporting those sorts of programmes."*
>
> - HSSD staff member

> *"Well, I think one of the major problems in putting together The Obesity Strategy was the lack of data …. You need to be able to speak from point of fact rather than a point of fiction and I think we've always struggled with that right from the beginning. …. So, in terms of evaluation and accountability, we know that we need to do these things, and how are we going to do them in any sort of effective way without data collection?"*
>
> - Public health epidemiologist

Second, participants repeatedly proposed that the GCMI was a foundation, or platform, for the wider Strategy. This view reinforced the link between the GCMI

and the Strategy, which from the local standpoint had underpinned the programme's original development.

(Question: How do you think the GCMI can contribute to the Obesity Strategy for Guernsey?)

> *"It is a really good starting point to addressing one of the recommendations which is brilliant, which will then feed in to lots of the other recommendations. …. So I think it is key, yeah."*
>
> - HPU manager

> *"I think it just meets the needs of the Strategy absolutely. I think it measures very nicely with so many of the recommendations. It forms a solid basis from which lots of other strands can come out. …. We can carry on doing parts of the Strategy in isolation but we don't have that basic foundation of statistics to have a benchmark…."*
>
> - Obesity Officer

Evaluation was noted as a role and expected outcome of the GCMI, but it was also highlighted as an area where the programme could contribute to progress on the Strategy. Participants suggested that the GCMI could facilitate assessment of particular interventions developed as a consequence of the Strategy. Furthermore, participants proposed that the GCMI could provide direction for the Strategy's overall vision.

> *"…. what we wouldn't be able to do without a programme is monitor how we are doing and thereby adjust or calibrate the Strategy. …. If we didn't have the programme, it would impair us in doing some of that really, so we wouldn't know how well we were doing."*
>
> - Director of Public Health

> *"I think lots of the parts of the Strategy …. [have] been done with the very best intentions, but we don't have anything to mark it against so*

it's a great starting point and it's a great thing to run alongside. We think we're going down the right route but we don't know."

- Head school nurse

Finally, participants acknowledged that the GCMI produced outcomes that were directly recommended by the Strategy. Therefore, some participants felt that the programme allowed existing obligations to be fulfilled, describing this as an independent result of the GCMI.

"I mean it's in the new sort of constitution of the Obesity Strategy Group; it's their role to commission data about obesity."

- Public health epidemiologist

"The Strategy itself wasn't particularly prescriptive, what it says is that we should investigate looking into a child measurement programme, so I can't remember exactly what it says …. just that we needed more statistics, we needed more background and that we should look into running some sort of [measurement] programme."

- HSSD staff member

5.3.3e Summary: 'Utility' (GCMI)

Within this category, participants highlighted their perceptions of the potential roles and expected outcomes of the GCMI, together with detailed consideration of feedback of individual results and alignment of the GCMI with the OSG. Key findings are summarised below.

Participants described specific roles and outcomes but also outlined their underlying rationale and intended audience. Typically, this audience was multi-level and reflected different views on the programme's general design. In

particular, responses suggested that different stakeholder groups held distinct priorities for the programme, with a strong trend for parents and teachers to place emphasis on the programme's role and utility at the individual rather than population level. Indeed, responses from parents and teachers suggested that this latter approach was seen to reflect an abstract concept. This finding may speak to different underlying levels of understanding of the issue of obesity across different participant groups.

In this study, participants defined a number of diverse potential roles for the GCMI. There was a high volume of data associated with this heading, which suggested that this was a central consideration for stakeholders: participants may have applied significant thought to this area in advance of the interviews and focus groups. Alternatively, this result could simply indicate that the GCMI was believed to have multiple possible roles. The clear central role and expected outcome for the GCMI was delivery of local prevalence data on childhood weight status. Evaluation also emerged as a key theme and encompassed review of external initiatives as well as the Strategy itself.

Overall, participants described ambitious expectations for the programme and, in doing so, risked overstating its potential roles in the local setting. For example, participants detailed that the programme would facilitate evaluation of broader obesity management initiatives and drive further action across the Strategy. However, the pilot GCMI only considered childhood obesity and collected data across two defined age groups. Consequently, results may not be generalisable to other population subgroups. At the time of the programme's

original development, the Strategy had only recently been approved by the States of Guernsey. Therefore, the GCMI represented the first new initiative that was directly associated with the Strategy's recommendations. The GCMI was also the first initiative to deliver local prevalence data on obesity. These considerations may explain the apparent enthusiasm and high expectations for programme functions communicated by various participants.

The outlined expected outcomes of the GCMI displayed alignment with the programme's proposed roles. However, participants appeared to adopt a more conservative approach when considering expected outcomes, as compared with roles, for the programme. Typically, responses included multiple possible roles but identified a single key deliverable for the programme. On this note, it is possible that proposed roles signified the ideal functions of the programme, whilst expected outcomes communicated by participants represented actual programme requirements. For example, participants communicated that data from the GCMI could be used to improve local understanding of the contribution of income inequality to obesity in Guernsey. However, as there is no proxy marker for SES in Guernsey and schools include mixed catchment areas, this reflected a purely hypothetical role for the programme. Accordingly, this role was not further suggested as an expected outcome for the GCMI. Therefore, some inconsistency in proposed roles and outcomes was apparent.

There was significant overlap in themes arising in relation to potential programme roles and the GCMI's alignment with the Strategy. This finding confirms that the GCMI is inextricably linked with the broader Strategy; an

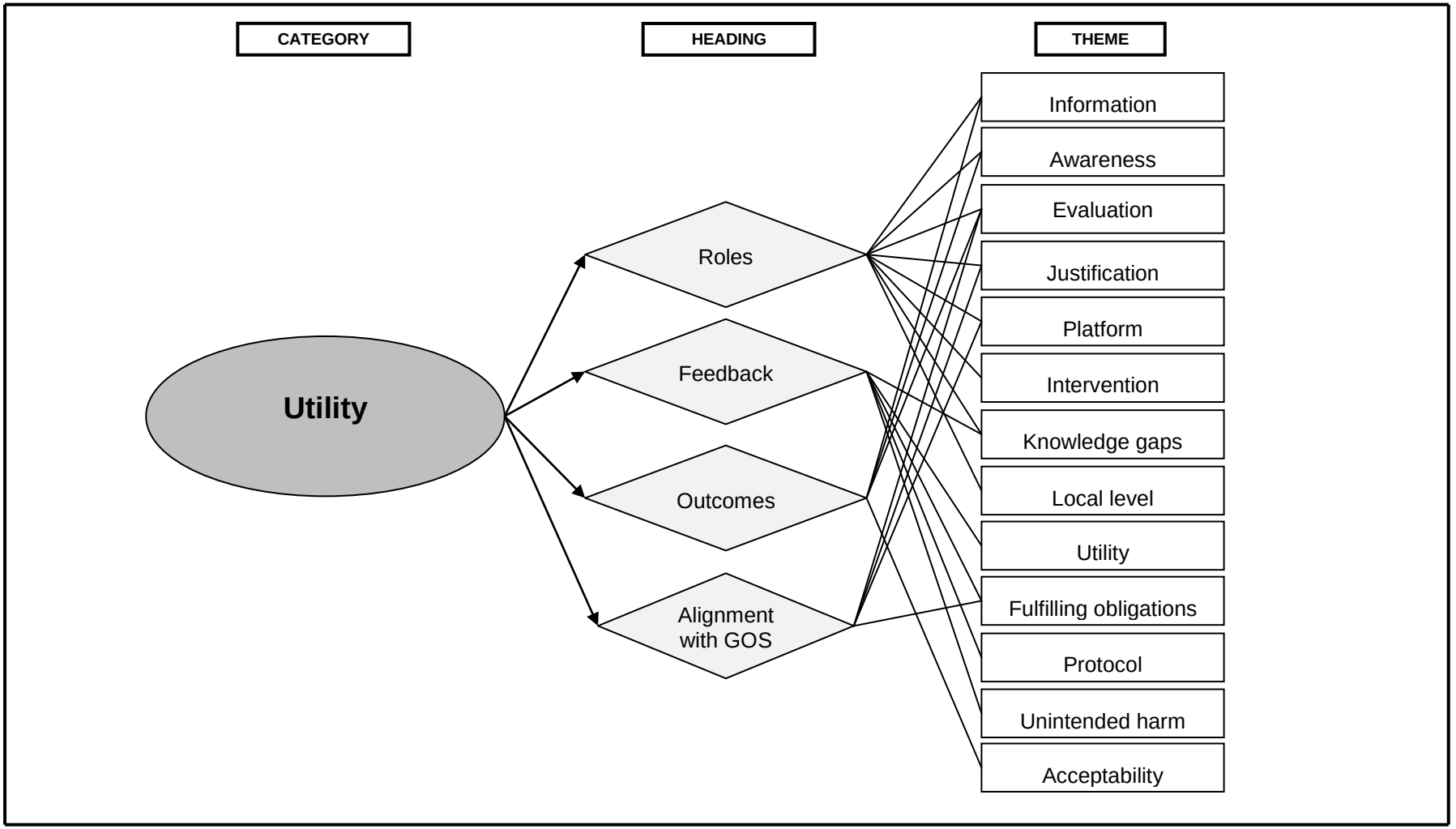
important consideration when contemplating the programme's audience, administration, utilisation and future.

Three further important findings arose within this category. The repetitive theme of justification suggested that participants acknowledged the need for political and public support of the Strategy at this early, critical stage. Second, there was significant discussion across multiple stakeholder groups regarding the importance of local data, highlighting the role of such data in promoting engagement, programme credibility and efficiency. On this point, participants communicated a genuine belief that Guernsey reflects a unique population with specific cultural and demographic features that may influence obesity prevalence.

Finally, participants described mixed views on preferred programme design. No consensus view emerged; however, the dominant trend was to endorse the approach utilised within the pilot programme whereby individual results were distributed by parental request alone. This communicated broad approval for a surveillance programme in this setting.

A summary of key themes emerging within this category is provided in Figure 5.2.

Figure 5.2: Summary of themes – 'Utility' (GCMI)



5.3.4 Category: 'Pilot programme'

Headings within this category comprise: childhood obesity in Guernsey; aims of the GCMI; outcomes achieved by the pilot programme; and unintended harm associated with the GCMI.

5.3.4a Childhood obesity in Guernsey

This evaluation explored stakeholder perceptions of the rationale that underpinned the pilot GCMI, including examination of the issue considered by this programme. Therefore, interviews and focus groups included discussion of beliefs around childhood obesity in Guernsey. Here, three clear themes were apparent.

Participants described their views of the impact of childhood obesity in the local setting. There was marked distinction in perceptions of professionals engaged in the healthcare domain and other groups, including parents and teachers. These latter two groups suggested that childhood obesity did not reflect a significant concern in the local population. In fact, parents and teachers commonly referred to the issue in terms of particular individuals or select groups and communicated that the burden of childhood obesity was highly variable from year to year.

> ***Teacher 1:*** *"I suppose that I would have a couple of children in my class and one in particular that, if I was her parent, I might be concerned."*

Teacher 2: *"I don't know if it is a significant issue, not at this age I wouldn't have said. I would have said they [overweight children] are few and far between."*
Teacher 3: *"Through the whole school – of 500 children – between us, we could probably pick out, in each year group, the children that you would think might be a little on the overweight side."*
Teacher 2: *"Yeah, so a handful of children, I would say."*
Teacher 4: *"I think I saw it more obviously last year … I mean, yeah, there were some very large ones last year, who couldn't join in as everyone else did."*
Teacher 2: *"It doesn't seem to be a big issue in this school anyway. Whether it is different across different schools …. it is just the odd, the odd one or two, isn't it?"*

- Excerpt from focus group with teachers

On the other hand, individuals working directly in the healthcare arena lamented the lack of local data on the issue and acknowledged that their views were assumptions based on figures extrapolated from the UK. However, the common expectation was that childhood obesity was a real, current threat and represented a public health priority for Guernsey. Additionally, participants offered comments relating to comparative prevalence in Guernsey and the UK, suggesting that figures were expected to be similar across both areas.

(Question: Do you think that childhood obesity reflects a significant public health concern in Guernsey?)

"Well we wouldn't really know at the moment in honesty because our sources of data for children, particularly around obesity, have been really problematic. I don't actually have any statistics on the weight status of children in Guernsey."

- Public health epidemiologist

"I think they probably are but we have no evidence to prove that at the moment, so it's just an assumption and really extrapolating from

the UK. So I think it's an important issue for us to explore whether it is a problem or not."

- Director of Public Health

"I do think it's a concern. I think because we're a microcosm of the UK and because the stats are coming through so clearly in the UK that there's a problem, I can't believe it's not the same here."

- Head school nurse

Next, public health and other healthcare professionals identified the diverse outcomes associated with childhood obesity. Overall, these participants defined consequences that directly reflected current evidence on the issue. In particular, responses highlighted physical and psychological health outcomes, together with the wider economic and social consequences of this issue. Childhood obesity was seen as a long term problem for Guernsey and these participants communicated the view that this condition posed a significant threat to the local community, given the potential for substantial resource requirement.

Finally, where participants had identified childhood obesity as a significant concern, they also considered and provided justification for why the issue had risen to prominence on the local public health agenda. Two distinct strands of thought emerged, though these were closely linked. Participants described that media reports and policy arising in the UK had a strong influence on decisions and practices in Guernsey. Also, responses suggested the role of the Strategy in this outcome. Ultimately, the Strategy was felt to have been developed following observations of activity in the UK directed toward addressing obesity.

(Question: Why do you think childhood obesity has risen to prominence on the public health agenda in Guernsey?)

Nurse 1: *"We follow what the UK say and do."*
Nurse 2: *"So, with the UK government making more noise about obesity and long term issues of obesity, it's higher up the agenda, isn't it?"*
Nurse 3: *"Yeah, higher up the agenda now, and with the Obesity Strategy also being written locally, people are being made more aware of what's on offer, what's not on offer and the long term issues of obesity. And also the media: because of the UK government making more noise about it, it's been in the media."*

- Excerpt from focus group with school nurses

"Well, one strand will have come from the fact that it's risen to prominence across the UK and then we tend to track the patterns that happen in the UK and globally. That's given rise to that. We have come to an era where we've actually managed to get a Strategy into the State and approved by the State …. So those are two reasons and the issue continues to grow I think."

- Obesity Officer

5.3.4b Aims of the GCMI

Participants identified four discrete aims of the pilot GCMI: (1) test the feasibility of a CMP in Guernsey; (2) examine the perceived utility of data and other potential outcomes from the GCMI; (3) deliver information on prevalence of excess weight status in a sample of Guernsey children; and (4) assess how the programme was received by stakeholders.

1). Feasibility:

(Question: What do you think were the aims of the pilot measurement programme?)

"OK. So it's a researcher coming to look at the feasibility of us implementing a child measurement programme. So the idea is that we've tested out how it could work if it was implemented, whether it's possible; what the practicalities might be."

- HPU manager

"A programme to determine effectively the costs and benefit of measuring child BMI. That is the confines of it, isn't it really? And I suppose the feasibility would be good – can we put feasibility in somewhere? <Laughter> Feasibility – that's probably quite a good word. …. the feasibility and the process of measuring child BMI ….."

- Former Obesity Officer

2). Utility:

"The idea is to firstly have a look at what the data's like, but also more broadly to evaluate the reaction of the HSSD to this data and what they do with it."

- Public health epidemiologist

"Initially, we thought it was just that we would know how many overweight children we've got, but the more we've looked at it, we've seen how useful it's going to be for other things. Perhaps that's broadened my thoughts …."

- HPU manager

3). Information:

"The aim was to generate statistics about the school age population of the Guernsey population in schools."

- Obesity Officer

"I guess the key question is, should we have concerns? Do we have a problem in Guernsey and what is the scale of the problem?"

- Head school nurse

4). Acceptability:

> *"…. just seeing if it's doable, if the schools would accept it, if the general public would accept it, and get a general baseline idea of how it would work or not work. I think is the way I saw it. The fact that actually the main thing was whether it would be acceptable, whether people would actually agree to doing it and actually participate I think is also a key thing."*
>
> - HSSD staff member

5.3.4c Outcomes of the GCMI

Participants articulated their reflections on the outcomes of the GCMI. Responses encompassed how the pilot programme was executed; its impact in the local setting; and, where indicated, observations around factors that contributed to its perceived success.

Overall, participants communicated that, from a practical standpoint, the GCMI represented a feasible undertaking for Guernsey. Responses indicated that the GCMI was viewed as a manageable programme because of the appropriate scope, allocated resource and timeframe associated with the pilot programme.

> *"I thought it was done well because I think we were informed very clearly all the way through of what was going to happen …. so I found it was good. It was well paced; it wasn't trying to do too much. I felt, 'OK, I've got a whole morning to do this and that's manageable,' whereas if it had been rushing through I don't think it would have been effective. So I think it worked fine actually."*
>
> - Head school nurse

> *"I think I had a vague idea of what [the programme] was but I certainly didn't know anything about the details or how it actually*

would look in practice. ….. So, the practicalities of it. Yes, that's certainly changed my perceptions and ideas of how it really works in practice and also some of the uses of the programme."

- HPU manager

"I think it's been really easy from our point of view …. the actual practicalities of it all have just been really good."

- HSSD staff member

Responses also highlighted the importance of engagement in achieving the aims of the GCMI. This was the central theme to arise when participants considered factors that had influenced the success or otherwise of the pilot programme.

"I think there was every opportunity to engage with the school, the schools are very supportive about acting as a bridge, putting it in newsletters and things like that so the families should have been reassured by the fact that the school were quite happy for it to happen in their school. I think that was a great thing."

- HPU manager

"I think the communication was the key thing. The working together with professionals already accepted by the school was a tremendous help …. Communication right down the line from communicating with parents, with the schools themselves…."

- Obesity Officer

Third, participants contemplated the overall impact of the GCMI. Participants that had a direct involvement in the measurement process, including teachers, nurses and parents, communicated that the pilot programme had not caused significant disruption. Indeed, the GCMI was described as being received as a streamlined process. However, the limits of a pilot programme were recognised;

some participants acknowledged that, amongst certain stakeholders, there would likely be residual questions.

> ***Teacher 1:*** *"There was no disruption. They just went out and came back. <laughs>"*
> ***Teacher 2:*** *"It didn't impact on our school day really, so that was a bonus for us. <laughs>"*
>
> - Excerpt from focus group with teachers

> *"The fact that we could prove how streamlined it could be obviously meant that we got the results out quickly, but it helped make it a positive experience for the teachers. I think that they could see that we weren't imposing it on them, that we could just fit in with their daily routine really."*
>
> - Obesity Officer

> *"I think it will have answered a large number of the questions, I think inevitably not all of the questions though, because we've got two out of the primary schools. Yeah, inevitably there are other ones who would have some sort of issue possibly. But I think it goes a long way to answering probably the main central questions …."*
>
> - HPU manager

Finally, participants defined elements of the GCMI protocol that contributed to their views on outcomes achieved by the pilot programme. Responses emphasised the role of a standardised, structured and professional approach. Participants also discussed the importance of sensitive phraseology in the feedback letters. This sensitivity was felt to influence public perceptions of the wider programme.

> *"I really do think the pilot programme has been fantastic. It has been really easy for us, which has been wonderful. And also what's been really good is about how professional it's all been both from the school's point of view and the parents. I think they've been really*

impressed about how it's a professional person coming in, it's not just somebody's doing it in their summer holiday project. This is a real, proper, research project and it's being done properly."

- HPU manager

"….I'd been talking to school nurses in the UK about how much fun they hadn't been having with the NCMP, and the concerns about the after-effects …. The phraseology of the letters that were sent out in UK was quite offensive I think. …. And those were my misgivings and my worries about this programme, but I think you waylaid those in the way you've adapted the letter. ….. The way that was handled, I think, within this pilot project was appropriate."

- HSSD staff member

5.3.4d Unintended harm associated with the GCMI

Participants were asked for their thoughts and comments on possible unintended harm arising from the pilot GCMI. Here, two themes emerged.

First, participants described their perceptions of outcomes relating to this area; in other words, harm resulting from the pilot programme. Without exception, there were no incidents of reported or observed harm from the GCMI.

(Question: Are you aware of any episodes or reports of unintended harm relating to the GCMI?)

Nurse 1: *"And as far as I'm aware, there's been no feedback from the teachers or in fact that any parents have complained."*
Nurse 2: *"I've not been aware of any parents contacting saying, 'I've had this' and blah."*
Nurse 3: *"No, I've had nothing come through."*
Nurse 4: *"You haven't had any parents approaching you complaining or anything? We've all obviously done a brilliant job then!"*

- Excerpt from focus group with school nurses

"No. In fact, I haven't had anything really! Which is actually what you want, because if it's going to be adopted it wants to be that something is accepted and not a huge issue. So that's good really. I've had no feedback, and no one's contacted me. ….. I'd been waiting for that actually; I had thought I might get parents phoning up to say, 'What are the results?' but I haven't heard anything. No one's contacted me and so that's good."

- Head school nurse

"No, there was no unintended harm. No, I don't think there was at all; I have no evidence of that."

- Obesity Officer

Some participants also related that this outcome was not consistent with their prior expectations. Where acknowledged, participants reported that existing expectations had been shaped by observations and reports from the UK.

"As I said, considering I was a bit anti, I was a bit anti only because of what I knew from the UK. I was worried about how it would affect the parents and children here, having heard all the horror stories, well, not horror stories but bad press with the UK. I thought, 'Do we really want this, do we want this bother?' "

- HSSD staff member

"I think I'd read lots of the bad publicity about the UK schemes and so on, and those things are always written from a personal or the poor parent's point of view …. and so on so I hadn't seen the benefit of the bigger picture really."

- Obesity Officer

Of note, one participant proposed the idea of harm from non-participation in the programme; fearing that children whose parents had opted out of the GCMI may feel excluded. However, this participant asserted that this reflected a potential rather than observed outcome.

Second, participants provided explanation for this perceived lack of identified harm. The key finding related to aspects of the GCMI protocol, which had emphasised the sensitivity and normalcy of the measurement process.

> ***Parent 1:*** *"I think it was well managed and the children weren't upset by it. I mean, I can remember at primary school being weighed for a maths lesson and that, <laughter> THAT was worse! I remember the fear of God being put into me then, but this was very sensitive. …. I think this was perfectly managed."*
> ***Parent 2:*** *"It wasn't highlighted as a big issue really, in the first instance. I mean, I let my two [children] know that they were having it done and that everyone was doing it: all of the year group were doing it…."*
> ***Parent 3:*** *"The younger ones, I think they found it more of a giggle rather than anything. <laughs>"*
>
> - Excerpt from focus group with parents

> *"I can't see that there's any problem with it …. particularly the way that you conducted the measurement. …. I can't see that any child can come away from that and say they had any adverse reaction to that at all."*
>
> - HPU manager

5.3.4e Summary: 'Pilot programme'

This category encompassed the aims, outcomes and unintended harm associated with the GCMI. Also, to establish the rationale for the issue considered by this programme, participants discussed their perceptions of childhood obesity in the local setting.

On this point, a central finding was that different interview and focus group participants offered diverse opinions and observations regarding the current

burden of childhood obesity in Guernsey. The distinct views presented by various stakeholders spoke to marked differences in levels of understanding of and exposure to this issue. Healthcare professionals were much more likely than other participants to profess that childhood obesity represented a significant public health concern in the local setting. Furthermore, healthcare professionals were more likely to indicate the view that obesity is influenced by a complex range of factors that extend beyond individual lifestyle choices.

However, parents and teachers repeatedly suggested that the burden of childhood obesity was less prominent in Guernsey than in other areas. These two groups also felt that this burden was dependent on the particular cohort considered; thereby suggesting that childhood obesity was not seen as an established, constant issue. Notably, the pilot GCMI measurements found that nearly 30% of participant children were either overweight or obese. This implies that opinions communicated by parents and teachers included in the GCMI evaluation did not accurately reflect the true extent of the issue in Guernsey.

The four aims of the GCMI that were related by participants demonstrated close, if not direct, alignment with those that I had identified in advance of the pilot programme: feasibility, overall utility, information and acceptability. This suggests clear communication amongst various stakeholders and that these stakeholders approached the pilot programme with a similar vision in mind. However, with one exception (feasibility), these aims were not formally acknowledged as outcomes of the GCMI. Several participants described the pilot programme as a *"success"* and none identified unrealised aims. Therefore,

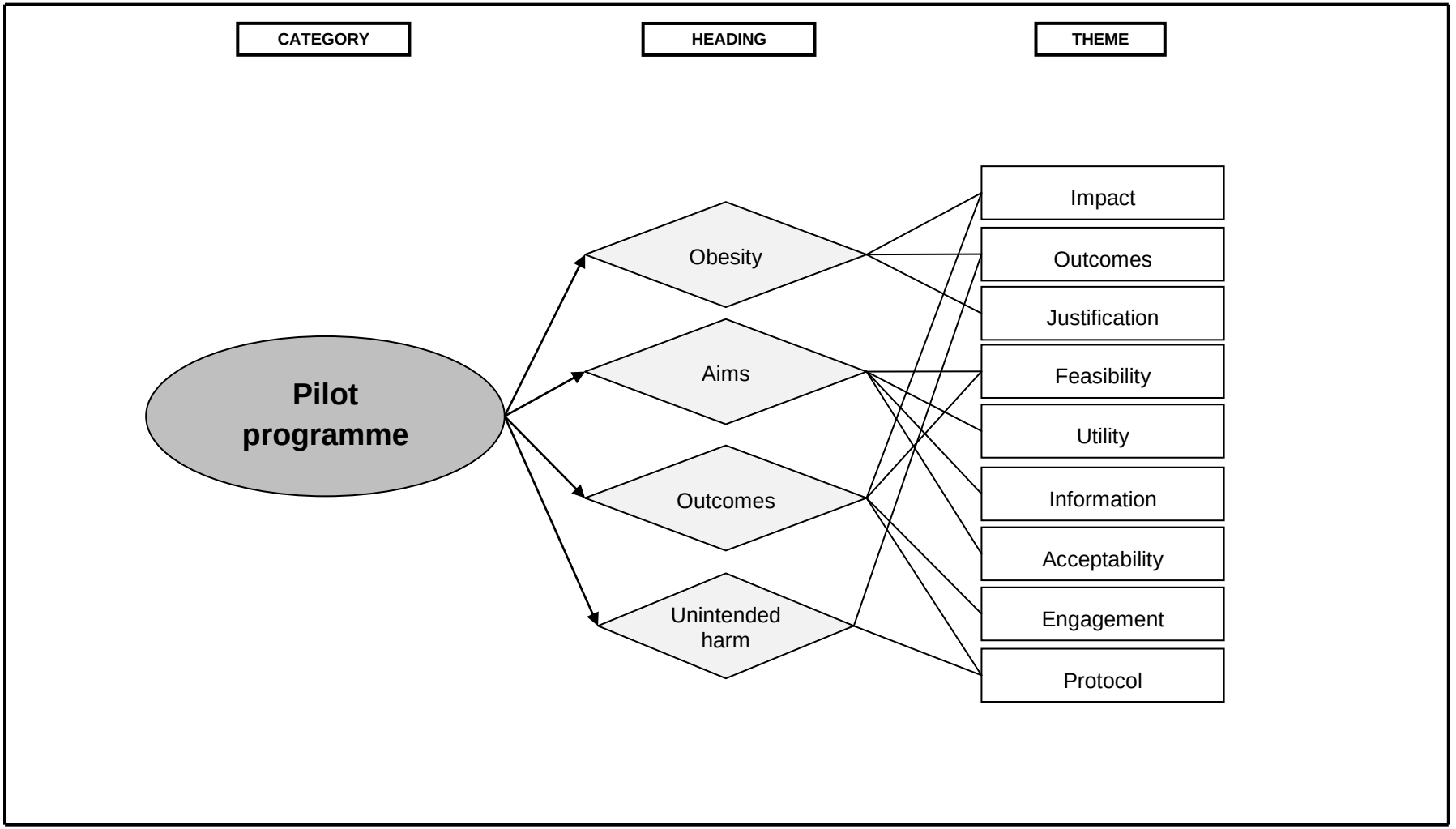
one possible explanation for the inconsistency observed between stated aims and outcomes was that participants felt that the achievement of certain outcomes, such as provision of information around obesity prevalence, was implied and did not require explicit acknowledgement.

A common view was that the measurements caused minimal disruption within the primary schools. Furthermore, responses stressed that the programme had been executed smoothly and highlighted perceptions around high levels of participation from eligible children. Where identified, participants defined that the features critical to the GCMI's perceived success were a standardised protocol and engagement across all stakeholder groups.

Finally, the issue of unintended harm was directly addressed in this evaluation. There was no evidence to suggest adverse outcomes from this programme, which was consistent with observations and direct reports obtained at the time of the measurements themselves. On this point, it is important to note that this evaluation only considered perceptions of short term unintended harm resulting from the GCMI. Participants proposed that features of the GCMI protocol, which supported a sensitive and normalising approach to measurement processes, had contributed to this outcome. Certain participants also communicated that their expectations for unintended harm from the GCMI had been shaped by previous exposure to media and other anecdotal reports on the NCMP in England.

A summary of key themes in this category is provided in Figure 5.3.

Figure 5.3: Summary of themes – 'Pilot programme'



5.3.5 Category: 'Programme development'

Headings within this third and final category comprise: scalability of the GCMI; potential uses of data produced by the programme; and sustainability of the GCMI in the local setting.

5.3.5a Scalability of the GCMI

Participants reflected on factors that might challenge or promote expansion of the GCMI to represent a population level CMP.

First, participants outlined that resources, fiscal and others, were the primary consideration when deliberating possible scalability of the GCMI. Participants suggested that the argument in favour of supporting the programme was clear, due to the inherent value of programme deliverables. However, this argument was not likely to alleviate initial concerns regarding demands on cost and time.

(Question: What is your main concern regarding the potential expansion of the programme?)

> *"Perhaps the only thing would be about making sure that it does continue and making sure that we give it enough support and time …. We need to make sure that we're saying, 'Yes it is important and it does need to happen,' - there needs to be a proper system."*
>
> - HSSD staff member

> *"Probably the cost and the time cost. I don't think it's going to be hard to convince people of the value of it once they've seen it …. but I think there will be big concerns about the cost initially."*
>
> - Public health epidemiologist

Some participants simply stated the importance of adequate resource provision, whilst others detailed that the required resource was already available as this had been incorporated into the Strategy's budget for the coming years. Responses also emphasised the perceived value of the new specialist weight management nurse for Guernsey, suggesting that this post was itself a critical and existing resource for the GCMI.

> *"Well, the money is there in the Obesity Strategy, it's <pause> well, the money is there for the school nurse post. There isn't a particular budget that says child measurement programme but there is money in the Strategy for all sorts of things …. So, yeah, I think money, at least initially, is there."*
>
> - HPU manager

> *"I mean the infrastructure is there; the school nurse infrastructure is there and the specialist school nurse is now in post and the funding for that will be on-going and they're in a unique position …. So I think to a certain extent our funding has all been assumed."*
>
> - Obesity Officer

Engagement arose as the key theme when participants deliberated factors that might promote the outcome of programme expansion. Responses alluded to the importance of consistent communication across multiple levels; however, participants identified that engagement with schools was particularly critical. Respondents put forth the view that engagement from schools could also act to endorse the programme to parents, therefore helping to settle possible concerns from this group. The alternative view was that communication to parents did not need to be prioritised as this group had a less direct involvement in the programme than schools or other stakeholders.

(Question: What might help to promote expansion of the programme in Guernsey?)

> ***Nurse 1:*** *"I thought about talking to parents' groups and at staff meetings, coming in at that level. In fact, I think you'd have to come in at lots of levels really to be effective, so it's informing people."*
> ***Nurse 2:*** *"Basically it's the information at any level, any opportunity really. But I think the key people that you'll have to convince that it's good is the schools themselves, 'cause the parents …. they don't really know what it is half the time. I know that sounds terrible!"*
> ***Nurse 3:*** *"That's the only thing – getting the schools on board."*
> ***Nurse 2:*** *"The people you've got to sell it to are the schools themselves and the staff, because they're the ones that are going to be inconvenienced rather than the parents."*
>
> - Excerpt from focus group with school nurses

> *"It's an obvious statement really, but I guess just as a broad observation it's going to be key to have the support of the teachers, and the head teachers, and the Education and Health and Social Services Departments."*
>
> - Former Obesity Officer

Responses also highlighted that a standardised protocol would be required for the programme to be successfully extended to include all primary schools in Guernsey. This standardisation was felt to be central to maintaining standards, consistency and programme credibility. There was broad endorsement of the existing protocol, which was seen as a template from which the GCMI could be further developed.

> ***Nurse 1:*** *"I think you would have to be really clear. I think you'd have to have almost the same boundaried approach, otherwise it could become … 'You can use that cupboard over there this morning'…. I think you have to be very, very clear about what you're doing. Because otherwise could become a bit, not casual, but a bit too comfortable almost. I think you have to be very careful but I think that's the only thing I could see being a problem."*

> ***Nurse 2:*** *"I think you've got a very clear template to follow really. It sets it out for you really. I think with the two schools that took part, the other schools are very similar so it wouldn't take much to be able to replicate it and move it on to more schools."*
>
> - Excerpt from focus group with school nurses

However, possible changes to the existing protocol were also considered. In particular, participants contemplated the option of a sampling rather than a census approach. Given Guernsey's small population size and the perceived benefits of a more inclusive method, participants communicated a clear preference for the latter option.

> *"The issue of I suppose sample size is always difficult. You know, you end up with your best estimates; the numbers aren't going to be that big anyway. In Guernsey you're only talking about 6,000 children for the whole island, I think, in every age group. So the numbers are relatively small, so yeah; I think we should try and measure everybody….."*
>
> - Public health epidemiologist

> *"I can see it [sampling] as a possibility. I would be interested to know how we would choose the sample. …. My preference would be that we do all children. I think it is a big plus, that we're able to say we've measured all of the children in this year group. This is it. We are in a position in Guernsey that we could do that, so we don't have to do a representative sample. We could literally measure all the children."*
>
> - HPU manager

Overall, participants felt that expansion of the current programme was a feasible option in the local setting. Both programme- and Guernsey-specific features were important in shaping this view. First of all, the GCMI was believed to be minimally disruptive in schools. Also, participants stressed that Guernsey's defined population was key to achieving further programme development.

(Question: What are your thoughts on whether the programme can be expanded in this setting?)

> ***Teacher 1:*** *"I don't see why not, even in a big school like this. I think it was really minimal disruption."*
> ***Teacher 2:*** *"It was no more disruptive than going to have your eyes tested, or going to see the school dentist, was it, really? In fact it is less. Far less. It was less disruptive than them being taken off for an appointment somewhere."*
>
> - Excerpt from focus group with teachers

> *"I think because of the small numbers in Guernsey you could quite easily aspire to measuring everyone."*
>
> - Public health epidemiologist

> *"Well, there's only 650-odd in each school year. I think it's a feasible number …. I would like to think that we do do it all and it's possible. Guernsey makes it possible."*
>
> - HPU manager

Finally, in considering the potential scalability of the GCMI, participants acknowledged that the Strategy had laid out a commitment to improve local monitoring of weight status in children. Therefore, the GCMI was perceived as means through which this obligation could be fulfilled.

> *"I think it would definitely be something that the Obesity Strategy Group could say, 'This is one of the things that we've done in order to meet our objectives.' Yeah, I mean it really shows that they're seeing through their commitments."*
>
> - Public health epidemiologist

> *"I mean, the Strategy's been approved and it's a requirement of the Strategy, so in some format we have to find the funding to progress that."*
>
> - Obesity Officer

5.3.5b Utilisation of data produced by the GCMI

As participants considered how the programme might be taken forward, they discussed proposed uses for and distribution of data produced by the GCMI. A core consideration was the planned target audience for these data: broadly, the protocol for data sharing. In general, responses indicated a preference for a wide-ranging audience encompassing health and non-health professionals, together with the wider Guernsey public. However, mixed and often divergent views were expressed. Participants highlighted the perceived need to consider details around how data would be communicated to different groups in order to minimise possible adverse reactions to this information. In particular, responses related concern that a decision to share population level results with the general public might impact on future participation rates.

(Question: How do you think data produced by this programme can best be used?)

> *"I think you come in at every level; I see that as the way forward. …. You need to come in at lots of different levels, giving the same message but in different ways maybe."*
>
> - Head school nurse

> *"…. hopefully will be built into a much bigger picture of obesity in general health which is children- and adult-layered. .... We don't necessarily have to stay within the confines of just informing our health services and our education services."*
>
> - Former Obesity Officer

> *"Because we're using it at a population level …. I don't think it's useable on an individual level. I don't think we could use it as a way of highlighting people to follow up …. we want to make sure that*

people taking part don't get any sense that that result says anything about them personally and their child."

- Obesity Officer

"…. if you did the study on the Monday and then on the Tuesday announced to the press what the results were, how the people who'd taken part would feel, all those parents? They would be shocked and feel awful and then the next time they came to take it up, they'd be saying, 'I don't want my child to be in that study, thank you.' So I think we've got to be really careful about how we put the figures out…."

- HSSD staff member

Participants contemplated how various approaches to data sharing would impact on eventual uses for the obtained data, thereby providing the rationale for proposed views on the protocol for data sharing. First, respondents identified that sharing school level data would facilitate a degree of internal evaluation. Evaluation was again described as a central role for the GCMI, but participants also acknowledged possible sensitivities associated with this approach. Specifically, there was concern that comparison of results across different schools could promote competition that *"might not be healthy"* and/or highlight inequalities, thereby threatening controversy.

Second, participants put forth and generally endorsed the idea that summary GCMI data should be shared with local GPs. Here, the idea was that this might promote engagement between public health and primary care. Finally, participants that supported broad dissemination of GCMI results justified this decision by referring to perceived obligations to the Guernsey public, given that the programme would be funded by public money.

5.3.5c Sustainability of the GCMI

Finally, participants offered views on various factors which could either enhance or challenge the GCMI's continuance in the longer term (sustainability).

In the first instance, participants described that the programme could best be promoted by demonstrating the utility of data and other outcomes from the GCMI. Participants outlined the value of a dataset that would enable longitudinal comparisons and defined this as an incentive to continue the programme. However, the need for more immediate outcomes was also recognised. On this point, participants indicated that it would be important that the GCMI did not function in isolation. Instead, the programme should contribute directly to development of intervention initiatives.

(Question: How do you think sustainability of the programme can be protected or enhanced?)

> *"I think the schools need to be aware that we valued their input and the results are really important and now we can do something with them …. there is a reason for it. Yeah, identifying the need and making it clear to them."*
>
> - Head school nurse

> *"There is that fact that once you've got a sufficient amount of data built up there's a huge incentive to keep going with it. When you've got 20 years of data, you really don't want to stop doing it; you want to keep going."*
>
> - HSSD staff member

> *"…. I think the value of surveillance is clearly extremely important …. we need to think not only of surveillance but what we are doing about*

things …. I suppose that's always at the back of my mind when we're running these programmes."

- Director of Public Health

"…. I don't think we need huge amounts of data; we just need to know of the children we've got that are underweight and those that are overweight. …. If we can find that stuff out, then I think that is enough to keep the programme going. That's what we need to know, anything else is a bonus."

- HPU manager

Furthermore, participants stressed the role of engagement in enhancing the sustainability of the programme. Many spoke of the importance of inclusivity and communication but also a positive approach when collaborating with schools, citing lessons learned from earlier local initiatives. Respondents also acknowledged the risk that accompanied programmes involving multiple different stakeholders and highlighted the need for communication across these groups.

"I think keeping everyone very informed and allowing people to feed back into the programme as far as is possible so that they feel that their point of view has been raised. …. You have to start from the beginning all the time. I think as much knowledge of exactly what's happening and why, rather than just perceived knowledge. <laughs>"

- OSG member

"Because it's so difficult with all these different departments and things and everyone working in isolation. Integration, I think, would be absolutely key."

- Former Obesity Officer

The importance of the protocol adopted by the programme was apparent across responses. Participants communicated that a standardised, professional

approach was vital for the programme to be taken seriously by schools. Moreover, responses outlined the view that this approach would protect the accuracy and validity of the central programme outcome: population level data.

> *"If there's any doubts ever sewn …. that the way you're doing it is not valid and reliable, then they won't take the results of the data seriously. …. We do it properly or we don't do it at all. That was why I was worried about doing it in a broom cupboard."*
>
> - Head school nurse

> *"I think we used the same type of format. I think if schools are presented with the same, very clear instructions and guidelines, they would respond to that. …. if you actually 'big it up' <laughs> basically. If you go into the schools and sell it, they'll know what you're up to and they'll understand that you're taking it seriously, therefore they should too."*
>
> - HSSD staff member

Also, participants repeatedly suggested that the GCMI should reflect a mandated programme in Guernsey. Overall, there was a strong sense that this formal commitment from States' Departments would be critical to securing the programme's future.

> *"I think by the States adopting it as an essential part of the school year and the Education Authority mandating it. I think that's going to make it sustainable."*
>
> - HPU manager

> *"I think for it to be mandated. I think for Education and Health to accept that if we're going to put all this resource and effort into this it has to be an essential part of the school year."*
>
> - Head school nurse

"I think a commitment from the Education Department …. I think that's the key thing: to get this commitment from the highest level…."

- HSSD staff member

Two further themes arose within this heading. Some participants put forth the idea that programme sustainability was contingent, at least in part, on prevalence figures themselves. However, there was no further elaboration as to which direction of trend, whether upward or downward, might help to protect programme viability. Finally, responses suggested that the possibility of unintended harm posed a challenge to programme sustainability and would require close monitoring.

5.3.5d Summary: 'Programme development'

Within this category, participants reflected on factors relating to the scalability and sustainability of the GCMI, together with the proposed approach to data sharing and later utilisation. Themes of stakeholder engagement and the programme's protocol arose in findings across all three headings.

When contemplating the potential expansion of the GCMI, there was much discussion around the need for communication and collaboration amongst various programme stakeholders. Whilst a broad target audience was identified, participants outlined that engagement of schools was critical, for two reasons. First, schools faced the greatest chance of being inconvenienced by the programme. Second, schools were seen as an avenue of access to parents. Therefore, if the GCMI was endorsed by schools, parents might be more likely to allow their child to be measured.

When discussed in relation to programme sustainability, engagement again arose as an important theme. Participants stressed the need for inclusivity and highlighted that encouraging collaboration amongst stakeholders would promote a sense of programme ownership in the local setting. In this study, it emerged that the approach to communication might also impact on levels of engagement, and subsequent programme viability. Here, a positive, pragmatic attitude was endorsed as an effective technique within the proposed setting.

The GCMI protocol was also an element critical to programme expansion and longer term sustainability. With respect to the former aspect, the protocol employed by the pilot CMP was identified as a template and platform for the programme's future. The view was that, by adopting a standardised approach to measurements, programme coordinators could maintain standards across the distinct schools, thereby enhancing overall programme credibility. As a result, schools might be more likely to meaningfully engage with the GCMI.

Protocol was also a key theme relating to programme sustainability. Participants acknowledged that the programme must deliver reliable and accurate data if it were to persist. On this point, a standardised measurement protocol could make a crucial contribution. Taken further, the consensus view amongst included stakeholders was that the GCMI should be incorporated as a routine, mandated component of the school year.

There was no clear agreement around the approach to distribution of data in the GCMI, with different stakeholders suggesting different intended audiences for

the data. Generally speaking, the distinct proposed data recipients were associated with identified programme roles including information, engagement, raising awareness, and intervention. Therefore, this highlighted different stakeholder priorities for the programme and hinted at inconsistency in the perceptions of what the GCMI was intended to achieve.

Certain participants, including parents and teachers as well as some healthcare professionals, advocated distribution of results to individual families. This reflected these stakeholders' overall vision for the programme: one that incorporated, or even emphasised, an individual level approach. However, the suggestion was that if feedback of results to parents was adopted, this should be conducted on a request-only basis.

In general, expansion of the GCMI was described as a feasible undertaking for Guernsey. Participants considered a number of factors, but identified that Guernsey's small size and defined population meant that population level measurements were achievable in this locale. Furthermore, this belief was reinforced by perceptions that the programme was straightforward and had not caused significant disruption to schools or other processes.

Scalability of the programme was also supported by the professed availability of resources for this programme. With few exceptions, this availability was described as pre-allocated and, importantly, adequate. In addition, strong focus was placed on the perceived contribution of the specialist weight management school nurse, who had been appointed immediately before this evaluation took

place. This emphasis highlighted the importance of central coordination and leadership for this programme.

Finally, the GCMI was again described as a means through which selected agreed requirements, as laid out by the Strategy, could be fulfilled. This perceived obligation contributed to certain beliefs around programme expansion and underpinned proposed plans for data dissemination. Ultimately, this observation acted to confirm the close association between the GCMI and wider Strategy. This association reflects an important consideration for stakeholders when making decisions regarding the programme's future.

A summary of key themes from this category is provided in Figure 5.4. A full summary theme map is presented in Figure 5.5.

Figure 5.4: Summary of themes – 'Programme development'

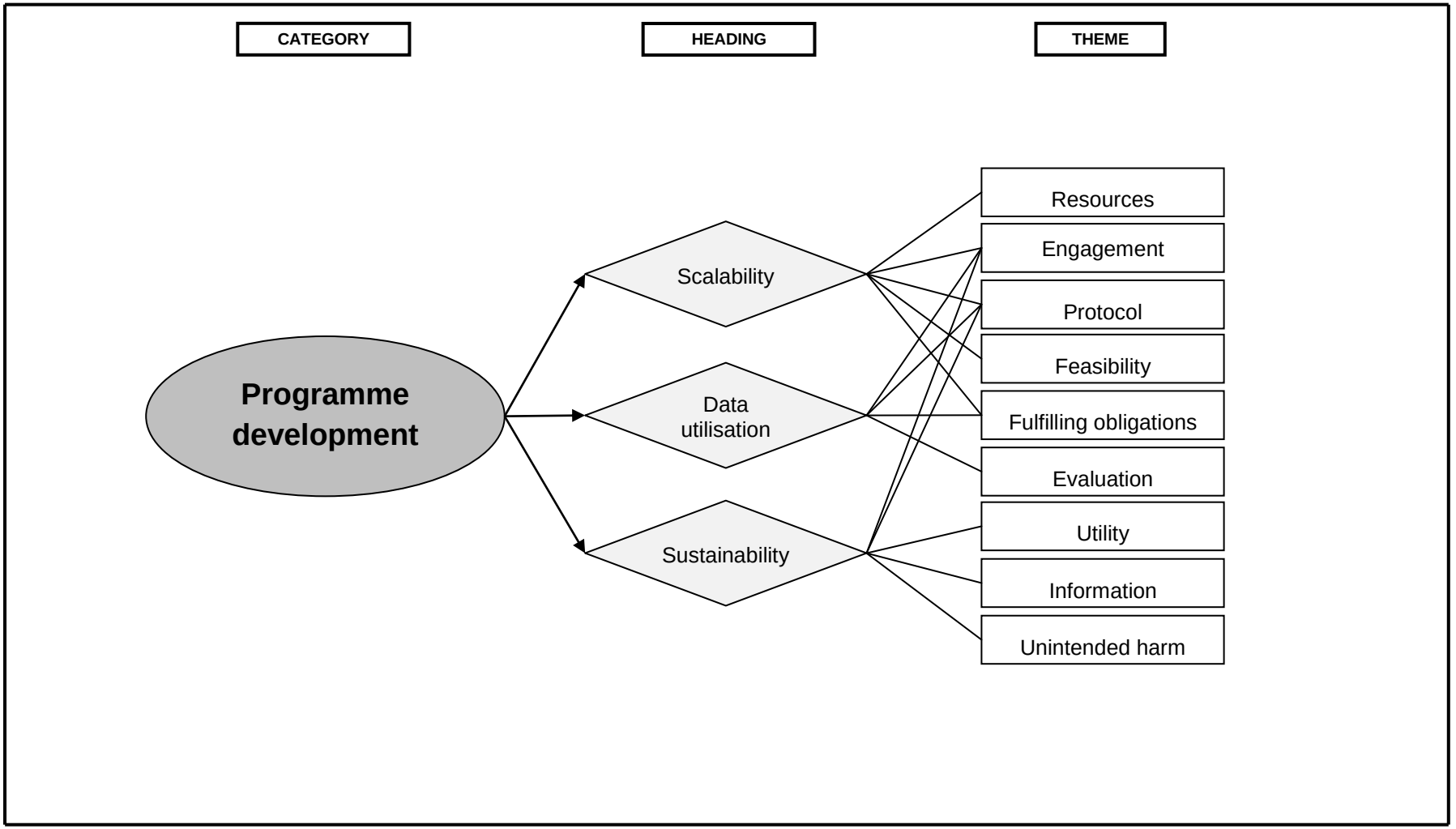
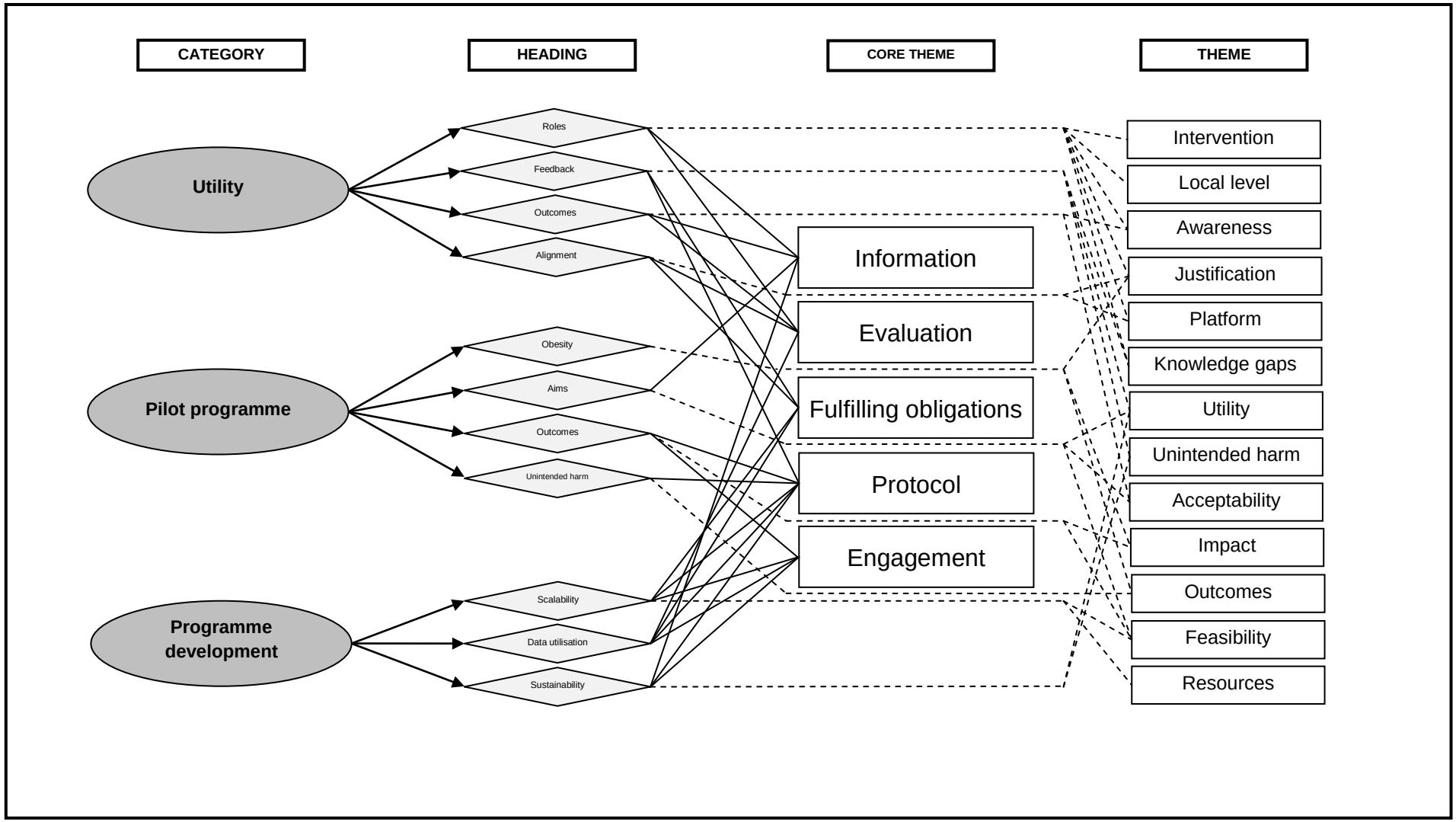


Figure 5.5: Summary theme map – GCMI evaluation



5.3.6 External review of the GCMI

This section describes findings from all three distinct elements of the external review of the GCMI, as outlined in section 5.2.2f.

5.3.6a Review of media reports relating to the GCMI

Here, media coverage of the GCMI is described. Press releases were disseminated to all local press agencies at three time points in the programme: in advance of parent/school information evenings; during actual measurements; and during programme evaluation. I prepared all press releases. Following an explicit request from members of the OSG, including the Director of Public Health, results from measurement or evaluation processes were not communicated to the media at any stage of the programme. The GCMI received coverage in the local media at each period outlined above.

These reports appeared across various press mediums as follows:

- One report on ‘Channel Television’, accompanied by a summary article on the channel’s associated website;
- Three live interviews for British Broadcasting Corporation (BBC) Guernsey Radio. All interviews were re-played over the day and, in one instance, a supporting report appeared on the BBC Guernsey website;
- One pre-recorded interview for ‘Island FM’;
- One article in Guernsey’s only local newspaper: ‘The Guernsey Press’.

In addition, a separate brief report relating to the GCMI appeared on a local radio website, but was not associated with any recent press contact.

'Channel Television' is broadcast across the Channel Islands and is also available for access online in the UK. Local radio and newspapers are distributed across Guernsey alone; however, access to their affiliated websites is not restricted.

Therefore, the GCMI received a moderate degree of media attention, which suggested local interest in the pilot programme. Most coverage occurred before measurements took place, with only one radio interview broadcast after this time. Copies of all available articles that appeared in newsprint or on local media websites are available on request.

Content in each identified report related to that seen in associated press releases, which were often directly quoted. Articles and reports included limited further content, although Guernsey's Director of Public Health was approached on several different occasions to offer comment on the programme. Therefore, it was not possible to analyse the content of these reports in depth and these reports did not contribute significant information to the broader GCMI evaluation.

However, the degree of coverage and actual report content did suggest that the programme was generally well received in Guernsey. Specifically, there was no evidence of reports that were critical of the GCMI. There were no reports that

suggested controversy or unintended harm associated with the programme and no public comment from local stakeholders regarding potential expansion of the programme. Of note, a news item that appeared on the website of a local radio station suggested that summary results arising from the GCMI were *"pleasing"*. However, no results or statement relating to the results from the pilot programme were released to media contacts.

5.3.6b Review of the GCMI by an independent consultant

Independent assessment of the GCMI was incorporated as one component of a report produced by an external consultant: Professor Harry Rutter [340]. This report included a review of and recommendations for the Obesity Strategy and was prepared for the OSG in Guernsey. It was not intended as an academic report. This report was not distributed beyond the OSG, though I obtained permission from the author to access the document.

Of note, I know Professor Rutter in the professional capacity and he contributed to the NCMP case study described in Chapter Three. Furthermore, Professor Rutter was instrumental in establishing the NCMP and has been involved in the development of other CMPs. Therefore, he has vast experience and recognised expertise in this area. Professor Rutter did not directly contribute to the development of the GCMI and there was no communication between us in the period February-August 2011, during which the GCMI measurements and evaluation were conducted.

All interviews that contributed to Professor Rutter's report were conducted on a single day in August 2011, approximately two months after completion of GCMI evaluation processes. This report did not include further information on methods used to analyse the interview data. Most individuals interviewed for Professor Rutter's report also participated in the GCMI evaluation. This was expected as there are simply a limited number of individuals working in the area of obesity in Guernsey.

This report made particular reference to the GCMI on four separate occasions. The report highlighted the importance of monitoring weight status in children and endorsed Guernsey-wide implementation of the GCMI, stating: *"The pilot weighing and measuring programme for schoolchildren on the island has been a success; rolling it out more widely presents several opportunities"* [Ibid, page 3]. The report did not offer any suggestions for or modifications to the GCMI. A final recommendation from this report was that *"[g]ood data systems are essential to underpin effective action. The child measurement programme piloted by Karina McHardy should be extended across all schools on the island"* [Ibid, page 21]. Other than the earlier assertion that the pilot programme had been a *"success"*, no justification was provided for this recommendation. This report did not include quotes from interviews that directly related to the GCMI.

Overall, this report provided an alternative, external perspective on the pilot programme and offered broad endorsement of the GCMI. However, due to the nature and scope of this review, the report did not contribute significant depth to the GCMI evaluation.

5.3.6c Decision from the OSG regarding the future of the GCMI

The summary recommendation regarding potential programme expansion was communicated to the OSG in a report I prepared in January 2012. In May 2012, four months after receipt of this report, the OSG held a closed meeting to discuss the future of the GCMI. At this meeting it was agreed that the programme would be introduced to all primary schools in Guernsey. Population-wide measurements are due to commence in May 2013 and will be conducted in both public and private primary schools on the islands.

The programme will be coordinated by the specialist weight management nurse and will adopt the measurement protocol utilised in the pilot GCMI. Furthermore, the programme will use an opt out consent model and feedback of individual results will be provided only if requested by parents. Programme coordinators are using a phased approach to implementation; therefore, school-level participation will not be mandatory in the first year. This approach is not consistent with my recommendation for the GCMI, or other evidence [375].

The OSG's decision communicated endorsement of the design, protocol, and consent model of the GCMI by the Group ultimately responsible for the programme's funding and delivery. When considered in isolation, this component of the external review did not offer significant additional information. Nevertheless, this decision adds value by contributing an external perspective on the programme and by demonstrating consistency with recommendations arising from internal evaluation processes (discussed below).

5.4 DISCUSSION

This section includes overall recommendations regarding the future of the GCMI. The rationale for these recommendations, which relate to programme expansion and design, is argued through presentation of summary findings from all evaluation processes. This section concludes with a discussion of the limitations of this study. A comparison of core findings from this study and the NCMP case study is presented in Chapter Six, together with discussion of recommendations regarding certain features of the protocol and the broader administration of CMPs.

5.4.1 Summary findings, including recommendations regarding the future of the GCMI

The overall recommendation regarding expansion of the GCMI was developed after analysis and review of findings from elements across all four components of the evaluation framework. Importantly, results and conclusions drawn from earlier components of this research also contributed to this recommendation.

The recommendation was that the GCMI should be introduced as a Guernsey-wide programme in all local primary schools. The GCMI will facilitate the collection and analysis of local, current and accurate BMI data across two age groups of children in Guernsey and will fulfil a central recommendation of the Obesity Strategy. Furthermore, the programme offers the possibility to evaluate new or existing weight-related initiatives designed for Guernsey children. The

GCMI could promote engagement on the issue of healthy weight status across various States' Departments. These include but are not limited to HSSD and the Education Department, together with local primary healthcare services. The anticipated functions of the GCMI represent four of five core themes arising from the interviews and focus groups: information; fulfilment of obligations; evaluation; and engagement.

The fifth and final core theme arising from these elements of the GCMI evaluation related to the importance of programme protocol. Here, a defined and standardised approach to the collection and dissemination of obtained data was critical to the perceived credibility and acceptability of the programme. Moreover, an established protocol may contribute to programme sustainability by facilitating valid longitudinal comparisons of results and protecting against possible unintended harm.

A further recommendation was that the GCMI should be expanded in accordance with the measurement protocol utilised in the pilot programme. This protocol was based on best available evidence and was well-received by local stakeholders. Additionally, findings from the process analysis confirmed that close observance of the protocol reflected an achievable goal: actual processes undertaken during the anthropometric measurements demonstrated strong adherence to stated GCMI guidelines.

Interview and focus group results, as well as outcomes from elements of the process analysis, suggested that data collection for the GCMI was a time

efficient process with minimal requirement for significant additional resource. Overall, a recurrent theme of this evaluation was that expansion of the GCMI reflected a feasible undertaking for Guernsey. Together with outcomes outlined above, this feasibility was enhanced by four distinct factors. These included: (1) an existing, tested, and evidence-based measurement protocol; (2) engagement from key stakeholders; (3) local features, including population size; and (4) adequate resource provision. This latter point was reinforced by four further factors: pre-allocated funding; the appointment of a local specialist weight management nurse; availability of measurement equipment; and templates for all required programme documentation.

The GCMI evaluation suggested that the programme was accepted in the local setting and did not cause significant disruption. Ninety percent (90%) of all eligible children participated in the measurements and there was no evidence of unintended harm associated with the pilot programme. This finding is consistent with current evidence that indicates that routine child measurement conducted within schools does not lead to either an increased incidence of weight-related bullying or general body image concerns [236,240,251-253,376]. In addition, the GCMI was received with interest and reported without controversy by local media agencies.

There are three further arguments which favour expansion of the GCMI. First, results from the pilot measurements confirmed that childhood obesity is a significant, current public health concern in Guernsey. Percentages of overweight and obese children in the included sample were comparable with

prevalence figures from England [278]. Therefore, this issue merits continued monitoring and subsequent management. Second, expansion of the GCMI was recommended by an external consultant with established expertise in the area of childhood obesity [340]. This recommendation followed review of Guernsey's Obesity Strategy and independent examination of local responses to the pilot programme. Third, the OSG were presented with results from the GCMI evaluation and subsequently approved a proposal to formally introduce the programme at the population level in May 2013. This decision communicated general approval of the GCMI and emphasised the perceived importance of its key functions in the local setting.

Findings from discrete elements of this evaluation advocated that the GCMI should be adopted as a surveillance programme. Therefore, the programme's remit should not incorporate routine provision of individual BMI results to parents. Across all interviews and focus groups, local stakeholders identified that the primary roles of the programme would be to: (1) deliver population level data on childhood weight status in Guernsey; and (2) provide evaluation of initiatives directed toward management of obesity. Furthermore, local stakeholders outlined in explicit terms that the success of the programme would be assessed against its ability to deliver on these two roles. To promote long term programme sustainability, it is critical to prioritise achievement of stated aims of the GCMI. Therefore, available resource should be directed toward delivery of surveillance data and facilitation of evaluation initiatives, rather than provision of individual feedback letters.

Analysis of findings from the GCMI evaluation revealed that the programme was neither intended nor expected to function as an intervention. Indeed, interview and focus group participants indicated that a chief concern relating to the programme was that the GCMI might be inappropriately used as a solution to the local obesity problem. This result acts to validate the recommendation that the GCMI should be implemented as a surveillance programme. Moreover, this recommendation is further evidenced by the lack of robust evidence around the effectiveness of routine feedback of individual BMI results: possible benefits of this practice remain theoretical. An important caveat to this current recommendation is that programme design may evolve with the emergence of new evidence or international guidelines, or changing local priorities.

Further recommendations regarding specific features of CMPs, including the GCMI, are described in Chapter Six.

5.4.2 Limitations of the study

There are certain limitations to consider when interpreting findings from this evaluation. These limitations apply to the research design and methods, including the approach to sampling, as well as interpretation of findings from this research.

First of all, the GCMI evaluation was primarily conducted on an internal basis, which may have reduced overall objectivity. However, external review

processes were included and were used to add depth, neutral input and an alternative perspective to the analysis.

Focus groups reflected an appropriate method for this research; however, focus groups are also associated with important limitations. A recognised concern with focus groups is that confidentiality may be compromised [365,366]. This was a valid consideration given the close-knit community in which this research was based. In focus groups, dissenting views can be marginalised or, conversely, given disproportionate weight in the analysis. There may also be difficulty distinguishing between individual opinion and findings from the group discussion [Ibid]. This is a particular concern if focus groups include individuals with a strong or dominant view on particular subjects [373].

To minimise the impact of these methodological weaknesses and to avoid possible ‘group think’, focus groups in this study included participants that displayed comparable characteristics and exposures, but were not similar in all respects [366,373]. Furthermore, to avoid individual comments being taken out of context, focus group data were presented as excerpts, rather than isolated quotations.

Focus groups are subject to researcher bias. These groups may be driven by a researcher’s own interests and priorities and risk a situation whereby certain participant views may be overlooked [368]. This represents an issue of concern in other qualitative research methods. In this study, this limitation was addressed in part by utilising a restricted number of open-ended questions in all

focus groups [373]. Additional concerns with focus groups include that this method is not a substitute for natural group conversation, focus groups may emphasise interesting rather than important findings, and they risk limited reproducibility and generalisability [368,373].

Interview and focus group participants were selected to enable evaluation of the GCMI from the standpoint of multiple key stakeholders, thereby providing a well-rounded summary of how the programme was viewed and received in the local setting. A unique advantage of conducting research in Guernsey was that all local stakeholders with a prominent role in the development and delivery of the pilot GCMI were accessible and able to be included in the evaluation process. Despite this inclusive approach, Guernsey has a small total population and participants did represent a select and relatively small pool of individuals. Therefore, results should be considered within the context of the somewhat narrow scope of this study.

In addition, this study may have been affected by selection bias as participants were from non-random groups. Across the focus groups and interviews, there were more female than male participants: indeed, only one interview participant, one parent and four OSG members were male. This gender imbalance amongst participants may limit the generalisability of findings. This outcome was expected as all teachers and nurses involved in the GCMI were female, most other key stakeholders were female, and focus groups with parents were conducted during working hours. In the GCMI evaluation, priority lay with maximising inclusion of key local stakeholders; therefore, ensuring equal

representation across both genders in focus groups and interviews was a lesser consideration. Moreover, individuals were invited to participate in the GCMI evaluation based on their role, rather than demographic variables.

Participation bias was a further consideration in this study. Parents that participated in the focus groups were offered a £10 voucher in recognition of their time. This compensation may have influenced the decision of certain individuals to contribute to this study and led to an unbalanced sample of participants. Additionally, whilst information about the GCMI evaluation was advertised to parents of all eligible children using multiple routes, parents that had requested individual feedback received an extra information sheet with the feedback letters themselves. There was no intention to target these individuals for inclusion in the study; this simply reflected an additional opportunity to recruit participants. Ultimately, all parents in one focus group (n = 5) had requested feedback, whilst none of the parents that attended the second focus group (n = 6) had requested this.

Analysis of focus group data did not reveal any notable differences in themes that were developed from responses across these two groups. This outcome suggests that possible participation bias resulting from the approach to recruitment did not have a significant impact on eventual findings.

In this study, the majority of transcription was performed by a single professional transcriptionist. However, I transcribed three focus groups, therefore risking some inconsistency in this process. Of note, I cross-checked

all interviews and focus group transcriptions against the original audio recordings and only minor transcription errors were detected.

The GCMI pilot tested a CMP that was intended to be delivered at the population level in the local setting. Therefore, strong emphasis was placed on securing engagement and direct involvement from local stakeholders. Despite this, the GCMI ultimately reflected an individual research project and was conducted under highly structured circumstances. In this context, it is possible that findings did not reflect 'real world' experiences.

Finally, as discussed earlier, the GCMI delivered the first set of local data on obesity prevalence in this setting. This was an output that was greeted with significant enthusiasm by local stakeholders. This enthusiasm may have obscured actual reflections on the pilot study, therefore portraying the GCMI in an artificially positive light. However, all interviews and focus groups were conducted at least six weeks after completion of the measurements, which allowed for a period of distance from these results.

Other relevant limitations associated with qualitative research methods were described in Chapter Three, section 3.4.3.

5.5 SUMMARY

This chapter described the processes, findings, and subsequent conclusions and recommendations from the GCMI evaluation. The GCMI evaluation aimed to assess the perceived utility, feasibility, acceptability and sustainability of a CMP in Guernsey. This evaluation also considered questions regarding possible unintended harm arising from the pilot programme. The GCMI evaluation was designed to inform multiple, specific and pre-established audiences. Also, the evaluation was used for a number of pre-defined purposes, including the development of a summary recommendation for the OSG regarding the programme's future.

Elements across all four stages of the public health planning and evaluation cycle were incorporated into the GCMI evaluation, which also comprised both internal evaluation and external review processes. Triangulation of research methods was used to enhance the richness and comprehensiveness of findings and to minimise the possible impact of researcher bias.

Interviews and focus groups with key stakeholder groups represented the primary components of the GCMI evaluation. Therefore, this chapter emphasised findings from these two elements. These interviews and focus groups explored questions concerning: (1) local perceptions of expected roles and outcomes from CMPs; (2) reflections on the pilot programme itself; and (3) future development of the programme, including examination of the potential for scalability and sustainability of the GCMI.

Findings from this evaluation suggest that the GCMI reflected a feasible, acceptable and sustainable undertaking for Guernsey. To maximise programme sustainability in this setting, the GCMI must ensure delivery of expected outcomes and stakeholder engagement, maintain a standardised protocol, and minimise potential harm. Key expected outcomes for the programme, including provision of accurate local prevalence data and capacity for evaluation of external initiatives, were seen as critical to drive and justify further action on obesity in the local setting. Therefore, the perceived overall utility of the programme was substantial. There was no evidence of short term adverse outcomes arising from the pilot programme.

This evaluation highlighted the importance of availability of local data on public health issues. The GCMI evaluation also revealed various Guernsey-specific factors, including defined population size and established stakeholder connections, which can impact on the feasibility, design, and potential scalability of a CMP. Furthermore, this evaluation suggested a symbiotic relationship between the GCMI and the Obesity Strategy for Guernsey. To date, each has justified and underpinned the other, and both will continue to play a crucial role in determining the other's future. This outcome confirms the need for CMPs to be integrated into wider strategies for obesity management. Such integration can guide a programme's vision and priorities and promote programme sustainability.

A further critical finding related to differing perceptions of the roles of CMPs, as seen by different population subgroups included in this evaluation. Evaluation

participants without direct involvement in the healthcare arena, including parents and teachers, reflected on the potential utility for individuals. On the other hand, healthcare professionals stressed population level benefits of CMPs. This observation highlighted different levels of exposure to and understanding of the issue of obesity amongst different population subgroups. Furthermore, this finding suggested that different stakeholders may hold distinct expectations for eventual programme outcomes. Whilst engagement across all stakeholder groups is vital to programme success, CMP outcomes should be primarily directed toward an audience of policy makers and healthcare professionals.

Results across all distinct elements of this evaluation were combined to form the final recommendation that the GCMI should be introduced as population level surveillance programme in Guernsey. This final recommendation was subsequently accepted by the OSG and this CMP will be expanded across all primary schools in Guernsey from May 2013.

Chapter Six

Discussion

6.1 SUMMARY OF THIS RESEARCH

This chapter presents a discussion of the principal themes and messages of this thesis. The chapter commences by summarising the aims, components, and unique contributions of this research. Next, central findings relating to identified research aims are described and compared across both the three distinct components of this work and the existing literature. Following description of limitations of the overall project and my own reflections of this research, the chapter closes by offering final conclusions and recommendations.

6.1.1 Review of research aims and components

This research aimed to: (1) identify current evidence to establish best practice for CMPs; (2) explore the roles, outcomes, challenges and sustainability of such programmes; (3) identify possible adverse outcomes associated with population level child measurement; and (4) examine the perceived utility, feasibility, acceptability and longer term viability of a new CMP in Guernsey. In addition, several secondary research aims were identified within earlier chapters. These secondary aims contributed independent information but also added to the overriding objectives of this research.

Research aims were achieved through a three-part, progressively informative project conducted over a total period of 28 months. This research incorporated a systematic literature review of existing CMPs, an in-depth case study of

England's NCMP, and finally the pilot implementation and evaluation of the GCMI. Mixed methods were utilised as the identified aims could not be achieved through a single research technique. Furthermore, this triangular approach promoted the depth and richness of eventual findings. All three individual components were presented in this thesis as a complete study, and in the order in which they were performed.

The systematic literature review highlighted current knowledge gaps in the area of CMPs. This provided direction and justification for the research aims, as well as certain methods utilised in subsequent components of this research. Therefore, the systematic literature review provided the platform for the development of further elements of this work. This review also provided a broad overview of existing international CMPs and offered detailed analysis of the various protocols employed by these programmes.

After providing an overall picture of the topic and establishing the rationale for this research, the next step was to transition to a more focused examination of a CMP. This was achieved through the NCMP case study, which explored key stakeholder perspectives of the roles, outcomes, challenges and sustainability of this large-scale, operative programme in England. This case study was complemented by a dedicated review of literature pertaining to this specific programme. The NCMP case study was informed by and built on results obtained from the systematic literature review and was also designed to assist in the development of the pilot CMP in Guernsey.

The final and main component of this research was the development, implementation and evaluation of the GCMI. The GCMI was designed to address all principal aims of this research. In particular, this programme enabled reflection on the potential independent contribution of a local CMP. This is because the pilot programme was conducted within a relatively 'blank slate' setting: at the time the GCMI was introduced, Guernsey had no local data, no CMP, and no active strategy for the management of childhood obesity.

The GCMI drew extensively on findings from the NCMP case study and systematic literature review. Specifically, critical learning points in relation to the broad design, implementation and continued administration of a CMP were identified by the NCMP case study. Also, the measurement protocol utilised by the GCMI was developed directly from information obtained from this study and the systematic literature review, together with consideration of the stated preferences of local stakeholders.

6.1.2 Unique contributions of this research

Each individual component of this research included unique features and, as a consequence, contributed new insights and information to the research base on this topic.

To my knowledge, this systematic literature review was the first to identify, assess and compare international school-based CMPs. Previous research has recognised existing within-country programmes [217-219]; compared

prevalence of excess weight in children across regions [65]; described the effect of utilising different reference curves in analysis of population level data [85,90,96,377,378]; and raised concerns around the consistency and accuracy of data obtained from CMPs [117,226]. This current research offered new information by contrasting detailed aspects of different measurement protocols, providing recommendations on best practice in this area, and defining existing knowledge gaps. Furthermore, this literature review examined reporting on the roles, outcomes and challenges of CMPs.

In contrast with earlier work [255-260,309], the NCMP case study examined the beliefs and experiences of centrally-placed stakeholders. This approach explored the rationale that underpinned the original development of the NCMP, the measurement protocol, and key programme elements; thereby enabling identification of areas requiring further evidence. This approach also highlighted areas of unfulfilled potential in the NCMP. In addition, this study adopted a broader programme view, rather than examining isolated aspects of the NCMP. At the time of writing, this study was the first to compare stakeholder perceptions of the NCMP and other large-scale surveys, such as HSE.

The GCMI demonstrated a number of exclusive elements. First, the pilot programme itself represented an entirely new initiative. Second, prior to this research, data on the prevalence of excess weight in Guernsey schoolchildren were not available. Third, these data contributed original information by enabling broad comparison of data on overweight and obesity prevalence in Guernsey and England. This research also delivered BMI results according to

four growth reference curves and two different digit rounding methods. Finally, the research in Guernsey incorporated process analysis and short term impact assessment. The systematic literature review that helped to inform the GCMI highlighted that these constituents of the evaluation cycle are typically under-reported in the available peer-reviewed literature.

Therefore, this research contributed multiple original elements to the knowledge base in this area and also served to fill recognised gaps in the current literature.

6.2 SUMMARY OF CENTRAL FINDINGS

This section links together the central findings of this research, which are presented in relation to the primary research aims noted above. In addition, key results from secondary research aims are revisited. This section also provides a comparison of central findings with the existing literature in this area. Finally, I summarise the five core messages to arise from this thesis.

6.2.1 Central findings relating to primary research aims

Here, main results pertaining to all four primary research aims are summarised. Findings arising from all three components of this work are presented and, where relevant, compared. This approach confirms where and by what means research aims were addressed and acts to underscore the depth and consistency of key results.

6.2.1a Best practice for CMPs

The first aim of establishing current best practice for CMPs was considered across all research elements; in particular, the systematic literature review. This review found that programme specifics are inconsistently and incompletely reported in the peer-reviewed literature. Consequently, there is currently no consensus or ‘gold standard’ approach to population level child measurement, despite the apparent simplicity of this process. However, with judgement we are

able to make recommendations[**] regarding certain aspects of measurement protocols. Of note, these recommendations are often formed following recognition of a common method rather than clear evidence of superiority. The review also identified other knowledge gaps and areas for improvement; specifically, in the areas of training of data collectors and the actual procedures for obtaining height and weight measurements. Finally, this review did not unveil evidence in support of routine feedback of individual results. For this and other reasons, this review concluded that surveillance may reflect the preferred programme type. Here, other reasons included that surveillance is less resource intensive, is associated with higher participation rates, and is sufficient to facilitate achievement of all key identified programme roles.

In contrast, the NCMP case study found that there is clear reporting of the planned measurement protocol in literature pertaining to this programme. However, there is little evidence in support of selected programme features, such as the included age groups or the decision to pursue routine feedback of individual results. Instead, many decisions were influenced by logistical or political considerations. The NCMP case study also established that there is little evidence or assessment of adherence to the stated protocol. These outcomes combine to produce concern regarding the accuracy of individual level data produced by the NCMP. As a final point, an important finding from this research component was that a standardised and accepted measurement protocol is viewed as critical to overall programme success.

[**] These recommendations were described in Table 2.4 (Chapter Two).

The GCMI implemented the best practice protocol, as identified by earlier research components. However, as with the NCMP, certain decisions were determined by logistical restraints or local stakeholder preference. A further similarity was evident when the GCMI evaluation confirmed the perceived importance of a standardised and rigorously applied measurement protocol.

Process analysis of the GCMI included assessment of the degree to which the measurement protocol was observed. Overall, adherence was high and the resultant measurements were precise. This latter finding suggests that there is no requirement to repeat anthropometric recordings performed at the population level. Additionally, the GCMI evaluation did not identify any concerns with the final protocol.

6.2.1b Roles, outcomes, challenges and sustainability of CMPs

Second, this research sought to explore the utility of and possible challenges to CMPs. For ease and clarity of presentation, these areas are summarised separately below.

The systematic literature review examined explicit reports of programme roles and outcomes. In general, few publications relating to defined CMPs included this information or outlined intended or achieved functions that extended beyond collecting prevalence data and assessing longitudinal trends. Where otherwise reported, these programmes were noted to drive further management initiatives, justify various funding applications, increase awareness of childhood

obesity, and/or establish potential risk factors for this condition. Overall, the existing literature in this area broadly endorsed that CMPs perform valued, important functions.

The NCMP case study and GCMI evaluation both considered stakeholder perceptions of programme roles and outcomes. Across these two programmes, a clear and common finding was that the principal role of population level child measurement was to deliver accurate local data on the prevalence of excess weight in children. Here, local data were felt to increase ownership of a CMP and facilitate analysis of possible correlates of obesity in given locations. A further congruent finding from these two studies was that CMPs are intended to drive additional action on the issue of childhood obesity. These programmes may also be expected to act as an independent intervention and can be an important tool for evaluating external initiatives. Of note, evaluation was seen by Guernsey stakeholders as an essential programme outcome. However, equivalent personnel in England acknowledged that this reflected an underused or, less encouragingly, hypothesised function of the NCMP.

On the whole, stated roles of the NCMP were perceived to have translated to recognised outcomes. One notable exception was that there was significant uncertainty around whether routine feedback of individual results had achieved the intended outcomes. Indeed, potential benefits of this programme feature were acknowledged as assumed rather than proven. Furthermore, this research suggested that population level child measurement is not designed to offer accurate individual results, meaning that this function might reflect inappropriate

use of obtained data. Routine feedback was also greeted with some trepidation in Guernsey. However, in this setting, the rationale was that this inclusion risked a scenario whereby CMPs would inappropriately be viewed as providing an 'all in one' solution to obesity management.

The NCMP case study found that identified roles of CMPs are numerous, diverse, changing, and at times non-specific. In addition, certain roles were aligned with or at least influenced by political priorities. There is also concern that these roles have both changed and increased over time, without supportive evidence or accompanying adjustments to the measurement protocol. Overall, these adaptive and expanding roles are believed to be necessary for CMP survival but, due to the impact of competing priorities, may in fact be detrimental to core programme functions. An alternative approach would be to limit these proposed functions, which could maximise the likelihood that they are successfully realised.

Next, I discuss findings relating to the challenges facing CMPs, as well as factors that may influence their sustainability. These questions received minimal attention in the existing peer-reviewed literature, which offered justification for the decision to pursue this research aim.

In both Guernsey and England, the potential losses of stakeholder engagement and a standardised protocol were seen as threats to the respective CMPs. Furthermore, the NCMP case study found that these programmes are vulnerable to changes in the healthcare system in which they function.

Therefore, they cannot be viewed in isolation. In a similar vein, CMPs face significant challenge if not formally integrated into more expansive strategies for obesity management. Concerns around resource availability were raised in Guernsey but not England, where the NCMP reflects an established and fully functioning programme.

The protection and promotion of CMP sustainability was considered in the NCMP case study and GCMI evaluation. Findings from both studies emphasised the importance of stakeholder engagement, as well as the requirement to maximise use of data obtained by the respective CMPs. Interestingly, this second point appears to contradict an earlier conclusion that warned against CMP roles that are unduly numerous or ambitious. However, there was no suggestion to create new roles for the corresponding CMPs. Instead, it was proposed that current potential functions were realised. In the context of the NCMP, this could be achieved by facilitating assessment of longitudinal trends in individual children or groups and ensuring use of obtained data in national level reports.

The NCMP case study and GCMI evaluation also highlighted certain distinct findings in relation to longer term programme viability. The former study underscored the role of CMP structure and evaluation in ensuring the continuation of measurements. However, in Guernsey, the durability of the GCMI was believed to be contingent on minimising unintended harm, together with clear alignment with Guernsey's Obesity Strategy. This latter point further confirms that CMPs should not function as discrete entities.

Overall, common themes arose from examination of the roles, outcomes, challenges and sustainability of CMPs. In particular, the importance of: (1) stakeholder engagement; (2) programme evaluation; and (3) the protection and delivery of accurate prevalence data were all highlighted in relation to each of these four discrete areas. These areas are inextricably connected: alterations or other activity in one area can be expected to impact on the others. This finding demands attention from stakeholders considering future programme development. Taken further, this finding speaks to the critical importance of establishing a clear vision for CMPs, as much is contingent on this basic platform.

6.2.1c Potential adverse outcomes associated with CMPs

The third research aim was to identify evidence of possible unintended harm associated with CMPs. Again, this aim was considered across all components of this research. Here, though different methods were employed, the eventual results were largely consistent. In particular, a conclusion across all three research elements was that there is inadequate awareness of the potential long term adverse outcomes of routine child measurement in schools. Whilst this issue is discussed within the literature, there is scarce formal research dedicated to this area. Where evaluated, previous work has not demonstrated evidence of significant short term harm to participants from this practice.

The GCMI incorporated both process analysis and impact assessment; neither of which revealed any suggestion of unintended harm resulting from the pilot

CMP. Nevertheless, similar to findings from the NCMP case study, the GCMI impact assessment identified that this issue represented a significant, on-going concern for local stakeholders. There was acute awareness of the need to prioritise strategies to recognise and protect against unintended harm, despite the current lack of actual evaluation in this area. Notably, the NCMP case study added a different angle to this analysis by highlighting stakeholder perceptions that certain programme features, such as routine feedback of individual results, might harm the CMP itself. However, this remains a theoretical rather than actual harm.

6.2.1d Utility, feasibility and acceptability of a local CMP

The final primary aim of this research was to examine the utility, feasibility and acceptability of a CMP in a local setting. This aim was only considered across a single research component: the GCMI. Summary findings from the GCMI evaluation suggested that this was a useful programme: the GCMI would fill a recognised knowledge gap and fulfil obligations of the approved Obesity Strategy for Guernsey. Despite initial reluctance, this pilot CMP and its affiliated data were received with enthusiasm and interest. The paucity of existing local data was identified as an obstacle to further action on childhood obesity, particularly at the political level. Furthermore, the GCMI evaluation showed that this CMP would function as a platform from which multiple other strands of the Obesity Strategy could emerge and also connect back to. Therefore, the GCMI represented a valuable programme in this locale.

Finally, upon reflection, the GCMI was both feasible and well-accepted, as evidenced by high participation rates, smooth conduct of the pilot programme, and the absence of significant reported concern or disruption to existing services. Considered together, these results support earlier findings that endorsed the importance and overall utility of CMPs.

6.2.2 Central findings relating to secondary research aims

Several other key findings arose from this research that did not display direct association with stated primary research aims. Rather, these findings related to secondary research aims; specifically, those outlined in relation to the development and implementation of the GCMI (Chapter Four).

Data from the GCMI showed that approximately 30% of Guernsey primary schoolchildren lay outside the bounds of a healthy weight classification. Furthermore, the percentages of Guernsey children classified as healthy weight, overweight and obese differed significantly from reference figures, based on the UK90 population curves. It is not currently possible to compare longitudinal trends in weight status in Guernsey, due to the lack of existing local data. However, obesity prevalence in this setting was similar to recent figures reported by England [278], as well as a host of other European countries [65,112,297]. Therefore, this research suggested that childhood obesity reflects an important public health concern in this setting.

The final GCMI dataset was analysed according to four recognised growth reference systems: UK90 (population and clinical thresholds), CDC, IOTF and WHO (2007). Prevalence figures across the distinct weight status categories were broadly comparable. However, in this sample, the IOTF growth reference returned a significantly lower percentage of obesity than the percentages seen with the WHO and UK90 (population) systems. In addition, the percentage of overweight children according to the WHO system was higher than the equivalent percentages from all other growth references, though this result did not attain statistical significance. Unsurprisingly, it followed that less children were classified as normal weight by the WHO system versus all others considered by this research.

There was no statistically significant difference in the percentages of children in the various weight status categories when results were analysed against both the UK90 population and clinical BMI thresholds. Moreover, this research demonstrated that different digit rounding methods (0.1kg/0.1cm as against 0.5kg/0.5cm) do not appear to influence prevalence figures at the population level. However, this research did not rule out the importance of greater precision in digit rounding techniques in larger populations, or for individual BMI centile results. Considered together, outcomes relating to the UK90 population and clinical BMI thresholds and the different digit rounding methods suggested that individual children in this particular sample did not lay at the margins of the distinct weight status groupings. Instead, the BMI centiles of children classified as overweight or obese were at the middle or upper bounds of the numerical

cut-offs for these two categories. Of note, that this would not be the case in a larger sample of children, where a greater spread of results would be expected.

6.2.3 Comparison of central findings against existing literature

Here, findings related to the four primary research aims are compared with those identified in earlier publications. Of note, certain results from this research were considered against existing literature in previous sections of this thesis[††].

Overall, and as identified by the systematic literature review described in Chapter Two, earlier research has not investigated the research aims addressed by this current work. In particular, no previous studies have included exploration of this combination of research aims, using this defined group of stakeholders, in the chosen settings. This situation can limit the depth and validity of final comparisons, but also acts to reinforce the independent and distinctive contribution of this work.

6.2.3a Comparison of central findings: best practice for CMPs

First, definitive best practice guidance for measurement protocols has not yet appeared in the literature pertaining to CMPs. Many programmes stress the value of data produced by these programmes; however, with few exceptions [114,117,171,226,237], authors have not explicitly examined or even questioned the accuracy, reproducibility and/or comparability of these data.

[††] Please refer to sections 2.4.1, 3.5.2, and 4.4.

Moreover, there has been little critical analysis applied to the methods used to produce eventual prevalence results. Certain articles make reference to use of a standardised protocol [218,220,232,234] but do not offer additional details or provide justification for selected methods. This may be because random error in measurement recordings is expected to balance out at the population level [379,380], or because significant assumption underlies these processes. Alternatively, this information may be omitted due to the inevitable restrictions applied to published material.

Consistent with findings from this current research, other authors reporting on CMPs have endorsed the introduction and continuation of surveillance programmes [225,232,233,246]. However, these researchers have not commented further on the overall utility of these programmes or promoted this programme type over screening. Similarly, screening has not been ratified ahead of surveillance. Rather, some authors have expressly cautioned that there is insufficient support for screening in relation to childhood obesity and proposed that resources are directed to alternative strategies [171,226,264].

Furthermore, despite the fact that BMI screening is now common and apparently increasing in certain regions, authors have not directly endorsed the inclusion of routine feedback in CMPs. There is also a distinct lack of longer term findings to support the effectiveness of this practice. These findings are broadly comparable with themes arising from the latter two components of this current research.

6.2.3b Comparison of central findings: roles, outcomes and challenges

Next, I compare summary findings relating to the roles, outcomes and challenges of CMPs across this research and external literature.

In general, roles of CMPs were rarely formally identified within existing publications, which may indicate a lack of clarity in this area. Instead, CMP roles were implicitly implied through the description of outputs produced by various programmes. Here, these roles aligned with two (of three) principal functions of monitoring as defined by Wilkinson et al (2007) [150]: to quantify prevalence and identify longitudinal trends in relation to public health issues. However, it was less obvious that the intended tasks of extant CMPs extended to incorporate the third recognised purpose of monitoring: evaluation of the effectiveness of population interventions [Ibid].

These three roles displayed direct correlation with those identified by this current research. Other roles highlighted by this work, such as the potential for improved parental awareness and enhanced collaboration amongst stakeholders, are described elsewhere [83]. However, in that instance these roles were not identified from primary research. As a final point, the existing literature on this topic has not described the distinct and important role of local level data. In contrast, this issue represented a recurrent theme of this research.

Similar to findings from this current work, the existing literature suggests that confirmed outcomes of CMPs are often identical to their primary roles

[63,112,223,225]. The NCMP case study and GCMI evaluation found that CMPs were seen as a possible tool to promote behavioural or weight status change in children, but that this was not reported as an achieved outcome of these programmes. This finding is not confined to this work. Indeed, whether due to a lack of examination or positive results, other studies have failed to demonstrate the independent effectiveness of measurement itself, routine feedback, or follow-up interventions [217,226,239,247,264,266,267,279]. Taken together, these results support the view that surveillance may be the superior programme type for CMPs. This is because, unlike functions that are exclusively associated with screening, the assessment and comparison of prevalence trends reflect both priority and achievable outcomes.

Other outcomes from this research that demonstrate overlap with earlier findings included the use of data to justify new or existing management initiatives [220,238,242] and/or identification of high risk population subgroups [63,245]. Of note, other authors did not identify these and further 'incidental' outcomes as programme aims in advance of data analysis and distribution. This raises the question of whether CMPs were designed to facilitate achievement of certain tasks. Lastly, in this research, evaluation of external initiatives and improved stakeholder engagement emerged as key perceived outcomes of CMPs. However, this was not consistent with earlier work, which has included minimal comment on these outputs.

As previously noted, literature on this topic has shown little consideration to the question of current challenges facing CMPs. However, Nihiser et al (2007) [83]

did propose some thoughts in relation to this defined area. Altogether, five challenges were described. These challenges included that CMPs may be associated with unintended harm; the potential benefit of BMI screening programmes remains unproven; and such programmes require an identified management pathway for at-risk children. Also, CMPs require on-going resource commitment. Finally, the authors suggested that CMPs *"might detract attention from other school-based obesity prevention activities"* [Ibid, page 662].

The first three identified challenges reflect areas of recognised overlap between these submissions and conclusions drawn from this current research. However, in direct contrast to concerns reported by Nihiser et al (2007), the NCMP case study and GCMI evaluation both found that CMPs are believed to bolster attention to external initiatives, as well as the issue itself. Of note, the challenges put forth by Nihiser et al (2007) reflected thoughts that had been garnered from summarising existing literature; these challenges did not arise from direct examination of this specific research question.

6.2.3c Comparison of central findings: potential adverse outcomes

Finally, I offer comparisons of central findings in relation to the research aim of identifying possible adverse outcomes associated with population level child measurement. Overall, findings from external studies [159,236,240,255] and this current research were consistent and indicated that CMPs do not cause significant or identified harm. Across these distinct studies, evidence of harm was assessed by a combination of direct observation and stakeholder reports.

An additional common outcome from these past and current reports was that more research is needed in this area and that on-going vigilance is required to help protect CMP participants. Findings from the NCMP case study went further by highlighting that the issue of adverse outcomes may harm a programme's reputation and overall credibility.

On the other hand, distinct publications have offered different opinions after considering the potential negative impact of BMI monitoring in childhood. These articles [171,248,249,381] warn that this practice may heighten stigma, damage self-esteem, classify children inappropriately, and/or encourage harmful reactions from parents. Typically, these authors have recommended substantial caution and consideration prior to the implementation of population level CMPs. However, these warnings related to potential programme harms; they were not conclusions drawn from witnessed or established outcomes.

Also, as identified immediately above, these warnings have not been borne out by research designed to explore this particular question. Furthermore, these articles have typically failed to account for various protective measures that may be incorporated into measurement protocols. These articles have also tended to focus on screening programmes alone. Ultimately, the generalisability and validity of summary judgements communicated by these articles appear compromised.

6.2.4 Core findings of this research

There were five core findings to emerge from this research. These findings reflect the summary messages of this thesis.

First, population level child measurement represents a topical, important issue. Child measurement programmes are growing in number and relevance and offer significant potential contribution to the public health arena. These CMPs enable the accurate and comprehensive quantification of the current prevalence of childhood obesity within specified populations. With this information, we are better positioned to implement strategies that are reflective of the true burden of the problem. Such programmes can promote inter- and intra-sectoral engagement and are a platform from which initiatives crossing the entire management spectrum can be both launched and evaluated. Therefore, the development and continuing presence of CMPs must be adequately supported and sustained.

However, this research also confirmed that CMPs must not function in isolation: rather, these programmes should be integrated into a comprehensive strategy for the management of childhood obesity. This outcome may, in turn, enhance the overall utility and longevity of CMPs.

Second, this research uncovered evidence to suggest inadequate clarity of, as well as some misalignment between the aims, intended roles and actual outcomes of CMPs. This inconsistency likely arises as these programmes are

expected to fulfil numerous, diverse roles. In this situation, the primary function of a given CMP may be diluted, de-prioritised or simply overlooked. Also, certain planned roles may be inappropriate or unrealistic in particular contexts. Therefore, these roles will not translate to recognised outcomes. Next, different stakeholders may hold distinct expectations for programme outcomes: this might contribute to incongruity between expected and actual functions. Finally, this research identified that political preference or pressure is important in shaping particular elements of CMPs, which can then influence or even interfere with their broader vision.

Consistency across the aims, roles and outcomes may promote clear overall direction for CMPs and help to inform the scope, structure, type and measurement protocol of a given programme. Furthermore, a stable and agreed approach may protect against the introduction of superfluous programme features or changes, thereby enhancing general effectiveness and efficiency.

Third, at present, there is a paucity of clear and available evidence on the topic of population level child measurement. Much current practice appears to be grounded in assumption or developed from prior example. As a result, it is difficult to overemphasise the importance of evaluation of CMPs. Evaluation can inform and justify critical decisions regarding the methods and other processes adopted by various CMPs; thereby promoting best practice and offering protection against possible programme threats. However, the potential role and influence of evaluation must be balanced against other external considerations:

in particular, CMPs often function within inescapable political and logistical constraints.

The fourth core message of this research is that a standardised approach to the collection, analysis and dissemination of anthropometric recordings is critical. This standardisation should be prioritised to maximise accuracy, potential programme outcomes and data comparability. Again, this message includes an important caveat: any agreed measurement protocol must also incorporate a degree of flexibility so that acceptability and stakeholder engagement may be preserved. Here, balance is required.

Finally, this research has highlighted that we are making similar mistakes to those that were identified in earlier work relating to monitoring programmes for childhood underweight [161,165]. Specifically, CMPs may not achieve their maximal potential utility as there is insufficient clarity and communication around their intended roles. Furthermore, these programmes are hampered by inadequate evaluation and, in some cases, uncertain data quality [Ibid]. This finding suggests that these issues are long-standing and recurrent across the public health domain; they are not restricted to this specialised area. This outcome reinforces the need for action on identified issues and the importance of communication and collaboration in public health.

6.3 LIMITATIONS OF THIS RESEARCH

This section describes limitations of the overall research project. Specific limitations relating to the individual components of this research were outlined in earlier chapters.

First of all, this research used a multi-phase, mixed methods design. I felt that this design was most appropriate to achieve stated research aims. However, this approach could also limit the depth of eventual findings as results were distributed across three distinct studies. A narrower approach could have produced additional findings or different insights.

On the other hand, several features of the research design helped to ensure that findings offered deep and substantial information relating to identified research aims. The NCMP case study used semi-structured interviews, whilst the GCMI evaluation employed both interviews and focus groups. These methods both offer rich, detailed data on an issue that may not be garnered from alternative techniques [310,313,314,317]. Furthermore, all interview participants had significant context- and topic-specific expertise and provided comprehensive exploration of the topic. Finally, research aims were considered consistently across all components of the broader project. This method, which examines the same questions from alternative perspectives, may in fact contribute further depth to the results [1-4].

An alternate approach for this research would be to examine a single programme element within a defined CMP. This option was not pursued for multiple reasons. First, previous work has already examined individual aspects of CMPs [114,240,254-256,285]. Second, this approach would likely restrict the breadth and generalisability of findings, as distinct CMPs function within different contexts and employ various protocols. Third, this research sought to highlight broad, transferable principles relating to CMPs. The principal research aims addressed by this project could not be considered in isolation; rather, these aims required a comparative view.

Therefore, it is possible that the depth of findings from this research were compromised by the decision to pursue a multi-phase, mixed methods research project. However, the design utilised in this research was both appropriate and preferable to alternative options.

The lack of existing evidence in this area is a further limitation of this research. Establishing representative and accurate prevalence of a given health-related condition is foundational to public health practice [152]. Nevertheless, routine quantification of excess weight in children is a relatively new and developing area. As a consequence, there is a restricted volume of available literature pertaining to this topic, which limits our ability to consider or compare outcomes and justify chosen models. This limitation is compounded by recognised knowledge gaps in the extensive, complex area of childhood obesity.

This research was also associated with a number of practical limitations. First of all, certain research components had to be conducted within a particular and often narrow timeframe. This was due to the sequential nature of this research, together with other logistical considerations such as stakeholder availability. Importantly, this was an individual research project that relied on continued cooperation and engagement from a range of individuals and groups over a prolonged period. Therefore, it was critical to identify and respect stakeholder preferences. In some instances, such as the timing of measurements or release of prevalence data, this approach reflected a compromise on the planned approach. This research demonstrated clear structure but, ultimately, was pragmatic and designed to function within an authentic, 'real world' setting. Overall, any adaptations to the research protocol were minor, unavoidable and were not felt to have a significant impact on final conclusions.

As noted in the appropriate chapters, some elements of this research featured relatively modest participant numbers. This was because there was a defined potential pool of individuals to draw on due to the location of the study and/or the specialised nature of the topic. The potential impact of these restricted total participant numbers on findings was examined in earlier chapters. However, limited human resource may have influenced this research in a manner not yet considered.

Specifically, with the exception of transcription of interview data, I conducted all components of this research alone. I received support and guidance from my supervisor and other colleagues over the course of this research; however, all

practical elements including design, delivery and analysis were performed by a single individual. This approach may leave this work vulnerable to researcher bias, due to the lack of direct additional input or perspective. Of note, this was an individual doctoral research programme with a defined budget that was conducted in a comparatively low-profile setting. In this context, extra research assistance was not feasible.

Finally, this research considered a range of distinct research questions relating to CMPs. However, several important questions were not addressed by this work. In particular, this research did not examine the relative strengths and weaknesses of whole population versus sampling approaches to child measurement. Furthermore, different sampling methods for these programmes were not compared as this question has been considered elsewhere [230,382-387]. Also, this research did not seek to identify the potential independent effect of measurement itself, which remains an unanswered research question. These questions lay outside the scope of this particular research.

6.4 RESEARCHER REFLECTIONS

In this section, I briefly reflect on select aspects of this research. Here, the intention is to highlight thoughts and observations that are not described elsewhere in this thesis.

On the whole, the research was well structured and progressed smoothly. The timing allowed for completion of all planned research activities and facilitated a situation whereby findings from early research phases could be used to inform subsequent work. It is important to acknowledge that there was some difficulty in applying design rigour to an area that is influenced by practical and political considerations. As with all research, certain concessions were inevitable. However, rigorous structure was applied at every stage and this research included assessment of adherence to the established protocol. Moreover, available evidence was examined and utilised wherever possible.

There were challenges associated with conducting this research in Guernsey, including the defined pool of potential stakeholders and high living costs. In addition, multiple local stakeholders expressed significant scepticism regarding the utility and feasibility of the GCMI, at least in the initial stages of this project. There was also overt resistance from local school nurses, who communicated concern that the programme would require extensive resources and might not be designed to reflect local priorities. Finally, prior to commencement of the pilot programme, various other stakeholders reported the belief that the GCMI represented an individual research project and would not offer independent

benefit to Guernsey. As a consequence, these individuals were hesitant to welcome ‘external’ input to local strategies. These reported concerns reflected important challenges in Guernsey as, in relatively small and well-connected populations, single individuals can exert a degree of influence not witnessed in other settings.

Despite the challenges outlined immediately above, I would choose the same location again, given the opportunity. The small, stable and largely transferable population, together with the recent approval of the Obesity Strategy for Guernsey and lack of local data on childhood obesity all contributed to a near-ideal setting for this particular research project. I invested significant time and energy in securing good relationships with key stakeholders in Guernsey, which provided a strong platform for engagement and collaboration throughout the duration of the GCMI.

The NCMP was originally selected for in-depth study at least in part for logistical reasons, but was an appropriate, headline example of an operative measurement programme. Also, the NCMP offered a useful point of comparison for the GCMI as Guernsey has traditionally looked to the UK for guidance around public health policy [S. Bridgman and Y. Le Page, personal communication. October 2010]. This is due to the close geographical proximity and numerous similarities between the respective settings. Ideally, I would have liked to travel to Arkansas (US) to observe that States’ high profile obesity screening programme in action and discuss this programme with key local stakeholders. However, this was not possible given time and other logistical

restraints. Despite the lack of direct exposure, information relating to this programme did contribute to this current research: it is well reported in the existing literature and several interview participants shared their first-hand experience with the Arkansas programme.

With the benefit of hindsight, there are certain decisions that I would reconsider or approach differently. The focus groups with parents and teachers in Guernsey were important for local stakeholders and to provide well rounded evaluation of the GCMI. However, these focus groups ultimately offered relatively sparse and superficial information, likely due to restricted participant knowledge of the topic. In all groups, I attempted to encourage interaction and discussion between participants. Nevertheless, I felt that individuals in the focus groups for both parents and teachers were simply responding to my initial questions, as might be expected in a group interview situation [369]. This may have eventuated as a result of unclear instructions on my part or differing expectations of what a focus group entails.

Irrespective of the reason, further exploration of issues required repeated prompting: in these instances, extreme caution was required to avoid leading or suggestive questions. In general, these prompts were not successful in eliciting significant further information. Overall, I felt that data from these focus groups contributed relatively little to the GCMI evaluation. If I had to repeat these focus groups, I would include parents and teachers in the evaluation process but would devote more time to introducing the structure and purpose of the sessions, as well as reframing and simplifying the guiding questions.

Next, further external review of the GCMI would have been desirable. The internal evaluation produced deep, relevant findings but was difficult to coordinate. This evaluation also represented a significant amount of work for one individual to complete within a narrow timeframe. Had the option been available, I would have utilised a research assistant to moderate all focus groups and instead adopted an observer role. This method could have produced different reports from participants and facilitated more detailed observation of subtle participant interactions.

I approached the GCMI evaluation acutely aware of potential concerns around response bias. However, my experience with local stakeholders in Guernsey did not indicate any tendency to withhold personal opinion or tailor responses in order to produce a particular desired response. Moreover, evaluation participants had no personal connection or other potential obligation to me. This could have helped to ensure that responses did reflect actual beliefs and observations of the GCMI.

Finally, it would have been helpful to pursue my argument to release final GCMI prevalence figures to the local media. The decision to withhold this release was made following a direct request from the HSSD, which I chose to respect without further challenge. In hindsight, I believe this release could have presented the prospect of additional external review of the GCMI through analysis of the subsequent response from the media and/or general public. Furthermore, these data may have offered an important public health educational opportunity for Guernsey.

6.5 RECOMMENDATIONS ARISING FROM THIS RESEARCH

This section summarises key recommendations for policy and practice relating to CMPs that arose from this research. These recommendations, presented in Table 6.1, were developed from central findings that emerged across the distinct research elements. Certain recommendations for the design, administration and protocol of these programmes were defined in Chapter Two (sections 2.4.2 and 2.4.3) and are not repeated here. Also, Chapters Three and Five included recommendations which, to prevent duplication, are not included below. Recommendations outlined in those two chapters were reported in relation to the NCMP and GCMI respectively, but were ultimately intended to apply to a wider audience.

Table 6.1: Summary recommendations for CMPs

- Child measurement programmes should not function in isolation but should instead be firmly integrated into a broader strategy to prevent and manage the issue of excess weight in children.
- Child measurement programmes should prioritise an evidence-based approach and incorporate a plan to adapt to meet evolving international guidelines and local priorities, including changes to resource availability.
- A consensus decision on the principal aim(s) of the programme is vital. This will shape the vision and structure of the CMP and allow for development of valid evaluation processes.
- Child measurement programmes should be a mandated element of the school year in order to maximise participation from local schools.

- Data sharing arrangements should be reviewed prior to introduction of a CMP. The application of a ‘national patient identification’ number (or similar) would facilitate development of an anonymised longitudinal tracking database, which could eventually incorporate multiple health parameters.
- There must be an agreed, detailed and communicated plan for the distribution of population level results, including specific information around media releases.
- Private- and state- funded schools should be invited to participate in CMPs, to increase the accuracy and representativeness of population level results.
- Child measurement programmes must include a plan for on-going evaluation, including assessment of possible unintended harm.
- All CMPs require central coordination.
- A central point of contact for: parents; teachers; school nurses; GPs; media; and other stakeholders is essential. This information should be included on all relevant documentation relating to the measurement programme.
- A formal commitment to adopting a longitudinal approach to data collection may promote sustainability of the programme and will enable comparison of local prevalence rates over time.
- Priority should be given to ensuring clear communication with all key stakeholders across all phases of a given CMP.
- Measurements should be carried out by a defined team of trained data collectors according to a rigorously applied protocol.
- Height and weight measurements should be conducted in age groups that: (1) align with local priorities; (2) show reliable tracking of weight status through to adulthood; (3) produce high participation rates; and (4) allow comparability with other international programmes.
- There is no need for repeat measurements in a population level CMP, unless incorporated as part of a broader plan to assess the precision of obtained data.

6.6 RECOMMENDATIONS FOR FUTURE RESEARCH

In addition to recommendations for policy and practice in this area, this research also identified particular questions to be addressed by future research.

First of all, there is a need for more evidence relating to the long term outcomes of CMPs. In particular, the potential adverse outcomes resulting from population level child measurement that may emerge over time should be explored. Moreover, where applicable, examination of the development and outcomes of specific policy elements that grew out of such programmes would be important to help strengthen the case for the continuation of CMPs.

The need for detailed evaluation of the impact of routine feedback of individual results was acknowledged in Chapter Three. However, there remains the additional question of the role of measurement itself as a potential intervention. Therefore, as also identified by Madsen (2011) [226], the independent effect of the measurement process on awareness and weight-related behaviours should be assessed. This research would assist in isolating any added benefit of individual feedback, thereby offering further useful information regarding the comparative utility of surveillance and screening in CMPs.

Currently, there is insufficient evaluation of adherence to measurement protocols and identified training processes for data collectors. These elements are important to assess validity and reliability of obtained data and subsequent results. The cost effectiveness of child measurement, as well as measurement

as a tool for evaluation, are both areas worthy of further examination. This research could serve two important purposes: establishing cost effectiveness represents good practice, and this information might also assist in promoting the sustainability of CMPs.

Finally, the GCMI will be introduced as a population level programme from May 2013. This programme will produce a dataset that facilitates further research on weight status in children in this setting. In particular, researchers would be well placed to consider possible risk factors for overweight and obesity in this defined population. Guernsey is a unique and supportive research environment that offers the potential to pilot test and later export important new contributions to the existing knowledge base.

6.7 CONCLUSION

The World Health Organization has called for annual body mass index measurements to be conducted in school-aged children. In line with this recommendation, routine school-based child measurement is attracting increasing interest and now represents an established international practice. However, this area has been challenged by limited information around the details, quality, roles and broader effectiveness of these programmes.

This research combined three progressively informative yet distinct studies to examine foundational questions regarding the practice and use of population level CMPs. Multiple core messages arose from this thesis, all of which have important implications for programme stakeholders, as well as the wider public health arena.

First, CMPs contribute valuable information to the issue of excess weight in children. Such programmes are a platform from which external initiatives crossing the entire management spectrum can be both launched and evaluated. These programmes may also promote enhanced intra- and inter-sectoral communication and can provide a forum for increasing both general public and political awareness of and engagement with the issue of excess weight status in childhood. Furthermore, CMPs are acceptable and able to be both introduced and conducted without significant disruption to existing services. Therefore, their development and continued presence should be adequately supported and sustained.

The principal roles of population level monitoring of particular health-related conditions have previously been well-defined. However, closer examination of this topic has unveiled inadequate clarity around and inconsistent application of these functions within existing CMPs. Indeed, these programmes are often tasked with diverse roles that do not necessarily convert to acknowledged outcomes. Furthermore, as with the NCMP in England, these roles may evolve and expand according to political, logistical, or other influences, without critical consideration of either current evidence or wider-reaching implications for the programme. Therefore, a core finding of this research is that the intended roles and broader vision underlying CMPs must be aligned and clearly delineated. These roles and this vision should also guide the development and continued administration, type and overall structure of CMPs.

More generally, CMPs should also be directly integrated with a broader, multi-factorial strategy for obesity management [8,67,388,389]. However, it is important to recognise that CMPs form just one component of these wider strategies: whilst CMPs are important, their outcomes are invariably limited. This is an obvious but nonetheless crucial learning point for stakeholders who may seek to design and implement single initiatives that are then required to perform multiple and at times unrealistic and unproven tasks. This approach could undermine programme outcomes, as well as the CMP itself. This is due to the possible diffusion, diversion or complete loss of efforts relating to fundamental CMP roles. Also, credibility may be sacrificed in the event of unattained programme outputs. In this context, it appears that ‘less is more’.

Next, this research exposed the paucity of clear evidence in relation to multiple aspects of CMPs, thereby highlighting the importance of regular programme evaluation. This lack of evidence was acknowledged as a critical knowledge gap that threatens the potential and sustainability of these programmes and leaves them vulnerable to shifting political and other priorities.

Furthermore, a consistent and carefully applied measurement protocol is critical to the success of CMPs. Here, a standardised approach to the collection, analysis and dissemination of anthropometric recordings should be prioritised to maximise potential outcomes and data accuracy and comparability. Population level anthropometric data collection risks a reputation as a straightforward and predictable process. However, in reality this reflects a complex, evolving system that demands rigour, sensitivity, collaboration, and adaptation.

The final core message of this thesis is that these issues do not reflect new challenges. Indeed, all issues summarised above have previously been recognised, albeit in relation to population monitoring for undernutrition based within different contexts and settings. However, the principles remain constant and now, as then, they require attention and action.

This finding emphasises the need to harness transferable learning opportunities identified in relation to other public health issues so that we might improve the efficiency, effectiveness and overall impact of our policy and practice.

In summary, CMPs are an important tool in the burgeoning fight against childhood obesity. These programmes appear safe and currently offer and fulfil multiple, valuable roles. The central perceived roles of population level CMPs are the provision of accurate local prevalence data and assessment of longitudinal trends. These findings can be compared both within and across the various CMPs, thereby adding significant epidemiological value. However, there are areas of unfulfilled potential associated with CMPs that may be due to a lack of clarity in identified aims, together with shifting political and other priorities.

These programmes are challenged by a series of delicate trade-offs and practical considerations: the need to balance the demand for evidence-based practice against inescapable logistical constraints; the need to weigh the requirement for standardised, robust protocols alongside a flexible, engaging approach; and the need for CMPs to deliver enough roles to preserve their perceived utility, whilst not compromising their vision and key programme roles.

Finally, CMPs should be assimilated into comprehensive strategies to tackle excess weight in children. Here, clear boundaries must be established so as to appropriately limit the expectation of their contribution and impact. Population level CMPs perform important roles but ultimately comprise a single component in the broader strategy to manage the obesity epidemic. These boundaries may be best applied by adopting a surveillance rather than screening approach to population level child measurement.

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APPENDICES

Obesity Monitoring in Schools

Karina McHardy
Wolfson College, University of Oxford
Trinity Term 2012

TABLE OF CONTENTS

Appendix	Title	Page
I.	Search terms for systematic literature review (all databases)	419
II.	Risk of bias assessment form	429
III.	Data extraction form	432
IV.	Table A1: Summary tables – systematic literature review	442
V.	Table A2: All documented school-based CMPs	452
VI.	List of interview participants by job description and organisation (NCMP)	454
VII.	Information form for participants (NCMP)	455
VIII.	Participant consent form (NCMP)	459
IX.	Outline of interview questions (NCMP)	461
X.	Table A3: Headings and Themes – 'Programme'	462
XI.	Table A4: Headings and Themes – 'Utility' (NCMP)	472
XII.	Table A5: Headings and Themes – 'Threats'	495
XIII.	Sample opt out form (GCMI)	512
XIV.	Sample measurement recording sheet (GCMI)	513
XV.	Sample feedback letter (GCMI)	514
XVI.	Information form for participants (GCMI measurements)	516
XVII.	Participant information brochure (GCMI)	519
XVIII.	Sample feedback request form (GCMI)	521
XIX.	Summary of time requirement for measurements (GCMI)	522
XX.	Summary of costs incurred by the pilot programme (GCMI)	523
XXI.	List of interview participants by job description and organisation (GCMI)	524

Appendix	Title	Page
XXII.	List of Obesity Strategy Group focus group participants by job description (GCMI)	525
XXIII.	Information form for participants (GCMI evaluation)	526
XXIV.	Participant consent form (GCMI evaluation)	529
XXV.	Sample interview schedule (GCMI evaluation)	530
XXVI.	Table A6: Headings and Themes – ‘Utility’ (GCMI)	531
XXVII.	Table A7: Headings and Themes – ‘Pilot Programme’	552
XXVIII	Table A8: Headings and Themes – ‘Programme Development’	567
XXIX.	Confirmation of ethical approval for included studies	582
XXX.	Supplementary information: courses and presentations	585
---	References (Appendices)	590

APPENDIX I

Search terms for systematic literature review (all databases)

PUBMED (date of original search: 08/03/2010)

Search	Search Terms	Results
1.	Obesity OR obese OR obes* OR obesity [MeSH Terms] OR adiposity [MeSH Terms] OR adiposity OR adipose OR adipos* OR "weight gain" OR "weight change*" OR "weight increase*" OR "excess weight" OR "unhealthy weight" OR overweight OR "over weight"	238894
2.	Child OR childs OR child's OR child [MeSH Terms] OR children* OR childhood OR adolescent OR adolescence OR adolescen* OR "pre school*" OR preschool* OR preschooler* OR youth OR schoolchild OR schoolchildren* OR schoolchild* OR pediatric* OR paediatric* OR "young person*" OR "young people*" OR teenage OR teenager OR teenaged OR teenage*	2466495
3.	BMI OR body mass index OR body mass indices OR body mass index [MeSH Terms] OR anthropometry OR anthropometric OR anthropometr* OR anthropometry [MeSH Terms] OR "body size*" OR "body composition*" OR "body constitution*" OR "fat mass" OR "weight for height" OR "weight-for-height" OR "height for weight" OR "height-for-weight" OR "waist circumference*" OR "waist to hip ratio*" OR "waist hip ratio*" OR "waist-to-hip ratio*"	380041
4.	School OR schools OR school's OR school [MeSH Terms] OR preschool OR preschools OR "pre school" OR "pre school*" OR "pre-school*" OR college OR colleges OR highschool* OR "high school" OR "grade school*" OR "elementary school*" OR "primary school*" OR	2859491

Search	Search Terms	Results
	"intermediate school*" OR "middle school*" OR "secondary school*" OR kindergarten* OR "nursery school*" OR reception	
5.	Measurement OR measurements OR measurement [MeSH Terms] OR measures OR surveillance OR monitor OR monitoring OR screening OR screening [MeSH Terms] OR prevalence [MeSH Major Topic] OR observation*	6133566
6.	Program OR programs OR programme OR programmes OR initiative* OR intervention* OR promotion* OR "health promotion"	964345
7.	Underweight OR "under weight" OR malnourish OR malnourished OR malnourish* OR "under nourish*" OR "low body weight"	105944
8.	Neonate OR neonates OR neonatal OR neonate's OR baby OR babys OR baby's OR babies OR infant OR infants OR infant's OR newborn OR newborns OR newborn's	1019713
9.	Search #1 AND #2 AND #3 AND #4 AND #5 AND #6	1794
10.	Search #9 NOT #7	1581
11.	Search #10 NOT #8	1351
12.	Search #11 Limits: Humans, All Child: 0-18 years, Preschool Child: 2-5 years, Child: 6-12 years, Adolescent: 13-18 years	1240

APPENDIX I (continued)

EMBASE (date of original search: 08/03/2010)

Search	Search Terms	Results
1.	Obesity or obese or obes* or overweight or adiposity or adipose or "weight gain" or "weight change" or "weight increase" or "excess weight" or "unhealthy weight"	189995
2.	Child or childs or child's or childhood* or children* or adolescent* or adolescence or "pre school*" or preschooler* or preschool* or youth or schoolchild* or pediatric* or paediatric* or "young person*" or "young people*" or teenage or teenagers or teenager or teenaged	1497937
3.	BMI or body mass index or body mass indices or anthropometry or anthropometric or anthropometr* or "body size*" or "body composition*" or "body constitution*" or "fat mass" or "weight for height" or "weight-for-height" or "height for weight" or "height-for-weight" or "waist circumference*" or "waist to hip ratio*" or "waist hip ratio*" or "waist-to-hip ratio*"	115860
4.	School or schools or preschool or preschools or "pre-school" or "pre school" or college or colleges or highschool* or "grade school*" or "elementary school*" or "primary school*" or "intermediate school*" or "middle school*" or "secondary school*" or kindergarten* or "nursery school*" or reception	2651752
5.	Measurement or measurements or measurement* or measures or surveillance or monitor or monitoring or screening or prevalence or observation*	1828270

Search	Search Terms	Results
6.	Program or programme or programs or programmes or initiative* or intervention* or promotion* or "health promotion"	854382
7.	Underweight or "under weight" or malnourish or malnourished or malnourish* or "under nourish*" or "low body weight"	8446
8.	Neonate or neonates or neonatal or baby or baby's or babys or babies or infant. or infants or infant's or newborn or newborns or newborn's	477780
9.	Obesity or obese or obes* or overweight or adipose or adiposity or "weight gain" or "weight change*" or "weight increase*" or "excess weight" or "unhealthy weight" not underweight not "under weight" not malnourish not malnourished. not malnourish. not "under nourish*" not "low body weight"	190326
10.	#2 and #3 and #4 and #5 and #6 and #9	1016
11.	Child or childs or child's or children* or childhood or adolescent* or adolescence or adolescen* or youth or "pre school*" or preschool* or preschooler* or schoolchild* or schoolchildren* or pediatric* or paediatric* or "young person*" or "young people*" or teenage or teenager or teenaged or teenage* not neonate not neonates not neonatal not baby not babys not baby's not babies not infant not infants not infant's not newborn not newborns not newborn's	1154937
12.	#3 and #4 and #5 and #6 and #9 and #11	936

APPENDIX I (continued)

CINAHL (date of original search: 08/03/2010)

Search	Search Terms	Results
1.	Obesity or obese or obes* or overweight or adipose or adiposity or adipos* or "weight gain" or "weight change*" or "weight increase*" or "excess weight" or "unhealthy weight"	33220
2.	Child or childs or children* or childhood or adolescent* or adolescence or preschool* or youth or schoolchild* or pediatric* or paediatric* or teenage*	311269
3.	BMI or body mass index or body mass indices or anthropometry or anthropometric or anthropometr* or "body size*" or "body composition*" or "body constitution*" or "fat mass" or "weight for height" or "height for weight"	30670
4.	"Weight-for-height" or height-for-weight" or "waist circumference*" or "waist to hip ratio*" or "waist hip ratio*" or "waist-to-hip ratio*"	0
5.	School or schools or preschool or preschools or "pre-school*" or college* or highschool* or "high school*" or "grade school*" or "elementary school*" or "primary school*" or "intermediate school*"	146583
6.	"Middle school*" or "secondary school*" or kindergarten* or "nursery school*" or reception	4005
7.	Measurement or measurements or measurement* or measures or surveillance or monitor or monitoring or screening or prevalence or observation*	270072
8.	Program or programs or programme or programmes or initiative* or intervention* or promotion* or "health	277567

Search	Search Terms	Results
	promotion*"	
9.	Neonate or neonates or neonatal or baby or babies or baby's or babys or infant's or infant or infants or newborn or newborns	105967
10.	Underweight or "under weight" or malnourish or malnourished or malnourish* or "under nourish*" or "low body weight"	47258
11.	#5 OR #6	147160
12.	#1 AND #2 AND #3 AND #7 AND #8 AND #11	303
13.	#12 NOT #9 NOT #10	106

APPENDIX I (continued)

COCHRANE DATABASE (date of original search: 08/03/2010)

Search	Search Terms	Results
1.	Obesity or obese or obes* or overweight or “over weight”	8975
2.	Adipose or adiposity or adipos* or “weight gain” or “weight change”	5794
3.	“Weight change*” or “weight increase*” or “excess weight” or “unhealthy weight”	890
4.	#1 or #2 or #3	13411
5.	Child or childs or child’s or children* or childhood	69994
6.	Adolescent or adolescence or adolescen* or preschool* or youth	85782
7.	Schoolchild* or pediatric* or paediatric* or teenage* or “young person*”	28376
8.	#5 or #6 or #7	122251
9.	BMI or body mass index or body mass indices or anthropometry or anthropometric	11437
10.	Anthropometr* or “body size*” or “body composition*” or “body constitution*” or “fat mass”	5539
11.	“Weight for height” or “height for weight” or “waist circumference” or “waist to hip ratio” or “waist hip ratio”	1048
12.	#9 or #10 or #11	13620
13.	School or schools or preschool or “pre school*” or “pre-school*”	69391

Search	Search Terms	Results
14.	College* or high school* or “high school*” or “grade school*” or “elementary school*”	29371
15.	“Primary school*” or “intermediate school*” or “middle school*” or “secondary school*” or kindergarten*	885
16.	“Nursery school*” or reception	159
17.	"#13 or #14 or #15 or #16	93641
18.	Measurement* or measures or surveillance or monitoring or monitor	170537
19.	Screening or prevalence or observation*	47196
20.	Program or programs or programme or programmes or initiative*	42019
21.	Intervention* or promotion* or “health promotion”	78870
22.	#18 or #19	197510
23.	#20 or #21	101836
24.	#4 and #8 and #12 and #17 and #22 and #23	352
25.	Underweight or “under weight” or malnourish* or “under nourish*” or “low body weight”	777
26.	Neonate or neonates or neonatal or baby or baby’s	12277
27.	Babys or babies or infant or infants or newborn*	30326
28.	#26 or #27	32543
29.	#24 not #25	329
30.	#29 not #28	271
31.	Cochrane review results only	46

APPENDIX I (continued)

ERIC (date of original search: 08/03/2010)

---

1. Child or childs or child's or children* or childhood or youth or adolescen* or adolescence or "young people*" or preschool* or schoolchild* or teenage* or pediatric* or paediatric* or "young person*"

---

2. Obesity or obes* or obese or overweight or "over weight" or adipose or adiposity or adipos* or "weight gain" or "weight change*" or "weight increase*" or "excess weight" or "unhealthy weight"

---

3. BMI or body mass index or body mass indices or anthropometry or anthropometric or anthropometr* or "body size*" or "body composition*" or "body constitution*" or "fat mass" or "weight for height" or "height for weight" or "waist circumference*" or "waist to hip ratio*" or "waist hip ratio*"

---

4. Measurement* or measures or surveillance or monitor or monitoring or screening or prevalence or observation*

---

5. Program or programs or programme or programmes or initiative* or intervention* or promotion* or "health promotion"

---

6. #1 AND #2 AND #3 AND #4 AND #5

Results: 38 records

APPENDIX I (continued)

GLOBAL HEALTH LIBRARY (date of original search: 08/03/2010)

Obesity AND child* AND BMI OR body mass index AND school* AND measurement OR surveillance AND program* OR initiative

---

Results: 65 records

Summary of results from electronic database searches

DATABASE	RESULTS
PubMed	1240
Embase	936
CINAHL	106
Cochrane Database	46
ERIC	38
Global Health Library	65
TOTAL	**2431**

APPENDIX II

Risk of bias assessment form

This study quality assessment form for research articles was developed from the guidelines recommended by the 'Cochrane Handbook for Systematic Reviews of Interventions: Assessing risk of bias in included studies' [1].

Study ID:

1. Are reports of the study free of suggestion of selective outcome reporting?

Yes	No	Unknown / Unclear

2. Was the study apparently free of other problems that could put it at high risk of bias?

Yes	No	Unknown / Unclear

3. Were the aims and objectives for the study clearly stated?

Yes	No	Unknown / Unclear

4. Was the study design appropriate given the primary study question and/or the aims and objectives for the study?

Yes	No	Unknown / Unclear

5. Were the methods adequately described?

Yes	No	Unknown / Unclear

6. Were the methods appropriate given the primary study question and/or the aims and objectives for the study?

Yes	No	Unknown / Unclear

7. Did the researchers adequately consider and acknowledge the limitations of their findings/study?

Yes	No	Unknown / Unclear

8. Was a summary of the pertinent findings provided?

Yes	No	Unknown / Unclear

9. Were the study's conclusions related to the actual outcomes of the research?

Yes	No	Unknown / Unclear

10. Did the study population constitute a representative sample?

Yes	No	Unknown / Unclear

11. Did the researchers consider and acknowledge alternative explanations for their observed outcomes?

Yes	No	Unknown / Unclear

12. Did the researchers consider and address counter arguments to their conclusions or summary points?

Yes	No	Unknown / Unclear

APPENDIX III

Data Extraction Form

Database source

- PubMed ☐
- Embase ☐
- CINAHL ☐
- ERIC ☐
- Global Health Library ☐
- Cochrane Database of Systematic Reviews ☐
- Related articles / reference list / 'Google' search ☐

Publication reference:	
Title:	
Year published:	
Author(s):	
Lead author information (training/qualification):	
Lead author contact details:	
Number of authors:	
Study period:	
Location of study:	
Language:	
Source of funding:	

- **Description of area in which study was conducted:**

Urban	Rural	Mixed	Other (specify)	Unknown

- **What was the scope of the study?**

National	State	County	Other (specify)	Unknown

- **What was the study design?**

Cross-sectional	Cohort	Case control	Meta-analysis	Other (specify)

- **Total sample size:**

- **Was the sample representative?**

Yes	No	Unknown

- **If not, describe why not:**

- **Clarify the underlying study population:**

- **Were recruitment methods described?**

Yes	No	Unknown

- **How were participants recruited for this study?**

- **What was the age range of the study participants?**

    - **From ..... to ..... years**

- **Were children from both sexes included in this study?**

Yes	No	Unknown

- **If no, describe:**

- **What was the ethnicity of the study participants?**

Caucasian	Asian	African	Various / Mixed	Other (specify)	Unknown

- **What was the predominant socio-economic status of study participants?**

High	Middle	Low	Various / Mixed	Unknown

- **What were the aims of the review or study?**

- **Did the study involve a screening or surveillance programme?**

Screening	Surveillance	Unknown/Other

- **How was this determined?**

Reported within article	Determined by reviewer (KMcH)	Other

- **Which anthropometric measurements were utilised?**

BMI	Waist circumference	Waist-hip ratio	BIA	Skinfold thickness	Other (specify)

- **Which growth reference was used?**

IOTF	CDC	WHO (2007)	UK90	Other national reference	Other (specify)

- **Who carried out the anthropometric measurements?**

Nurse	Doctor	Other (specify)	Not Stated

- **Specify the equipment used to obtain the anthropometric measurements:**
    - Height:
    - Weight:
    - BIA:
    - Waist and/or hip measurements:
    - Skinfold thickness:
    - Other:

- **Did the study detail the protocol for equipment calibration?**

Yes	No	Yes, incomplete

- **If yes, summarise the calibration protocol:**

- **How was consent obtained?**

Opt in	Opt out	Other (specify)	Unknown

- **What was the potential pool of participants?**

- **How many individuals and/or schools initially responded to the invitation to participate in the study?**

- **What was the participation rate?**

- **Participation rate / total number of potential participants (%)?**

- **Did the protocol include information regarding clothing at the time of data collection?**

Yes	No	Unknown

- **If yes, specify:**

- **Did the protocol include information regarding the time of year for the data collection?**

Yes	No	Unknown

- **If yes, specify:**

- **Did the protocol include information regarding exclusion criteria?**

Yes	No	Unknown

- **If yes, specify:**

- **Did the protocol include information regarding the frequency of data collection (i.e. annual, or otherwise)?**

Yes	No	Unknown

- **If yes, specify:**

- **Did the study collect any other information, aside from anthropometric data (e.g. fitness measures, dietary records, etc.)?**

Yes	No	Unknown

- **What type of database was utilised?**

Electronic	Paper-based	Other	Unknown

- **How were results communicated?**

Routine	Request only	Other	Unknown

- **Who were the results communicated to?**

Parents	Schools	State / Region	National body	Other (specify)	Unknown

- **Was follow-up linked to the screening/surveillance programme?**

Yes	No	Unknown

- **If yes, specify:**

- **List any issues, concerns or learning points associated with the programme:**
    -
    -
    -
    -

- **List any ethical issues, concerns or learning points associated with the programme:**
    -
    -

- **Was the programme evaluated?**

Yes	No	Not Stated

- **If yes, describe how this was done:**

- **Main summary points from the article:**
  -
  -
  -

- **Limitations of the findings:**
  -
  -
  -

- **Three-sentence summary of article:**

APPENDIX IV

Table A1: Summary tables - systematic literature review

Publication	Study information	Programme design	Measurement protocol	Analysis	Outcomes
Author: Al-Mousa et al [2] **Year:** 2000 **Journal:** Bahrain Medical Bulletin	**Location:** Kuwait **Rural/urban:** Not reported (NR) **Study type:** Cross-sectional study **N =** 46,684 children **PR:** NR **Period:** NR	**Design:** National sample **Programme type:** Surveillance **Consent:** NR **Freq:** NR	**Age(s):** 0-17 years **DC:** NR **Cloth:** NR **Timing:** NR **Equip:** Electronic scale, CDC measuring board **Calib:** NR **Other:** "Various" settings reported – not otherwise described	**Ref:** CDC **BMI:** % and standard deviation score (SDS) **Rndg:** 0.1kg/0.1cm **DSha:** NR **Other info:** Date of birth (DOB); gender **Other meas:** NR	**FB:** No **UI harm:** NR **Costs:** NR **Other:** Measurement protocol not standardised. Results indicate that obesity rates in this setting were low prior to age six years.
Author: Armstrong J et al [3] **Year:** 2003 **Journal:** Scottish Medical Journal	**Location:** Scotland **Rural/urban:** Both **Study type:** Cross-sectional, feasibility study **N =** 130,147 children **PR:** 85% (school-aged sample) **Period:** 1998-99	**Design:** National sample **Type:** Surveillance **Consent:** NR **Freq:** Annual	**Age(s):** 39-42 months and 5,8,12,14 years **DC:** Health visitors / school nurses **Cloth:** NR **Timing:** NR **Equip:** NR **Calib:** NR **Other:** NR	**Ref:** UK90 **BMI:** SDS **Rndg:** NR **DSha:** NR **Other info:** DOB; gender; birth weight; breastfeeding status; weight at 8/21 months **Other meas:** NR	**FB:** No **UI harm:** NR **Costs:** NR **Other:** This study looked at the feasibility of using routinely collected data to monitor childhood obesity and underweight. The authors advocate the use of surveillance.
Author: Bovet et al [4] **Year:** 2006 **Journal:** International Journal of Pediatric Obesity	**Location:** Seychelles **Rural/urban:** Both **Study type:** Series of cross-sectional studies **N =** 23,459 children **PR:** 77% **Period:** 1998-2004	**Design:** National sample **Type:** Surveillance **Consent:** Opt in **Freq:** Annual	**Age(s):** 5, 9, 12, 15 years **DC:** School nurses **Cloth:** Light clothing, no shoes **Timing:** NR **Equip:** SECA 870 scales, SECA 208 stadiometer **Calib:** Performed, but not detailed **Other:** Children from state- and privately-funded schools included	**Ref:** CDC and IOTF **BMI:** % and z scores **Rndg:** NR **DSha:** NR **Other info:** DOB; gender; school; national identity number; information on exercise times **Other meas:** NR	**FB:** No **UI harm:** NR **Costs:** NR **Other:** Participation rates were high for opt in consent model, though noted to decline with increasing child age. The authors advocate the use of BMI surveillance.

Key:

N = Number
PR = Participation rates
Period = Data collection period

Type = Programme type
Consent = Consent model
Freq = Frequency

DC = Data collectors
Cloth = Clothing
Equip = Equipment
Calib = Calibration

Ref = Growth reference
Rndg: Rounding
DSha = Data sharing
Other info = Other information
Other meas = Other measures

FB = Feedback
UI harm = Unintended harm
Other = Other outcomes

Publication	Study information	Programme design	Measurement protocol	Analysis	Outcomes
Author: Brosnan et al [5] **Year:** 2008 **Journal:** Public Health Nursing	**Location:** US (Texas) **Rural/urban:** Urban **Study type:** Cross-sectional study **N =** 2,338 children **PR:** NR **Period:** 2001-03	**Design:** State-wide sample (3 schools) **Type:** Screening **Consent:** NR **Freq:** NR	**Age(s):** 12-19 years **DC:** Nursing students **Cloth:** NR **Timing:** NR **Equip:** NR **Calib:** NR **Other:** Training procedures for data collectors reported	**Ref:** CDC **BMI:** % **Rndg:** NR **DSha:** Parents **Other info:** DOB; gender; ethnicity **Other meas:** Blood pressure (BP)	**FB:** Yes, letter to parents **UI harm:** NR **Costs:** Yes. Cost per student (BP and BMI screening): $US28 (approximately £18.10) **Other:** Majority of cost related to personnel expenses. The authors advocate screening in schools.
Author: CDC (Berger M et al) [6] **Year:** 2011 **Journal:** Morbidity and Mortality Weekly Report	**Location:** US (New York City) **Rural/urban:** Urban **Study type:** Series of cross-sectional studies **N =** 947,765 children **PR:** 61%-93% **Period:** 2006-2011	**Design:** State-wide population level programme **Type:** Screening **Consent:** NR **Freq:** Annual	**Age(s):** 5-17 years **DC:** Physical education (PE) teachers **Cloth:** NR **Timing:** NR **Equip:** NR (but not standardised) **Calib:** NR **Other:** Measurement setting not reported	**Ref:** CDC **BMI:** % **Rndg:** NR **DSha:** Parents **Other info:** DOB; gender; ethnicity; place of birth; language at home; postal code; free lunch status **Other meas:** NR	**FB:** Yes **UI harm:** NR **Costs:** NR **Other:** This study considered longitudinal trends in child obesity prevalence in New York and analysed results according to ethnicity and socio-economic status.
Author: CDC (Evans R et al) [7] **Year:** 2009 **Journal:** Morbidity and Mortality Weekly Report	**Location:** US (Florida) **Rural/urban:** NR **Study type:** Cross-sectional survey **N =** NR, 67 counties in Florida **PR:** 88% of counties screened at least 75% of children **Period:** 2007-08	**Design:** State-wide population level programme **Type:** Screening **Consent:** NR **Freq:** Annual	**Age(s):** 6, 8, 11, 14 years **DC:** NR **Cloth:** NR **Timing:** NR **Equip:** NR **Calib:** NR **Other:** Measurement setting not reported	**Ref:** CDC **BMI:**NR **Rndg:** NR **DSha:** Results shared with Florida Department of Health **Other info:** NR **Other meas:** NR	**FB:** NR **UI harm:** NR **Costs:** NR **Other:** This article detailed a review of existing screening practices in Florida and revealed a lack of coordination and no standardised measurement protocol.
Author: Chomitz VR et al [8] **Year:** 2003 **Journal:** Archives of Pediatrics and Adolescent Medicine	**Location:** US (Massachusetts) **Rural/urban:** Urban **Study type:** Pilot study **N =** 1,396 children **PR:** 89% **Period:** 2001	**Design:** State-wide sample **Type:** Screening **Consent:** Opt out **Freq:** Pilot	**Age(s):** 5-13 years **DC:** PE teachers **Cloth:** NR **Timing:** Spring-summer **Equip:** NR **Calib:** NR **Other:** Training procedures for data collectors described	**Ref:** CDC **BMI:**NR **Rndg:** NR **DSha:** Parents **Other info:** DOB; gender; ethnicity; language at home; free lunch status; “physical fitness” **Other meas:** NR	**FB:** Yes, varied by group **UI harm:** NR **Costs:** NR **Other:** This study looked at the effect of a health report card approach (parental feedback). Feedback was found to be time consuming, intensive and did not alter behaviour.

Publication	Study information	Programme design	Measurement protocol	Analysis	Outcomes
Author: Conrey EJ et al [9] **Year:** 2009 **Journal:** Preventing Chronic Disease: Research, Practice and Policy	**Location:** US (Ohio) **Rural/urban:** NR **Study type:** Pilot study **N =** 14,451 children **PR:** 57% **Period:** 2004-05	**Design:** State-wide sample **Type:** Screening **Consent:** Opt in **Freq:** Annual	**Age(s):** 8 years **DC:** Healthcare professionals and school nurses **Cloth:** Shoes and heavy outer clothing removed **Timing:** NR **Equip:** Tanita BWB800 scales, SECA 214 stadiometer **Calib:** Yes, tested by staff **Other:** Height measured once, weight measured twice (in private)	**Ref:** CDC **BMI:**NR **Rndg:** 0.2lb/0.25inch **DSha:** Individual/ School level results not available to families or school faculty members **Other info:** Oral health survey; free lunch status; DOB, gender; ethnicity; oral health behaviours **Other meas:** NR	**FB:** No **UI harm:** NR **Costs:** NR **Other:** Time per measurement reported: 2-3mins per child. Pilot study adding BMI screening to existing oral health programme. Programme labelled as screening but not feedback delivered to individual families.
Author: Demerath E et al [10] **Year:** 2003 **Journal:** Preventive Medicine	**Location:** US (West Virginia) **Rural/urban:** Rural **Study type:** Cross-sectional sample **N =** 1,338 children **PR:** 40% **Period:** 2000-01	**Design:** County-wide sample **Type:** Screening **Consent:** Opt in **Freq:** NR	**Age(s):** 11 years **DC:** Health Science students **Cloth:** Light clothing, no shoes **Timing:** Oct-Dec 2000 **Equip:** SECA scales, Shorr portable stadiometer **Calib:** NR **Other:** NR	**Ref:** CDC **BMI: %** **Rndg:** 0.1kg/0.1cm **DSha:** Parents **Other info:** DOB; gender; ethnicity; socio-economic status **Other meas:** BP and cholesterol	**FB:** Yes, to parents **UI harm:** NR **Costs:** NR **Other:** The authors concluded that the programme was inexpensive and non-invasive. Major use of the programme: highlight the issue to parents and physicians.
Author: Ells LJ et al [11] **Year:** 2008 **Journal:** Public Health	**Location:** England (Teesside) **Rural/urban:** NR **Study type:** Cross sectional study (pilot) **N =** 174 children **PR:** NR **Period:** 2005-06	**Design:** Region-wide sample **Type:** Surveillance **Consent:** Opt in **Freq:** Pilot	**Age(s):** 5,12,15 years **DC:** NR **Cloth:** Light clothing **Timing:** NR **Equip:** Tanita or hoist sling scale, Leicester measure/roller meter **Calib:** NR **Other:** Approximated ulna length also used	**Ref:** UK90 **BMI:** NR **Rndg:** NR **DSha:** NR **Other info:** Gender; DOB; medication use; medical supervision; ethnicity; free lunch status; gastrostomy use **Other meas:** Waist circumference	**FB:** No **UI harm:** NR **Costs:** NR **Other:** Pilot study looking at the feasibility of including children with disabilities within an existing child measurement programme.
Author: Filbert E et al [12] **Year:** 2009 **Journal:** Journal of Community Health Nursing	**Location:** US (Kansas) **Rural/urban:** Rural **Study type:** Longitudinal study (pilot) **N =** 174 children **PR:** NR **Period:** 2007-08	**Design:** County-wide sample **Type:** Surveillance **Consent:** NR **Freq:** Annual	**Age(s):** 5,11 years **DC:** NR **Cloth:** NR **Timing:** NR **Equip:** TriFIT scales and stadiometer **Calib:** NR **Other:** NR	**Ref:** CDC **BMI:** NR **Rndg:** NR **DSha:** Results communicated to school districts, superintendents and local governments **Other info:** DOB; gender **Other meas:** NR	**FB:** No **UI harm:** NR **Costs:** NR **Other:** Results from this pilot study led to the introduction of new intervention initiatives. The importance of local area data addressing a public health issue was underscored.

Publication	Study information	Programme design	Measurement protocol	Analysis	Outcomes
Author: Hoelscher DM et al [13] **Year:** 2004 **Journal:** American Journal of Public Health	**Location:** US (Texas) **Rural/urban:** Both **Study type:** Cross-sectional study **N =** 6,695 children **PR:** 39%-80% (by age-group) **Period:** 2000-01	**Design:** State-wide sample **Type:** Surveillance **Consent:** Opt out (80%), Opt in (20%) **Freq:** Annual	**Age(s):** 9, 13, 16 years **DC:** Project staff and Department of Health employees **Cloth:** NR **Timing:** NR **Equip:** SECA 770 or Tanita BWB800 scales, Perspective Enterprises portable adult measuring unit **Calib:** Yes, reported **Other:** Private/charter/special needs schools excluded. Training of data collectors reported.	**Ref:** CDC **BMI:** NR **Rndg:** 0.1kg/0.1cm **DSha:** State **Other info:** Demographic information; nutrition behaviours, attitudes and knowledge **Other meas:** NR	**FB:** No **UI harm:** NR **Costs:** NR **Other:** Sample from children in high schools likely not representative due to low participation rates, school dropout and lack of a single classroom. However, the authors concluded that this programme was "feasible at several grade levels".
Author: Jones SE et al [14] **Year:** 2005 **Journal:** Archives of Disease in Childhood	**Location:** Wales **Rural/urban:** Both **Study type:** Series of cross-sectional studies **N =** 46,073 children **PR:** 94% **Period:** 1986-2002	**Design:** Region-wide sample (South Wales) **Type:** Surveillance **Consent:** NR **Freq:** Annual	**Age(s):** 5 years **DC:** Clinic nurses **Cloth:** NR **Timing:** NR **Equip:** NR **Calib:** NR **Other:** NR	**Ref:** IOTF and Child Growth Foundation 1997 BMI reference charts **BMI:** NR **Rndg:** NR **DSha:** NR **Other info:** DOB; gender **Other meas:** NR	**FB:** No **UI harm:** NR **Costs:** NR **Other:** The authors condone use of such surveillance systems and collation of data above the level of individual Trusts.
Author: Justus MB et al [15] **Year:** 2007 **Journal:** Journal of School Health	**Location:** US (Arkansas) **Rural/urban:** Both **Study type:** Cross-sectional study **N =** NR, **PR:** 90%-95% **Period:** 2003-06	**Design:** State-wide population level programme **Type:** Screening **Consent:** Opt out **Freq:** Annual	**Age(s):** 5-17 years initially, later ages 5,7,9,11,13,15 years **DC:** School nurse or other school personnel **Cloth:** NR **Timing:** NR **Equip:** Tanita HD 314 scale, standardised and purpose-built stadiometers **Calib:** NR **Other:** Height measured twice, weight measured once. Training procedures for data collectors reported	**Ref:** CDC **BMI:** % and z-score **Rndg:** NR **DSha:** Letter to parents. Aggregated results communicated to school, districts and state **Other info:** DOB; gender **Other meas:** NR	**FB:** Yes, letter to parents **UI harm:** NR **Costs:** NR **Other:** This article described the first three years of Arkansas Act 1220 (2003). The aim of this Act is to "combat childhood obesity", rather than monitoring alone. Overall, school and parental buy-in were identified as key to success of weight monitoring programmes.

Publication	Study information	Programme design	Measurement protocol	Analysis	Outcomes
Author: Kalich KA et al [16] **Year:** 2008 **Journal:** BMC Pediatrics	**Location:** US (Massachusetts) **Rural/urban:** Urban **Study type:** Cross-sectional study **N =** 852 children **PR:** 80% **Period:** 2003	**Design:** City-wide sample **Type:** Screening **Consent:** Opt out **Freq:** Annual	**Age(s):** 10-13 years **DC:** PE teachers **Cloth:** NR **Timing:** April (spring) **Equip:** SECA scales, SECA 216 stadiometer **Calib:** NR **Other:** Measurements performed in school gym. All data collectors received training	**Ref:** CDC **BMI:** BMI and z-score **Rndg:** 0.2lb/0.25inch **DSha:** Parents **Other info:** DOB; gender; ethnicity; fitness measurements **Other meas:** NR	**FB:** Yes, letter to parents **UI harm:** Yes, reported **Costs:** NR **Other:** This study considered the comfort, utility and privacy of measurements. There was no evidence of an increase in intention to engage in harmful health behaviours after receiving weight results.
Author: Kelishadi R et al [17] **Year:** 2012 **Journal:** International Journal of Preventive Medicine	**Location:** Iran **Rural/urban:** Both **Study type:** Cross sectional survey **N =** 5,528 children **PR:** NR **Period:** 2009-10	**Design:** Nation-wide sample **Type:** Surveillance **Consent:** Opt in **Freq:** Every 2 years	**Age(s):** 10-18 years **DC:** Trained healthcare professionals **Cloth:** Bare-foot, lightly dressed **Timing:** NR **Equip:** NR **Calib:** NR **Other:** NR	**Ref:** WHO 2007 **BMI:** z-score **Rndg:** 0.2kg (weight only) **DSha:** NR **Other info:** DOB; gender; questionnaire on lifestyle factors **Other meas:** Waist circumference and fasting lipids	**FB:** NR **UI harm:** NR **Costs:** NR **Other:** This study considered a range of risk factors for NCDs and the authors advocated the use of "establishing surveillance systems for risk behaviours to implement action-oriented interventions".
Author: Krue, S et al [18] **Year:** 2010 **Journal:** Obesity Reviews	**Location:** Denmark **Rural/urban:** NR **Study type:** Cross-sectional study **N =** 7,541 children **PR:** 87% **Period:** 2007-09	**Design:** Region-wide population level study **Type:** Surveillance **Consent:** NR **Freq:** Annual	**Age(s):** 14-16 years **DC:** Physicians **Cloth:** Light clothing, no shoes **Timing:** NR **Equip:** NR **Calib:** NR **Other:** NR	**Ref:** IOTF **BMI:** % **Rndg:** 0.1kg/0.5cm **DSha:** NR **Other info:** DOB; gender; questionnaire on lifestyle factors **Other meas:** General health exam	**FB:** No **UI harm:** NR **Costs:** NR **Other:** In this study, measurements were conducted as part of a routine health exam conducted by physicians within the school setting.
Author: Lager AC et al [19] **Year:** 2009 **Journal:** Scandinavian Journal of Public Health	**Location:** Sweden **Rural/urban:** NR **Study type:** Cross-sectional study **N =** 7,584 children **PR:** 92%-96% in 2005-6 **Period:** 2003-06	**Design:** Region-wide population level study (study conducted in 4 municipalities) **Type:** Surveillance **Consent:** NR **Freq:** Uncertain, annual in some cases	**Age(s):** 7, 11, 14-15 years **DC:** School nurses **Cloth:** Light clothing (3 municipalities), "stripped to waist" (1 municipality) **Timing:** NR **Equip:** NR **Calib:** Yes, performed annually **Other:** NR	**Ref:** IOTF **BMI:** NR **Rndg:** 0.1 or 0.5kg/0.1 or 0.5cm **DSha:** NR **Other info:** NR **Other meas:** NR	**FB:** No **UI harm:** NR **Costs:** NR **Other:** This study examined the feasibility of using existing electronic health records to measure prevalence of overweight and obesity in Sweden. Overall, this method was found to be executable and used minimal resources.

Publication	Study information	Programme design	Measurement protocol	Analysis	Outcomes
Author: Levine RS et al [20] **Year:** 2008 **Journal:** Public Health	**Location:** England **Rural/urban:** Urban **Study type:** Cross-sectional study (pilot) **N =** 3,271 children **PR:** 88% **Period:** 2004-05	**Design:** City-wide sample **Type:** Surveillance **Consent:** Opt out **Freq:** Annual	**Age(s):** 5,8,13 years **DC:** School nurse and trained healthcare assistant **Cloth:** Normal school attire, shoes and jumpers removed **Timing:** April-June **Equip:** Tanita TBF300 scales, Raven Dunmow stadiometer **Calib:** NR **Other:** Children unable to be measured excluded	**Ref:** UK90 **BMI:** % and SDS **Rndg:** 0.1kg/0.1cm **DSha:** Parents, if requested **Other info:** DOB; gender, postcode, ethnicity **Other meas:** NR	**FB:** Yes, if requested **UI harm:** Yes, reported **Costs:** Yes, less than £1.50 per child **Other:** Reported time requirement for measurements: approximately 2mins per child. The authors do not recommend including children in secondary schools due to various organisational challenges.
Author: Levine RS et al [21] **Year:** 2009 **Journal:** Child: Care, Health and Development	**Location:** England **Rural/urban:** Urban **Study type:** Cross-sectional study (follow-up from earlier pilot: Rudolf et al) **N =** Not specified (24 primary schools) **PR:** 91%/89% in Reception/Year 6 **Period:** 2006	**Design:** City-wide sample **Type:** Monitoring **Consent:** Opt out **Freq:** NR	**Age(s):** 5-6, 10-11 years **DC:** Healthcare support worker **Cloth:** Normal school attire, shoes and jumpers removed **Timing:** Summer term **Equip:** Tanita TBF300 scales, Raven Dunmow stadiometer **Calib:** NR **Other:** NR	**Ref:** NR **BMI:** BMI **Rndg:** 0.1kg/0.1cm **DSha:** NR **Other info:** DOB; gender **Other meas:** Waist circumference and BIA	**FB:** NR **UI harm:** NR **Costs:** NR **Other:** This study examined feasibility of data collection by trained healthcare support worker (vs school nurse). BIA scales were found to be difficult to use and the authors did not recommend including this method in population-level monitoring.
Author: Madsen KA [22] **Year:** 2011 **Journal:** Archives of Pediatric and Adolescent Medicine	**Location:** US (California) **Rural/urban:** Both **Study type:** Series of cross-sectional studies **N =** 6.97 million children **PR:** 73% **Period:** 2001-08	**Design:** State-wide population level programme **Type:** Screening **Consent:** NR **Freq:** Annual	**Age(s):** 10, 12, 14 years **DC:** NR **Cloth:** NR **Timing:** NR **Equip:** NR **Calib:** NR **Other:** NR	**Ref:** CDC **BMI:** BMI, % and z-score **Rndg:** to nearest pound (weight) **DSha:** Parental notification in some instances **Other info:** DOB; gender; ethnicity **Other meas:** NR	**FB:** Mixed: feedback provided in some instances **UI harm:** NR **Costs:** NR **Other:** This study considered the impact of feedback provision on obesity prevalence and concluded that feedback might have certain benefits but, “in its current form may not reduce pediatric obesity”.

Publication	Study information	Programme design	Measurement protocol	Analysis	Outcomes
Author: Montgomery-Reagan K et al [23] **Year:** 2009 **Journal:** Rural and Remote Health	**Location:** US (Ohio) **Rural/urban:** Rural **Study type:** Cross sectional study **N =** 2,000 children approximately **PR:** NR **Period:** 2006-07	**Design:** Region-wide sample **Type:** Screening **Consent:** Opt out **Freq:** Annual	**Age(s):** 6-11 years **DC:** Medical students, interns and residents **Cloth:** Coats and shoes removed **Timing:** NR **Equip:** Digital floor scales, SECA portable stadiometers **Calib:** NR **Other:** Measurements conducted in teachers' lounges	**Ref:** CDC **BMI:** % **Rndg:** 0.1kg (weight only) **DSha:** NR **Other info:** Health information survey **Other meas:** NR	**FB:** NR **UI harm:** NR **Costs:** NR **Other:** This article described a measurement programme targeted at high-risk children. This programme aimed to "identify subpopulations of children who may warrant clinical intervention"; however, no feedback or follow-up processes were described.
Author: Moore WE et al [24] **Year:** 2006 **Journal:** Preventing Chronic Disease: Research, Practice and Policy	**Location:** US (Oklahoma) **Rural/urban:** Rural **Study type:** Cross-sectional study (pilot) **N =** 769 children **PR:** 38% **Period:** 2001-02	**Design:** District-wide sample **Type:** Screening **Consent:** Opt in **Freq:** Annual	**Age(s):** 5-17 years **DC:** Researchers **Cloth:** Heavy clothing, shoes and jackets removed **Timing:** NR **Equip:** SECA 770 scale, SECA Road Rod stadiometer **Calib:** NR **Other:** NR	**Ref:** CDC **BMI:** NR **Rndg:** 0.1kg/0.1cm **DSha:** Parents. Aggregated results to school administration. **Other info:** DOB; gender; ethnicity; free lunch status **Other meas:** BP	**FB:** Yes, to parents **UI harm:** NR **Costs:** NR **Other:** This study coupled BMI screening with BP measurements. This pilot programme led to development of an intervention targeting childhood obesity. Overall, participation rates were low and decreased linearly with increasing age.
Author: Nellist K et al [25] **Year:** 2009 **Journal:** Preventing Chronic Disease: Public Health Research, Practice and Policy	**Location:** US (Utah) **Rural/urban:** Both **Study type:** Cross-sectional study **N =** NR (69 schools) **PR:** NR **Period:** 2006	**Design:** State-wide sample **Type:** Surveillance **Consent:** Opt in and opt out **Freq:** Every 2 years	**Age(s):** 6, 8, 10 years **DC:** Nurse or trained volunteer **Cloth:** NR **Timing:** Jan-Mar **Equip:** Tanita BWB800 scale, Handi-Stat stadiometer **Calib:** Performed, not described **Other:** In-person training for data collectors	**Ref:** CDC **BMI:** z-score **Rndg:** NR **DSha:** Schools, school nurses, district superintendents and principals **Other info:** DOB; gender; information on data collector **Other meas:** NR	**FB:** Yes, at school level only. Results not provided to parents **UI harm:** NR **Costs:** NR **Other:** Opt out consent identified as preferable. This programme was found to be manageable, inexpensive, time-efficient and provided useful results. Overall, the authors identified that support from "upper management" was key to the success of any management initiative.

Publication	Study information	Programme design	Measurement protocol	Analysis	Outcomes
Author: Northrup KL et al [26] **Year:** 2008 **Journal:** Journal of School Nursing	**Location:** US (West Virginia) **Rural/urban:** NR **Study type:** Series of cross sectional studies **N =** 6,975 children **PR:** 4%-63% **Period:** 2002-07	**Design:** State-wide sample **Type:** Screening **Consent:** Initially opt in, later opt out **Freq:** Annual	**Age(s):** 5, 8, 11 years **DC:** School nurses, nursing students, physician assistants **Cloth:** NR **Timing:** NR **Equip:** SECA 880 scales, Schorr height/length board **Calib:** NR **Other:** NR	**Ref:** CDC **BMI:** % **Rndg:** NR **DSha:** Parents. Annual county-wide report to stakeholders and researchers **Other info:** DOB; gender; free lunch status; academic performance; fitness scores **Other meas:** Lipid profile, fasting glucose, BP, fitness information, vision/hearing screening, dental assessment, acanthosis nigricans screening	**FB:** Yes. Letter to parents if results abnormal **UI harm:** NR **Costs:** NR **Other:** Multiple measurements were incorporated into this programme, which included blood tests. Screening was found to provide avenues to pursue communication between schools and parents around health status and cardiovascular disease risk factors.
Author: Raczynski JM et al [27] **Year:** 2009 **Journal:** Journal of Public Health Policy	**Location:** US (Arkansas) **Rural/urban:** Both **Study type:** NA **N =** 450,000 children in year 1 of programme **PR:** NR **Period:** 2003-08	**Design:** State-wide population level programme **Type:** Screening **Consent:** Initially required, later opt out **Freq:** Annual	**Age(s):** 5-17 years **DC:** NR **Cloth:** NR **Timing:** NR **Equip:** NR **Calib:** NR **Other:** Information on protocol available elsewhere	**Ref:** CDC **BMI:** % **Rndg:** NR **DSha:** Parents, school district, county **Other info:** NR **Other meas:** NR	**FB:** Yes, letter to parents **UI harm:** Yes, reported **Costs:** NR **Other:** This article highlights that an explicit aim of Act 1220 was to increase the number of healthy weight children in Arkansas. Evaluation processes enabled changes in response to concerns raised by stakeholders.
Author: Routen AC et al [28] **Year:** 2011 **Journal:** Child: Care, Health and Development	**Location:** England **Rural/urban:** NR **Study type:** Cross-sectional study **N =** 74 children **PR:** NR **Period:** NR	**Design:** Sample within nation-wide population level programme **Type:** Screening **Consent:** Opt out **Freq:** Annual	**Age(s):** 10-11 years **DC:** Single researcher **Cloth:** Light clothing, shoes, hair ornaments and objects removed **Timing:** Time of day reported **Equip:** Tanita HD352 scale, SECA 214 stadiometer **Calib:** Yes, reported **Other:** Protocol described in depth. Multiple measurements taken throughout day	**Ref:** UK90 **BMI:** % and BMI **Rndg:** 0.1kg/0.1cm **DSha:** NR **Other info:** NR **Other meas:** Repeat height and weight measurements throughout different times of the day	**FB:** Yes, not detailed **UI harm:** NR **Costs:** NR **Other:** This small-scale study, set within the NCMP, considered the impact of time of day at which measurements conducted and concluded that changes in height over the day may impact on subsequent weight status classification in Year 6 children.

Publication	Study information	Programme design	Measurement protocol	Analysis	Outcomes
Author: Rudolf MC et al [29] **Year:** 2006 **Journal:** Archives of Disease in Childhood	**Location:** England **Rural/urban:** Urban **Study type:** Cross-sectional study (pilot) **N =** 999 children **PR:** 95%/85% in primary/secondary schools, respectively **Period:** 2004	**Design:** City-wide sample **Type:** Surveillance **Consent:** Opt out **Freq:** NR	**Age(s):** 5, 9, 13 years **DC:** School nurse **Cloth:** Light clothing **Timing:** NR **Equip:** Tanita scale, Raven Dunmow stadiometer **Calib:** NR **Other:** Children unable to be measured were excluded. Training procedures for data collectors reported	**Ref:** UK90 and IOTF **BMI:** SDS **Rndg:** 0.1kg/0.1cm **DSha:** NR **Other info:** DOB; gender; ethnicity; postcode **Other meas:** Waist circumference, BIA	**FB:** No **UI harm:** NR **Costs:** NR **Other:** This study trialled and recommended use of representative sampling of schools rather than whole population data collection. The authors did not recommend use of waist circumference or BIA in large scale measurement programmes.
Author: Sjoberg A et al [30] **Year:** 2008 **Journal:** Acta Paediatrica	**Location:** Sweden **Rural/urban:** Urban **Study type:** Series of cross sectional studies **N =** 13,002 children **PR:** 80%-83% **Period:** 1984-85, 2000-01, 2004-05	**Design:** City-wide population level programme **Type:** Surveillance **Consent:** NR **Freq:** Annual	**Age(s):** 10 years **DC:** School nurses **Cloth:** NR **Timing:** NR **Equip:** NR **Calib:** NR **Other:** NR	**Ref:** IOTF **BMI:** SDS **Rndg:** NR **DSha:** NR **Other info:** DOB; gender; socio-economic status **Other meas:** NR	**FB:** No **UI harm:** NR **Costs:** NR **Other:** The authors advocated use of measuring children aged 10 years and including waist circumference in the measurement protocol (however, no justification provided).
Author: Smith DT et al [31] **Year:** 2008 **Journal:** Journal of Rural Health	**Location:** US (Wyoming) **Rural/urban:** Rural **Study type:** Repeated cross sectional sample **N =** 448 children **PR:** NR **Period:** 1999-2004	**Design:** State-wide sample **Type:** Surveillance **Consent:** NR **Freq:** Annual	**Age(s):** 6 years **DC:** School nurse **Cloth:** Light clothing, no shoes **Timing:** Oct **Equip:** Medical beam balance (scale and stadiometer) **Calib:** NR **Other:** NR	**Ref:** CDC and IOTF **BMI:** BMI, % and z-score **Rndg:** 0.5lb/0.5inch **DSha:** NR **Other info:** DOB; gender **Other meas:** NR	**FB:** NR **UI harm:** NR **Costs:** NR **Other:** This study analysed BMI results according to both CDC and IOTF curves. No notable discrepancies were found in the results.
Author: Stanojevic S et al [32] **Year:** 2008 **Journal:** Journal of Pediatric Gastroenterology and Nutrition	**Location:** Chile **Rural/urban:** Urban **Study type:** Multiple cross sectional studies **N =** 10,246 children **PR:** NR **Period:** 1996-2004	**Design:** City-wide sample (within national programme) **Type:** Surveillance **Consent:** NR **Freq:** Three times per year, every year	**Age(s):** 2-5 years **DC:** School teachers **Cloth:** Light clothing, no shoes **Timing:** March, Aug, Nov **Equip:** SECA 720 scale and stadiometer **Calib:** Yes, once per week **Other:** Children measured in the morning. Teachers received training	**Ref:** CDC and WHO (1977) **BMI:** z-score **Rndg:** 0.1kg/0.1cm **DSha:** NR **Other info:** NR **Other meas:** NR	**FB:** NR **UI harm:** NR **Costs:** NR **Other:** This study considered comparisons of trends in weight status throughout the year. Children were noted to be heaviest in and after the winter months, when compared with weight status in the autumn period.

Publication	Study information	Programme design	Measurement protocol	Analysis	Outcomes
Author: Stoddard SA et al [33] **Year:** 2008 **Journal:** Journal of School Nursing	**Location:** US (Minnesota) **Rural/urban:** Urban **Study type:** Cross-sectional study **N =** 70 children, 7 school nurses **PR:** NR. Nurses: 88% **Period:** 2005	**Design:** State-wide sample **Type:** Screening **Consent:** NR **Freq:** NR	**Age(s):** 5, 7, 9, 11 years **DC:** School nurses and researcher **Cloth:** Heavy clothing and shoes removed **Timing:** NR **Equip:** SECA 880 scales, Schorr stadiometer **Calib:** NR **Other:** Two height recordings	**Ref:** NR **BMI:** NR **Rndg:** 0.1kg/0.1cm **DSha:** NR **Other info:** NR **Other meas:** NR	**FB:** NR **UI harm:** NR **Costs:** NR **Other:** This study concluded that screening performed by school nurses was reliable and private, with high inter-rater reliability. The authors highlighted the need for training of data collectors.
Author: Tambalis KD et al [34] **Year:** 2009 **Journal:** Obesity	**Location:** Greece **Rural/urban:** Both **Study type:** Series of cross-sectional studies **N =** 651,582 children **PR:** 95% **Period:** 1997-2007 (except 2002)	**Design:** Nation-wide population level programme **Type:** Surveillance **Consent:** NR **Freq:** Annual	**Age(s):** 8-9 years **DC:** "Two trained professionals" **Cloth:** NR **Timing:** May-June **Equip:** NR **Calib:** NR **Other:** Data collectors were trained. Measurements conducted in the morning.	**Ref:** IOTF **BMI:** % **Rndg:** 0.1kg/0.5cm **DSha:** NR **Other info:** DOB; gender; city; area **Other meas:** NR	**FB:** No **UI harm:** NR **Costs:** NR **Other:** This study considered longitudinal trends in childhood obesity prevalence. The authors advocated screening children after age six years – after the period of adiposity rebound.
Author: Thompson JW et al [35] **Year:** 2009 **Journal:** Pediatrics	**Location:** US (Arkansas) **Rural/urban:** Both **Study type:** NA **N =** 1.45 million children in years 1-4 of programme **PR:** 92%-96% **Period:** 2003-07	**Design:** State-wide population level programme **Type:** Screening **Consent:** Opt out **Freq:** Annual	**Age(s):** 5-17 years **DC:** School nurses and other school personnel **Cloth:** Shoes, jackets and sweaters removed **Timing:** NR **Equip:** Tanita HD 314 scale, standardised stadiometers **Calib:** NR **Other:** Height measured twice, weight measured once.	**Ref:** CDC **BMI:** % **Rndg:** NR **DSha:** Parents **Other info:** NR **Other meas:** NR	**FB:** Yes, letter to parents **UI harm:** Yes, reported. **Costs:** Yes. Reported as $US3 per child initially, falling to $US1.50 in later years **Other:** The authors noted that increased unintended adverse outcomes had not eventuated since the programme's introduction in 2003.
Author: Werner BO et al [36] **Year:** 2006 **Journal:** Scandinavian Journal of Public Health	**Location:** Sweden **Rural/urban:** Both **Study type:** Longitudinal study **N =** 3,749 children **PR:** 96% **Period:** 1980-1991	**Design:** Nation-wide sample **Type:** Surveillance **Consent:** NR **Freq:** Annual	**Age(s):** 7-18 years **DC:** School nurse **Cloth:** Underwear only, bare feet **Timing:** NR **Equip:** NR **Calib:** NR **Other:** Children from state- and privately-funded schools included	**Ref:** NR **BMI:** NR **Rndg:** NR **DSha:** NR **Other info:** NR **Other meas:** NR	**FB:** No **UI harm:** NR **Costs:** NR **Other:** In this study, data were extracted from existing school health records. The authors concluded that this approach was feasible, affordable, and representative.

APPENDIX V

Table A2: All documented school-based CMPs

Location	Reported by:
Chile	Stanojevic et al (’08) [32]
Denmark	Krue et al (’10) [18]
England	Ells et al (’08) [11], Levine et al (‘08) [20], Levine et al (‘09) [21], Rudolf et al (’03) [29], Routen et al (’11) [28]
Greece	Tambalis et al (’09) [34]
Iran	Kelishadi et al (’12) [17]
Kuwait	Al-Mousa et al (’00) [2]
Scotland	Armstrong et al (’03) [3]
Seychelles	Bovet et al (’06) [4]
Sweden	Lager et al (’09) [19], Sjoberg et al (’08) [30], Werner et al (’06) [36]
United States:	
• Alabama	Linchey and Madsen (’11) [37]
• Arkansas	Justus et al (’07) [15], Raczynski et al (’09) [27], Thompson et al (’09) [35], Linchey and Madsen (’11), Longjohn et al (’10) [38]
• California	Madsen (’11) [22], Linchey and Madsen (’11), Longjohn et al (’10), Nihiser et al (’09) [39]
• Colorado	Oza-Frank and Siegal (’11) [40]
• Connecticut	Linchey and Madsen (’11)
• Delaware	Longjohn et al (’10)
• Florida	CDC (Evans et al, ’09) [7], Linchey and Madsen (’11), Longjohn et al (’10)
• Georgia	Oza-Frank and Siegal (’11)
• Illinois	Linchey and Madsen (’11), Oza-Frank and Siegal (’11), Nihiser et al (’09)
• Iowa	Longjohn et al (’10)
• Kansas	Filbert et al (’09) [12]
• Louisiana	Longjohn et al (’10), Nihiser et al (’09)
• Maine	Linchey and Madsen (’11), Oza-Frank and Siegal (’11), Longjohn et al (’10)

Location	Reported by:
• Massachusetts	Chomitz et al (’03) [8], Kalich et al (’08) [16], Linchey and Madsen (’11), Longjohn et al (’10)
• Michigan	Nihiser et al (’09)
• Minnesota	Stoddard et al (’08) [33]
• Mississippi	Linchey and Madsen (’11)
• Missouri	Longjohn et al (’10)
• Nebraska	Linchey and Madsen (’11)
• Nevada	Linchey and Madsen (’11)
• New Hampshire	Oza-Frank and Siegal (’11)
• New Jersey	Linchey and Madsen (’11)
• New York	CDC (Berger et al, ’11) [6], Linchey and Madsen (’11), Nihiser et al (’09)
• North Carolina	Longjohn et al (’10)
• North Dakota	Oza-Frank and Siegal (’11)
• Ohio	Conrey et al (’09) [9], Montgomery-Reagan et al (’09) [23], Linchey and Madsen (’11), Oza-Frank and Siegal (’11)
• Oklahoma	Moore et al (’06) [24], Longjohn et al (’10)
• Pennsylvania	Linchey and Madsen (’11), Longjohn et al (’10), Nihiser et al (’09)
• South Carolina	Linchey and Madsen (’11), Longjohn et al (’10)
• Tennessee	Linchey and Madsen (’11), Longjohn et al (’10), Nihiser et al (’09)
• Texas	Brosnan et al (’08) [5], Hoelscher et al (’04) [13], Linchey and Madsen (’11), Longjohn et al (’10)
• Utah	Nellist et al (’09)
• Vermont	Longjohn et al (’10), Nihiser et al (’09)
• West Virginia	Demerath et al (’03) [10], Northrup et al (’08) [26], Linchey and Madsen (’11), Longjohn et al (’10), Nihiser et al (’09)
• Wisconsin	Oza-Frank and Siegal (’11)
• Wyoming	Smith et al (’08) [31], Oza-Frank and Siegal (’11)
• Wales	Jones et al (’05) [14]

APPENDIX VI

List of interview participants by job description and organisation (NCMP)

Job title(s) at time of interview	Affiliated organisation(s)
1. Lead: Obesity team	Department of Health
2. Member: Obesity team; Public Health analyst	Department of Health
3. Member: Obesity team	Department of Health
4. Senior Public Health analyst	National Obesity Observatory (NOO)
5. Director; Public Health consultant	NOO/South East Public Health Observatory
6. Senior Public Health analyst	NOO/ South East Public Health Observatory
7. Senior researcher	NOO/University of Oxford
8. Obesity Lead	North East Public Health Observatory

APPENDIX VII

Information form for participants (NCMP)

Project title: 'The National Child Measurement Programme: A case study'

Date: 28th October 2010 (version 1)

Principal Investigator: Dr Karina McHardy

You are being invited to take part in a research project. This information sheet is designed to fully inform you about the project. Before you decide whether you are happy to participate in this research project, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully. Please do not hesitate to contact us if you would like more information, or if anything is not clear.

What is the purpose of the study?

The purpose of this research is to collect and analyse information around the experiences and perceptions of those involved in the development and on-going organisation, administration and management of the National Child Measurement Programme (NCMP) about the Programme's role, limitations and outcomes. This case study project seeks to understand how and why the NCMP was established and to identify the vision and strategy for the Programme as a whole.

This research will explore how the NCMP was and is now viewed by the individuals that played a key role in its introduction, development and on-going management. This will include individuals who work for or who have worked for the National Obesity Observatory, Department of Health, Primary Care Trusts, Public Health Observatories, as well as schools and healthcare professionals.

This project forms one component of the Principal Investigator's doctoral research programme. The main element of the complete doctoral programme will be the development, introduction and evaluation of a pilot child

measurement initiative in Guernsey. This NCMP case study will contribute to the background work for the design and introduction of the new child measurement programme. Additionally, this research aims to be of interest and relevance to project coordinators, researchers and other stakeholders engaged with school-based population level child monitoring programmes.

Why have I been chosen?

You are being approached as we have identified that you have or have previously had a role in the introduction, development or on-going management of the National Child Measurement Programme.

Do I have to take part?

No, taking part is voluntary. You are free to decide whether or not you will take part in this study. If you decide that you are happy to participate in this project, you are still free to opt out at any time, even after the interviews have been conducted. If you decide not to take part you do not have to give a reason and it will not affect you in any way.

What does the project involve?

The project involves a series of one-on-one semi-structured interviews. If you are happy to participate in this research, you will be asked to attend **one** of these at a time that is convenient for you. Over the course of the interview, you will be invited to talk about your experiences of the NCMP. You can choose not to answer questions and you are completely free to participate in the discussion as much or as little as you like, without giving any reason. Each interview will last for approximately one hour. You are free to opt out or leave the discussion at any time. There is no monetary compensation for participation but participants will be offered the opportunity to collaborate on future planned publications relating to this research project.

If you agree, the discussion will be recorded. This is to allow an easier and more accurate analysis of the themes that might arise over the course of the discussion. All of the recordings will be anonymised by name but not general job title (e.g. ‘General Practitioner, Oxford’ or ‘Policy Analyst, Department of

Health'). It is understood that any views or opinions expressed in the interview do not necessarily reflect those of your employer or organisation. All results will be treated as individual opinion alone. You are completely free to indicate if you would prefer that your employer or organisation is not identified in any way at any stage of the data collection or analysis.

All recordings will be stored on a password-protected computer. The Principal Investigator is responsible for the recordings and these will not be shared with anyone else. Data will be collected and stored in accordance with the Data Protection Act. You are completely free to decide whether or not you are happy for the discussion to be recorded. You can ask to listen to the recording if you wish. Without giving any reason, if you prefer you can request that the recording be deleted at any time after the interview. The findings from these interviews will be incorporated into discussions and conclusions relating to this project.

What are the possible disadvantages of taking part?

Participation in the evaluation of this pilot initiative requires attendance at an interview, which will last for approximately one hour (excluding any possible travel time). The total time commitment associated with the interview is not expected to exceed 90mins. We anticipate that participating in this project will have no significant effect on your lifestyle.

What are the possible benefits of taking part?

This research project will explore the role, limitations and outcomes of the NCMP and will be used to inform project coordinators, researchers and other stakeholders engaged with school-based population level child monitoring programmes. This project will provide an opportunity to reflect on the vision and broader strategy for the Programme and will promote understanding of the differing approaches to and expectations for these types of initiatives. Finally, it will act as a comparative source for later research.

Project funding

This project is funded by the British Heart Foundation Health Promotion Research Group and the Department of Public Health at the University of Oxford.

Ethics approval

The project has been reviewed and approved by the Social Sciences & Humanities Inter-Divisional Research Ethics Committee at the University of Oxford.

Further information

If you have any questions or would like any more information please contact the Principal Investigator:

Dr Karina McHardy
E-mail: karina.mchardy@wolfson.ox.ac.uk
Phone: +44 (0) 1865 617787 / +44 (0) 79 9088 2721 (mobile)

APPENDIX VIII

Participant consent form (NCMP)

Project title: 'The National Child Measurement Programme: A case study'

Date: 28th October 2010 (version 1)

Principal Investigator: Dr Karina McHardy

Please initial box

I confirm that I have read and understood the participant information sheet dated 28th October 2010 for the above study and that I have had the opportunity to ask questions which have been answered fully	
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 understand that I may request to have any or all of the recording of this discussion deleted at any time without giving any reason	
I agree to take part in the above study	

It is understood that any views or opinions expressed in the interview do not necessarily reflect those of your employer or organisation. Please initial this box if you prefer that your employer or organisation is **NOT** identified in any way at any stage of the data collection or analysis.	

Name of participant: .....

Signature: ..... Date: .....

Organisation (Optional): .....

Name of person taking consent: .....

Signature: ..... Date: .....

Principal Investigator: .....

Signature: ..... Date: .....

One copy for the participant; one copy for Principal Investigator.

All data will be collected and stored in accordance with the Data Protection Act.

APPENDIX IX

Outline of interview questions (NCMP)

1. What is the NCMP and why was it introduced?
2. Please describe your role(s) and involvement in the NCMP.
3. How does the NCMP compare with other national childhood obesity monitoring initiatives?
4. What do you think are the roles of the NCMP?
5. How do you think NCMP data can be used to tackle obesity in England?
6. What were the principal challenges encountered during the development and initial introduction of the NCMP?
7. What are the principal challenges currently facing the NCMP? What do you think can be done to address these challenges?
8. What can be done to protect or promote the sustainability of the programme?
9. Please describe how the measurement protocol was developed.
10. What are the principal limitations of the available data and, more broadly, of the programme itself?
11. What additional data would be useful or appropriate for this type of programme to collect and analyse?
12. What does the feedback process aim to achieve?
13. What are your thoughts on the current feedback process?
14. What are your thoughts on unintended harm associated with the NCMP?
15. What is being done to monitor for and minimise possible unintended harm resulting from or relating to the NCMP?
16. Broadly speaking, what further evidence on child measurement programmes is needed?
17. What advice would you give to someone who was in the position of setting up a new population level monitoring initiative?

APPENDIX X

Table A3: Headings and Themes – 'Programme'

Key: I = Interviewer, IR = Interviewee response

Headings	Themes	Quotes
Overview	**Development**	**IR:** It was originally called NCOD, which was the National Childhood Obesity Dataset, but it was renamed NCMP the following year. Basically there was all sorts of problems with NCOD in the first year, all coming from logistical problems, and one of the issues that a lot of individuals raised was around the name and it was stigmatising 'cause it had 'obesity' in it, and it didn't link into the whole health-related agenda. So that was changed in 2006. **IR:** It was set up for two reasons really, or at least the NCOD was, which were performance management of Primary Care Trusts, to check that they were achieving the appropriate trajectory towards meeting the child obesity target set under the previous government, and secondly to support and inform local-level action. And those were the reasons that drove the Department of Health to set it up. **IR:** Well the programme now has dual function of being surveillance plus the feedback element, but when it was first introduced it was purely a surveillance programme at that point, and results weren't routinely shared with parents. So it was set up really to give us that population-level data on obesity in children, and the thing about it was that, because it's almost a census-level programme, it gives quite accurate data down to a local level so a Primary Care Trust or local authority level, and that enabled us to link it to government obesity targets. And then after the programme had been in place for a couple of years, two years I think it was, there was pressure really to introduce the routine feedback element. Up until that point, parents could request the results if they wanted them but it was … it really varied.… but people, ministers and people at DH and also some practitioners as well, thought if we're

Headings	Themes	Quotes
		collecting this information it's wrong not to be sharing it with parents, and they should be informed about their child's result. And so there was this move to introduce routine feedback, where our guidance was that areas should be sending results to all parents….
		IR: ….. I don't know, but I guess that childhood obesity was chosen as a topic of the agreement because you could measure progress towards it. …. Local authorities and the local health authorities wouldn't have come to an agreement to progress on child obesity if they couldn't measure how they were going to improve. Now, because they could do that, I think quite a lot of these joint agreements at a local level came about. So that is what it is, that was why it was introduced.
	Information	**IR:** …. So far as I understand it, it was introduced for population monitoring, so for collecting accurate measurements of prevalence on a population level and collecting them in numbers that could then be obviously used at a local level as well, 'cause a lot of measurement programmes don't collect large enough numbers; you can't really take it down to a local level. The NCMP tried to get over that by collecting large numbers.
		IR: It's a surveillance tool principally. I think it was introduced as a surveillance tool, and I think that's still principally what it is….
		IR: …. I guess my quick definition would be a programme of measurements of children in state maintained schools on an annual basis, two age groups 4-5 and 10-11 roughly speaking, Reception and year six, which basically is used for parental feedback to those individual children but also used to compile a sort of larger data set which can be used for a number of purposes.
	Local level	**IR:** Why it [the NCMP] was introduced is I think initially was… basically there was a focus from the government on local obesity monitoring. And I think we already had local obesity targets or at least a national target which you wanted to check local areas were adhering to or

Headings	Themes	Quotes
		contributing towards …. **IR:** I think basically we had the Health Survey for England data for children, but that's only at regional level, and I think the government wanted local-level surveillance data to actually get some kind of handle on what the prevalence of child weight status was at a local level, to help inform service planning and delivery. **IR:** So, it was introduced in order to encourage local health authorities to tackle the problem with obesity, to understand the problem of obesity in their area, and to motivate them and to help them tackle it. It was also, under the previous Government, a tool for the performance management of local areas …. So national surveillance and, at a local level, performance management. **IR:** But mainly initially it was for local monitoring for adherence to targets and not really with a… creating a data set that's valuable for epidemiological analysis wasn't really in the mind set. I don't think parental feedback was at least explicitly stated as a reason at the time. It was something that got added on a bit later. **IR:** …. I'm not quite sure when this is introduced, but fairly early on it was used for joint agreements between the health authorities and the local government authorities, and that was actually I think quite significant. They were able to come to those agreements because they had an annual measure of what childhood obesity was; they're called the local area agreement…. So that it put an obligation not just on the health authorities, but on the local authorities as well.
NCMP Protocol	**Protocol**	**IR:** I was quite involved with the actual development of the protocol. In terms of standardisation of the equipment that was used, we provided requirements in terms of calibration and the type of equipment that should be used, how it should be used and how the data should be recorded. We set out quite explicit instructions around how privacy should be maintained

Headings	Themes	Quotes
		and the kind of area that should be allocated to the measurement programme. And being quite specific about how the data's recorded to decimal places and good practice in terms of ensuring that the data is anonymised. And we've also given details, and we've got the training video and we've got the measurement guidance as well. That actually gives you a best practice guide as to accurate height and weight measuring. **IR:** …. You pick up enough problems with the data, really simple problems like rounding to one decimal place and things like that. Also a lot of problems inputting the data from the PCTs, so that personally I would have some concerns over the training that's going on and how the people collecting the measurements actually perceive the protocol. **IR:** So clearly we weren't going to accept, 'Oh, I'm going to estimate someone's height against a tape measure'. There were minimum quality standards in terms of high quality scales and proper stadiometers and measuring the kids properly and training and so on, but some of the detailed practicalities were just consulted upon. **IR:** .... I do think that there probably is a huge variation locally in terms of how they do it and whether guidance is fully followed. We don't go out and check what they're doing! **IR:** …. I think on this kind of process you have to be very sympathetic to where the data collection is taking place and really you have to work with the schools and you've got to time it so that it's convenient for the schools and you can't be too much of a burden. I think if you started saying, 'Right, it has to be this time. You can only measure them in the morning' or 'You can only measure them at this time in the afternoon,' it would be very interesting for us and it would probably be better data, but at the same time I think it would be more of an onus on the school and I think that would make it slightly harder. **IR:** In terms of timing during the school year, we say at the moment that it can take place at any point in the school year, and areas just do what suits them really, and I think we needed to allow that flexibility without making it too difficult for areas…. I think it's a trade-off again and

Headings	Themes	Quotes
		I think probably to be very prescriptive might reduce coverage and things like that, and we'd lose quality somewhere else. **IR:** …. We weren't prescriptive about the way in which it had to be done.… There was a minimum standard they had to meet, but beyond that it was pretty flexible.
	Engagement	**IR:** …. When we were setting up the NCMP I ran a series of workshops around the country that I got as many of the local obesity people as possible to turn up to, and we made it very clear that this was genuine consultation. We weren't just telling them what was going to happen. We were telling them what we had learnt, what we had thought and what we were proposing, and wanting to see what they thought of it…. I think they could see and they could feel that this was genuine consultation; we were really listening to them. We took advice from the people who were actually having to do this in the field.
Comparison	**Protocol**	**IR:** The Health Survey for England I guess is seen as a real gold standard but I feel like NCMP is the gold standard. I guess they do different things, because the Health Survey for England is a much smaller sample size especially in children, so it doesn't give that richness of data down to local area level, like NCMP does. And I guess in the early days of NCMP it was criticised because it was based on opt-out, people could opt out of the programme, but so can they for Health Survey for England. But it's [HSE] seen as being more robust I guess, in terms of the way it's conducted. I think they probably do two measurements and things like that, whereas NCMP is only one measurement. **IR:** So in terms of comparison, there's actually quite a lot of similarity in some respects between the way we've set up the NCMP and the way the other countries in Europe have set up their child obesity surveillance initiatives. There were also some important differences. …. They're looking at a sample size of somewhere between 6,000 and 8,000 so clearly that's the big difference. But associated with a smaller sample size, they are potentially able to get

Headings	Themes	Quotes
		more data and look at each child in more depth and get some contextual data from the school and that kind of thing, which we're not able to do. They're also looking at different ages. We've looked at kids at the start and end of English primary school, whereas they've tended to go for a single age-group in the middle of that age band, and there are pros and cons to both. **IR:** There's a lot of similarities in the measurement protocol. I think we were able to give them some lessons in terms of things that had worked with school-based measurement and ways to organise it and so on. Although there was nothing original about the way we were doing it; I don't think we could claim any credit for that. Things like … using standard measures and calibrating your instruments and training people up to a decent standard and that kind of thing. So there were practical similarities there but you'd expect there to be. **IR:** …. I think there is less focus on huge numbers and more a focus on rigorous methodology and careful sampling, etc. ….I've not read anywhere else where they just do quite what we do, like go out and measure such huge numbers but actually because it's set up purely for surveillance we don't really pay that much attention to getting the individual measurements as right as they are in most research based studies. So I think for me, that's the big difference really. **IR:** …. They are going for maybe, I forget the actual numbers they recommend in the end but something like 6,000 children in a country <laughs> whereas we're doing like a million … so you cannot get that level of information with those numbers. Obviously, because we try and measure all children, we don't need to have a complicated sample design in terms of identifying sampling children but in most research studies you would have, for example, have a number of observers and you'd take repeated measurements … which we don't do any of, so that makes us quite dissimilar to most other obesity monitoring programmes. **IR:** I'm not aware of any other international programmes that do weigh and measure all

Headings	Themes	Quotes
		children. Generally I think they're self report but I could be wrong. **IR:** The most similar one I think I'm aware of is the model they have in Arkansas where it's state-wide, …. So in that sense I think that's probably the most similar programme I'm aware of, but I don't think there are that many programmes that are similar. …. So that has been one of the challenges of NCMP in a way; that we haven't necessarily had somewhere to copy. When we looked at introducing routine feedback we did speak to the people in Arkansas because they were already doing that and we looked at how that was working, but there isn't that good evidence base to go by or other countries to follow. It's been pretty much introducing things, speaking to stakeholders in the NHS and other health practitioners and academics, but we've had to go out really and just do our own thing to a certain extent: be bold! **IR:** You come across measurement programmes probably not quite on this scale, I don't think. **IR:** You do come across papers where they're trying to utilise school measurements, but I don't think they were set up specifically under the aim of collecting population monitoring data. …. So, although other countries have measurement programmes, [there's] nothing really on the scale of the NCMP and nothing that I'm really aware of that was actually set up with the specific aim of population monitoring. **IR:** Well, obviously the Health Survey for England doesn't give us data that we can scrutinise down to a local level…. Also, with the NCMP, we can interrogate the data into quite small groups, so you're down to different ethnic populations and from that we've been able to identify particular groups like Bangladeshi boys where there's quite a difference in trend. And so essentially it's very much about the level of details that we can get into in relation to the data and usefulness of the data locally; it's [NCMP] far more useful locally than HSE is. **IR:** Whereas the HSE is only six thousand children throughout the whole country, and the

Headings	Themes	Quotes
		NCMP is one million, so it's a much richer data source. **IR:** [D]efinitely the biggest advantage of the NCMP for me is just the huge numbers that lead to… you'd be able to do some quite powerful calculations. Now, the limit on that is obviously that we have two select age groups so we can understand very well what's the understanding between 4 and 5 and between 10 and 11 [years], and there's a void on anything which happens in the middle, which is a little bit frustrating ….
	Local level	**IR:** Obviously HSE covers 2- to 16-year-olds whereas NCMP only looks at the two year groups. However, it's only robust to regional level, rather than local level, so the NCMP really has an important role in providing that local level information. **IR:** …. Certainly going forwards we've been looking to use both sources really of information. ….I think there's certainly a role for both data sources going forwards.
Advice	**Engagement**	**IR:** Get your partners on board early, really early. I'm assuming your school is going to be the key setting for delivering the way you're measuring and also parents. Start to get that message out early to expect the programme and what it is about and do some promotion around healthy lifestyles and why people need to be weighed and measured…. So I think making sure all partners are on message is really crucial to the programme. **IR:** …. Close working and communication with the people delivering, but also I guess the communications with perhaps the public. Maybe you can do a bit more proactive PR in advance; that's something that didn't happen with NCMP at all. It was very much there wasn't anything to tell parents this was coming and this was going to be happening; it was just the letter from the local area. …. So parents know it is coming and you're selling them the programme the way you want it to, rather than letting the media do it their way, which inevitably they're going to put a negative spin, or their own spin on it.

Headings	Themes	Quotes
		IR: Probably my biggest advice would be engage with your stakeholders really closely. They're really valuable. When the NCOD was set up…. There was an absolute outcry, and giving people the opportunity to say … when we did the regional consultation workshops, they were just so well received. People really benefited from being part of the programme, feeling like they'd been engaged in the development of the programme. And also if you can demonstrate that you have actually listened to them, you've taken on board their views, their comments, and incorporated that into the programme, I just think you can't really beat that. I just think the more you can publicise what you're doing and engage and take on people's views, the more widely accepted the programme will be. And I think, ultimately, the more sustainable it will be and the bigger the benefit it will have, because the more engaged people feel with the programme, the more you're likely to achieve in terms of the outcome and the impact of it. **IR:** You're going to want to relate to the newspapers at some point as it were. Do it early on and do it positively. **IR:** I would engage politicians in the process of developing it, so that they get to understand the complexity of the problem. So to engage politicians in the process of a) seeing that this is a complex problem and b) following on from that, seeing that data in this sense are there to drive action. I think there is value in engaging the decision makers in a process… **IR:** …. The media are a loose cannon in this and one needs to be cautious of that. And in the current political climate where money is tight and cuts are being made and there is endless rhetoric about nanny states and all that kind of thing, it's not a game to go into lightly. **IR:** [E]xplain why you're spending this money …. So you need the Chief Medical Officer talking to the public and the press early on about why this is actually a problem that needs to be solved. …. So start from that end of the problem as it were.

Headings	Themes	Quotes
	Consistency	**IR:** Well, GPs just think it's [BMI] done the same as it's done with adults and so it doesn't take account of the fact the child's growing, it takes account of their age, and so when they say that back to an individual or a parent who's come in worried about it and they just dismiss it, it totally undermines the whole programme…. **IR:** …. One of the big problems we also get is they'll get a letter saying they're overweight and then they go to the GP and the GP says, 'No, you're absolutely fine, it's not a problem.' So, some kind of education for the workforce [is necessary] because also I must say that a lot of GPs really just don't even understand how child height and weight is actually then translated into BMI, then into BMI centiles…. Because there's no incentive for them to identify overweight and obese children in primary care. And this is a very awful thing to say, but the strap line is usually, 'They'll grow out of it; it's a bit of puppy fat'.
	Evaluation	**IR:** I think … look at the NCMP, 'cause I do think it's a good programme, and I think when you go round to conferences and stuff like that round the world, people are interested in it and people that are trying to set things up are interested in looking at the experience of setting up the NCMP and how they can utilise it. **IR:** Try to introduce things in a staggered way, which means you can do proper evaluation; staging implementation or implementation in one area and not another so you can compare and actually having control of that sort of roll out. …. If there was an opportunity to have some basic things that are done but different people try different things in different areas at different times to allow you to compare and contrast the different pieces of evidence before coming to a decision, rather than just a blanket roll out of everything straight away, that would be fantastic. That would be fantastic.

APPENDIX XI

Table A4: Headings and Themes – 'Utility' (NCMP)

Key: I = Interviewer, IR = Interviewee response

Headings	Themes	Quotes
Roles	**Information**	**IR:** Well, the population monitoring is the main thing. **IR:** So …. In terms of the uses, there is the classic surveillance monitoring use, both at national and local levels, or regional levels…. **IR:** Well, essentially it's a really valuable source of population data for the Department of Health and also for the NHS at large. It gives a really good, rich source of information about what's happening in relation to obesity trends…… So it very much does provide an extremely rich source of information and data. **IR:** I think we are hugely privileged to have a dataset that looks at over a million kids a year, is able to tell us things you simply are not able to glean from smaller datasets. So for example yeah, we know that there's a socioeconomic relationship but we can really look at that in quite a lot of detail. We are able to look at relationships with ethnicity in a way that I don't think has been possible in any other context at the level of detail that we're able to…. Nothing else is going to have the numbers to be able to pick that kind of thing out. …. And I think that's where local-level data could be really useful. It's not just detailed, it's also locality-based. …. So I think there's huge epidemiological value…. **IR:** The sort of thing I think it should be used for… is to say, 'OK, well that's the prevalence nationally and this is the prevalence within your area.' And it's like, 'Look, your multi-cultural ethnic group prevalence seems to be a lot higher than it is at the national level, and we would expect it to be high, but it's like *really* high'. …. And it's kind of like, 'What's going on there? Can you work out why that might be the case and therefore how to tackle it?'

Headings	Themes	Quotes
		Basically I think there is lots of potential to improve people's understanding but I think people want it just to give them easy answers.
	Engagement	**IR:** … we disseminated that through regional reports ….and that NCMP data is included as part of that and updated on an annual basis, and we use that to disseminate the message. And that has been disseminated to quite a wide audience really …. To try basically to ensure that within our region a consistent, standardised message is delivered across the region and everybody has a baseline understanding of what the issues are around childhood obesity, and what the costs and physical implications of it are at a very basic level, and what our prevalence rates are within the Northeast. **IR:** And then I would say there is a use as a strategic tool which is to remind people that it is an important topic and to engage people in that topic. And by people I would mean the organisations and the professions that we need to work with, as well as the members of the public. So I would say that's a use of data which is often not quite articulated properly. **IR:** …. I always felt that if anything in the NCMP could be used or had to be used to assess the performance of PCTs, it was things like the level of school engagement, 'cause that's to me a proxy for the relationships between health and education. So if you've got good working relationships, then it may well be that within public health you're doing something effective. So, I always felt response rate of schools, and to some extent response rate altogether …. Are more important as measures of success than prevalence, because there are so many other confounders affecting prevalence.
	Driver	**IR:** At the moment, it is very much a population surveillance tool to help inform service planning and delivery. And certainly from my experience within the Northeast, it has definitely helped to inform service planning and delivery. **IR:** …. So some of the reasons why, particularly in a local area, child obesity gets a lot of

Headings	Themes	Quotes
		thought and attention put into it is because there is data and it acts as a yearly reminder that there is this issue. Irrespective of what the numbers are, it is a yearly reminder so I think there are a number of levels where this type of thing can be useful. …. It is irrelevant what the data says, it is just a reminder. **IR:** …. We use it to inform policy and programmes … and also it's got a really valuable use locally in terms of helping to form local policy and local programme development and … to help local areas make the case for investment in services and to identify whether or not overweight and obesity needs to be more of a priority locally…. **IR:** I think it's twofold; I think it's a surveillance tool …. For local areas themselves to see whether progress is being made or not. And secondly, it encourages action to tackle obesity; I think those are the two things.
	Evaluation	**IR:** Then there is something around, 'How does my data compare to your data?' You know, people start looking at each other's results and comparing …. **IR:** I've just come up with another role …. Which is performance management. This is where I get… don't ask me my views on this thing! …. NCMP data has been, may well be in the future, used as a sort of performance management tool to compare different areas. And that might lead to resource allocation varying by area based on the sort of data that you are seeing. People being held to account …. Because of the trends in their data in their patch. **IR:** .... as we now get a relatively stable dataset with a consistently high response rate, I think there is potential for using as a research tool to assess the impact of interventions.
	Feedback	**IR:** I think the other thing is that you've got to recognise that the NCMP actually is an intervention because it does have a letter sent out to parents, and so I think in that capacity actually it is an intervention. Whether it's being used to its fullest in an intervention sense is another

Headings	Themes	Quotes
		question, but by informing parents whose children are overweight and obese that they are [overweight and obese], I think it does act as an intervention as well. **IR:** ….. There is the one that's the high profile one of course: the feedback of the data to parents. So there is the use of it as a behaviour change tool, whether you feel that it is appropriate or not. **IR:** I think there is potentially an intervention competent to the measurement process itself. It may well be that the heightened awareness …. Maybe in some way or other contributes to a shift in social norms or social attitudes, and it's very hard to know whether that's the case or not but it's a question that's worth asking and it could be one of the most important impacts of it, independent of the routine feedback….
	Local level	**IR:** Well, I think we can get down to targeting on a local level. We can really find actually at the local level where the associations are with obesity and where we need to target health promotion interventions and where we need to target funds …. **IR:** … the sort of programmes that are really going tackle obesity …. They probably need to be rolled out to a much larger population. You know, populations the size of local authorities or PCTs or something, so I personally think using it at a local level say to target is…. Problematic for me in a way. But then I think using it… there has definitely got to be an advantage of having local information, if it is used intelligently ……[but] to me, it seems to be they've decided they're going to have the intervention, they're going to commission however many whatevers and they want to stick them in an area and they want us to tell them in which area to stick them. **IR:** We don't actually know what local areas are doing with it [the data]. … There is too much going on; there is no way anyone is ever going to know all of that stuff …. And whether the people that are doing that have the knowledge and skills to do it and to interpret what

Headings	Themes	Quotes
		they've got … is a big concern actually, I think. **IR:** I think there's some discussion as to its capacity on a local level and whether it can be used to judge local approaches.
	Consistency	**IR:** So, there is a risk there certainly around the fact that potentially it could be a behaviour change programme, but if it doesn't work or is not effective in doing it, then there's a huge difference between expectations and what it can actually do …. But then I would say if it can't change behaviour, then why are we doing it? …. So, I think the challenge for us is really trying to get a much better sense of its role as a behaviour change tool or whether it really does just need to be pared back to a kind of surveillance programme. **IR:** It is quite a difficult area, this sort of thing. I think it serves a lot of functions. I don't think it is designed for a lot of functions but it certainly serves a lot of functions. …. I don't know whether it is actually physically possible to design something which can meet all these needs, because the different needs require different types of information, but you can't have all of that so you've got to make do. …. And I think the NCMP is a really good example of where you've got data being pulled in multiple directions actually. I think one of the reasons is because it is available at such a small geography and that automatically means that things will be done with it which may or may not be appropriate. **IR:** Well it was set up for two reasons, both of which I think are of questionable value. I think performance management of Primary Care Trusts … is not something that can be done by using obesity prevalence data. …. The solutions to obesity are generally … large-scale population level interventions that are often dependent on national and international action, which isn't to say that the local-level actions aren't important. But in the absence of doing the bigger things as well, a lot of the local action could just be wasted …. So there's not that much that can be done on its own locally, so I think the idea that you can use it as a

Headings	Themes	Quotes
		measure of performance is naïve in the extreme… **IR:** …. Clearly there are local-level things that can and should be done as part of the wider constellation of things that need to be done to address obesity, but to think that you'd use local-level information to, for example, say that kids at one school can eat salad and kids at the other school can eat chips, strikes me as naïve. Because most of the interventions ought to be the same everywhere, because I think there's probably a policy-level misunderstanding of the difference between a population surveillance programme and a screening programme that is designed at directing activity towards individuals. **IR:** I think my biggest concern with it has always been …. It sort of sits between so many different worlds, this programme, in terms of being surveillance but also there's the feedback and also there's use in other areas, that I don't know whether we really sometimes remember what it is and what it is for…..
	Utility	**IR:** If you can see that some small areas are, obesity prevalence is decreasing and in others it was increasing, clearly this is the sort of useful information that can help us understand how better to tackle it. So, you can see how in theory it would provide very useful information for that. Now in practice whether it can be used in that way… I'm never sure whether we want to be targeting anything really. **IR:** If we only had the Health Survey for England we'd be in a much weaker position. There's no doubt about that….
Feedback	**Development**	**I:** Why do you think the feedback process was introduced? **IR:** It was initiated because there was a political view that there was a moral and ethical obligation if you're collecting this kind of information that you should share it back with families.

Headings	Themes	Quotes
		IR: Purely because it was popular amongst ministers and why that is I'm not quite sure, but I think something about the right of parents to have this information. They have allowed the child to take part in the programme, why shouldn't they get their results? **IR:** I know there definitely was something about feeding it back but I think they also wanted to send a message that parents need to do something about this; it's as much their responsibility as anyone else's and they should have the information. **IR:** Ministers were quite keen on it so I think in a way it was a policy decision from them, rather than being a particularly evidence-based decision. Because, as we've talked about, there isn't a lot of evidence on this …. So I think it wasn't necessarily an evidence-based decision, but pragmatically it was thought to be the right thing to do. **IR:** If I were really cynical I would say that what it aims to achieve is deflection of political flack from politicians and senior civil servants. …. So it was a couple of politicians who thought they knew the answers …. **IR:** Yes, the routine feedback does very much align with the direction of government and the views of ministers in terms of individuals being enabled to take responsibility to make those lifestyle changes that they need to do. **IR:** Well, you do need to have the feedback letter. I would guess it is a good thing. In fact we now sell it on that [feedback]…. I think we sell it more to ministers than the public to be honest…. Which wasn't how we got it through Parliament for example. <chuckles> We got it through Parliament by saying it was a surveillance tool. ….. So, I think that is a good thing, but it's a change in the original specification as it were. **IR:** [T]he other element that we've introduced or we're encouraging local areas to introduce is the proactive feedback. Because we know that being told your child's overweight or obese is extremely sensitive and often not very well received … we know that but we don't really

Headings	Themes	Quotes
		know what the negative impact is of providing the information routinely through a letter and whether actually, that's doing more harm than it is good, although the intention is positive. **IR:** ….. when routine feedback was first introduced it was on a locally-led basis; it wasn't compulsory. It was, 'If you've got the services in place we strongly think you should be doing it, but only when you've got the services in place, and this is how we recommend it should be done.' **IR:** I couldn't avoid getting involved to some extent when it was first put in place, and trying at least to minimise the harms and think about ways of designing a system where kids aren't going to have letters in their book-bags to take home at the end of school and fat kids get them ripped out of their bags and get laughed at in the playground. **IR:** …. Healthcare practitioners felt they would want to share the results if the follow-up services were in place. So they didn't feel it was right to be doing it if they didn't have anything to offer, but actually if they could offer healthcare services then they were happy to do it. **IR:** Yeah, there was a bit….. it was a bit of a divided camp in a way. I think some people felt, 'No, that's screening and there's no evidence for screening obesity in children, we mustn't do that'; and other people felt, 'Well, we're measuring them anyway, we've got this information, we should be sharing it'. And actually some PCTs were already sending the results to parents…. So some areas were like, 'Well, we do this anyway in Reception and we would send parents the result; why is it any different to that?' So people were divided. **IR:** So my view, which was firmly rejected at the time, was that there is a perfectly sensible and valid research question to be asked about whether or not this [feedback] works. So I suggested asking it as a research question…. But that was rejected and it was felt that it just had to be put into place. **IR:** … the whole thing that should never really have been there. But the disadvantage obviously

Headings	Themes	Quotes
		is, there's pressure on funding isn't there? So why play down the popular benefits of a programme? Are we risking throwing away all the surveillance? So it kind of puts us in a very tricky position because we don't want to be overly critical of it and the other thing is obviously we would like to still be here to be able to do the things that *are* useful, so if you're very critical of something that's very popular with ministers, at some point they're going to want us to shut up. So we need to keep that in mind else they stop funding us. <Laughs> So it's a tricky one and I try and flag up my concerns indirectly…. **IR:** …. So we have the paradox of an intervention that is politically popular that has face validity; it makes sense to people that if you give them information that they will act on it. There is to some extent a moral imperative to feed back information to people if you've obtained it from them ….. but you have something that ends up being a de facto screening programme that meets none of the criteria of a screening programme. And no evidence to tell us one way or the other what's going on here. **IR:** And it just does not look good for the programme and given that that's not why it was set up, why are we using it for that? If we want to do feedback, fine. But we need child health systems or to have it integrated onto the school record where the information is verified against other information … It's not like I'm so much against the feedback; more just the actual system by which some of the information's being collected. I think is wrong for it. So I find it hard to see that really as a role of NCMP <laughs> **IR:** Wilson and Jungner's criteria for a screening programme say that a screening programme should have a disease that we know we can influence, a test that we know will be reasonably discriminating, there is an effective treatment available and the programme is theoretically practical and affordable and so on. This fails on all four. **IR:** So, I can see there's some sense in it but I just don't think there's been enough thought … as to how it can work and I obviously have a problem with sending out incorrect numbers to

Headings	Themes	Quotes
		people. I just think it's worrying, so that's my big reservation with it. **IR:** But it's a lot of effort and expense for the PCT …. If the same amount of time spent on the parental feedback was spent actually doing some intelligent local analysis of their data … rather than these quick and dirty things that we tend to see produced at PCT level, then it would be a lot more useful and we'd get a lot more understanding back for them. Very few areas that I've seen have actually really intelligently used their data to really identify different patterns …. Or really try and enhance their understanding of what's going on. It just is all a pretty map of our area. **IR:** …. one of my concerns is … parents have real trouble in actually understanding when their child has a weight problem, which is why a lot of them take offense when they receive the letter. I think we could do a lot more to improve parental perception of weight status before it gets to the NCMP measurement, so the NCMP is almost reinforcing messages that hopefully should already be starting to trickle in. **IR:** Well it's interesting, because parental feedback is now a role; [it] probably wasn't initially, therefore the system was not particularly designed in order to do that…. So it's a very odd role in my point of view for endless reasons. Like not even questioning whether it's useful or not to give feedback …. Quite possible it is; possibly isn't, who knows? But if you're doing it, it should be based on accurate data. **IR:** …. with the introduction of routine parental feedback there's a lot of questions, because it flips into the territory of becoming a screening programme. However, the only problem with that is we really haven't probably got in place the support that's required at the latter end of that screening programme…. **IR:** So, at my most cynical I'd say it was put into place to divert political flack….

Headings	Themes	Quotes
	Outcomes	**IR:** So, the idea of that is to raise awareness among parents about their child's weight status, because we know that there's quite a bit of research showing parents are really poor at telling if their child is overweight, and health professionals are as well. So it's to actually raise that awareness, and I think the intended effect is either that parents and families might choose to make lifestyle changes on their own….
		IR: Well, it aims to make parents aware of their child's weight status … given that supposedly … people think their child's a normal weight because they're the same as all their mates, but they're all fat basically, so that's the main driving factor behind it.
		IR: I think that's probably part of the .... more holistic, broader obesity agenda and it's about raising the awareness around healthy weight and overweight and obesity.
		IR: Well, I think it aims to achieve awareness in the first instance, and then change of behaviour in the second instance.
		IR: The kind of relatively new aspect of the programme which is the routine feedback is really an opportunity to share with parents information about their child's weight status.
		IR: …. But also using the NCMP as a lever to help parents understand the consequences of childhood overweight as well, 'cause even now you talk to parents and anecdotally you'll hear things like, 'Oh, it's only puppy fat' …. And they don't actually see that the weight status of their child could have significant health outcomes …
		IR: And now in the current government I guess as well, there's more of an emphasis on….. it's down to individuals …. Their parents to make the healthy choices to improve matters…
		IR: …. Really the idea is to share the information back with the family, to highlight that there could be a problem, but also to get them thinking about what they might do in terms of tracking their child's weight. I mean obviously it's a picture of the child's BMI centile at one

Headings	Themes	Quotes
		point in time so we encourage them to try and keep an eye on that … and then try and get them to think about different behaviours that they might want to consider around healthy eating and physical activity. **IR:** Well, it clearly has potential to lead to action at a family level or something like that. So…. I don't know how much it does do that. I don't know how much it does do that. **IR:** So, we looked at the introduction of proactive follow up whereby the local area would do something in addition to providing the letter …. To try and help manage the receipt of the information so that parents don't think it's a judgment … and to try and better encourage them into activities or into changing their behaviour …. But, again, we don't know what the impact of doing proactive feedback is at all…. **IR:** But certainly I have personal experience of friends of ours with overweight kids who are outraged to get these letters. Intelligent, middle-class parents …. Who get these letters saying their kids are overweight and they're just pissed off to get them. It makes absolutely no difference to their behaviour; it just creates anger. **IR:** But certainly my understanding of the evaluations that have been done, and I think they've been rather poor-quality, small, biased evaluations. Nevertheless, my understanding is that many of the concerns about the harms … may have been overstated and it may well be that actually it's fine and doesn't do any harm and it might do some good. **IR:** The other issue would be that if people start to view the NCMP badly, so I mean if you've got people that stopped … participating in it because of the letters …. You'd have to maybe rethink it. **IR:** I'm not entirely sure whether it [feedback] does enough at the moment, and I think one of the problems is that the feedback system is not well respected. …. So I think it needs to be used very carefully. I certainly think we do have a massive problem with parents recognising

Headings	Themes	Quotes
		the weight status of their child …. So it's very important that parents are told when their child is overweight or obese, but I think just telling them isn't maybe enough. <pause> And also the means by which it's done … there's a lot of people that don't view the letters with a lot of respect. I think they feel that it's finger-pointing; they think it's laying the blame and I think it then puts their back up a little bit and then they're probably less likely to actually work in conjunction with whatever support could be given …. **IR:** …. Every coverage in the media where you get *another* child that doesn't look fat … and gets a 'fat letter', weakens the strength of the intervention. **IR:** My concern is …. The way the measurements are taken is very quick and dirty and that's fine for surveillance, but I just really think it's not accurate enough to be putting these things in a letter that looks like it comes from the NHS. And I think that when you start getting people's weights completely wrong …. Which I bet does happen from time to time; that just does not instil confidence in the NHS. **IR:** Although the newspapers focus on this, we don't actually have many complaints and I think the evidence that we have …. Is that most families are happy to hear the information about their child. **IR:** The first thing, I think, is to get away from this idea that it's finger pointing. I think the parents get the letter and they feel that they're being blamed …. But it's enabling the parents to feel that they can go somewhere with this information and actually be helped; it's not finger pointing, it's helping these individuals. …. People talk about 'getting the fat letter' and the stigmatisation of 'getting the fat letter'.
	Utility	**IR:** I wonder if the letters on their own… are working as well as they could….. I'm not entirely sure whether it [feedback] does enough at the moment …. I would question whether just sending letters out to parents … just that, is enough…

Headings	Themes	Quotes
		IR: <pause> I don't know really because I think if you just get weighed and measured, that's not really going to tell you anything and I can see an advantage of making people aware possibly with certain information, but my big issue is with the accuracy of the measurements. … <laughs> I don't know, I really don't know! I don't really know whether sending a letter to somebody could make any difference anyway…. **IR:** …. The political lay community seem to think that feedback of this information is somehow going to create a miracle of change in weight in children, which it's clearly not and I think that's the big tension. **IR:** I was here when the feedback was introduced… and we did think it would be a significant feature. I don't know whether it is or it isn't to be perfectly honest with you. … It is certainly the most publicised part of the whole programme; it's a part that people read about in newspapers, usually negatively. …. I think the small amount of evidence that we have suggests that it does lead to people intending to encourage their children to do more exercise and to be fitter. I don't know, I really don't know. **IR:** …. The difficulty is, we know that just providing people with information doesn't actually affect behaviour change and, as I say, we don't really know what the impact has been of providing routine feedback to families. So I guess they're the tensions that we need to balance. There's a bigger question: should we be providing routine feedback? … we don't know what the impact of sharing this information is, we don't know how much damage or harm it might be causing and we don't know what benefits or positives it might be causing….
	Evaluation	**IR:** I think it would be important at that point to talk to everyone involved, including schools and particularly the parents, on how they view it and how they view the letters …. Because if you don't get the schools and the individuals on board, then the programme is obviously not

Headings	Themes	Quotes
		going to last. It will cease. **IR:** …. There is also a genuine concern about what is realistic for an intervention of that type to actually achieve and we are really keen to sort of go back to basics and rethink some of these things ourselves. I think the time is probably right to do that as well as there has been a lot of experience now and a lot of areas have done things differently. **IR:** I would be looking hard at the feedback process. I mean I am not against doing it as such, I just think it needs to be studied a bit more. There certainly isn't enough …..we would love there to be more evidence on sort of ways of doing it and the best way of doing it… **IR:** There's still really strong political support for the delivery of NCMP and for the continuation of routine feedback …. The difficulty is that they're resistant because there's no evidence and rightly so, there isn't. So, ultimately I think if you've got that evidence and it was contrary to what you thought…. Then really we should be thinking through why it is that we're doing this. **IR:** I wouldn't be confident about saying we have this information that feedback is necessarily a good idea. I mean, it obviously seems to be. Common sense suggests that it is because we know that parents misjudge the degree to which children are overweight. So, common sense would suggest that giving them accurate knowledge of their children's weight would be useful. But I couldn't put my hand on my heart and say that we have the evidence. **IR:** In a sense of whether or not NCMP can live up to the expectations of being a behaviour change programme, I think it's a question that I could maybe try and answer in three years' time! <laughs> We'd love it to because …. It's already resourced locally and being delivered in all the PCTs …. So I think the challenge for us is really trying to get a much better sense of its role as a behaviour change tool or whether it [the NCMP] really does just need to be pared back to a kind of surveillance programme.

Headings	Themes	Quotes
		IR: But then it's difficult because they think… 'We have to do this, this is a good idea,' and it's kind of hard to say to people, 'Well the system isn't accurate for that.' … people don't want to hear that at the minute because they're already doing these letters, so they really don't want evidence dropping into their inbox saying, 'Your letters are all wrong', because that gets them panicking. And then when they panic, it's quite hard to manage.
Outcomes	**Information**	**IR:** I think the surveillance aspect … in the early days some local areas were really on board but some needed convincing; they felt it was just a measurement programme … what's the real benefit? But now I think that attitude has really changed and … areas are really telling us how fantastic the data is in informing their work … it's helped to prioritise obesity and enable them to put programmes in place and get the money for it and get people to take obesity seriously. I think that's different to other things. There are other policy areas within DH where there isn't the data, so actually making the case for investing locally in it is much more difficult. **IR:** .... the Information Centre report shows such a direct correlation with deprivation…. The richness of the dataset, because it's so large and the confidence intervals quite small, it really enables us to find these things and almost to have evidence for what people might have thought anecdotally anyway. **IR:** I think it certainly gives a certain amount of understanding of obesity within the UK for the child population. I think it the aetiology, the epidemiology, this what it is within the UK that actually is associated with obesity. And also I think local population monitoring is important, because we do need to understand what's going on with conditions such as obesity. …. If we can collect really good data going down to the local level, we can actually have a good idea of what characteristics at the local level we need to target … to actually have an impact on obesity levels. **IR:** <Pause> So I think it can drive action. It's epidemiologically important, it's a research tool for

Headings	Themes	Quotes
		understanding, it's potentially an intervention in its own right, and I think there's more it could do. And if for example you were able to build in longitudinal follow-up and linkage, I think it could be even more useful. **IR:** [NCMP data] shows a clear gradient against deprivation, and it also shows that different ethnic groups have significantly different levels of prevalence. Now the national data does show that as well, but I think because the NCMP has such a large number of data points; it is very convincing. …. I think that's something we've said to ministers and people like that, but I really think it is really hard evidence that there is an issue, for child obesity anyway, around the link between deprivation and levels of obesity. **I:** Can you think of outcomes that the programme is producing? **IR:** Erm, apart from feedback and the various forms of analysis and information… I can't right now, I have to admit. <pause> No, I don't think so really. **I:** Do you think the programme is worth the required resource? **IR:** Erm, I do think it's worth it because of the data that's gathered that, actually, we realise how much of an issue and problem there is with weight in our population … So yeah, I do certainly. … it gets a lot of media interest and I think that in itself is of benefit because it's continually flagging to the population actually that this is a problem, this is an issue, you should be able to see the ribs of your child…. **IR:** So I think there are potential things outside obesity just from the sheer numbers and the amount of child information we've got. … There's endless papers that could be got out of it which I think is starting to kick off now. … So yeah, it should lead to a load of other useful things I think. **IR:** …. I am kind of more surprised that lots of things haven't got done. If you'd asked me three or four years ago what I'd have done with NCMP data by now …. I'd have had loads more

Headings	Themes	Quotes
		exciting things and I haven't really. It's all like the same sort of thing …. It's like we did this last year and we know the figures haven't changed much, *but* we've got to do because everyone wants it at local level and we've got to make all the stuff available. So, I think I'm more surprised that things haven't been done given what is there.
	Engagement	**IR:** And certainly the NCMP has been an amazingly useful tool just to keep schools engaged in this and to remind the local health people that they have this as an issue and give them an advocacy tool. To say, 'This is our latest data, this is what's going on,' to all the people that they are trying to encourage to work with them. **IR:** …. we need to have that constant reminder that, ok, it [obesity prevalence] might be flattening out in terms of trend but actually it's still pretty high. So we need to keep doing things and it gives us a reason to negotiate with food manufacturers as well…. It just helps to provide essentially some of those levers to make the case for why we should progress different action, obesity policy action. **IR:** …. It's keeping it on the table. It's keeping obesity on the agenda as a high-profile, important problem that we do really need to do something about. …. I just think that there is something about local ownership of data and local engagement in the programme, and if we were only measuring 7,000 kids a year then it may not be … and if each PCT, or in the future, each local authority didn't have its own figures, then it might not be seen as that much of a problem over which they'd have ownership. **IR:** I guess we've talked quite a lot about the effect it's had on the local areas in terms of the NHS and what they do, by targeting services and being a catalyst to get services in place, but also I think the routine feedback side of it can maybe actually help the public and actually raise awareness amongst the public. …. I think the majority of parents are reasonably accepting of the result and actually may not have realised it, or might have been a bit concerned but not really thought too much about it. But actually by sending them that

Headings	Themes	Quotes
		result it will in some way raise their awareness and maybe help them to make changes. **IR:** And I think routine feedback was actually introduced at the same time that the Change4Life programme was launched, so I think that worked really well because, up until then, in a way people had seen the NMCP as the only thing that the government was really seen to be doing publically on obesity. …. I think having Change4Life at the same time made it feel like, 'OK, there is this movement, this whole big effort going on to try and tackle childhood obesity' … and it worked quite well I think. So I think that public awareness hopefully has been increased because of NCMP as well…. **IR:** Well, I think there's political engagement. … The continued existence of this dataset does mean that we can show really what's going on and keep a handle on it…
	Driver	**IR:** And actually it acted as a bit of a catalyst really for local areas, getting weight management services and care pathways in place … they might have had services, but they weren't joined up and properly planned really, in a set out care pathway that everybody in the area knew about. So, one effect of this policy was that actually areas then thought, 'Well, right, we need to do routine feedback, we need to get proper service in place for these children', and … that's been quite a positive impact in a few areas. **IR:** Areas have also used it for targeting, so as well as just getting funding in general, they can actually then look … within their PCT and actually say, 'We know for the past three years obesity rates have been highest in these schools, so we are going to particularly target those.' **IR:** At the moment I don't know how much it is going into influence at the policy level. I think it can do, but whether it's having that impact at the moment, I think is another question. …. I'm not entirely sure that it is. …. Certainly my work goes to the Department of Health and the work from National Obesity Observatory goes to Department of Health. So it could be

Headings	Themes	Quotes
		influencing them, but I'm not entirely sure that we've actually seen it. **IR:** I think it's tricky 'cause ideally you'd have perfect services in place and everybody perfectly trained and then you'd start the programme… but things don't happen like that in the real world …. It's not the perfect way but … arguably maybe that is a good thing. [W]e're driving people, staff, to get trained and to put weight management programmes and other services in place and get their care pathway properly written up … what else would drive them to do it, if not this? Maybe it just wouldn't happen. **IR:** ….it has been valuable in raising awareness and … in helping to inform an obesity team, because prior to *Healthy Weight Healthy Lives* there were a couple of offices in the Department of Health working their way around the obesity agenda … and now obviously we've got a much more comprehensive team… [That's] not just [due to] the National Child Measurement Programme, but obviously the data it's generated has helped to give birth to that and I think as soon as you start to take away the information, people start to feel as though the problem's solved and it's no longer an issue and so you take your foot off the pedal. **IR:** …. It's still not really got to a stage where the analysis that we're producing feels like we are helping people. And where it does feel like it's helping people … I'm not sure they want to do things that I think they should be doing. **IR:** We don't just want to set up a programme measuring a million children every year and just have it monitoring levels [of obesity]. We want it to have some kind of impact … So yeah, I think we need to use it and it would be a waste if we don't.
	Evaluation	**IR:** …. It made us think as a region what we're providing. What kind of top tier services do we have in place for children that might be coming through our system through routine parental feedback? What do we have that can accommodate them?

Headings	Themes	Quotes
		IR: I think it's [evaluation] a potential role, and I think people feel it [the NCMP] has that role but I don't think it's been properly assessed as such. **IR:** …. Obviously, in the past the data was helpful around local area agreements and the monitoring systems that were in place …. the majority of local areas chose to have an obesity child weight indicator and so we needed a local level of data in order to detect whether or not they'd met that …. So it was used to inform that previously. …. Obviously this current government is moving away from targets so it's unlikely to be used in a performance management sense going forwards because of devolved responsibility in the localism agenda. But it may well be used by local authorities to performance manage themselves…. **IR:** Well, it was part of a performance management system. So I think in that sense we encouraged local health authorities first of all to collect the data and secondly, once they've collected the data, to do better than their neighbours and to do better than they had done in the past.
Unintended harm	**Outcomes**	**IR:** You hear anecdotal…. I heard of one case where a group of girls hadn't eaten for the last two days or something because they knew they were going to get height and weight measured, and that's just the kind of circumstances that we want to absolutely avoid. **IR:** Now of course there is one of the impacts could be an impact on the programme itself. The biggest epidemiological risk and challenge to the programme is one of selection bias, and there is both endless anecdotal and actually some analytical evidence that tells us that it's the heavy kids who tend to opt out. …. Now if that gets shifted even more because you're pissing off the parents of the overweight kids, so they then don't want to participate … then you're going to get less useful results from the programme itself.
	Protocol	**IR:** Well, I think there's like recommendations in there in terms of, like, children to be measured in a screened off area so you're not measured in front of others; children shouldn't be told

Headings	Themes	Quotes
		their BMI ….. So there's quite a bit of stuff in the guidance to try and stop individual children feeling picked on or pressurised … There is a load of cautions around that ….. So that I think some attempt's made to tackle or to try and prevent any unintended harm… **I:** Can you comment on elements in the measurement protocol that are in place to minimise unintended harm associated with these programmes? **IR:** Well, the only thing I know about is the use of the language in the letter. So the purpose is not to scare parents or children; the purpose is to inform them, to draw attention to possible risks to the future health of their children. Well, even that in itself seems to scare some people.
	Engagement	**IR:** I think what we haven't done to date is actually engaged children directly, used social networking or social media to try and engage with children about their result or the fact they're going to be weighed and measured …. So that would be quite an interesting way I think of trying to influence their understanding of the process and why it's done and what it actually means. **IR:** I think the key issues are around the process of measurement and also engaging with children before the measurement programme takes place. The Department of Health provided two training videos … how to measure for PCT staff; but also like an assembly resource just to de-stigmatise the height/weight measurement process, that can be used to engage with the kids. …. I think that, and ensuring that there's privacy of measurement during the measurement process … 'cause the biggest concern is around heightening children's awareness of fears around weight status, particularly with girls….
	Evaluation	**I:** Are you aware of any evidence suggesting unintended harm associated with the NCMP? **IR:** Not that I can think of and also I have to admit I sort of think there's a bit of a fuss over

Headings	Themes	Quotes
		nothing…. **IR:** I don't think we are aware really. We get people writing into the Department nationally … and there have been cases like that in the media. It is small numbers really; given it's a million children being measured, it's really quite small numbers. … I think one of the problems is we just don't know, 'cause a lot of parents don't contact and does that mean that they're fairly happy and not really too bothered …? We don't really know, so I think that is one thing we really want to look at. … should we even be doing this if we haven't properly evaluated it? Maybe not, but these things, in the real world they happen and you can't always wait for the evidence …. I think the indications are that we're not aware of any strong negative impacts I suppose. But I think we need to look more at it and see if we can properly assess it. **IR:** I don't know. There may well be some [evidence]. Certainly my recollection of the evaluations that have been done is that there isn't much evidence of it and it's a theoretical objection and it's actually not the case in real life. **IR:** So if you said 98% of children weighed and measured were not bullied… Would that sway your attitude? It is a bit of a meaningless statistic. … I think certainly in terms of our justification for continuing… That would give us a stronger position, but personally I think that to affect the public we need to get them to a stage where they actually accept that they can't tell whether or not their child is overweight …. It's not a reflection of their parenting; it's a reflection of modern lifestyle and what's around you. So I think [it's] more about how we manage the programme from the professional side of things and that we are confident and content that actually the programme is doing more benefit than it is harm … there will always be an element of harm and risk in it.

APPENDIX XII

Table A5: Headings and Themes – 'Threats'

Key: I = Interviewer, IR = Interviewee response

Headings	Themes	Quotes
Challenges	**Structure**	**IR:** I think the main challenge is probably the new government and the changes from the new government…. I think the issue, or one of the major issues is that, at the moment, data collection is coordinated by PCTs and PCTs will cease to exist in two or three years, and what happens then is anyone's guess. How is the data collection then going to be coordinated? I think that's a massive issue. I mean, once the PCTs have gone the whole nature of the NCMP is going to change. **IR:** The main challenge at the moment is the dissolving of the PCTs because currently, in almost every single locality, the PCTs are responsible for the NCMP programme. So, obviously when the PCTs dissolve, it's still very unclear as to who's going to take a lead responsibility for the NCMP. Obviously public health is going to be integrated into local government but we don't know where the NCMP will fit as part of that. So I'd say that's my biggest concern at the moment. **IR:** Well, that it is done by PCTs who are about to disappear <laughter> is probably one risk factor. ….. You know, so obviously no one knows who's going to be there to take these measures. You know, when it gets to local authorities it might be all very well for the government to say, 'Well, it will continue,' and assume that local authorities – if they're running school nurses – will continue to do it. I can see all sorts of problems, like a local authority suddenly saying, 'Wait, you want us to go and measure all these children? Get their names, dates of births, heights, widths, stick them in this Excel tool? No way! Give us a system to enter it into and we will.' At which point, it's like, 'How much do our trial systems cost? Ahhh, right, I think we'll have to drop the NCMP.'

Headings	Themes	Quotes
		IR: In the current political and organisational climate where the NHS is being completely reorganised; public health is being completely reorganised; PCTs are being closed down …. So in a time of chaos and flux and budgetary constraint, the likelihood of improving a programme seems pretty slim …. But things will settle down…. **IR:** Oh, absolutely the main challenge is the massive reorganisation of public health. …. There is apparently a strong government commitment to the NCMP. Ministers like it; they want to see it there. …. I have had strong indications that it's something that will continue, but we're seeing the abolition of Primary Care Trusts; public health moving into local authorities; talk of ring-fenced budgets …. **IR:** So the challenge is that we've got a two year interim period …. So it's kind of what happens in the two years of transition that's quite difficult and it's during that period that we don't have any significant mechanisms to utilise centrally to help local areas make the case for it to be a priority for them to be able to continue to do it.
	Consistency	**IR:** I think there is potentially an issue around, will local areas choose to implement NCMP? Obviously up until now, every area in the country has been doing it, so we've had this fantastic national dataset, but going forward this government doesn't like to mandate areas to do anything; it's very much locally led decisions. So going forward, if areas start to not do it …. Either they might not measure at all or their coverage might drop, and … if one or two areas drop out, that really affects the whole dataset. **IR:** Erm, challenges? Certainly the removal of Vital Signs. So Vital Signs is not continuing; it was not in the 2011/12 framework. …. And obviously the local area agreements are not continuing either …… so there are no levers for central government to ensure not only that local areas deliver the NCMP, but they get a certain coverage rate….. **IR:** Now when we set it up, I was very clear from the start that we didn't mind how it was

Headings	Themes	Quotes
		conducted locally, 'cause there were some areas that were already doing this kind of thing and we didn't want to step on existing good practice. …. Now it ought to be something that fits with the current way of doing things, but I think the level of autonomy that is being promoted may be too great to allow good enough consistency for a programme like this.
	Engagement	**IR:** It will be really nice if education could maybe take a stronger role …. I just feel we could do more to help engage schools in the programme. I know we can't give schools their individual prevalence figures, but I think we could do more generically to use the data on a locality level to provide resources to help schools understand what the implications of obesity are, how their environment could possibly affect the levels of obesity, and what they could do to improve their obesity prevalence. **IR:** I think if the schools are going to keep letting you in there, the schools have got to feel they're a part of the process and they've got to feel they're getting something out of it. Otherwise why do they keep opening their doors to these measurements, and why do their lessons get disrupted, why do the kids all line up? You've got to keep the schools onside. **IR:** …. Last summer there seemed to be almost every day in the press for a few weeks this child who'd been told they were overweight and who didn't look particularly overweight in the pictures in the newspaper. So I do think that kind of thing, the negative publicity is a threat to the programme. I think it may be that parents will then withdraw their children and say they don't want them to be included. **IR:** ….I think it's also parents who might have had a child measured in Reception and then the child's come into Year 6, they might not want them measured. Or, they have a child who's been measured and then they have a bad experience and the next child they withdraw. … I think it's something we're always aware of: that we are reliant on parents really being open to having their child measured and not withdrawing.

Headings	Themes	Quotes
Sustainability	**Structure**	**IR:** …. Certainly the model's not stood still; it's evolved and changed continuously depending on the demands locally and nationally. And I think that's been a really positive part of the programme because it needs to do that because nothing stands still. So for it to be sustainable, it has to make sure it meets the current needs and I think we need to accept that all projects go through a life cycle and, at some point, come to a conclusion. And this will be one of those; it's just when that conclusion actually is. **I:** What do you think can be done to maximise the sustainability of the NCMP? **IR:** Sticks and carrots. So one of the things, this happened when we went from NCOD to NCMP …. Department of Health put the message out …. That this wasn't optional; they had to do it. It was important that they prioritised it and the performance management people would be crawling all over them if they didn't. And it changed things very rapidly! **IR:** …. It depends completely, I would say, on the funding model and how it's kept in people's minds as being an important source of information as it progresses. And there's lots of different approaches to do this sort of thing, with sort of data survey collection. **IR:** But with data like this, you need years of data to get the real value of it, so no-one in a team who needs to show results quickly is going to invest in something that is not going to give them any benefit for ten years. There is no incentive to do that …. It will be the first thing that goes if you are required to make cuts.… **IR:** …. Certainly from our point of view, the pressure to show that this type of data collection is not just for data's sake …. Is really strong and it is also incredibly hard to do. How can you justify value for money out of a data collection exercise when the value might come 10-20 years down the line? But if you can't show that, the chances of keeping these programmes, I would say, are increasingly small. So it is interesting times when it comes to monitoring and data collection.

Headings	Themes	Quotes
	Data utilisation	**IR:** …. linking to other data sets is another one, and something we've been pondering over and speculating on quite a bit ourselves. ……. In order to get the maximum value and use out of the data, you need to be able to look at it in parallel with other data that you have about your patch and interpret that…. I think that's going to be a big need of expertise in that. **IR:** I think if we can engage schools more, maximise the use of the data, provide practical resources and programmes to help schools …. I just think if we bring it more into the broader obesity agenda and use it as a lever to help facilitate change, I think that will help in terms of its sustainability.
	Outcomes	**IR:** I think one thing is having the data. If they've been measuring for five years or whatever it is and seeing that child obesity prevalence is x%: pretty high. It may be that it would be quite hard for them to justify and say, 'Well, actually we're not going to bother measuring anymore and we're not going to do anything to tackle child obesity', because clearly they know they've got an issue. So in a way that should help areas want to continue. **IR:** Well, one thing they're saying they're removing targets…. But if they're going to have outcomes that are meaningful at local level, they've got to be able to measure them at local level. My guess would be that this is the only meaningfully measured, reliable and accurate outcome measure at local level …. this is a solid world-class, robust surveillance programme at local authority level. …. And I think this is probably the only outcome indicator of that nature. **IR:** I think it's using the information, because there is a focus on local-level health now, so I think it's using this data on a local level. And also if it can become embedded into systems on a local and national level, where that data is used to inform say the commissioning of services and things like that, and make it really valuable in these decision-making processes, then I think it will sustain because of that.

Headings	Themes	Quotes
		IR: I think the longitudinal data that it is currently producing is really valuable. There isn't a dataset like it in the world and it's just a really robust data source and when we can start to track individual cohorts of children as well, that will just be really, really valuable data in terms of actually getting a really good grip on not only what the prevalence is, but how that prevalence changes over time …. **IR:** …. If you think about other public health topics or areas like smoking cessation, which has been around for quite significant periods of time and haven't gone away, underpinned by information and data. They've been starting to show reduction in smoking rates, but they haven't dumped their data collection approaches…. **IR:** Now, the only reason for the huge numbers is for local area information isn't it? And I think there is a use for that but then it has to be understood as well to be useful. Is just having the numbers enough to protect the programme? Erm, kind of yes I think because the government's interested in obesity, right? They want local areas to be in charge of tackling it, so they want local level information. There's a scheme in place, so that's sort of in a way enough to protect it….
	Engagement	**IR:** Politically the view is that local areas should be prioritising those topics that they feel are important. We have got a good trend, a good source of data now over the last four years, so the information's there for local practitioners to make the case to get investment to continue the service ….. As I say, it's always been a controversial programme but generally there's real goodwill and good support for it, particularly in relation to the data that it generates. **IR:** …. The uptake of it is very high, so you have to have the local authorities – either health or local government authorities – willing to do it. ….There is quite a lot of support from the current regions to PCTs in supporting this programme, so that support now needs to come from somewhere else. I'm not sure where it's going to come from! <chuckles>

Headings	Themes	Quotes
		IR: I think if you can involve the schools….. if the school has got something out of it, if they just felt that they were partners in the process, I think that may be enough to protect the programme. **IR:** So, it is one of those ones where I don't think there is an ideal solution to it; you've just got to try and have everyone engaged all the time. …. Just having people who know the data side is not enough …. So there are many different aspects to that so, to some extent, I think NCMP has done a pretty amazing job considering all that. **IR:** …. If we can say there's this public health ambition and there's an indicator and you need to be reducing prevalence kind of thing; the stronger we can say that, the stronger local areas are likely to make it a priority for them as well. **IR:** I think it needs to be made clear that this is politically a priority…. If there's no comeback on people for not doing it then they won't do it.
	Evaluation	**IR:** …. And so I think it is timely to sort of take stock of things really and say, 'What have we got? …. Is it achieving what we want it to achieve? And if not, how else could it be done?' **IR:** I think the challenge with the general public is that we've got fat eyes essentially and if you told someone, 'Your child is being weighed and measured to help you change your behaviour', I think that would just build quite a lot of frustration and I don't think that would help at all…. **IR:** I think the surveillance tool and the feedback have to be defended separately, that would be my view. …., because they have different objectives and things. **IR:** I think certainly if we could demonstrate what the impact of the [NCMP] model has been in affecting behaviour change would be the key other aspect to it, both nationally and locally, because locally if there's clear evidence that taking that approach is going help support

Headings	Themes	Quotes
		behaviour change in the local population and get people into services and helping to contribute to a reduction in prevalence, then there's a much stronger business case for them to be supportive and to actually deliver it and use it as part of a care pathway. **IR:** Well, I think any evaluation that could follow up to improve it would obviously help. …. I don't think it's just showing that it's unintended harm; I think it's maybe making the improvements of where it is publically perceived as harmful. So I think at the moment really what is the unintended harm? I don't think it's that great, but the public perceptions may be slightly different…. **IR:** …. Obviously there's always massive variation in local areas in terms of how they deliver the programme, but if we can at least have an ideal model then I think that will help areas to know what they're aiming for. …. I think also getting evidence for a positive effect, so we are wanting to evaluate routine feedback a bit more and hopefully if that shows that it does have a positive impact then that again will make it easier for local areas to make the case to be doing it. I think at the moment if there's not evidence for why it's beneficial, then arguably they're not going to want to fund it. So, I think it's much more about us looking at how we can make the case to local areas so they can then make the case locally to be doing and implementing it.
	Protocol	**IR:** I think for population monitoring data then cross-sectional data are fine, because you're comparing between years and you're looking at the population trend over time. If you then want to start using the NCMP to look more on the causal pathway for overweight and obesity …. Then the longitudinal would be very useful. But I wonder, if we don't start using NCMP outside of just population monitoring, quite how long it will continue. If people just see it as collecting year after year of data …. [I wonder] whether actually people are really going to see a value in it and keep going with it. **IR:** I think at the moment one of the dangers of the NCMP is it seems to sit out on its own a little

Headings	Themes	Quotes
		bit. But if you can actually put it in as an important part of the system where it's used for commissioning services on a local level, or even on a national level, then I think actually it becomes more valuable and then it actually protects it slightly.
Limitations	**Protocol**	**I:** What do you think are some of the limitations of the available data? **IR:** Yeah, clearly longitudinal data would make a huge difference. For consent reasons we've not been able to do that. The data are anonymised so we have repeated cross-sectional data, which are useful, but I think as an epidemiological tool and a research tool it would clearly be much more valuable if we were able to look at changes in individuals over time, which could still be anonymised or pseudonymised so you wouldn't be able to identify them. I think that's feasible…. **IR:** .... the reason we couldn't get this done as a longitudinal dataset in the first place was because of issues of consent and the fact that I had four months to sort the whole thing. …. So we just couldn't deal with that as well as all the other things we had to deal with; it was a problem to come back to later. More important to get the response rate up, otherwise the whole thing would have been canned. **IR:** So, age bands is a clear issue; they're probably not the age bands I would have chosen. There was a notion, again I think a rather naïve one, that if you measured kids at the start and end of primary school this would tell you what primary school was like as an intervention, and I think it was really based on this concept that this was about the health impact of the period spent in primary school, without thinking through the vast number of other confounders that are affecting kids at those times. **IR:** …. It might have been better …. To have a younger age band as well; a pre-pubertal age band. And then there's the fact that our national obesity surveillance programme only looks at four-to-five-year-olds and ten-to-eleven-year-olds. It doesn't look at younger kids, it

Headings	Themes	Quotes
		doesn't look at kids in between, it doesn't look at adolescents, it doesn't look at adults. So we've got wonderfully detailed data on two very narrow age bands. **IR:** …. Inevitably there is possibility of inaccurate results being recorded locally, and it is obviously a one-off measure so it's not going even measuring twice on the second day, not repeat measures…… **IR:** The main limitation, which is unavoidable I think, is that you collect from a huge number of individuals but you collect very little information on them, which as I say is unavoidable. It's an ethical issue and it's time constraints and stuff like that, but it's really height and weight measurements. …. So I think that's the main limitation of the data. **IR:** <long pause> Well, there are issues about how accurate the weighing and measuring is. My impression is that those are things which we can learn about, and we are learning about, so that's both the practical business of weighing and measuring children, and the local analytical business about things like rounding to the nearest centimetre or unit of weight. …. There are issues around the time of year at which the measurements are made. … But that's an issue that I'm not sure we can do much about, other than analyse it to see what effect it has. **IR:** Risk factors don't change greatly as you pass through from being a healthy weight to being overweight, and from being overweight to obese …. So the cut-offs …. We reify the cut-offs and of course people who report on it – like newspapers – probably do it even more. But we reify into risk factor categories, which are only approximately good. <laughs> But you have to say something as it were; we have to some sort of category…. **IR:** But we do give very clear, detailed guidance on how the measurements should take place. We do ask that it's a healthcare professional who's trained in weight measuring that takes the measurement. So there is all of that but obviously it's down to the local area and things like whether the scales are calibrated properly and all that type of thing that we can't ever

Headings	Themes	Quotes
		control for. But I think if it's being taken seriously at the local level, and I think generally it is, then they are taking all the efforts they can to record the data accurately. **IR:** I guess local areas should be, especially given that the results are going to be going back to parents, they do need to take particular care to make sure they're doing measurements really accurately and at each stage of the process, so actually the measurement but then recording of the result and then producing of the letters. And I guess it's like other tests, with any test you do there's always margin for error and the requirement to make sure that things are done accurately. I think it does get tricky because obviously there's a threshold and a child is going to fall on one side of it, but it's an initial indicator I guess. It can be a flag to parents…. **IR:** It's difficult because you want to get the balance right, and you don't want to say, 'Well it's only one measurement. Don't worry about it. It may not be correct and BMI's not a perfect measure so probably ignore it actually.' You want to say, 'Well, you don't need to be overly concerned but you should be aware of this …' I think it's the awareness raising and signposting …. So yeah, I do think it is about that and I think no matter how carefully you word the letter, parents don't always read it like that, which I think is the difficulty … some parents get upset or angry, because they see their child as being labelled and it doesn't fit with what they think their child is. So it's a difficult message to put across certainly….
	Outcomes	**IR:** Well, we only get two years of children, the first year and the last year of primary school. They're anonymised I think at anything above PCT level, which means we can't follow children through and, in particular, in a couple of years' time we can't measure them a second time because …. They'll be a different set. They'll be the same set, but we won't be able to match them up with the measurement before. **IR:** ….. And if the data was used much more intelligently, like for example rather than looking at which schools are the highest prevalence, which schools have got a lot higher prevalence

Headings	Themes	Quotes
		than we would expect them to have given the socio-demographic mix of the population, or perhaps even more importantly, which schools have a much lower prevalence of obesity than we would expect them to have? Try and find out what is going on in those schools and what would work. Well, that's the sort of thing that we all talk about and we all say it would be nice to research, and then we go back to producing an E-Atlas which regurgitates already published data in a form that's easier for people to click on because that's what they all want! **IR:** …. One of my biggest bugbears is the fact that the data isn't identifiable and we aren't actually able to link the data with other datasets. So that limits what we can do in terms of looking at it from an epidemiological perspective. … But it would also be really interesting to look more from the health side of things to see if we could link it, say, with an NHS number and look at hospital episodes that were linked to those children. That would just give us huge strength in terms of what we could actually learn from the data.
	Information	**IR:** The other issue is the comparison group, and I bet one parent in a thousand doesn't realise this, which is that we're comparing against a population in 1990. I suspect – I haven't asked – but I can always bet that parents think that we're comparing against the current population. And of course if you think that through that doesn't make sense, because the whole population has moved, and so you have to compare against a population at least prior to some of the rise in obesity. But nevertheless, I suspect if people were told that your child is very overweight …. They probably think that means they're in the top X percent of their peer group. <chuckles> They're not; they would've been in the top X percent of a population in 1990. …. But, as I say, I don't think anyone understands it. **IR:** So, I can definitely see how thorough analysis of the NCMP data should help inform what we do to tackle child obesity, but I think people use it to look for too easy answers. …. I think we need to think behind these findings a lot more. So I think there is a lot of potential for it to

Headings	Themes	Quotes
		provide it, but I think unfortunately the pressure is on people say, producing maps of obesity prevalence ….. giving those to commissioners who will decide that when they commission whatever response, they will place it in those wards or in those schools which to me, is missing a lot of the point really. **IR:** Yeah. I think firstly it's what you're measuring and it's secondly how you're measuring. As we've said, with the NCMP 'cause it's cross-sectional, you could collect all the data you wanted and it's always going to be cross-sectional. You could link it to loads of things and actually you're not getting down to the real causal pathways; you're just looking at associations, you're not really explaining a great deal. **IR:** We're measuring children at a point in time, we're not measuring how they get to that point in the case of the four- to-five-year-olds for example, and we're not measuring how they move from being four-to-five-year-olds to being ten- or eleven-year-olds. …. There is the whole question of the dynamics; it doesn't get to the bottom of the dynamics at all, so that's a limitation. So if we've measured every year or if we had a longitudinal study, we would be discovering something different.
Solutions	**Protocol**	**IR:** I would say collect data earlier in life and believe me we've tried! But it is not proving an easy one to crack. …. But I mean, where do you stop with something like this? I mean, teenagers, wouldn't that be interesting; to have more data on teenagers? But then you end up trying to collect data on every year of life. But, you have to make choices…. **IR:** I mean the trouble is any other data we would collect, because … we measure every single child, would be quite burdensome and logistically I'd say probably impossible, unless significant further resources were added to it. [Additional parameters] would give us huge strength in terms of how we could use the data and the interpretation that we could gain from that, but that's logistically completely impractical to do….

Headings	Themes	Quotes
		IR: One of the questions I do have is the age group, because I think it's good in a sense, because it's the beginning of the primary school and the end of the primary school. … One of the problems I have with Reception …. Is I have the feeling that the children start at different times of the year. They don't all start at the beginning of the year …. So I think using Reception could be problematic …. So I think that's probably the main thing: Reception as a year group wouldn't necessarily be the best year to target. **IR:** Well, we obviously would like a bit more measurement from different age-groups. …. I think that would be really useful, I think that would be excellent. And outside of that, whatever other information you can get on the correlates with overweight and obesity would obviously be useful. **IR:** Well, an NHS number or pupil ID if that were allowed to be able to link records. Obviously that would be brilliant and an anthropometric measure – waist circumference would be great basically. …. And that's realistic as well; it's not ridiculously involved to take one extra field on the data set. … I could probably think of more, but that will do. **IR:** I would say in terms of policy …. Teenage years are something we've not really addressed in policy and we don't really have any data on it …. So, if it was to help us get a better sense of what was going on in the later years of adolescence – the teenage years – then that might be helpful. **IR:** I think the issue is the cost of changing it. I mean the NCMP as far as I'm concerned has been set up with minimum expenditure really in utilising funds that have already been there or haven't been used. So I think from that point of view, I'm not entirely sure I would necessarily feel the need to change a great deal. **IR:** I think realistically you could want to collect everything, so I think keeping the data as it is, but if you could map it longitudinally in a few years' time, I think that would be most useful.

Headings	Themes	Quotes
		I: Are there any other data that you would like to see collected in this programme that you think would be useful? **IR:** Personally, no I don't. I don't think so and actually I think going down to one year group would be a better approach as well, although obviously having a two age set does give us a sense of what's happening up until Reception year and then what's happening between Reception year and secondary school…. **IR:** So, I think at the moment there's no real consideration to add anything in, even though I guess the more you collect, the more interesting it can be. But it's the trade-off of what really would you do with that?
	Data utilisation	**IR:** The other thing that would be good actually, which would be incredibly difficult, would be linking it to something like the child NHS number or something like that, so that it then could be linked to future ill-health or even past measurements and things like that. That would be really good. … it makes a massive ethical issue I'm sure, but that would be really useful on a public health level. **IR:** I would like someone not to have put in place the regulations that are currently in place though in the implementation of the National Child Measurement Programme; they're horrendous. They limit data sharing, they're prohibitive beyond need… **IR:** I know some of the PCTs do store that NCMP data on their child health systems, so that potentially would give rise to the possibility of linking it with other information that's stored on the child health system. **IR:** What would be really good is the longitudinal mapping, I think, even just using the data that we've already got; I think making it longitudinal would be very interesting. …. I think it would add a better understanding of firstly the aetiology of obesity, the causation of it, and also then the mapping to future ill health. And also all the analysis at the moment is cross-

Headings	Themes	Quotes
		sectional, so it's all association and so we don't really do much work on causality….
	Feedback	**IR:** We've got the system in place and we're doing all the four-to-fives and ten-to-elevens, so then there's no reason why it would need to stop in a way. But I still say parental feedback has been fairly problematic I think because of the potential for getting it wrong and for some people not liking getting the letters. … if there's any resistance from, say, parents or schools and things, it seems to often be around …. Feedback. **IR:** Like, at the minute, the other danger is possibly that parents all of a sudden start to get really angry about this. ….. if anything like that does start to happen and participation starts to drop, can we trust our figures anymore? …. So, I think I'm worried about big disruption and disturbance of which I see parental feedback as being the big issue; that leading to all sorts of problems and then it not being worthwhile carrying on with in a way. So, for me, I'd like parental feedback to be dropped because I think that would help the system. **IR:** …. The government like feedback so they will want to pay for it because it's something else they get out of this programme basically. …. Feedback is only advantageous because they don't fully appreciate epidemiology. …. I really don't think the letters add to it. I don't think many people are like, 'I love these letters; I want my child to participate in the NCMP.' Whereas people *are* like, 'I *don't* like this nosey government writing letters telling me about how fat or thin my child is.' So it can only really have a negative impact on the population… **IR:** I just think this should just be a routine thing that happens …. That children should be getting weighed and measured. It should be put into a health system and we should be able to analyse the information, so I think keeping it away from all this feedback and things would be the best way ….. **IR:** I don't know about the feedback side of things, because I think it is seen as being quite intensive – quite resource intensive - …. And I know in a lot of areas they haven't seen that

Headings	Themes	Quotes
		conversion from sending the result and then increased numbers going into weight management programmes. And many areas are actually really struggling to recruit onto programmes like MEND. … I think therefore they won't necessarily see a benefit of routine feedback. I think probably our evaluation of routine feedback, and hopefully showing that there can be a positive benefit and hopefully not very much negative impact, then that might help areas…..
		IR: I think it's around 1% of parents who get the results letter will contact the PCT, and of those most of them are the kind of angry ones who don't necessarily want help but just want to complain. …. So, I think that's what areas are seeing as routine feedback, and it's not particularly … rewarding I suppose. They will have a few cases where they have a positive experience with a family, but I think that's only a few, so unless they see more positive effects …. Then it might be hard for areas to carry on.

APPENDIX XIII

Sample opt out form (GCMI)

Project title: 'The Guernsey Child Measurement Initiative'

Date: 20th December 2010 (version 2)

Principal Investigator: Dr Karina McHardy

Opting out of the programme

If you are happy for your child to be weighed and measured, **you do not need to do anything.** If you do **not** want your child to participate in the measurements, please let us know by phoning or e-mailing us using the contact details found on this page. Alternatively, if you prefer you can complete and post the form below. Thank-you.

I do not want my child to be weighed and measured as part of the pilot Guernsey Child Measurement Initiative.

- Child's name: ……..……..……
- Child's school: …..……..……..
- Name of parent/guardian: ……..…….……
- Signature of parent/guardian: ……..……....……..
- Date: ……..……..……

Please return to:
Dr Karina McHardy
C/- British Heart Foundation Health Promotion Research Group
Department of Public Health
Old Road Campus, Roosevelt Drive
Headington, Oxford
OX3 7LF, United Kingdom
E-mail: karina.mchardy@wolfson.ox.ac.uk
Ph: +44 (0) 1865 617787 **OR** +44 (0) 79 9088 2721 (mobile)

All data will be collected and stored in accordance with the Data Protection (Bailiwick of Guernsey) Law, 2001.

APPENDIX XIV

Sample measurement recording sheet (GCMI)

School: **Form Class:** **Date of measurements:** **Measured by:**

Name	Age (months)	Gender	ID Code	Repeat Measure	Opt Out	Absent	Non-Participation (Other)	Feedback	Height (cm)	Weight (kg)	Repeat

APPENDIX XV

Sample feedback letter (GCMI)

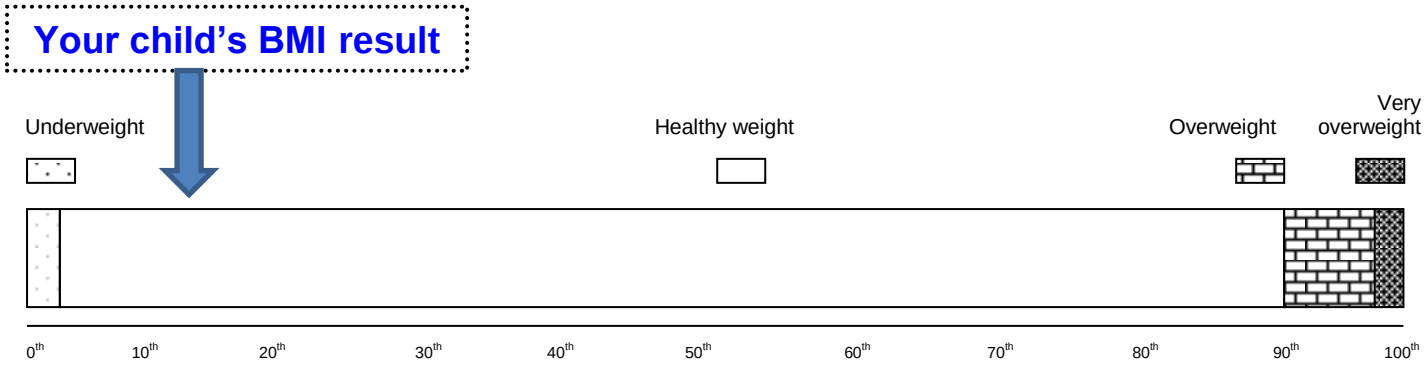
PRIVATE AND CONFIDENTIAL

Dear Parent/Guardian,

Your child recently had height and weight measurements taken at their school as part of the Guernsey Child Measurement Initiative (GCMI). Information about the GCMI was sent to you before these measurements were carried out. Our records indicate that you have requested individual feedback of your child's results. The purpose of this letter is to inform you of these results.

SUMMARY OF RESULTS

Child's name:	**Master John Smith**
Date of measurements:	**01 May 2011**
Location of measurements:	**Disneyland Primary School**
Height:	**125.8cm**
Weight:	**22.5kg**
Body mass index (BMI):	**14.2**
Height percentile for age and gender:	**91%**
BMI percentile for age and gender:	**13%**



BMI percentile for age and gender

This BMI result suggests that your child is a **healthy weight** for their age and gender. Generally, a child is said to be a healthy weight if their BMI lies between the 2nd and 91st percentile. Further information around how to interpret your child's BMI result is provided on page 2 of this letter.

*** It is important to know that these results are intended to be an approximate guide. ***

How are the results worked out?

Body mass index, or 'BMI', is a measure of a child's weight in relation to their height. It is calculated using a simple formula and is more useful than either height or weight alone. It is important to know that BMI is interpreted differently in children and adults. The BMI result is presented as a percentile for your child's age and gender. This allows you to compare your child's BMI result to other children of the same age and gender.

What does the BMI result mean?

BMI is often used as an estimate of the amount of body fat that a child has. Most of the time, a child with a high BMI – one that is above the range suggested for a child with a healthy weight – also has high levels of body fat. BMI helps us to identify whether a child might be at risk of certain health problems that are associated with high body fat, such as type 2 diabetes, high blood pressure, heart disease and some forms of cancer.

Overall, BMI is a very helpful tool to assess whether your child is likely to be a healthy weight. However, like all tests, BMI is not a perfect measure. We know that children grow and develop at different rates and this alone may influence the BMI result. The best way to assess BMI is to monitor repeat measurements over time. Also, in a few cases – for example children with certain medical conditions – the BMI result may not apply. Therefore, we recommend that parents/guardians use this BMI result as a **guide** only.

If you have any further questions, your family doctor or other healthcare professional will be able to assist you in understanding your child's results.

What can I do from here?

- If you have any questions or concerns regarding the information contained in this letter, we suggest that you discuss your child's results with your school nurse or family doctor (GP) in the first instance. They are available to talk about these results and offer further information and support. In particular, a follow-up consultation with your healthcare professional is strongly recommended if your child's results suggest that their BMI lies **outside** the healthy range for their age and gender. Please note that any weight related lifestyle changes for children should first be discussed with a healthcare professional.

- Achieving and maintaining a healthy weight is an important health goal for us all, no matter our age. There are a number of ways to learn more about some of the easy steps that you and your family can take to eat well, be active and achieve a healthy weight. Firstly, you can speak to your family doctor or other healthcare professional. The Guernsey Health Promotion Unit (http://www.guernseyhealthpromotion.com) also has a number of useful links and resources available. Finally, the NHS 'Change for Life' programme offers lots of free, helpful information for the whole family. Simply visit www.nhs.uk/change4life to learn more.

- If you would like any more information about the Guernsey Child Measurement Initiative or if you have any feedback or comments that you would like to share, please contact the Principal Investigator (Dr Karina McHardy): E-mail: karina.mchardy@wolfson.ox.ac.uk

This letter has been developed from the model used by the UK's 'National Child Measurement Programme'.

APPENDIX XVI

Information form for participants (GCMI)

Project title: 'The Guernsey Child Measurement Initiative'

Date: 20th December 2010 (version 2)

Principal Investigator: Dr Karina McHardy

Your child is being invited to take part in a research project. This information sheet is designed to fully inform you about the project.

Project Background

You are being approached as your child may be eligible to participate in this research project. Before you decide whether you are happy for your child to participate in this research project, it is important for you to understand why the research is being done and what it will involve. Please do not hesitate to contact us if you would like more information, or if anything is not clear.

What is the purpose of the study?

The purpose of this research is to assess whether or not a school-based, population level child measurement initiative is a feasible, acceptable and sustainable venture for Guernsey.

Why have I been chosen?

All children in Years 1 and 5 who attend either St Martin's Primary or Amherst Primary School are eligible to take part in this pilot project.

Does my child have to take part?

No, taking part is voluntary. You are free to decide whether or not your child will take part in this study. If you decide that you are happy for your child to participate, you are still free to withdraw at any time, even after the measurements have been collected. If you decide not to take part you do not have to give a reason and it will not affect either you or your child in any way.

This study uses ‘passive consent’, meaning that participation ensues unless either a parent/guardian or child states that they do not wish to be involved in the research. If you prefer that your child does not participate in this project, you can let us know by letter, e-mail or phone – whichever option is best for you. An opt out form is included in this information pack.

What does the study involve?

This pilot study involves the collection of height and weight data on a sample of school children in Guernsey. The measurements will be conducted over a single morning in mid-May 2011. All measurements will be performed by a trained healthcare professional with a local school nurse present. The measurements will be conducted on a 1-by-1 basis in a private setting within the school itself. One in ten participating children (10%) will be randomly selected to have their height and weight measurements recorded twice to ensure the accuracy of the results.

Children will be measured in their usual school clothing, but will be asked to remove their shoes. Children will not be informed of their individual results at the time at which the measurements are conducted.

All results will be anonymised, meaning that it will not be possible to identify individual children. All results will be stored in a secure, password-protected database that can only be accessed by the Principal Investigator. A child’s individual results will not be shared with anyone other than the parents/guardians themselves (and here, only if requested). All data will be collected and stored in accordance with the Data Protection (Bailiwick of Guernsey) Law, 2001.

If parents/guardians indicate that they wish to receive their child’s individual results, these will be available approximately three weeks after the measurements have been conducted. These results will be presented in the form of a confidential letter that may be collected in person from the school. Parents or guardians who wish to receive their child’s results may contact the

Principal Investigator by either letter or e-mail to indicate their preference. A request form is included in this information pack.

What are the possible disadvantages of taking part?

If you are happy for your child to participate in this pilot project, it will require that they leave the classroom for a maximum of ten minutes in order for the measurements to be conducted meaning that there will be some disruption to class time, though this will be minimised. The measurement process itself is fast and straightforward and is not expected to cause any physical or emotional discomfort. We anticipate that participating in this project will have no significant effect on your child.

What are the possible benefits of taking part?

This project will result in the pilot testing and evaluation of a child measurement initiative for Guernsey. Parents/guardians will have access to their own child's body mass index results, which can help to provide accurate up-to-date information around current growth patterns, including weight status. The results from this research project will be submitted for publication in an academic journal and will be used to inform researchers on future work.

Project funding

This project is funded by the British Heart Foundation Health Promotion Research Group and the Department of Public Health at the University of Oxford.

The project has been reviewed and approved by the Guernsey Ethics Committee.

Further information

If you have any questions or would like any more information please contact the Principal Investigator:

Dr Karina McHardy
E-mail: karina.mchardy@wolfson.ox.ac.uk
Phone: +44 (0) 1865 617787 / +44 (0) 79 9088 2721 (mobile)

APPENDIX XVII – Participant information brochure

How do I request my child's results?

The GCMI looks at the whole population and is not designed to provide information on any single child's height and weight. However, parents/guardians may have access to their own child's results. These results will not be routinely provided, but are available if requested. This feedback is completely free of charge. These results will be presented in a confidential letter that must be collected in person from the school. Parents or guardians who wish to receive their own child's results may contact the Principal Investigator by letter or e-mail to indicate their preference. A request form is included in your information pack.

Parents or guardians of children who participate in the measurements but who do not wish to receive feedback on their own child's results do not need to take any additional steps.

Measuring for health in Guernsey



The Guernsey Child Measurement Initiative is endorsed by the Obesity Strategy Group and Guernsey's Health Promotion Unit. This project is funded by the Department of Public Health at the University of Oxford.

The GCMI has been reviewed and approved by the Guernsey Ethics Committee.

Principal Investigator:
Dr Karina McHardy

Ph: +44 (0) 1865 617787
Mob: +44 (0) 79 9088 2721
E-mail: karina.mchardy@wolfson.ox.ac.uk

Alternative Contact (Guernsey):
Miss Yvonne Le Page (Health Promotion Manager)
Health Promotion Unit, Princess Elizabeth Hospital
Le Vauquiedor, St Martins
Guernsey. GY4 6UU
Ph: (01481) 707 311
E-mail: Ylepage@hssd.gov.gg

British Heart Foundation
Health Promotion Research Group

Measuring for health in Guernsey

UNIVERSITY OF OXFORD

The Guernsey Child Measurement Initiative (GCMI)



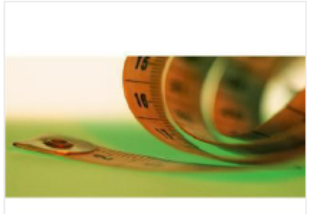
The Guernsey Child Measurement Initiative

The Guernsey Child Measurement Initiative (GCMI) is a new project that involves the introduction of a local child measurement programme. The project aims to establish whether or not a school-based island-wide growth monitoring programme is a valuable undertaking for Guernsey.

The GCMI involves the collection and analysis of information around weight status in primary-school children from two different age groups. This initial trial project - known as a 'pilot' - will take place in two local primary schools.

Importantly, this project does not look at any child's individual results. Instead, the focus is on collecting measurements from across all children in the included age groups.

The GCMI aims to gather information and promote education around the important issue of healthy weight status in children. The GCMI does not offer individual diagnoses of either growth or weight related conditions in individual children, such as obesity.





The GCMI: A Summary

What? The GCMI involves the collection of height and weight measurements on a sample of school-children in Guernsey. These 2 measurements will then be converted to a single result—body mass index or BMI. Children will be measured one at a time in a private room. The total measurement time per child should not exceed 2mins. Children will be measured in their usual school clothes but will be asked to remove their shoes. The measurement process is fast and straightforward and is not expected to cause any physical or emotional discomfort.

When? The measurements will be conducted on a single morning in mid-May 2011. Your school will advise you of the exact date of the measurements closer to the time.

Where? The measurements will be conducted in a private room in the local school setting.

Who? All children in Years 1 and 5 at St Martin's Primary and Amherst Primary Schools will be invited to participate. To ensure safety and accuracy, a child must be able to stand without any assistance in order to be measured. The measurements will be performed by a trained healthcare professional with the assistance of a local school nurse.

Why? This research will assess whether or not a school-based child measurement initiative is a valuable undertaking for Guernsey.

Confidentiality will be respected

A child's individual results will **never** be shared with others, including school staff and other children. Individual results will only ever be made available to parents or guardians, and only if requested.

All results and information relating to this project will be kept anonymous and stored on a password-protected computer. All data will be collected and stored in accordance with the Data Protection (Bailiwick of Guernsey) Law, 2001.

Participation is voluntary

This research project uses opt out consent. This means that if you are happy for your child to be weighed and measured as part of this pilot initiative, **you do not need to do anything.** If you do not want your child to be weighed and measured, please inform the Principal Investigator in writing or by telephone using the contact details identified at the bottom of this page. Children can also opt out of the programme on the day and will not be weighed and measured if they do not want to be.

Principal Investigator:
Dr Karina McHardy

British Heart Foundation Health Promotion Research Group
Department of Public Health
University of Oxford
Old Road Campus, Roosevelt Drive
Headington, Oxford

Ph: +44 (0) 1865 617787
Mob: +44 (0) 79 9088 2721
E-mail: karina.mchardy@wolfson.ox.ac.uk



APPENDIX XVIII

Sample feedback request form (GCMI)

Project title: 'The Guernsey Child Measurement Initiative'

Date: 20th December 2010 (version 2)

Principal Investigator: Dr Karina McHardy

Requesting your child's results

If you **would** like to receive your child's individual results, please complete this form and return it to the address noted below.

Yes, I would like to receive my child's results. I understand that results will be available approximately 3 weeks after the date of the measurements and that the results must be collected in person from the school.

- Child's name: ……
- Child's school: ……..
- Name of parent/guardian: ……
- Signature of parent/guardian: …….
- Date: …..……..……..

Please return to:
Dr Karina McHardy
C/- British Heart Foundation Health Promotion Research Group
University of Oxford
Old Road Campus, Roosevelt Drive
Headington, Oxford. OX3 7LF
United Kingdom
OR
Send an e-mail with the above information to:
karina.mchardy@wolfson.ox.ac.uk

All data will be collected and stored in accordance with the Data Protection (Bailiwick of Guernsey) Law, 2001.

APPENDIX XIX

Summary of time requirement for measurements (GCMI)

Please note:

- Except where otherwise noted, all timings provided are based on an average class size of 20 participant students.
- All timings provided include repeat measurements.
- Body mass index (BMI), BMI centile and z-score calculations were performed on an individual basis. A software package was not utilised in the pilot programme.
- All feedback letters were prepared individually, with cross-checking of height and weight data with the original measurement sheet.
- Data entry, cleaning and analyses were all cross-checked.

Task	Approximate time requirement (mins)
Set up of measurement room	10
Briefing of participant students (per classroom)	5
Preparation time of first student group	5
Measurements	20
Pack up of measurement room	10
Preparation of anonymised Excel spreadsheet (includes ID code, age in months, school, gender, form class, opt out and feedback information)	20
Data entry to Excel spreadsheet	10
Data cleaning in Excel spreadsheet	5-10
Height, weight, and BMI analyses (includes centile and z-score calculation)	100
Preparation of individual feedback letter	5-10

APPENDIX XX

List of costs incurred by the pilot programme (GCMI)

Please note:

- All prices include VAT
- This list **excludes**:
    - Local staff time/ human resource costs
    - All researcher expenses (including travel, accommodation and insurance)

Item	Price (UK pounds)
1. Seca 899 Remote Display Floor Scale (Class III)	£233.83
2. Custom printed GCMI pencils for participants	£94.97
3. Leicester Height Measure	£61.10
4. External hard drive 500GB	£57.99
5. Postage costs (local stamps)	£46.80
6. Ink cartridges (colour/black and white)	£42.95
7. Custom GCMI stamp	£42.29
8. Seca 421S Carry Case	£41.13
9. Local travel expenses	£40.00
10. Mobile phone expenses	£30.00
11. Bulk pack self-seal envelopes	£22.64
12. Bulk A4 paper for printing	£22.55
13. 'Private and Confidential' stamp	£5.86
Total	**£742.11**

APPENDIX XXI

List of interview participants by job description and organisation (GCMI)

Job title(s) at time of interview	Affiliated organisation(s)
1. Director of Public Health	Health and Social Services Department (HSSD)
2. Health Promotion Unit manager	HSSD
3. Obesity Officer	HSSD
4. Public health epidemiologist	HSSD
5. Head school nurse	HSSD/Department of Education
6. Former Obesity Officer	Not applicable

APPENDIX XXII

List of Obesity Strategy Group focus group participants by job description (GCMI)

Job title(s) at time of focus group

1. Guernsey Sports Development Officer

2. Environmental Health Officer

3. Clinical Lead, Dietetics

4. Guernsey Sports Development Officer

5. Director of Traffic and Environmental Services

6. Team Leader, School Nurses

7. Activities Manager, Beau Sejour Leisure Centre

8. Health Promotion Unit Manager

9. Head of Psychology Services

10. Lifelong Learning Manager

11. Obesity Officer

12. Public Health Epidemiologist

13. General Practitioner

APPENDIX XXIII

Information form for participants (GCMI evaluation)

Project title: 'The Guernsey Child Measurement Initiative' - Evaluation

Date: 20th December 2010 (version 2)

Principal Investigator: Dr Karina McHardy

You are being invited to take part in a research project. This information sheet is designed to fully inform you about the project. Before you decide whether you are happy to participate in this research project, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully. Please do not hesitate to contact us if you would like more information, or if anything is not clear.

What is the purpose of the study?

The purpose of this research is to assess whether or not a school-based, population level child measurement initiative is a feasible, affordable and sustainable venture for Guernsey. The purpose of these types of measurement programmes is to assess growth patterns in children at the population level. In order to help make a decision around whether or not this type of programme is appropriate and valuable for Guernsey, it is important to evaluate how it worked and to talk to various individuals about their experiences of the project.

Why have I been chosen?

All parents of children in Years 1 and 5 who attend either St Martin's Primary or Amherst Primary School are eligible to take part in this research project. Additionally, stakeholders including but not limited to school nurses, school teachers, local general practitioners and other healthcare professionals from Guernsey are eligible to participate in the evaluation of this initiative.

Do I have to take part?

No, taking part is voluntary. You are free to decide whether or not you will take part in this study. If you decide that you are happy to participate in this project, you are still free to opt out at any time, even after the interviews have been conducted. If you decide not to take part you do not have to give a reason and it will not affect you in any way.

What does the evaluation involve?

The evaluation involves a series of focus group discussions and one-on-one semi-structured interviews. If you are happy to participate in this research, you will be asked to attend **one** of these at a time that is convenient for you. As part of the evaluation, you will be invited to attend to talk about your experiences of this research project. You can choose not to answer questions and you are completely free to participate in the discussion as much or as little as you like, without giving any reason. Each focus group session or interview will last for approximately one hour and participation is entirely voluntary. You are free to opt out or leave the discussion at any time. Refreshments will be provided for all individuals who attend the discussion / interview, but there is no monetary compensation for participation.

If you agree, the discussion will be audio recorded. This is to enable an easier and more accurate analysis of the themes that might arise over the course of the discussion. All of the audio recordings will be anonymous and stored on a password-protected computer. The Principal Investigator is responsible for the audio recordings and these will not be shared with anyone else. Data will be collected and stored in accordance with the Data Protection (Bailiwick of Guernsey) Law, 2001. You are completely free to decide whether or not you are happy for the discussion to be audio recorded. You can ask to listen to the recording if you wish. Without giving any reason, if you prefer you can request that the audio recording be deleted at any time after the interview, including after the analysis has been performed. The findings from these discussions /

interviews will be incorporated into the eventual final analysis of the pilot project, but all contributions will be anonymous.

What are the possible disadvantages of taking part?

Participation in the evaluation of this pilot initiative requires attendance at **either** a focus group discussion **or** an interview, which will last for approximately one hour (excluding travel time). The total time commitment associated with this evaluation is not expected to exceed 90mins. We anticipate that participating in this project will have no significant effect on your lifestyle.

What are the possible benefits of taking part?

This project will result in the evaluation of a child measurement initiative for Guernsey and will help to establish whether or not this programme will be of significant, sustainable benefit to the local community.

Project funding

This project is funded by the British Heart Foundation Health Promotion Research Group and the Department of Public Health at the University of Oxford.

Ethics approval

The project has been approved by the Guernsey Ethics Committee.

Further information

If you have any questions or would like any more information please contact the Principal Investigator:

Dr Karina McHardy

E-mail: karina.mchardy@wolfson.ox.ac.uk

Phone: +44 (0) 1865 617787 / +44 (0) 79 9088 2721 (mobile)

APPENDIX XXIV

Participant consent form (GCMI evaluation)

Project title: 'The Guernsey Child Measurement Initiative' - Evaluation

Date: 20th December 2010 (version 2)

Principal Investigator: Dr Karina McHardy

Please initial box

I confirm that I have read and understood the participant information sheet dated 20th December 2010 for the above study and that I have had the opportunity to ask questions which have been answered fully	
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 understand that I may request to have any or all of the audio recording of this discussion deleted at any time without giving any reason	
I agree to take part in the above study	

Name of participant: .....

Signature: ..... Date: .....

Child's school / Organisation: .....

Name of person taking consent: .....

Signature: ..... Date: .....

Principal Investigator: .....

Signature: ..... Date: .....

One copy for the participant; one copy for Principal Investigator.

All data will be collected and stored in accordance with the Data Protection (Bailiwick of Guernsey) Law, 2001.

APPENDIX XXV

Sample interview schedule (GCMI evaluation)

1. Do you think that childhood obesity represents a significant public health issue in Guernsey?
2. Why do you think this issue has risen to prominence on the public health agenda in Guernsey?
3. Please describe the existing data on childhood weight status in Guernsey.
4. What do you think are the roles of child measurement programmes?
5. Please describe the Guernsey Child Measurement Initiative (GCMI) in your own words.
6. Please describe the aims of the GCMI in your own words.
7. How do you think the GCMI aligns with recommendations from the Guernsey Obesity Strategy?
8. What are your thoughts on how the pilot programme was conducted?
9. Were you aware of any adverse outcomes affecting any of the participants that arose from the measurement process? Please elaborate on your thoughts or experiences.
10. What are your thoughts regarding whether this programme could be introduced at the population level in Guernsey?
11. What are your thoughts around the feasibility of the time and other resource commitment required to implement this programme at the population level in Guernsey?
12. What are your thoughts on the current feedback process?
13. Do you feel that the information communicated in the feedback letter was clear? What there any information included that you feel was unnecessary or unhelpful?
14. What are your thoughts on routine provision of individual results to parents?
15. How do you think data from this programme should be distributed?
16. What do you think can be done to protect or promote the sustainability of this programme in Guernsey?

APPENDIX XXVI

Table A6: Headings and Themes – 'Utility' (GCMI)

Key: I = Interviewer, IR = Interviewee response, FG = Focus group response

Headings	Themes	Quotes
Roles	**Information**	**I:** What do you think are possible roles of child measurement programmes? **IR:** The first role of it is to find out what we have and then we can start talking about what we do next, but at the moment we don't know other than the measurements you've done and when they're 3½. So I think the first role is to find out what the problem is. **IR:** It's vital really. All the way through from when we very first started people have been saying, 'So, what's the problem?' and we've had to say, 'Well, we don't really know, we have an idea.' Particularly for the children again, you know, this feeling that there's an issue but we've not been able to prove it. …. We can see it, we think, but we need to prove it. So to have some sort of proper statistics, measured that we know is all the children, it goes right across the board …. I think that will make a real difference. **IR:** I think they're not designed to be a sort of GP monitoring system for individual children in that they're not designed to pick up on an individual child. I mean, I guess it depends how it's run and what is offered afterwards, but as a project as a whole, it's an overview of the island. …. But not on an individual child basis, I would say. **IR:** I think it's important anyway because it gives you a baseline. It still gives you an idea of what you're working with. Even if it came in that nobody was overweight it would be fantastic, wouldn't it? We could say, 'wow, we're doing a really good job!' **IR:** I think that it needs to be in the school so that they can look at a child's chart and see what's happening over the years. You can never have too much information.

Headings	Themes	Quotes
		I: What do you think is the biggest potential role of this programme in Guernsey? **IR:** Probably … hmm that's difficult. I was going to say either being able to identify areas of particular inequality, or being able to identify how big a problem we're storing up for the health service in the future in terms of children who are going to become adults who are going to eventually make demands on the health service. I think probably the one about making demands on the health service actually in terms of how things are prioritised within an organisation like the HSSD. **IR:** I think knowing what's going on really, because you can't make progress without knowing what's going on. Getting a better picture of what's going on, of course it's not going to give us every piece of data, the answers, but shedding light on the problem so we can really properly address it and take it forward. **IR:** They'd allow for some planning for what kind of problems we're storing up for the future, or at least to know what kind of patients we might have in 30 years' time maybe or 40 years' time. So it would allow for some forward planning if obesity was found to be an issue in the ages of children that we're interested in measuring.
	Awareness	**I:** What do you think is the biggest potential role of this programme in Guernsey? **IR:** Well, they can drive everything from raising awareness of the individual and the individual families to actually changing policies across the island. I think it just raises the awareness of the issue generally and puts some foundation and some evidence to that for both families and for the school to change their policies, and right through to the State's for putting funding into different issues. It just gives us some clout really, doesn't it? **IR:** I think it can be used to raise awareness as a community at large but also as a political driver for change really.

Headings	Themes	Quotes
		IR: I think that definitely once you've got one source of good data, you can disseminate the results in a way that people can see the value of it. It definitely spurs people on to firstly just have it in their mind that, yes, people are going to be collecting data about this and we are moving; we do want to put evidence against this Strategy. It just keeps it fresh in people's minds. **IR:** I think they can build confidence actually. I think if people around you are looking to help with the right attitude, then hopefully it will build confidence in referring them to the service. And it also raises awareness and it will lead to further health promotion. It raises the profile of the whole thing. **IR:** I think the biggest thing, if we do implement it, will be the fact that we've got a school nurse going in and talking to children, talking to parents, highlighting the issue. I think if that's done that parents will have to think about, 'Actually, is this something that's relevant to me and my child?' So, certainly there's a whole addition of education going on around it that wouldn't happen otherwise. **IR:** I think a way to the adults is through the children, isn't it? Children can be quite a powerful group, can't they? If you educate the children in school, very often the parents are more aware, I think. …. And in some respects, if the parents know their children are going to be measured it might be a trigger to think, 'ooh gosh, he is getting a bit big.' I doubt it very much, but at least makes people more aware of the fact that their children are going to be monitored regularly so maybe they should be considering their lifestyle and keeping themselves healthy. **IR:** I know from my eldest one, we kept saying, she was a bit overweight and we needed to sort a few things out and this [measurement] actually did sort of……Well, she even read the information afterwards herself and asked, 'well, what does this mean?' And I was sort of explaining things to her and she said, 'Oh. So, what you've been saying?' So, we did sort of

Headings	Themes	Quotes
		make her aware as well. **IR:** I think once you've got the results if we're going into the schools and talking to the staff, then you can say, 'How do we make the school healthier?' …. So if they haven't got the Healthy School status, you can be working towards that, so it's that sort of…. <pause> what's the word? Identifying the need and making it clear to them. **IR:** …. you can provide the education that is necessary, rather than the stuff that isn't necessary for that particular population. Obviously, it does depend on the cohort each time; you can't start talking about, you know, weight loss, if you've got children who don't need it. **IR:** Personally I think that raising awareness of the issue, making the whole community aware of whether there is an issue and, if there is an issue, it's a community issue. It's not a school issue, it's not just a medical issue; it's an island wide issue with all sorts of strands to it. I think that's really important.
	Evaluation	**IR:** Yes, it's [evaluation] vital I'd say because if you can't measure it, you don't really know what you're doing in managing it. So yeah, I see that as essential. **IR:** I suppose it would form a double evaluation because the people who are identified and offered interventions, you can evaluate how they do individually, but it would be nice to see that the general populace are also getting the message and those that aren't accessing specific interventions, the ones that are just bordering on a little bit overweight and doing their own thing, it will show whether the message is getting across to the general populace that healthy lifestyle is the way to go. So it would show that. **FG:** I see [evaluation] as one of its key functions. It can't monitor the individual interventions, but as a trend for Guernsey we can see how a lot of money is being ploughed into the Strategy overall. People and politicians will want to see results from that. Yeah, so I see it as very

Headings	Themes	Quotes
		powerful. **IR:** Yeah and you need the evidence-based benchmark to start with, don't you? …. We also spend lots of money on all sorts of initiatives like healthy eating or whatever and by linking up the data we get from this programme to those initiatives, you can actually see which of the initiatives implemented have big effects and which do relatively little and we could then be saying, 'Well, why don't we just spend more on this initiative and ditch that one.' I mean if we found that, let's say that one of the schools has got a much higher rate or overweight and then they have a real, hard go at introducing a healthy eating initiative and it makes no impact, then clearly it's not wise to keep pursuing that. You'd be better off trying something else. **IR:** I think it can work in that way in the same way that some of the academic benchmarking does, that it acts as the ultimate outcome measure but it also acts to make schools look at doing different things because they're wondering what effect it will have on that outcome measure. **IR:** It's essential to know how we're doing. It will also be used in a range of issues to reflect back to people what the size of the problem is and how we're doing. And in addition to the Guernsey-wide view, hopefully we'll break it down into smaller areas and reflect that to a range of people to show how they're doing. **IR:** Whichever way it [obesity prevalence] changes, it is interesting to see how things are developing and whether messages are getting through. And I think you need that monitoring thing, don't you? Because if you're putting forward that maybe there is a problem, we need to be able to back that up at some point, don't we? That actually, we highlighted this concern, this is what we've done and five years down the line, these are our figures. 'cause otherwise it's just going to get lost: you do it once and then you go away. You'd take away its relevance and its importance. …. I think it's very relevant and we're talking about a thing

Headings	Themes	Quotes
		that's not going to change overnight, is it? It's going to be years, perhaps generations down the line before we see anything, but we need to be doing it now. **IR:** I don't think we're going to see any results for a long time but eventually it would be great to be able to say, 'We started measuring in 2011 and 2012 and in 2020, we can actually see a difference; we can see over time when things started to turn around and when they made a difference.' I think we've started to use figures like that for the smoking debate, we are now able to say 20 years on from putting the first funding in, now we can start to see some results and that's very powerful for when we're looking to do the next step …. So, eventually I think that sort of evaluation would be great but I'm not <laughs> counting on see them soon! <laughs> **IR:** I think perhaps if you could demonstrate [outcomes] by setting a target based on child measurement surveillance data. If you could use that to set a target and then by looking again at your data set a few years down the line prove that certain interventions have been a success, then you could justify funding for those same interventions again. Yeah, evaluating how effective it is or what you're doing that's not been effective, in which case you could re-direct funding from that to something else. **IR:** If we're getting differences across schools, then we can start to look at if there are differences in the attitude of schools to things like how keen they are on exercise or whatever. Then we can actually start to try and get the other schools to change and see if it has an effect on levels of obesity longer-term. **IR:** What we need to do is to see if there are significant differences across schools. Ten years ago people thought that Guernsey was a modulus and that there were no differences and the more work we've done, the more we've understood that's not true. There isn't a direct cause and effect, but I would want to be seeing those schools where we know there's opportunities for physical exercise or whether they've signed up to Healthy Schools'

Headings	Themes	Quotes
		initiatives, whether or not that's comparative. **IR:** It's not just at looking at where you are now. It's about using that as a reference for down the line.
	Justification	**IR:** It's about credible proof particularly for our politicians. Yeah, that would be the main thing. …. we need to be able to say, 'This is the problem.' I think a professional will know, but for lay people and politicians we need to actually have some proof and they always want statistics, which we've not been able to give them. So that would be the main one I think: giving us some sort of credibility and the reason why. **IR:** We can't go to politicians and the general public to ask for tax payers' money to spend on various supportive programmes without saying, 'It is because we know or we can now make a very informed assumption as to the levels of obesity.' We can't continue to say, 'Well we're likely to be like the UK.' It's very likely we are, but I think if we can actually justify why we're asking for the money and then show them that we're seeing …. then we are fulfilling the role of serving the public. Oh, it's all getting very patriotic now. **IR:** It gives you a good research base because our practice is based on research, so it makes it very … what's the word? It provides justification for it, doesn't it? It provides evidence and also it will help justify the roles of the jobs, the people who are actually doing the interventions and being proactive in helping it. So it proves that we do need that service. Otherwise it's almost like us saying, 'well, we've noticed a few of them are a bit plump.' It's not quite the same. This gives it credibility is what I'm trying to say. **IR:** I think it would back up the need to have the support systems in place and it would validate the role because if you're saying, 'Right, this percentage of the population we know are struggling, therefore this is why we should put our resources into this area.' Then we can actually do something constructive for them rather than just hitting the baseline targets, just

Headings	Themes	Quotes
		going for the seriously obese children. Yes, you've got to deal with it on a one-to-one level, but then you've also got to have your other children looked after. You can't just go for the high level ones. **IR:** But it does provide you evidence that you have got more of <pause> a weighty issue. So that's one good thing about it; it provides the statistics and the evidence that you do need the services to help people with the weight issues. That's the good thing about it: that it will provide the evidence that yes, we do have an issue that's either increasing or we're doing all the right things and it's decreasing. **IR:** Well, I go back to this bit about having some credible figures that are local; something that we haven't got at the moment. I think the biggest benefit will be that we won't have that vacuum now. We'll have some actual real statistics to back-up what have been for a long time our concerns and our thoughts and possibilities, but this will actually give us some actual real figures.
	Platform	**I:** What do you think a child measurement programmes can contribute to Guernsey? **IR:** I guess this can be massive. You can start small and help an individual school or the Education Department, but hopefully it will also feed into a whole range of other things. It might help to develop health policy; help to develop education programmes; help to then look at the monitoring and evaluation of where the work is going. …. So you can take it from the smallest factor of a family right up to population strategy, I'd have thought. **IR:** I think the programme is the driver for us to make decisions about the other recommendations. I see it as the basic tool. Lots of things in the Strategy were directly extrapolated from the UK and we just made these assumptions about what's happening to our children here, but we need that base level of understanding in order to drive all the other factors really.

Headings	Themes	Quotes
		IR: It's a good starting point isn't it? It's somewhere to set off from to begin to build a framework around but not to be too entirely focused on school being the only thing to think about. **IR:** I suppose you'd have your figures, but then you'd actually be putting interventions into play as well, and then see whether those are working. If you highlight that you have so many overweight children and we have the facilities to actually help them address that issue, then that's brilliant. But if it's just going to get us figures, if we just say, 'Yeah, we've got this many fat children,' and we don't do anything about it, then it's not worth doing. **IR:** This is the big issue. We've got some stats and I'm sure they're very well put together, there's no doubt about that, but they do raise more questions than answers and we just open up more and more possibilities. That's the danger I think and I'm only highlighting it as a danger.
	Intervention	**IR:** I think they can have a couple of different roles. One of them is purely for surveillance, for observing trends, and another is for identifying children who might need treatment or to be targeted for treatment or advice or that kind of thing. **IR:** I think it does have an effect. It has had an effect certainly among young people and there's evidence that shows that asking the question does actually have an impact in terms of it helping reduce smoking. And I think that asking or making people aware of issues around obesity is the first step toward making people address those issues, especially parents for their children. **IR:** I think there is going to be an effect on those parents who've asked for the result. They'll get a letter back saying, 'Your child is out of the range. You can see the school nurse.' On an individual basis I would hope there is some impact. **IR:** Clearly there's a conversation about giving personalised data back to individuals being an

Headings	Themes	Quotes
		important intervention in itself, but I'm not sure how important that is. **IR:** Well, I think we've got to be very careful not to say, 'Right, what we'll do is we'll monitor then we'll send you off here, there and everywhere and we will be able to solve your problems.' I think there's a danger that parents and even departments might say, 'Well, you're doing it.' By monitoring somehow that leads to a reduction in obesity levels <chuckles>. I think we've got to be careful to say that this is merely a tool for us to identify a problem that then needs to be tackled so that you don't find people going, 'Obesity: tick.' And I think that that would be one of the major things that would need to be highlighted.
	Knowledge gaps	**FG:** The programme would identify the ones that haven't actually been identified as needing a medical intervention or a health promotion intervention. It would identify that. **IR:** If you've gone in and carried out this programme and then you've got your results, then you see what you're working with because at the moment we're only working on perception. We're only working on what we can see and it's not proof really. You look at a child and think, 'That child's a bit plump,' but then that's not really a very good way to practice; there's no research in that. Otherwise I think you'll look at a class of people and think, 'Well actually they're all OK,' because I think that's what we do. **IR:** I think it could be a very interesting window on inequalities and a window that we don't currently have because we can't really quantify it at the moment. We know kind of intuitively that there are inequality issues but we can't actually quantify that and I think if we were happy to use these BMI results as a window on that, that would be a really useful tool. **IR:** I think that comes about because it's the one bit of demographic data we've got. We've just got age and gender and school in that so you start to then look for, 'OK is there an effective school? Does it make a difference?' If we had something else like, for example if the study had measured parental income, I bet we'd be saying lots of other things about that now.

Headings	Themes	Quotes
		FG: Well, like I say, it [the measurement result] is there. I don't think you need to particularly do anything with it, unless there is a problem, and then you flag it up. I don't think it is something that you need to keep giving us information on – not every individual. **FG:** And it is probably more ideal for the doctors and things like that to monitor as well. I don't think we need the names of the children, unless there is a problem. If there is a problem, you or the teacher can then get in touch with the parent.
	Local level	**I:** What do you think is the role of having local data on the issue? **IR:** I think it's very important because [using UK data is] what we've had to do so far. That's all we've had to go on. We are basically saying, 'We think we're like the UK because we're like the UK for lots of other things,' but we're not like the UK for some others, so to be able to have our own local version is really important particularly as we're putting all this money and time and effort in. If it was some small project somewhere then we do just take the UK and say, 'Well we're similar,' but this is a big issue. Lots of money, lots of people, lots of politics …. We have to convince particularly a lot of the local politicians who will say, 'Oh yes but this is Guernsey.' So to be able to say, '*This is* Guernsey, *these* are our figures.' **IR:** Oh, [it's] very important because then there's no getting away from it. I think it's very easy, if you're looking at something in the UK, to think, 'well, you're tucked away in nice little sunny Guernsey, it's not a problem'. But actually I think parents will take notice and they will look and think this is a local problem, it's not just confined to the UK or elsewhere. This is what we've got here. So I think it's happening, it's very real, isn't it? **IR:** I think it's really important because I think it's a more powerful and persuasive point if you can actually talk to people about their own population. I think if you're talking about data that's not been collected locally there's always a chance that people might think, 'oh well that might actually not be the case for us', whereas if you can present them with data that is

Headings	Themes	Quotes
		definitely derived from the children living on the island then there's no arguing with that. **IR:** The qualitative feeling is it's the parents and the politicians because otherwise people may not think it applies to us. And not only both groups but also staff. It's also a question about staff taking it seriously. **IR:** Yeah, it does, and especially for some of the parents it will be more relevant to them that it's a local fact rather than it's something from London or wherever in the UK. **FG:** People like to think that Guernsey's very separate until it's easier to use the UK figures. If you look at lots of our other health issues we are basically the same as the UK, you know? But we do have some differences. Things like our skin cancer rates are different because of where we are and things like that. **FG:** Plus the demographics are different. I mean we are an island and we don't have a huge ethnic population or anything like that. **FG:** It's [obesity] increasing though. Some are wealthy, some not, we do have our poverty, and I think being able to prove a local picture makes more sense. **IR:** There's no reason really why if we can get the funding and the support that we can't then collect our data. The more localised we are the more accurate we can be in delivering our services and targeting, because we've obviously all got finite resources and we all want to make sure that we're actually putting those resources in the right direction. So we can use a bigger picture if that's the best that we can do and that's pretty much what's been done so far, but we've got this opportunity now rather spend the scant resources in the right places, that's where I would suggest that this is ideal.
Feedback	**Utility**	**IR:** I'd quite like to be able to give every parent the results. I think there will be quite a number who haven't asked and perhaps should have them …. one of my plusses would be that it's

Headings	Themes	Quotes
		an education event as well. If they don't get the results back then I think they lose out on that aspect of it, but I also recognise that that's a huge, big thing on its own if you're sending back 1200 odd results to all these children and making sure the right results get back to the right parent and all of that. So, the logistics …. but from an education point of view, I think parents should get the results back. What they do with them is then up to them …. but I think it would be good if they did actually get them. **IR:** It would give parents knowledge of where their children were and in particular where their children weren't at a physical level and potentially giving them the opportunity to think about how they're going to manage that if it's seen as an issue. ….. It is an intervention, yeah. **IR:** I don't think sending someone out a letter saying that your child falls just over the threshold that puts them in the obese category is really managing it very well. I think it's a very reactionary way to hope that it will put people on the right path. It just seems to be quite inflammatory without offering any practical support about how to take steps to alleviate the problem …. I'm sure there are individual cases where actually parents have received the letter and thought, you know, that's been the push that they've needed …. But I would imagine that in the majority of cases it works in the reverse, that it just worries people without giving them a solution about what to do. **IR:** I think as long as we keep conveying this message that it's not designed to be an individual programme. If you go down the route of letting parents have, whether by request or routinely having their results, as long as it's emphasised that this is an island wide initiative - it's not designed to be an individual thing - I think it's very clear that parents can't expect to have anything more than a guide.
	Fulfilling obligations	**IR:** I do think parents - if we're collecting data - have a right to then have that data on their children if they so want it.

Headings	Themes	Quotes
		IR: I've thought about this and I haven't come to a definitive answer about the feedback process because I think it sort of depends where you're standing. …. if you stand back and think this is an island wide initiative, we're not looking at individual children so there's no reason why they [parents] should have them, there's no huge benefit to them. But as a parent I can still see that maybe I would want the reassurance that I was doing things right or the evidence that I was doing things wrong. I think it's going to vary hugely and I don't know how you resolve that …. I think it's a huge amount of work to give results out to everybody with very little benefit but if you take that opportunity away from parents I'm not sure that's ethically right either.
	Protocol	**IR:** I think parents might struggle with the concept of BMIs because I know professionals do …. I think it [the feedback letter] was fairly obvious wasn't it? I think it's fairly clear because you've directed them to other people, which is what you need …. I think living here then people are able to contact nurses very easily. I think it's very straightforward and I like the idea of the web sites because that directs them to other areas and they're so computer literate, that wouldn't be a problem. I think that's good, I think that's fine actually. **FG:** I think [the letter's] good. I think if you've got parents out there that may be concerned about their child's weight, be it under or overweight, I think it's very satisfying for a parent to know that there's that protection there; that somebody else isn't going to be privy to your child's information. So yeah, I think that's really important. I thought that was good. **FG:** I thought it was hugely appropriate because I couldn't really make my own mind up about whether it was appropriate to have the results or not, but the way it was laid out in just a very simple straightforward mapped way. If we're going to do it [feedback], I think that's a really good way of doing it, without any words of condemnation or judgement about it. It's very simply laid out. **FG:** I think that's good. It's nice and clear, nice and simple, there's an explanation there, and

Headings	Themes	Quotes
		being a parent myself, I wouldn't be offended by any of that content at all, be it good or bad. No, I think it is fine. It's good. **IR:** I think [the approach used] was good in that that fitted that programme. So I think if parents wanted to know, they could know, which was excellent. I think my difficulty would be if we identify a child who's definitely overweight or obese … I think they have to know, but I think there's a way of telling them and I think there may well be problems because letters have been sent out saying to phone if your child's fat, which isn't the way to do it. There's definitely a better approach because I think if you go in with that sort of rather hard approach, you're immediately putting backs up and they aren't going to work with you. **IR:** I see your point on not delivering it as a matter of course, particularly in terms of resources and that side of things. I guess it would be important to pick up data, all the data would obviously be fed through to the representative school nurse who would have the ability to transfer that data to people who haven't necessarily requested it but perhaps it would be of their benefit to look further at it. So, I guess as long as data not going back to parents doesn't mean that the children who need to be picked up are missed out. Does that make sense? Then I guess this [approach] would work. **IR:** And it is probably more ideal for the doctors and things like that to monitor as well. I don't think we need the names of the children, unless there is a problem. If there is a problem, you or the teacher can then get in touch with the parent. **IR:** I think it would be a good idea to make the information available on request, but I think that it should really be kept as a surveillance programme and not offered routinely because that kind of takes you into a different set of issues with parents I would imagine …. and from the little I've picked up about parents' reactions to the Child Measurement Programme in England, I think that's probably a better way to do it than just blanket sending out results.

Headings	Themes	Quotes
	Unintended harm	**IR:** I can see that once you've sent that piece of paper, you have no control over the parent's interpretation of that letter. An articulate parent may interpret it very differently from somebody else who maybe doesn't have that level of knowledge or understanding. And yet obviously you have to have some sort of a standard letter but you've then lost control of how that's interpreted and so therefore that can sometimes not be helpful. Some people might act very responsibly on the results that they have and others not so. And also children talking, comparisons made and I think there's potential for a lot of harm there. **IR:** One of the issues then is, of course, restricting potential harm if we were doing [feedback] and again this is where some of the research you've got has been useful. You can imagine untoward harm from saying, 'Well, where was Johnny?' **IR:** I think that's got to be treated with care, how that information does literally physically get to a parent needs to be quite carefully monitored. …. it would be so important to look at being able to transfer that information perhaps face-to-face and not through a piece of paper that goes in a school bag …. Yeah I do I think that's very important, because it's a mean old place in a playground. **IR:** I think I would be worried that the programme, if it wasn't treated sensibly and full information conveyed to children and parents about what was going on, would raise the issue but not address the issue. **IR:** …. there's not an established support system yet. There is a support system with the school nurses and GPs but it almost hasn't been developed onto the next stage yet so I found it quite hard to visualise where that's going.
	Knowledge gaps	**IR:** You might argue where's the evidence for that feedback doing things and I'm not sure yet. I don't know the standard of evidence and whether other research is required on that. I mean the assumption is brief interventions make some difference in smoking and adult obesity

Headings	Themes	Quotes
		where we're now pushing brief interventions. …. I think what we're saying is, we give people the information where they can think about what they do. So the question is, 'Can we afford not to intervene when our judgement is it's more likely to be beneficial than not if it's done in the correct way?' And that's at the moment where I am at but you'll get other people with a different view. **IR:** I'd want to see some actual data that indicated that telling people in the general population, 'Look, you're all fat, do something about it,' actually results in some change because if it doesn't, then there is no point us putting it out. …. unless you've actually got some data [to say] that changes behaviour, it just makes people feel bad. You'd be sacrificing your uptake rates for the next year for what purpose? **IR:** Yeah, I'd be interested to know about that. The advantage of routine feedback letters, I can see some advantages, so yeah. I don't know what the evidence is one way or another …. I don't know and I'd be interested to know.
Outcomes	**Information**	**IR:** I think just getting the results is the biggest; I think actually having a picture of what's going on out there is basically the important thing. **IR:** Annual statistics on the BMIs of children in those specific age ranges and on-going statistics of comparison that we can see the progress forward … I think the programme is the driver for us to make decisions about the other recommendations …. It's a tool, I see it as the basic tool. Lots of things in the Strategy were extrapolated from the UK and we just made these assumptions about what's happening to our children here, we need that base level of understanding in order to drive all the other factors really. **IR:** Obviously the aim of the Obesity Strategy I think is to reduce [obesity] but you can't do that until you've measured it.

Headings	Themes	Quotes
	Awareness	**IR:** I think we don't know what the nature of the problem is until we know what the nature of the problem is. **IR:** My overall aim would be to halt and then reduce obesity. So you'd be doing well if you actually halted it to be honest let alone… <laughs> reducing it. So I think initially you'd be raising awareness; you'd be educating and gradually, hopefully, you'd see a halting. But I think if you raise awareness; if you can give regular messages out; if the nurses are on the case; that could help.
	Evaluation	**FG:** I think its only value is if it helps guide our initiatives and enables us to show whether those initiatives which have as an aim to reduce rates of obesity, are effective. If we can use it for that, then it's valuable. **FG:** So perhaps you see its principal role as an evaluative tool? **FG:** Yeah. If it doesn't guide us to do that then, whether we get 100% uptake or 0% uptake, it isn't helpful.
	Acceptability	**IR:** I think all it needs to deliver is having a high uptake rate because in some ways what you find out about the weight status of the kids is immaterial. If you'd come back and said that the majority are in a healthy weight, that to me is still valuable to know. So I think it's important that we separate our concerns about the results with the question of do we value having a population surveillance tool? And I think, yes, we do. So I think making sure that people participate in it and it's well received and that we handle the data in the right way is all well and good, but I think the main thing is that we actually get people agreeing to be weight measured. **IR:** …. good uptake; good coverage; good feedback from parents so that we don't end up with problems from that point of view …. and, in terms of side effects, that we don't end up with

Headings	Themes	Quotes
		any bullying; we don't end up with any untoward side effects as a consequence of this.
Alignment with Guernsey Obesity Strategy	**Justification**	**I:** Do you think Guernsey can achieve the aims of the Obesity Strategy without measuring local prevalence of obesity? **IR:** I think they'd be incredibly lucky if they managed to, because they would have nothing to pin it on. You'd be essentially giving out health messages but with no research behind it, so why would people listen? It's way too vague. I think to be credible you've got to have good stats to work with and evidence is what you need. **I:** How do you think the GCMI can contribute to the Obesity Strategy for Guernsey? **IR:** I think it is probably the best argument that we can have …. I think people are always quick to say, 'Oh but…' but if we've got answers to the 'but', then I would say that this is probably one of the best justifications of using the money [for the Strategy] that we will have…. **IR:** We're going to struggle to get the money without much more backup, because we have to fight through The State Strategic Plan process. And for Phase 2 it would help to have some quality data in there to say, 'This is why we need to do it.' And so if we haven't got that, they will be saying, 'Well you've got Phase 1 money, why do you need any more?' **IR:** We have to have this sort of data in order to justify training and supporting those sorts of programmes. I mean there are a whole range of things that we have to have data like this to justify and to basically evaluate what we're doing. **IR:** Well, I think one of the major problems in putting together The Obesity Strategy was the lack of data …. we can't give any sort of accurate picture as to the levels of obesity. You need to be able to speak from point of fact rather than a point of fiction and I think we've always struggled with that right from the beginning. And the next stage on from that is, 'this is where we believe or estimate levels to be and this is where we'd like to go to'. So then we haven't

Headings	Themes	Quotes
		even got a vaguely detailed picture <chuckles> of those two things. So, in terms of evaluation and accountability, we know that we need to do these things, and how are we going to do them in any sort of effective way without data collection?
	Platform	**I:** How do you think that the GCMI might contribute to the Obesity Strategy for Guernsey? **IR:** It is a really good starting point to addressing one of the recommendations which is brilliant, which will then feed in to lots of the other recommendations. I think unless we do start to collect data we're throwing money away really, because we don't know whether we're spending it in the right way and we can't tell. So I think it is key, yeah. **IR:** I think it just meets the needs of the Strategy absolutely. I think it measures very nicely with so many of the recommendations. It forms a solid basis from which lots of other strands can come out. …. We can carry on doing parts of the Strategy in isolation but we don't have that basic foundation of statistics to have a benchmark, a starting point really for the work in schools. **IR:** I think it's a crucial bit of information that we lack at the moment. It's something that will drive the way forward for the whole Strategy. When you look through the Strategy, we've tried to cover everything from antenatal and young children right through to the elderly …. and also for schools to think about their policies. So, I think right from the individual and the family focus right through to the State's policy, I think it's a crucial bit of evidence that we need. **IR:** Certainly in things like the Healthy Schools Programme - obviously it has a role in backing up why we should continue to do that. …. So I think to back up initiatives like that would be good. …. I don't think there's many of the recommendations actually in the Strategy that this won't back up.

Headings	Themes	Quotes
	Evaluation	**IR:** The measurement programme is one of them [recommendations] but what we wouldn't be able to do without a programme is monitor how we are doing and thereby adjust or calibrate the Strategy. In many ways, it's got to be a long-term situation of monitoring the problem in the population, so that's what it would contribute. If we didn't have the programme, it would impair us in doing some of that really, so we wouldn't know how well we were doing. **IR:** I think lots of the parts of the Strategy …. [have] been done with the very best intentions, but we don't have anything to mark it against so it's a great starting point and it's a great thing to run alongside. We think we're going down the right route but we don't know.
	Fulfilling obligations	**IR:** I mean it's in the new sort of constitution of the Obesity Strategy Group; it's their role to commission data about obesity. **IR:** The Strategy itself wasn't particularly prescriptive, what it says is that we should investigate looking into a child measurement programme, so I can't remember exactly what it says but it didn't lay down any guidelines about who we should measure or when or anything like that but just that we needed more statistics, we needed more background and that we should look into running some sort of [measurement] programme.

APPENDIX XXVII

Table A7: Headings and Themes – 'Pilot Programme'

Key: I = Interviewer, IR = Interviewee response, FG = Focus group response

Headings	Themes	Quotes
Obesity	**Impact**	**I:** Do you think childhood obesity represents a significant public health issue in Guernsey? **IR:** I do think it's a concern. I think because we're a microcosm of the UK and because the stats are coming through so clearly in the UK that there's a problem, I can't believe it's not the same here. We're a wealthy island so there's a lot of access to all sorts of food. <laughs> There's an awful lot of things which will impact upon their style of living which could lead to obesity. So yes, I do think it's a problem. **IR:** I think it's quite a significant issue. So from my point of view it's been an issue for a while and I wrote the first Strategy really based on the UK, there was a report from the Parliamentary Committee, and so we basically took their report and looked at it and how relevant was it for Guernsey and felt that actually most of it was relevant for us. So as a public health issue, it's been something we've highlighted for a long time… **IR:** I don't go into primary schools that often and when I do I am really quite shocked compared to my memory of children in primary schools, going back to years ago. The numbers that I can remember were that it was actually unusual that there was any child that was visibly overweight or obese, whereas now it's so common that; in every class, there's more than one or two; it's lots. **IR:** I would say based on the information, the scant information that we have got that, yes, [it's] an issue that needs addressing. …. certainly from what we know so far – yes, definitely worth the input that we'll try and put into it. **FG:** I suppose that I would have a couple of children in my class and one in particular that, if I

Headings	Themes	Quotes
		was her parent, I might be concerned. **FG:** I don't know if it is a *significant* issue, not at this age I wouldn't have said. I would have said they [overweight children] are few and far between. **FG:** Through the whole school – of 500 children – between us, we could probably pick out, in each year group, the children that you would think might be a little on the overweight side. **FG:** Yeah, so a handful of children, I would say. **FG:** I think I saw it more obviously last year when we had some children who struggled to do the physical activities that we asked them to do. It does depend on the cohort, really. I mean, yeah, there were some very large ones last year, who couldn't join in as everyone else did. **FG:** It doesn't seem to be a big issue in this school anyway. Whether it is different across different schools …. it is just the odd, the odd one or two, isn't it? **FG:** But it was significant last year… **IR:** Well we wouldn't really know at the moment in honesty because our sources of data for children, particularly around obesity, have been really problematic. I don't actually have any statistics on the weight status of children in Guernsey. [There] are two theoretical sources of data about children and children's weight status, but neither of those are actually available at the moment. **FG:** I think it's the subtle ones as well, don't you? You can see the really big ones easily, but it's the ones that are coming up to being overweight and obese that are really hard to identify because your perception changes because it's a big group. **FG:** There is definitely a bit of a mixture. I would say it is probably not as bad as it is in the UK actually. There is a lot more sport stuff and a lot more outdoor stuff in Guernsey. **IR:** I think they probably are but we have no evidence to prove that at the moment, so it's just

Headings	Themes	Quotes
		an assumption and really extrapolating from the UK. So I think it's an important issue for us to explore whether it is a problem or not. **FG:** I think we are identifying more arriving in Reception, so the weight issue is increasing maybe. I mean statistics show that in the UK and I think we're very similar. I wouldn't say we're any worse or any less; I think we're probably on par with what the statistics are showing in the UK. **FG:** And I've been teaching here for 7 years and in England for 8 years so, in 15 years, I would say that in each class I thought I only had a couple of children that were overweight.
	Outcomes	**IR:** I think we know that we're going to get overweight adults and therefore, we're going to get lots more diabetes and heart disease. The bit that always strikes me actually is the cancer, links with weight and cancer and I don't think many people do realise that. And joint problems, arthritis, all the horrible things that come with particularly obesity, but the fact that lots of people are overweight are therefore on their way to being obese, I think from a public health issue, that's where we see it leading and the more I've found out about this issue the more I think, 'Actually this is a huge issue and if we don't do anything we really are going to be in trouble.' **IR:** Well, we're again following a similar sort of pattern to anywhere else, in terms of levels of diabetes, heart disease, those sorts of things. And I think we're looking at probably more and more issues such as time off work and therefore productivity. We're looking at issues where people are starting to claim more and more in terms of benefits and those sorts of things. So those things are compounding and I think we're getting to a state where children and adults are beginning not to be able to enjoy their lives as much as they want to and achieve their potential and I think more and more people are finding that. **IR:** In the long-term it's going to lead to a range of health problems that we want to prevent,

Headings	Themes	Quotes
		both mortality we're talking about and also the morbidity, including both physical and psychological effects associated with it. In addition to those effects it will also indirectly affect the wider community on a range of things we can't invest in if we have to put a lot of our money into obesity. **IR:** <Laughs> Finance. Most likely, long term because if you're overweight or obese you're much more at risk from all sorts of health issues we know, which are long term health issues; diabetes, blood pressure problems, all these types of things which will make you ill but at a low level ill for years, so chronically ill, and obviously funding has to come from somewhere for that. But the quality of life would be my main concern. **IR:** It's a long term view, so they could be coping very well being obese or just overweight, they could be pottering along quite happily but it's the long term. As they get older it's going to have an impact on them, then you've got the undermining, the bullying, the teasing, you've got that aspect as well. So there's lots of different issues coming in.
	Justification	**I:** Why do you think obesity has risen to prominence on the public health agenda in Guernsey? **IR:** I think it's the UK obviously started this programme before we did and so we're jumping on the back of that. I think the word obesity is quite frightening for the community at large. There have been lots of discussions about whether it should be an obesity or just a weight issue. But I think, for Guernsey, it's jumping on the UK band wagon about obesity. **FG:** We follow what the UK say and do. **FG:** So, with the UK government making more noise about obesity and long-term issues of obesity, it's higher up the agenda, isn't it? **FG:** Yeah, higher up the agenda now, and with the Obesity Strategy also being written locally, people are being made more aware of what's on offer, what's not on offer and the long-term

Headings	Themes	Quotes
		issues of obesity. And also the media: because of the UK government making more noise about it, it's been in the media. We get the UK telly and everything so I think the public are more aware of the issues, long-term issues as well I think, because of all of those things. **FG:** It's being proactive, isn't it really? I think the flavour of attitude towards health services become more preventative and proactive to prevent these problems because it's cheaper in the long-run. **IR:** Well, one strand will have come from the fact that it's risen to prominence across the UK and then we tend to track the patterns that happen in the UK and globally. That's given rise to that. We have come to an era where we've actually managed to get a Strategy into the State and approved by the State …. All of that lends itself to allow us to then actually make some progress which I think quite a lot of people have wanted to make for some time, but it's taken documents such as a Strategy to actually push it to where it needs to be in terms of gaining the recognition. So those are two reasons and the issue continues to grow I think.
Aims	**Feasibility**	**I:** What do you think were the aims of the pilot measurement programme? **IR:** OK. So it's a researcher coming to look at the feasibility of us implementing a child measurement programme. So the idea is that we've tested out how it could work if it was implemented, whether it's possible; what the practicalities might be. **IR:** The idea was testing about the feasibility and acceptability of setting up a surveillance programme in Guernsey. It was less about feeding back to individuals, it's more about population. **IR:** A programme to determine effectively the costs and benefit of measuring child BMI. That is the confines of it, isn't it really? And I suppose the feasibility would be good – can we put feasibility in somewhere? <Laughter> Feasibility – that's probably quite a good word. Effectiveness? No, not effectiveness because it's the process, the feasibility and the process

Headings	Themes	Quotes
		of measuring child BMI and the on-going… I want a better word for usefulness, the on-going usefulness of the data.
	Utility	**IR:** The idea is to firstly have a look at what the data's like, but also more broadly to evaluate the reaction of the HSSD to this data and what they do with it. **IR:** Initially, we thought it was just that we would know how many overweight children we've got, but the more we've looked at it, we've seen how useful it's going to be for other things. Perhaps that's broadened my thoughts because I think so many times we've gone into meetings and talked to people and said, 'Ah yes, but we're doing a child measurement programme and now we'll be able to tell you these things,' and realising lots of other people will be interested as well. **IR:** Three things, one of which is clearly that it's feasible and acceptable to local people in the way we're doing it. The second one is about, and I'm not sure if we'll answer this question, but the desirability of parents to have data on their children at an individual level that is relatively robust …. And the final one would be: who can do those measurements in the most cost-effective way if we're going to scale it up?
	Information	**IR:** My understanding is that the whole pilot programme was designed to take a pocket of the Guernsey population as an example of how the statistics would be gathered from two schools and then rolled out in order to measure children to get an island-wide perspective of the weight of children, the BMIs of children. **IR:** We did it to find out if Guernsey compared to the mainland both in terms of obesity and overweight, so whether the same issues were here as for the mainland. **IR:** The aim was to generate statistics about the school age population of the Guernsey population in schools.

Headings	Themes	Quotes
		IR: I guess the key question is, should we have concerns? Do we have a problem in Guernsey and what is the scale of the problem? **IR:** Each child was individually measured and weighed …. that information goes to a database and you can see across the year how things are fluctuating in their weight and in their height. That way you've got some information to see which are the overweight children.
	Acceptability	**IR:** …. just seeing if it's doable, if the schools would accept it, if the general public would accept it, and get a general baseline idea of how it would work or not work. I think is the way I saw it. The fact that actually the main thing was whether it would be acceptable, whether people would actually agree to doing it and actually participate I think is also a key thing. I think quite a few people, not everybody but at some schools, have heard about the measurement programme in the UK and the bad press that has had. So I think it was trying to sell it. Whether it's something that would happen, whether people would accept it and whether it was worth doing and continuing. **IR:** I'd be quite interested to know from the schools' point of view their real thoughts about it. <laughs> …. You know, how disruptive or not they felt it was because if it really wasn't too much of a chore for them, that will soon go around the other schools because obviously all the head teachers meet each other very regularly and all the staff know each other. I'm sure it was very positive, but I'd like to know from their point of view about that. **IR:** I'd like to hear more from the schools about how useful they found it. …. I would like to make sure that the schools are comfortable. So I'd want to hear how useful they found the programme and if they were comfortable with it and everything. I wouldn't want us to go through this process if they found it difficult or if it created problems.
Outcomes	**Feasibility**	**IR:** I thought it was done well because I think we were informed very clearly all the way through of what was going to happen and I've certainly got written evidence of everything; the

Headings	Themes	Quotes
		planning; how it was going to work; how it was going to fit into the schools; so I found it was good. It was well paced; it wasn't trying to do too much. I felt, 'OK, I've got a whole morning to do this and that's manageable,' whereas if it had been rushing through I don't think it would have been effective. So I think it worked fine actually. **FG:** For me personally, I thought it was all nice. … I think communication is key and obviously you've given a lot of support to the parents beforehand. …. So I think it went really smoothly, I really enjoyed the morning. We had the staff to do it, and I think that's key if we're going to carry this on, because I can't see how you can do it if you only have one person on their own. It just wouldn't work for the amount of children that you'd have to do. **IR:** I think it's been really easy from our point of view and really interesting to find out all the things that were done. And the actual practicalities of it all have just been really good. **FG:** I didn't feel in any doubt about what I was doing. I understood it, which was good, and I got hard copy to refer to so I knew what was going on, which was really helpful, 'cause sometimes you do feel a bit adrift and things are going on and you think, 'now do I know what's happening or not?' But I thought this was very clear. **FG:** Yeah, I think that was key to why we enjoyed it so much. **FG:** Yeah, 'cause it was all organised. It just went smoothly. **IR:** I think I had a vague idea of what [the programme] was but I certainly didn't know anything about the details or how it actually would look in practice. I had this sort of vision of when I used to go for my TB injection at school that it would be something like all these children lined up and done in one long line. So, the practicalities of it. Yes, that's certainly changed my perceptions and ideas of how it really works in practice and also some of the uses of the programme. **IR:** I think it answered those questions that we as school nurses were worried about. Like what

Headings	Themes	Quotes
		happens when we have identified the children or communicating with parents about weight issues, things like that: How was that going to be done? I think that was a big worry, just within the school nursing team, as to how it was going to be handled and what was going to be done with the information and the data. But I think you answered those questions and it went well.
	Engagement	**IR:** I think there was every opportunity to engage with the school, the schools are very supportive about acting as a bridge, putting it in newsletters and things like that so the families should have been reassured by the fact that the school were quite happy for it to happen in their school. I think that was a great thing. The parents had every opportunity to ask questions, to contact people directly or to go through other avenues. So, if there were concerns, it was just because it's something new. **IR:** I think the communication was the key thing. The working together with professionals already accepted by the school was a tremendous help so the school nurses that helped on the project were people known to the school already, so that helped to act as a bridge. Communication right down the line from communicating with parents, with the schools themselves…. **IR:** All the things like the letters that have been going out and the parents' evenings and all the things that have been put in place to make sure that everybody knows and everybody's happy with everything; I think that's all been really good. In fact, I think it's almost worked slightly to the detriment that we've almost raised some fears that actually are not there. You've been so good about saying to people, 'We want to tell you all about it beforehand, and are you worried about it?' It's almost said to people, 'Oh should I be [worried]?' <laughs> When some of the other things we do to children in schools are much worse and yet parents just take that as par for the course, so I think if in the future we perhaps wouldn't be as worried about what they were going to worry about.

Headings	Themes	Quotes
		I: What is your overall reflection on how the GCMI was conducted? **IR:** I think we can call a success. What was key? I think certainly the fact that we had two very good schools, so hopefully that was part it, that the schools were willing to do that. The head teachers knew you well before you went in and the people that you've worked with in the unit and things like that and the school nurses. **I:** What do you think led to the change in perception around the programme? **IR:** Very coherent, clear arguments and some of these things are down to individual personalities aren't they? ….The other thing that was also perhaps quite important is your work with some of the other units who were very, very sceptical. They're on board now but it took a lot of persuading to get people on board and clearly some of your work was really important there …. I think there's naturally some resistance, but you've won everybody over.
	Impact	**FG:** There was no disruption. They just went out and came back. <laughs> **FG:** It didn't impact on our school day really, so that was a bonus for us. <laughs> **IR:** I thought it was brilliant. Very, very good quality data from what I can see and better than anything that we've had before. **IR:** The fact that we could prove how streamlined it could be obviously meant that we got the results out quickly but it helped make it a positive experience for the teachers. I think that they could see that we weren't imposing it on them, that we could just fit in with their daily routine really. **IR:** I think it will have answered a large number of the questions, I think inevitably not all of the questions though, because we've got two out of the primary schools. Yeah, inevitably there are other ones who would have some sort of issue possibly. But I think it goes a long way to answering probably the main central questions ….

Headings	Themes	Quotes
		IR: I think that it has been really useful so hopefully we'll get some robust answers and that is important for me in this area, that we're able to evidence what we're doing. So, it's been a really, really important initiative and I hope we can continue the collaboration. **IR:** Yeah I think it was good, I think we managed to capture a lot of the students which surprised me; I thought there might be more absences, which there weren't, so that was good because I was afraid that we might come to do it and find lots of them didn't turn up for it. So I think we did well at catching them. **IR:** It seemed to run pretty fast and easy….
	Protocol	**IR:** I didn't know what to expect, I must admit, but I did really enjoy it. I think, as I said, it goes back to having the right numbers of staff to cover and everything had been organised and that was the key to it I think. **IR:** I really do think the pilot programme has been fantastic. It has been really easy for us, which has been wonderful. And also what's been really good is about how professional it's all been both from the school's point of view and the parents. I think they've been really impressed about how it's a professional person coming in, it's not just somebody's doing it in their summer holiday project. This is a real, proper, research project and it's being done properly. **IR:** I think it's been difficult because, not difficult - it hasn't been difficult at all - but the fact that it's somebody from outside coming in, that's always a barrier isn't it? But that was obviously something that couldn't be improved on anyway, for a pilot. **IR:** I had misgivings I suppose, but only because I'd been talking to school nurses in the UK about how much fun they hadn't been having with the NCMP, and the concerns about the after-effects, the letters that were going out and the results of upset parents when they're being told that their children are fat or obese. The phraseology of the letters that were sent

Headings	Themes	Quotes
		out in UK was quite offensive I think. They didn't mean to be offensive but it was taken that way by the parents. And those were my misgivings and my worries about this programme, but I think you waylaid those in the way you've adapted the letter. The letter's not the same as what goes out from the companies in the UK. The way that was handled, I think, within this pilot project was appropriate.
Unintended harm	**Outcomes**	**FG:** It's obviously been handled well, better than the way they're doing it at the moment on the mainland. **FG:** I think schools were happy about the fact that it was over and done with efficiently. That's about it really. I haven't heard anything else, no. **I:** Almost a bit of a non-event? <Laughter> **FG:** No, I mean it's an event, but it went smoothly and everybody's happy is the way to look at it. Rather than a non-event, because I think schools, yeah, they knew you were there but it didn't disrupt too much; it happened promptly, efficiently and, I mean, I was only at Amherst but none of the kids were upset about taking their shoes off and things like that. **IR:** No, there was no unintended harm. No, I don't think there was at all; I have no evidence of that. **IR:** No, only we had a couple of phone calls about parents who didn't want their child to do the measurement at all and one parent I spoke to in Year 5 said, 'I've discussed it with my daughter and she doesn't want to take part.' I think for that child to be not doing it when everybody else was, there were going to be questions with some of the other children saying, 'Well, why are you not having it done?' So I think it's very much that way around; rather than any child having adverse problems from being measured, I think it was maybe those who were being left out. But I've got no proof of that, but when I had this conversation with the mum I thought, 'Well this poor girl, she's going to be the one now that everybody's

Headings	Themes	Quotes
		going to say, she didn't have it done!' **IR:** I think if we're talking strictly the measurement here, I think these children are alert that they are large anyway. They're going to be bullied or teased regardless of whether you measure them or not, being absolutely cold-blooded about it. …. It's not a sudden surprise; by the time you're so identifiable, actually measuring somebody isn't going to highlight that problem because the other children will have been aware of that anyway. I can see it can bring it to the fore and it might highlight it in some ways but actually it shouldn't be a factor. **FG:** I think most of the children found it quite exciting. Anytime you get to go out of class with someone you don't know, it is fairly exciting. And a freebie at the end of it, well! **I:** Are you aware of any episodes or reports of unintended harm relating to the GCMI? **IR:** Do you know: nothing. So, I have to say, if it's a piece of data in itself, I have heard nothing in the playground. If there had been a campaign with banners, I would've seen it. <Laughter> **IR:** No. In fact, I haven't had anything really! Which is actually what you want, because if it's going to be adopted it wants to be that something is accepted and not a huge issue. So that's good really. I've had no feedback, and no one's contacted me. ….. I'd been waiting for that actually; I had thought I might get parents phoning up to say, 'What are the results?' but I haven't heard anything. No one's contacted me and so that's good. **FG:** And as far as I'm aware, there's been no feedback from the teachers or in fact that any parents have complained. **FG:** I've not been aware of any parents contacting saying, 'I've had this' and blah. **FG:** No, I've had nothing come through. **FG:** You haven't had any parents approaching you complaining or anything? We've all obviously

Headings	Themes	Quotes
		done a brilliant job then! **IR:** As I said, considering I was a bit anti, I was a bit anti only because of what I knew from the UK. I was worried about how it would affect the parents and children here, having heard all the horror stories, well, not horror stories but bad press with the UK. I thought, 'Do we really want this, do we want this bother?' It can be done, but it is down to whether it's used appropriately. …. And it can be done diplomatically or without offending too many people, if you know what I mean. It can be done properly. **IR:** I think I'd read lots of the bad publicity about the UK schemes and so on, and those things are always written from a personal or the poor parent's point of view …. and so on so I hadn't seen the benefit of the bigger picture really.
	Protocol	**IR:** I can't see that there's any problem with it …. particularly the way that you conducted the measurement. They weren't all summoned, 'Come and have your weight done now, dear,' and the fact that it was all done very quickly and it was more about their height than anything, I can't see that any child can come away from that and say they had any adverse reaction to that at all. **FG:** No. If you get them while they are little – like in Year 1 – they accept it. It all depends on how you do it. **FG:** I think it is easier if it's done in school rather than monitoring them individually, because you are treating them all the same. **IR:** I think that's the thing, isn't it? If it's done professionally and thoroughly, then it should be OK. You should cover your bases, shouldn't you? <Laughs> **FG:** I think it was well managed and the children weren't upset by it. I mean, I can remember at primary school being weighed for a maths lesson and that, <laughter> THAT was worse! I

Headings	Themes	Quotes
		remember the fear of God being put into me then, but this was very sensitive. This was done away from the whole class. It was done individually, wasn't it? I think this was perfectly managed. **FG:** It wasn't highlighted as a big issue really, in the first instance. I mean, I let my two [children] know that they were having it done and that everyone was doing it: all of the year group were doing it. If one or two had been taken out, then I think that might hurt the programme. **FG:** The younger ones, I think they found it more of a giggle rather than anything <laughs>.

APPENDIX XXVIII

Table A8: Headings and Themes – 'Programme Development'

Key: I = Interviewer, IR = Interviewee response, FG = Focus group response

Headings	Themes	Quotes
Scalability	**Resources**	**I:** What do you think are possible obstacles to expanding the GCMI across all primary schools in Guernsey? **IR:** I mean the infrastructure is there; the school nurse infrastructure is there and the specialist school nurse is now in post and the funding for that will be on-going and they're in a unique position …. So I think to a certain extent our funding has all been assumed. **IR:** Money, resources. …. I think it's going to be resources. And associated with that clearly is influencing people to think this is important that we do that, so the two go together really. Getting the resources also depends on how we might influence the key decision makers to get to where we want. **IR:** I imagine that there would be staffing issues in terms of the clinicians actually having time to go and do it …. but I believe there may be some money in the Strategy for another post that might help out with that. **IR:** Obviously, things like staffing issues and any other financial support. I'd have thought those were the main blockages. I mean I don't know, but it would be fairly key to have the resources available to push this forward and obviously the capacity to deal with that data once it's been gathered. That should be in place, hopefully, if there's going to be a specialist school nurse. **IR:** Well, the money is there in the Obesity Strategy, it's <pause> well, the money is there for the school nurse post. There isn't a particular budget that says child measurement programme but there is money in the Strategy for all sorts of things …. So, yeah, I think

Headings	Themes	Quotes
		money, at least initially, is there. The peripherals we would have to budget for but it literally would be paperwork; that's the additional cost and, between us and the schools, I think we can cope with that. **IR:** Finance is always an issue, but hopefully having now appointed a specialist nurse, that's one huge barrier that allows us the time and the finances to coordinate the post. **IR:** Only from energy points of view, whether that person can actually do all that or whether they'd be taking on too much. But I don't think it should be a problem because I think that that will be that person's role and they should want to do it. **IR:** Absolutely. If we hadn't got any money I'd say no. But because we've had part funding from the Obesity Strategy and part of that funding was for the specialist school nurse post and written into that school nurse post job description is to look at some form of child measurement programme. We appointed that person last week, so there is a post at least for five years whose job description is to implement a child measurement programme. **IR:** Well, we've got Chris. And she's been principally appointed as the new school nurse for obesity management. <Laughter> **IR:** I was very cagey about saying it would be a good thing. I think it is a good thing to do; but actually adopting it without a weight management nurse in post; that wouldn't be possible. …. I hope it will be possible with a weight management nursing post. **IR:** I think to upscale it you'd actually need big organisation; you'd have to stay highly organised I think, and you'd need other people on board to help. …. I think as long as you've got your weight management nurse who understands how to do the measurements and how to record it, it should be possible, but you need someone in that role. **IR:** It would probably depend on who was running it over here and whether they felt had the time

Headings	Themes	Quotes
		and resource for this. And the timing! **I:** What is your main concern regarding the potential scalability of the programme? **IR:** I don't think I have any major concerns. I think all the work that you've done has allayed any of those concerns. Perhaps the only thing would be about making sure that it does continue and making sure that we give it enough support and time …. We need to make sure that we're saying, 'Yes it is important and it does need to happen,' - there needs to be a proper system. **IR:** Probably the cost and the time cost. I don't think it's going to be hard to convince people of the value of it once they've seen it. I think it might initially be a bit tricky to convince people of the value of it but I think with time that will go away, but I think there will be big concerns about the cost initially. **IR:** Well, my biggest concern would have been not being able to offer a service afterwards. That would be my biggest concern. .... I mean offering it with nothing to follow up. I think that would be like saying, 'This is your problem, deal with it'. **IR:** …. having sufficiently trained staff and the various follow-on programmes that are going to be required if it's going to roll out. If people are going to have that issue raised in their minds, even if it's not necessarily fed back directly to them, there should be something or somebody they can turn to to discuss the issue of weight, if that's what they want. So I think it would be great to upscale it but with a plan for people who want to know more.
	Engagement	**IR:** …. demonstrating, I think, probably that the school has full support and understanding of it and is promoting it, which I think would help to settle parents. Because, if you like, it's something sort of being done to a school rather than with a school; there's always a slight lack of ownership from the school which is always slightly unnerving for parents. I think if head teachers and their staff were encouraged to understand and promote the programme

Headings	Themes	Quotes
		… they're obviously entitled to their own points of view on it, but I think the buy-in from schools and particularly, more than buy-in, the support, I think is important. **FG:** I thought about talking to parents' groups and at staff meetings, coming in at that level. In fact, I think you'd have to come in at lots of levels really to be effective, so it's informing people. **FG:** Basically it's the information at any level, any opportunity really. But I think the key people that you'll have to convince that it's good is the schools themselves, 'cause the parents …. they don't really know what it is half the time. I know that sounds terrible! **FG:** That's the only thing – getting the schools on board. And we've got two schools on board, which is brilliant. If they did good press then maybe it will be OK, but there are some schools who are a little bit more awkward about letting outside agencies in for a certain time and taking up space and getting in the way. **FG:** The people you've got to sell it to are the schools themselves and the staff, because they're the ones that are going to be inconvenienced rather than the parents. **IR:** I guess keeping the schools on board and making sure that the dissemination of the results of this pilot study go as smoothly as possible …. the two schools that have currently participated have had really good experiences, everything's gone smoothly then that goes a long way, I think particularly in Guernsey, to how it will be received in other schools. **IR:** It's an obvious statement really, but I guess just as a broad observation it's going to be key to have the support of the teachers, and the head teachers, and the Education and Health and Social Services Departments. **IR:** …. have everybody fully informed so that somebody who wants to know more has got somewhere to go, and the people who are involved centrally and peripherally know what that process is supposed to be so you don't end up with confusion and therefore possibly a

Headings	Themes	Quotes
		negative attitude towards the programme before it's even managed to get off the ground.
	Protocol	**FG:** I think you would have to be really clear. I think you'd have to have almost the same boundaried approach, otherwise it could become … 'You can use that cupboard over there this morning and we'll try and find you a TA to help.' I think it would be a question of informing the schools and going in and talking to them …. I think you have to be very, very clear about what you're doing. Because otherwise could become a bit, not casual, but a bit too comfortable almost. I think you have to be very careful but I think that's the only thing I could see being a problem. **FG:** I think you've got a very clear template to follow really. It sets it out for you really. I think with the two schools that took part, the other schools are very similar so it wouldn't take much to be able to replicate it and move it on to more schools. **IR:** I can see it [sampling] as a possibility. I would be interested to know how we would choose the sample. That would be my one slight concern, particularly in the primary schools …. so choosing the samples could be quite interesting. …. My preference would be that we do all children. I think it is a big plus, that we're able to say we've measured all of the children in this year group. This is it. We are in a position in Guernsey that we could do that so we don't have to do a representative sample. We could literally measure all the children. **IR:** The issue of I suppose sample size is always difficult. You know, you end up with your best estimates; the numbers aren't going to be that big anyway. In Guernsey you're only talking about 6,000 children for the whole island, I think, in every age group. So the numbers are relatively small, so yeah; I think we should try and measure everybody….. **IR:** I mean ideally it would be lovely to have a seamless programme …. which I think is probably an ideal rather than a realistic point of view. I think there needs to be provision and it needs to have been thought through; if we can't provide a full service what can we provide?

Headings	Themes	Quotes
	Feasibility	**IR:** I think because of the small numbers in Guernsey you could quite easily aspire to measuring everyone. **IR:** Well, there's only 650-odd in each school year. I think it's a feasible number and there are several other things that we do do in all the year groups, so it's not unusual for things to happen to a whole year group across the whole of the rest of the island. …. I would like to think that we do do it all and it's possible, Guernsey makes it possible. **I:** What are your thoughts on whether this programme can be expanded in this setting? **FG:** I don't see why not, even in a big school like this. I think it was really minimal disruption. **FG:** It was no more disruptive than going to have your eyes tested, or going to see the school dentist, was it, really? In fact it is less. Far less. It was less disruptive than them being taken off for an appointment somewhere.
	Fulfilling obligations	**IR:** I think it would definitely be something that the Obesity Strategy Group could say, 'This is one of the things that we've done in order to meet our objectives.' Yeah, I mean it really shows that they're seeing through their commitments. **IR:** …. the Strategy's been accepted and one of the recommendations is that we monitor children, so we've needed to work alongside it and build our knowledge as we've gone along really. **IR:** I mean, the Strategy's been approved and it's a requirement of the Strategy, so in some format we have to find the funding to progress that.
Data utilisation	**Protocol**	**I:** How do you think data produced by the programme can best be used? **IR:** I think lots of people are going to use it. …. I think it will be used by lots of people. …. It is important for them to be able to have a reason for their board and their taxpayers to say,

Headings	Themes	Quotes
		'This is why we're supporting it. We have this percentage of children who are overweight …. So other departments will certainly use all that info. Again, I think from the parents' point of view as well, being able to say <pause> …. 'Is my child normal?' <laughs> and for them to recognise if they are in the normal range, but if they're not for them suddenly to think, 'Well actually maybe there is something I have to do about it.'
		IR: I think you come in at every level; I see that as the way forward. I think you come in at Strategy level which is your informed professionals who are interested and wanting to make a difference. I think you come in at the parents and here we have to be quite cunning and develop ways of talking to them. And obviously the teachers. You need to come in at lots of different levels, giving the same message but in different ways maybe.
		IR: Well not in any sort of order, they should be taken back initially to give the Health and Education Departments a broad outline of what is going on. So they can picture it in a standardised way and it can be compared with other datasets. And it's like a starting point, a proper picture of a starting point for those age groups. …. Then it hopefully will be built into a much bigger picture of obesity in general health which is children- and adult-layered. And then specifically down to the family and child level …. So again, from the smallest denominator of a child right through to policies for The Education Department, I hope .... We don't necessarily have to stay within the confines of just informing our health services and our education services.
		IR: Because we're using it at a population level and I don't think it's useful …. I don't think it's useable on an individual level. I don't think we could use it as a way of highlighting people to follow up …. we want to make sure that people taking part don't get any sense that that result says anything about them personally and their child.
		IR: I think it should be for parents who do request it, and there is this debate, question, about whether they request it or not they still get it <laughs>; that's something else that I'm not

Headings	Themes	Quotes
		sure about. So it's whether you tell the parents everything if the children have got concerns. And then also you've got to …. feedback to the Obesity Strategy, so they're aware of the situation …. parent-wise, if there isn't a problem and the parents aren't concerned, we most likely wouldn't send results. I think the health professionals need to know and the health promotion people need to know because they're the people that we work with. **FG:** Yes that's a tricky one isn't it, because I guess it should be open to the community. I mean, obviously health professionals are going to be very interested in the data - and education - so that there will be key States' departments that are very interested, but I think a community at large should be entitled to see the overview of the Guernsey's statistics. **FG:** …. if you did the study on the Monday and then on the Tuesday announced to the press what the results were, how the people who'd taken part would feel, all those parents? They would be shocked and feel awful and then the next time they came to take it up, they'd be saying, 'I don't want my child to be in that study, thank you.' So I think we've got to be really careful about how we put the figures out …. Because otherwise, we'll just get, instead of it being 1.8% or whatever, not take-up rate; it will be a 20-30%. **IR:** …. you get small numbers of people and they all say, 'Who is it?' So, I can see some potential problems, but on the other hand if we're saying it's an important health issue, they need to know don't they? That's my view. **FG:** I just don't think releasing those statistics [to the media] will serve any good purpose at all probably. **FG:** I think it should be published and make everybody aware that it will be published… **FG:** But there's a question of how it comes out because, not that we would, but if we released this kind of information it would turn instantly into a front page press report of, '*1 in 3 Guernsey Children is Fat'* and that would be the headline.

Headings	Themes	Quotes
		IR: I don't think we're going to be publishing. Certainly no school data has published anything like that, you know, 'Amherst have got all the fat children,' or anything like that.
	Evaluation	**FG:** …. as far as this Group's concerned, the publication of that information is of lesser importance than what we can do about it and what does it tell us. **IR:** I guess that's the sort of negative side really of individual schools knowing. This element is like any marker and the element of competition between schools might not be helpful, might not be healthy. **IR:** I think it's quite a sensitive issue because I imagine that there will be differences between the schools. I think possibly bringing to light inequalities issues is not necessarily a bad thing, but it just needs to be thought about really carefully. **IR:** The schools, yeah. …. It gives the school the opportunity to think about what it's doing …. Ideally we should be publishing these but I'm always thinking about the harms and some of those can be difficult to predict sometimes.
	Engagement	**IR:** I think the more data we share with [GPs] the more they may eventually share with us <chuckles> and that's something that we're always keen to do. I think in the past it has been quite a closed system and each has operated very much in isolation …. I can't really speak for how useful it would be for them clinically to know the results, but I think definitely from a bridge-building point of view it would be useful. **IR:** I mean, yes, it would be good to have all of our primary care services up to speed on the problem but we would then need to integrate that with, what are we going to do about the problem? It's a really good feeler point for other services but we need to build those at the same time, otherwise we're going to end up with the sort of BMI registration that they have in the UK and, what is that about? <Chuckles> Do something then with that register. So,

Headings	Themes	Quotes
		yeah. Definitely. But do it with part (b) as well, not just part (a) <laughs>.
	Fulfilling obligations	**IR:** I think two things. One is if we invest public money in it I think there's a requirement to make clear what the outcomes were. And secondly I think that there is a requirement to ensure that almost …. I don't mean freedom of information because that's got a different meaning nowadays, but if we have this information I think it should be made public. **IR:** We are required to write an annual report of the Obesity Strategy so each year we will have to say what we've done and what we've been up to. So it can go in as part of that.
Sustainability	**Utility**	**I:** How do you think sustainability of the programme can be protected or enhanced? **IR:** I think the schools need to be aware that we valued their input and the results are really important and now we can do something with them to help you. So we're not just working in a vacuum; there is a reason for it. Yeah, identifying the need and making it clear to them. **IR:** I imagine we could find ways of making it useful to schools or showing them how useful it was, which would help lower the resistance in some places. …. There are fairly easy ways to point out to people how useful it could be. **IR:** [I]f we do collect some of the surveillance stuff it will give us a surveillance programme, which is fine. The next stage is the interventions and many of the managers will be asking about that. …. I think the value of surveillance is clearly extremely important …. we need to think not only of surveillance but what we are doing about things because that's what a manager will say. Public health creates all these problems <laughs> and what I need is solutions, so I suppose that's always at the back of my mind when we're running these programmes. **IR:** …. we have got an issue politically in that people do trivialise it and therefore it will have to have a fairly clear case for the benefits of doing this to have it accepted.

Headings	Themes	Quotes
		IR: I think schools will understand the value of it, they'll recognise that it's not an imposition. **IR:** The Obesity Strategy will be reviewed in a five year cycle so if the results are there, that's the key thing. If the results are there and they're valuable and they drive the rest of the Strategy, then we will be reapplying for funding every five years to reinforce that. **IR:** There is that fact that once you've got a sufficient amount of data built up there's a huge incentive to keep going with it. When you've got 20 years of data, you really don't want to stop doing it; you want to keep going. **IR:** …. I don't think we need huge amounts of data; we just need to know of the children we've got that are underweight and those that are overweight and hopefully over time be able to see some differences. We're not looking for … it might be interesting, boys and girls and all that sort of thing … but the basic stuff is if we can find out that we have this many children who are overweight and this many children who are obese, and last year there was more or less. If we can find that stuff out, then I think that is enough to keep the programme going. That's what we need to know, anything else is a bonus.
	Engagement	**IR:** I think right from the start right now making sure that people have appreciated what has been done, why it's been done, and what's going to happen next. I think keeping everyone very informed and allowing people to feed back into the programme as far as is possible so that they feel that their point of view has been raised. But yeah total clarity, total transparency and as much awareness of it as possible …. You have to start from the beginning all the time. I think as much knowledge of exactly what's happening and why, rather than just perceived knowledge. <laughs> **IR:** I think it depends though on how we present it. I'm sure it's how we promote it within the schools. I think like most things if you go in with a positive attitude then they usually respond positively. Like with the immunisations, that was a brand new thing and we thought, 'ooh,

Headings	Themes	Quotes
		that's not going to go down well', but actually they were fine…. **IR:** I think in the teachers' meetings they have, it would be actually going into those meetings and talking to them and saying, 'This is what we're planning; this is my role; this is what I hope to do and I need your help.' …. Just through going in and explaining what I'm doing. **IR:** I think the sorts of things that you did worked well, having the information that went home and then it went in the school newsletters and there was some publicity about it certainly initially. **IR:** Because it's so difficult with all these different departments and things and everyone working in isolation. Integration, I think, would be absolutely key. **IR:** I wouldn't give too much information to parents! **IR:** I think that if you initially get the kind of programme that most people are happiest with then it's likely to have a better run than a programme that's been based on limited consultation about how it's going to be received. **I:** What is your main concern with the programme? **IR:** That, as it became more established, more and more people would drop out or the school might not really encourage it to happen. I mean it would happen if it was mandatory, it would have to happen but you need the support of the school to get really good uptake, don't you?
	Protocol	**IR:** I think we used the same type of format. I think if schools are presented with the same, very clear instructions and guidelines, they would respond to that. I think if it was just, 'Oh we're coming in to check heights and weights,' that wouldn't do. I think a clear letter and if you actually 'big it up' <laughs> basically. If you go into the schools and sell it, they'll know what you're up to and they'll understand that you're taking it seriously, therefore they should too.

Headings	Themes	Quotes
		But I think if I went in with the attitude, 'Well I just want to weigh and measure a few kids,' that's not going to work. **FG:** There's no point in doing a hash job. You've got have the same instruments and the same process, so that you know that what you're getting is real. The fact you're getting accurate recordings and that they are on the same level. **FG:** If there's any doubts ever sewn …. that the way you're doing it is not valid and reliable, then they won't take the results of the data seriously. So I think if we're going to do an evidence-based something, we do it properly or we don't do it at all. That was why I was worried about doing it in a broom cupboard. **I:** What is your main concern with the programme? **IR:** I think probably the co-operation of the schools and to standardise it …. I think that would be my biggest thing: that schools wouldn't see it as a huge priority for them. To keep that consistency and accuracy and involvement really …. I think that would be my main issue. **IR:** I think that calibration and making sure that people are taking weights and heights in the same way is really, really important. **I:** How do you think the sustainability of the programme can best be promoted? **IR:** I think by the States adopting it as an essential part of the school year and the Education Authority mandating it. I think that's going to make it sustainable. **IR:** In a way it has to become mandatory to be successful. Because we're not going to have such cooperative head teachers all the way along the line, I'm sure. And if that's the way we're going to go and we're trying to get the population level overview, then it needs to be mandatory. Is that right? **IR:** I think for it to be mandated. I think for Education and Health to accept that if we're going to

Headings	Themes	Quotes
		put all this resource and effort into this it has to be an essential part of the school year. **IR:** OK, from the schools point of view, I don't think we give them an option. I think it would be assumed that we're doing it and all schools would participate. From lots of other things that I've done with schools actually very rarely do they opt out of anything. …. Certainly I know that, from the Education point of view, health is a very important issue for them. …. So I would be very surprised if they didn't back it wholeheartedly. **IR:** I think a commitment from the Education Department that this is something that happens on a yearly basis so that it just becomes part of the school year. I think that's the key thing: to get this commitment from the highest level and then good communication with the schools and the school nurses to make it just a part of the school year for that school. **IR:** I guess ensuring that it's well enough integrated with the Obesity Strategy.
	Information	**IR:** I think if we had not just Year 1 and Year 5 but Year 10 or something as well. I think that would be very helpful, because there are probably greater concerns and a more varied range of concerns about that age group. Plus, there's the fact that you can show, 'OK, it's 30% of Year 5 but what if it's 45% or something, which it could well be, of Year 11?' I think it becomes a really powerful argument then. **IR:** I think so, but as I actually haven't *seen* the data ….<laughter> It will a bit depend on the data. **IR:** Depends what the statistics show, doesn't it? …. In some respects it would be nice to have facts, but then it will take a few years before we actually see whether the problem is going up or down. I suppose that's the dilemma with it: the fact that you won't know immediately. …. it still doesn't show the whole picture straight away. So it's knowing whether it is worthwhile to keep doing that and whether the authorities are happy that we continue doing

Headings	Themes	Quotes
		it just to get the figures. I suppose it's that dilemma, isn't it?
	Unintended harm	**I:** What is your main concern with the programme? **IR:** There may be untoward side effects that we've not thought of, so we end up doing something that is potentially harmful …. So that's the concern, that in 20 years they say, 'Well why in the bloody hell did they do that? We now know it didn't work.' **IR:** My single biggest concern would be what we've been talking about, is to be very sensitive to the possible side effects and acting to address those.

APPENDIX XXIX

Confirmation of ethical approval for included studies

SOCIAL SCIENCES & HUMANITIES
INTER-DIVISIONAL RESEARCH ETHICS COMMITTEE

Hayes House, 75 George Street, Oxford. OX1 2BQ
Tel: +44(0)1865 614871 Fax +44(0)1865 614855
ethics@socsci.ox.ac.uk www.socsci.ox.ac.uk

Co-ordinator of the IDREC
Social Sciences Divisional Office

UNIVERSITY OF OXFORD

Ref. SSD/2/3/IDREC

3rd December, 2010

Dr Karina McHardy
Department of Public Health
Old Road Campus,
Headington
Oxford
OX3 7LF

Dear Dr Karina McHardy

Application Approval

Ref No.: SSD/CUREC1A/10-101

"As discussed in correspondence, it is outwit the powers of the University's ethics committees to grant approval for those aspects of your project which involve people who are being interviewed in their capacity as current or former employees of the National Health Service. Such studies require approval from the National Research Ethics Service."

Title: The National Child Measurement Programme: A Case Study

The above application has been considered on behalf of the Social Sciences and Humanities Inter-divisional Research Ethics Committee (IDREC) in accordance with the procedures laid down by the University for ethical approval of all research involving human participants.

I am pleased to inform you that, on the basis of the information provided to the IDREC, the proposed research has been judged as meeting appropriate ethical standards, and accordingly approval has been granted.

Should there be any subsequent changes to the project, which raise ethical issues not covered in the original application, you should submit details to the IDREC for consideration.

Yours sincerely,

Chris. Ballinger

Dr Chris. Ballinger

Cc. Dr Charles Foster, Department of Public Health
HBP / CAJB

HEALTH AND SOCIAL SERVICES
A STATES OF GUERNSEY GOVERNMENT DEPARTMENT

Corporate Services
Corporate Headquarters
Rue Mignot
St Andrew's, Guernsey
GY6 8TW
Telephone +44 (0) 1481 725241
Facsimile +44 (0) 1481 235341
www.gov.gg

IJG/C5.4

Dr Karina McHardy
British Heart Foundation
Health Promotion Research Group
University of Oxford
Old Campus Road, Roosevelt Drive
Headington, Oxford
OX3 7LF

17 January, 2011

Dear Dr McHardy

THE GUERNSEY CHILD MEASUREMENT INITIATIVE

Thank you for your e-mail, dated 21 December, 2010, and the revised study documentation / additional supporting information in respect of the above research study, which were as follows:

a) Summary of the Project (Updated December, 2010);

b) Detailed Protocol for the Project (Updated December, 2010);

c) Information Sheet for Participants – Data Collection (version 2, dated 20 December, 2010);

d) Information Sheet for Participants - Evaluation (version 2, dated 20 December, 2010);

e) Informed Consent Form for Participants - Evaluation (version 2, dated 20 December, 2010);

f) Information brochure for parents + guardians (Updated December, 2010);

g) Opt out form (version 2, dated 20 December, 2010);

h) Feedback request form (version 2, dated 20 December, 2010);

i) Response to query around availability of existing data (letter from Dr McHardy, dated 20 December, 2010);

j) Outline of questions for project evaluation (dated 20 December, 2010);

k) Summary of themes for project evaluation (dated 20 December, 2010).

The Vice Chairman and I have reviewed the revised study documentation / additional information and confirm that all of the requirements of my letter, dated 3 December, 2010, have been addressed.

As such, the matters raised by the Ethics Committee have been fully addressed and, on behalf of the Committee, I am pleased to confirm that full approval is granted for your research study.

In order to track progress of approved studies, the Ethics Committee would be grateful if you could provide regular] progress reports for the study (e.g. at key milestones such as following completion of the recruitment phase) and / or a final report following its completion. This should be forwarded to: Ian Gaudion, Executive Assistant (Committees), Health and Social Services Department, Corporate Headquarters, Le Vauquiedor, St Andrew's, GY6 8TW.

The Committee and I wish you every success with your study.

Yours sincerely

Dr Graham Beck, Chairman, Ethics Committee

APPENDIX XXX

Supplementary Information: Courses and Presentations

Courses (2009-2011)

1. **'Ethics 1 – Good Research Practice'.** 14 October 2009. Online course. Medical Sciences Division Skills Training Course. University of Oxford.
2. **'Ethics 2 – Working with Human Subjects'.** October 2009. Online course. Medical Sciences Division Skills Training Course. University of Oxford.
3. **'Project Management in the Research Context'.** 14 October 2009. Online course. University of Oxford.
4. **'Teaching Skills, Part 1'.** November 3 2009. Medical Sciences Division Skills Training Course. University of Oxford.
5. **'Access: Fundamentals of using a database'**. November 12 2009. Oxford University Computing Services (OUCS), Oxford.
6. **'EndNote: Introduction'.** November 16 2009. OUCS, Oxford.
7. **'Access: Database structure'**. November 17 2009. OUCS, Oxford.
8. **'Word: Creating professional documents'**. November 19 2009. OUCS, Oxford.
9. **'PowerPoint: Getting the message across'.** November 19 2009. OUCS, Oxford.
10. **'Word: Managing your thesis'.** November 2009. OUCS, Oxford.
11. **'Ethics: Introduction to research ethics'.** Michaelmas Term seminar 2009. Medical Sciences Division, University of Oxford.
12. **'Qualitative Research Methods'**. January 25-29 2010. DIPEx Health Experiences Research Group. Department of Public Health, Oxford.
13. **'Ethics: Consent'.** Hilary Term seminar, 2010. Medical Sciences Division, University of Oxford.
14. **'Introduction to Stata'**. DPhil Student Teaching Session. November 15 2010. Department of Public Health, Oxford.
15. **'Presentation Zen'**. December 3 2010. OUCS Course. Keble College, University of Oxford.

16. **'Medical Writing Skills'**. January 26 2011. Medical Sciences Division, University of Oxford.
17. **'Doctoral Thesis Writing'**. February 14 2011. Medical Sciences, Division, University of Oxford.

Publications (2011-12)

1. McHardy K, McCann L. *The little country that could.* Junior Doctor Journal, Global Health issue. May 2012; (2). Available from: www.juniordoctorjournal.com
2. McHardy K. *Calling all leaders: Your (health) world needs you.* Published in:
   (i) Australian Junior Doctor Journal. February 2012; (1): 1-2;
   (ii) New Zealand RMO Review. October 2011; (1): 1.
3. McHardy K, Ariana P, Plugge E. *Public Health in Practice: translating theory into action.* Medical Education 2011; 45(11): 1142
4. McHardy K. *Going Global.* Guest Editorial. NZMSJ. Issue 13 July 2011. Available from:

   http://sadaka.otago.ac.nz/ojs/index.php/NZMSJ/issue/view/31
5. Wickramasinghe K, McHardy KM. *Disaster response: The need for capacity building amongst healthcare professionals.* NZMSJ. Issue 13 July 2011
6. Co-author: *Enhancement of medical interns' levels of clinical skills competence and self-confidence levels via video iPods: Pilot randomized controlled trial.* JMIR. 2011; 13(1): e29. Available from: www.jmir.org/2011/1/e29

Poster Presentations (2010-12)

1. *Obesity Monitoring in Schools: A systematic literature review.* Poster prepared for British Heart Foundation site visit. September 17 2010. Department of Public Health, University of Oxford.

2. *The use of course alumni in curriculum development: The PHIP example.* Association for Medical Education in Europe Conference. Vienna, August 2011
3. *Public Health in Practice: translating theory into action.* Transformative Education for Global Health Conference. University College London. London, February 2012

Presentations (2010-12)

1. *The Guernsey Child Measurement Initiative*. BHF Health Promotion Research Group Research Strategy Meeting. February 17 2010. Department of Public Health, Oxford.
2. *The Guernsey Child Measurement Initiative*. Clinical Lunch Presentation. October 13 2010. Princess Elizabeth Hospital, Guernsey.
3. *Obesity Monitoring in Schools.* Presentation to Guernsey Obesity Strategy Group. October 13 2010. Princess Elizabeth Hospital, Guernsey.
4. *The Guernsey Child Measurement Initiative.* Presentation to School Nurses and Head Teachers. October 14 2010. Department of Health and Social Services, Guernsey.
5. *The Medicine of CVD.* Clarke Lecture Series. November 10 2010. Department of Public Health, Oxford.
6. *Obesity Monitoring in Schools.* 'Work in Progress' seminar. November 18 2010. Department of Public Health, Oxford.
7. Keynote Address, Population Health Intensive. May 2011. School of Population Health, University of Auckland, New Zealand.
8. *Safety in Numbers*. Guest lecture, Faculty of Medicine and Health Sciences. May 2011. University of Auckland, New Zealand.
9. *New Zealand's Got Talent.* Medical Grand Round. May 2011. Whangarei, New Zealand.
10. *Conversations in Global Health.* Guest lecture, Medical Students for Global Awareness. May 2011. University of Auckland, New Zealand.
11. *Obesity Monitoring in Schools.* Presentation to Health Sciences Research Institute. January 2011. Warwick Medical School, Warwick.

12. *GCMI: Programme Overview.* Presentation to Queens Road Medical Practice. Guernsey. July 2011.
13. *GCMI: Programme Results.* Presentation to Obesity Strategy Group. July 2011. Education Department, Guernsey.
14. *Public Health in Practice: translating theory into action.* International Conference on Global Health and Public Health Education. Hong Kong, October 2011
15. *Going Global.* Transformative Education for Global Health Conference. University College London. London, February 2012.
16. *GCMI: Evaluation and Recommendations.* Presentation to Obesity Strategy Group. April 2012. Princess Elizabeth Hospital, Guernsey.

Teaching Roles (2009-2012)

1. Project Co-ordinator: 'Public Health in Practice'. September 2009 – August 2012. MSc in Global Health Science. Department of Public Health, Oxford.
2. Health Promotion tutorials for fifth year medical students. April 2010 – April 2012. Department of Public Health, Oxford.
3. Guest lecturer: Oxford Summer School Programme. June – July 2010. Corpus Christi College, Oxford.
4. Guest facilitator: Peking University Summer School. 'Public Health'. August 2-5 2010. Music Faculty, Oxford.
5. Global Health Tutor: 'Non-Medic Sessions'. October 2010 – August 2012. MSc in Global Health Science. Department of Public Health, Oxford.
6. Variety of informal or one-off teaching sessions conducted through both of the Department of Public Health, Oxford and the Faculty of Medical and Health Sciences, Auckland (New Zealand).

Other Roles, Affiliations and Seminar Attendance

1. DPhil Student Representative. 2009 – September 2011. Department of Public Health, Oxford.
2. Leader: 'DPhil Student Support Group'. 2009 – September 2011. Department of Public Health, Oxford.
3. Honorary Lecturer: Department of Medicine. 2009 – Present. University of Auckland, New Zealand.
4. Chair: Scrubs Advisory Panel. 'A website for Kiwi Resident Medical Officers'. Website: www.scrubs.co.nz
5. Editor-in-Chief: 'Australasian RMO Review'. Website: www.juniordoctorjournal.com
6. Lead author: 'Scrubs: Medicine and Beyond Series'. Available from: www.scrubs.co.nz/blogs/medicine-and-beyond
7. Team member: Health Education Authority *Students as Partners Change Programme.* May 2012. Department of Public Health, Oxford
8. Member: Oxford Global Health Group (OGHG). Michaelmas 2008 – Present. University of Oxford.
9. Member: Oxford University Australia and New Zealand Society. Michaelmas 2008 – Present. University of Oxford.
10. Wolfson College Representative: Vice Chancellor's Post Graduate Student Breakfast Meeting. October 22 2010. University of Oxford.
11. Attendance at a variety of Departmental, College and University lecture series, including but not limited to: 'Richard Doll' lecture series; 'Work in Progress' seminars; 'Unit for Biocultural Variation and Obesity' (UBVO) series; Said Business School 'Medical Entrepreneurship' series, 'Lessons in Government' seminars; 'Global Economic Governance (GEG)' seminar series.

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