National Evaluation of the Healthy Communities Challenge Fund

The *Healthy Towns* Programme in England

Final Report

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Contents

Executive Summary

Background and aims

This research reported here presents findings from an evaluation of the development and implementation of the Healthy Community Challenge Fund (otherwise known as the 'Healthy Towns' programme). A key aim of the research has been to inform the development of future environmental and systems-based 'whole town' approaches to obesity prevention.

The overall aim of the Healthy Towns programme was to pilot and stimulate novel 'whole town' approaches that tackle the 'obesogenic' environment in order to reduce obesity, with a particular focus on improving diet and increasing physical activity. Through a competitive tender process, nine towns were selected that represented urban areas across England ranging from small market towns to areas of large cities. The fund provided £30 million over the period 2008-2011, divided amongst the nine towns. The amounts awarded ranged from £900,000 to £4.85 million. Towns were instructed to be innovative and were given freedom to develop a locally-specific programme of interventions. This report supplements local process and impact evaluations undertaken by each town (not reported here) by taking an overall view of the programme's development and implementation.

Our evaluation therefore addressed the following research questions:

1. What kinds of interventions were delivered across the Healthy Towns programme?
2. Were environmental and infrastructural interventions equitably delivered?
3. How was the Healthy Towns programme theorised and translated into practice?
4. How was evidence used in the selection and design of interventions?
5. What are the barriers and facilitators to the implementation of a systems approach to obesity prevention?

Key Findings

- The Healthy Towns programme was very successful in stimulating a very heterogeneous programme of interventions, with 305 interventions described in

programme initiation documents. These interventions were comprised of directly commissioned interventions (n=228) and community-led partnerships (n=77)

- Five main intervention themes emerged. These were physical activity; active travel; growing; urban planning and 'other', which comprised of one-off initiatives or co-ordinating activities.
- Environmental and infrastructural Interventions were generally delivered equitably. Careful planning by towns indicated a commitment to the reduction of health inequalities through the targeting of interventions towards relatively resource poor environments and areas with highest population need.
- Towns were able to articulate what environmental and systems-based approaches to obesity prevention were, but in practice tended to rely on more traditional multi-component risk-factor based approaches to programme delivery. Only one town (Dudley – Family Health Hubs) could be said to have developed and implemented a set of environmental interventions based on an implied systems perspective from programme inception.
- Towns would have liked more guidance from central government in developing programme content and to have had much clearer steer as to what might constitute a 'systems-based' intervention in practice.
- Towns were enthusiastic about the opportunity to trial new and innovative environmental and systems-based approaches for obesity prevention and to potentially generate evidence for practice.
- Despite a clear mandate to be innovative and to not fear failure, towns felt under some pressure from a variety of stakeholders to demonstrate positive results. As such, some towns fell-back on 'tried-and-tested' interventions that they knew had a higher chance of success, rather than testing truly innovative interventions that had a higher risk of failure. This was compounded by the programme spanning a change in government which inevitably resulted in a shift in local and national priorities and funding. In an environment where there was increasing competition for resources, town felts that this increased the pressure to deliver effective programmes in order to protect their activities.

- Systems approaches were seen to be a promising solution to tackle obesity but that there existed a wide range or enabling and disabling factors that influenced each town's ability to implement systems approaches.
- Enabling factors included: the programmes ability to stimulate engagement with a wide range of local stakeholders, the identification of leaders and champions within each town; the provision of funding acting as a catalyst to continue existing interventions and develop new ones
- Barriers included: town leads having limited time and space to develop as 'systems-thinkers'; the imposition of extremely short timetables (for programme bidding, design and delivery) impacted on the ability to take a more strategic approach; towns also reported that they would have liked more support and directed leadership at the national level;
- Austerity measures imposed as a result of the recession impacted on each town's ability to develop sustainable programmes. Loss of funding streams led to staff redundancies, particularly at management level, resulting in a loss of knowledge skills and continuity.
- Within the nine towns delivery structures were not often geared to the implementation of systems approaches for obesity prevention. Individual interventions were often developed and delivered in isolation which made it difficult to make connections across programmes and create 'synergies' between interventions.

Research and Policy Implications

The findings suggest that 'whole-town' approaches are seen by local public health leaders and practitioners as a potentially important to way to reduce obesity prevalence in an area where progress has been challenging. As such the programme was welcomed as a timely and important initiative.

Analysis of the interview data suggests the Healthy Towns programme experienced a number of challenges related to execution of the programme at the national and local level.

To optimise the delivery of similar programme the following practical recommendations could be made:

- the requirement of a greater steer from the centre;
- a longer lead-in time for local authorities and programme managers for programme development;
- to enhance and better develop a practice-focused evidence base;
- the development of approaches that help foster innovation locally; and
- an assessment of whether local delivery structures are suited to systems-based interventions.

The study has important implications for a number of current policy initiatives, notably Heathy New Towns, a series of demonstration projects recently launched by NHS England that aims to 'design in' health within new communities. This initiative bears many similarities to the 'Healthy Towns' programme thus there are important lessons around the design and delivery of such a programme that can be learned from the experiences reported here.

Chapter 1. Introduction

Excess body weight is directly associated with a range of serious health problems including hypertension, type 2 diabetes and osteoarthritis and is indirectly associated with an increased risk of death through its role as a major risk factor for a range of chronic diseases such as cardiovascular disease and some cancers (Finucane et al 2011). In England the rapid increase in the prevalence of overweight and obesity has resulted in the proportion of adults with a healthy Body Mass Index (BMI) decreasing from 41.0% to 32.1% among men and from 49.5% to 40.6% among women between 1993 and 2012. There has also been a marked increase in the proportion of adults that were obese, rising from 13.2% to 24.4% among men and from 16.4% to 25.1% among women (HSCIC, 2014). Costs to the NHS are estimated to be in the region of £4.2 billion in direct treatment costs, with wider costs to the economy of £16 billion. The underlying cause for the recent and rapid increase in the population prevalence of obesity is thought to be environmental with changes in the food and physical activity environment acting as one of the primary drivers of weight gain (Egger & Swinburn, 1997).

The Government Office for Science Foresight Report *Tackling Obesities: Future Choices* (2007) remains one of the most comprehensive investigations of the drivers of population obesity. It highlighted that tackling the 'obesogenic' environment may be crucial in reducing population obesity prevalence. An 'obesogenic' environment in one which promotes sedentary behaviour and excess calorie intake and thus one important policy action could be to modify the environment in such a way that it makes 'healthier choices, the easy choices' in order to promote a healthy diet and increase physical activity. Systematic reviews of the epidemiological evidence suggest that some aspects of the food and built environment may be associated with diet and routine physical activity, for example proximity to fast-food outlets and grocery stores selling fruits and vegetables, green space, and walking and cycling infrastructure (Papas et al 2007, Lovasi et al 2009). In addition disadvantaged populations may reside in poorer quality environments and certain disadvantaged groups may also be more susceptible to the environmental risks associated with obesity-related behaviours.

1.1 The Healthy Community Challenge Fund

Encouraging the development of healthier lifestyles through improving opportunities to consume a healthy diet and increase physical activity is thus a key aim of public health policy. In 2008, and in response to *Tackling Obesities: Future Choices*, the Department of Health (DH) and the Cross Government Obesity Unit (CGOU) initiated the Healthy Community Challenge Fund (HCCF) as a key element of the *Healthy Weight, Healthy Lives Strategy*. The HCCF was established to pilot and test a series of social and environmental interventions aimed at tackling the 'obesogenic' environment in England as part of the wider Change4Life national health promotion programme. These environmental interventions are aimed at making healthy food choices and regular physical activity easier for local communities.

The Healthy Community Challenge Fund (HCCF) was intended to stimulate a 'whole town' approach to address the environmental determinants of obesity by testing and validating holistic approaches to promoting physical activity through investments in infrastructure improvements that implement the lessons of a variety of programmes (e.g. Home Zones and Cycling Demonstration Towns), combined with galvanising local members of the community to take action to change both food and activity habits, following the example set by the EPODE[1] model. The fund represented a £30 million investment over a three year period from 2008-11 to be distributed between a small number of 'Healthy Towns'. Local authorities and Primary Care Trusts were invited to bid jointly for funding, with a limit of £5 million per town, which had to be match-funded from local sources. Towns were expected to deliver a coherent cross-sectoral plan that implemented a programme of interventions in their local area.

[1] EPODE (Ensemble Prévenons l'Obésité Des Enfants - Together Let's Prevent Childhood Obesity) is based on a pilot project that took place in two communities in North East France from 1992 to 2004. The EPODE programme provides a framework for activity, rather than prescribed interventions. The EPODE method is a coordinated, capacity-building approach for communities to implement effective and sustainable strategies to prevent childhood obesity by generating changes in the social and physical environment to facilitate the adoption of a sustainable, healthy lifestyle by children and their families

Tackling Obesities noted that there existed a real lack of evidence to guide and support the development of effective whole-town community and environmental approaches. In particular, there was a relative lack of evidence of the effectiveness of environmental and other population-level interventions aimed at combating obesity. It was in this context that each Healthy Town was expected to develop locally specific programmes and interventions for implementation and also local evaluation. Following a rigorous selection process led by the Department of Health nine 'Healthy Towns' (HTs) were chosen: Tewkesbury, Halifax, Thetford, Tower Hamlets, Manchester, Middlesbrough, Dudley, Sheffield and Portsmouth.

1.2 Aims & Objectives

In the original response to the tender the overall aim of the evaluation was to generate robust evidence on the implementation and impact of the Healthy Communities Challenge Fund. In the early stages of the evaluation, in response to a request by the Department of Health, and due to a change in government in 2010, the work plan was modified to become primarily a process evaluation of the development and implementation of the HCCF. The voice of users was captured in local evaluations so this report concentrates on national policy actors and members of the Healthy Towns programme board, programme staff and those who delivered programmes on the ground.

In this revised programme of work the overall aim of the evaluation was therefore to assess implementation at the programme level with an investigation of the learning from the programme as a whole, rather than conducting separate evaluations on each town's activities. Thus the principal objectives of the process evaluation were to address the following questions:

1. What interventions are planned and implemented?
2. What are the anticipated impacts on health and inequalities in health?
3. How does local context vary in terms of organisations, geography, planning, population and socio-economic and health status of the local population?

4. How does this affect the delivery and development of interventions?

5. What are the main barriers and facilitators to the successful implementation of interventions?

6. How successful is partnership working?

7. What anticipated future support might be required by HTs for longer-term sustainability of interventions?

In addition we were also asked to develop a potential impact evaluation framework using the HCCF as a case-study. The resulting framework (reported in Appendix A) has been written as a resource to help policymakers decide when to evaluate complex public health interventions. Whilst the resulting framework was not applied to an impact evaluation this has now been used extensively with the Department of Health and other policy research funders (such as MRC and NIHR) in order to help guide decision-making around the commissioning of public health evaluations.

The process evaluation findings reported here are the results of two rounds of qualitative interviews, eighteen months apart with 72 stakeholders involved in the design and delivery of the programme.

We report the main findings from the national evaluation in five main results chapters. These are organised as follows:

Chapter 3 What kinds of interventions were delivered within the Healthy Towns?

Chapter 4 Were environmental and infrastructural interventions equitably delivered?

Chapter 5 How was the Healthy Towns programme theorised and translated into practice?

Chapter 6 How evidence was used in the design of interventions?

Chapter 7 Is it possible to implement a systems approach to obesity prevention?

The final chapter (8) presents a summary of the in-depth discussions and conclusions presented in each of the individual results chapters.

Chapter 2. Design & Methods

We conducted a process and implementation evaluation utilising elements of realist evaluation. We employed a longitudinal qualitative methodology to collect primary data on programme implementation from a range of stakeholders at a national and local level. This work was supplemented by the creation of an extensive (quantitative) database of programme activities on a town-by-town basis. In addition we undertook a spatial equity analysis of the delivered environmental and infrastructural interventions.

2.1 Setting

The nine successful 'Healthy Towns' included a London borough (Tower Hamlets), three large cities (Manchester, Portsmouth and Sheffield), two medium-sized towns (Halifax and Middlesbrough), one metropolitan borough (Dudley), and two smaller provincial towns (Tewkesbury and Thetford). Though the identity of towns is a matter of public record we have anonymised the quotes utilised throughout this report. In total in excess of 305 interventions were developed and managed through joint partnerships between local authorities and the NHS across the nine towns and were primarily focused on promoting on a healthy diet and increasing physical activity (see Chapter 4). Each town established a programme board responsible for overseeing the development and delivery of the programme. Board stakeholders generally included representation from the primary care trust, local authority, voluntary and community sector, and academic sector. A brief description of project methods is provided below.

2.2 Process and implementation evaluation - collection and analysis of qualitative data

Participants in the study were purposively selected to represent national policy actors involved in the initial set up of the HCCF and the allocation of funds, successful bid and management teams, Healthy Town board members with management responsibilities, and intervention delivery staff in each of the nine towns. Towns were aware that an evaluation of the programme would be conducted at the outset and as part of the funding agreement were required to participate in the evaluation where possible. The final sample included 72

participants who were all involved at different levels and stages of their respective town's programme, with nobody declining to participate. Data were collected in two waves from the same group, the first undertaken between July and December 2010 and the second wave between October 2011 and April 2012. The first wave focused on initial programme development and delivery and the second wave focused on sustainability and legacy of the programme. The breakdown of staff included members of teams that contributed in a substantial way to the initial HT bid in their respective towns (n=6); local board members who contributed to programme management in their towns (n=2); programme managers (n=9) and their successors (n=6); and intervention staff who were involved in implementing and delivering interventions across five targeted delivery themes (n=49). In addition data were gathered from interviews with two national policy actors. The five delivery themes were physical activity, community led projects, growing projects, healthy urban planning and active travel.

2.2.1 Procedure Interviews were semi-structured, allowing the interviewers to explore emerging themes as well as salient issues in relation to the programme (Spencer et al., 2003.) Interviews discussed the development, implementation, running and sustainability of the programme. This included questions related directly to programme governance, staffing, partnership working, management, evaluation, sustainability and political or economic impact. Throughout the interviews stakeholders were asked to discuss any barriers and facilitators that may have influenced the achievement of each stage of programme development and sustainability. The majority of interviews were face-to-face, with 6 conducted over the telephone. Interviews were conducted by the core research staff between July and October 2010, with a second wave of interviews conducted later between October 2011 and February 2012. The second wave interviews were conducted to gain further insight into programme development over time and the potential sustainability of programmes post funding. Interviews lasted between 50 and 110 minutes each and were audio-recorded and transcribed verbatim. All participants provided written informed consent to be interviewed, with ethical approval for this project given by the Queen Mary, University of London Research Ethics Committee.

2.2.2 Analytical approach Interview transcripts were coded and analysed thematically (Boyatzis, 1998) using a computer-assisted qualitative data analysis software program (NVivo10). To reduce researcher bias, transcripts were independently read and independently coded by the two research staff using the broad research questions as an initial coding framework. Themes were then discussed by the researchers for comparison and consistency of coding, with dominant themes identified and mutually agreed. These initial analyses were then explored with all investigators and staff with coding refined on the basis of group discussion. Throughout the analysis the interpretation was compared with the verbatim data. Direct quotations from interview transcripts are used throughout this report to illustrate key themes. Participant categories (role, position) and the names of the towns are anonymised.

2.3 Database of programme activities

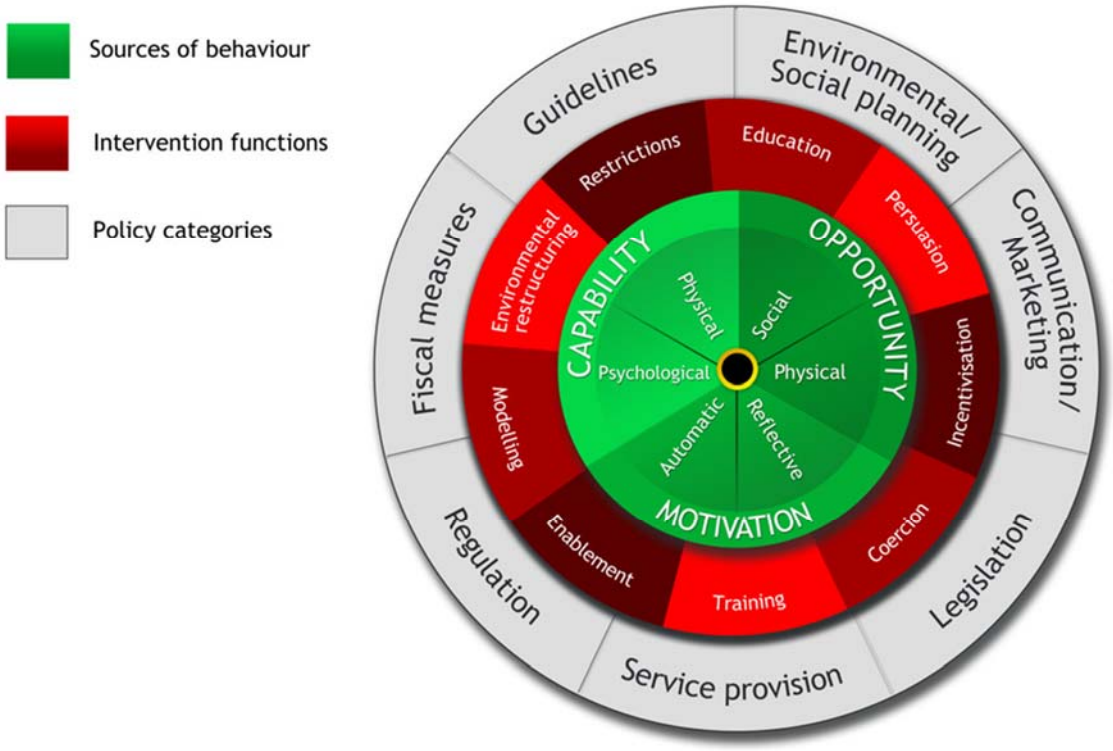
We also collected data on the activities of each 'Healthy Town'. In order to do this we collated and extracted all information available on interventions as described in each of the Project Initiation Documents (PIDS) submitted to the Department of Health by each of the nine towns. Quarterly local monitoring reports from each town were used to supplement and update this information where possible. Each intervention was described and then coded using the Behaviour Change Wheel (Michie et al 2011), a framework for coding behaviour change interventions based on intervention functions and resulting policy.

Three researchers familiarised themselves with the categories and definitions of the Behaviour Change Wheel as well as the theoretical content underpinning the framework. The primary activity of all of the interventions by intervention function and policy category were coded according to the coding categories detailed below (see Figure 1). We created a new 'unclassifiable' code for interventions that did not easily fit the given categories, or if there was insufficient information to accurately apply the BCW framework. Interventions were coded for the activity implemented based on the available information rather than the proposed project. Any ambiguities that arose during the coding process were collated for later discussion with the research team.

After the initial coding, all of the interventions coded 'unclassifiable' that had sufficient descriptive detail were second coded by two researchers. Researchers responsible for coding the data met to discuss any differences in philosophical approach to the coding process and interpretation of the primary outcome of interventions and parameters of the BCW as a descriptive framework. We then refined and amended the coding to reflect the discussion by authors and if no consensus on coding a particular intervention was reached, an unclassifiable code was assigned to prevent arbitrary categorisation.

Interventions that were coded unclassifiable and described in sufficient detail to understand the main intervention activity were grouped to identify common features. Emergent themes were identified to highlight features of complex public health interventions not well captured by the Behaviour Change Wheel framework in its current form.

Figure 1: The Behaviour Change Wheel (Michie et al., 2011)



2.4 Spatial equity analysis of delivered environmental and infrastructural interventions

To assess the spatial equity of the delivery of these interventions, it was necessary to identify the spatial extent of the infrastructural developments in relation to the distribution of key population groups. This was examined to identify if particular groups were advantaged or disadvantaged in terms of local provision. In addition, funding allocations per town and by population diversity were examined to see if successful delivery of interventions varied according to the funding context. The evaluation considered the possible existence of trade-offs whereby interventions aimed at more than one population group, may have favoured one group at the expense of others in a given location.

2.4.1 Spatial location of infrastructure All spatial analyses were conducted using GIS software [ArcGIS 9.3™]. Each local area was defined by urban settlement area boundaries identified by the UK Ordnance Survey (OS), the national mapping agency of the UK. These boundaries were supplemented with a 400m buffer in order to include populations within a short distance of the urban fringe.

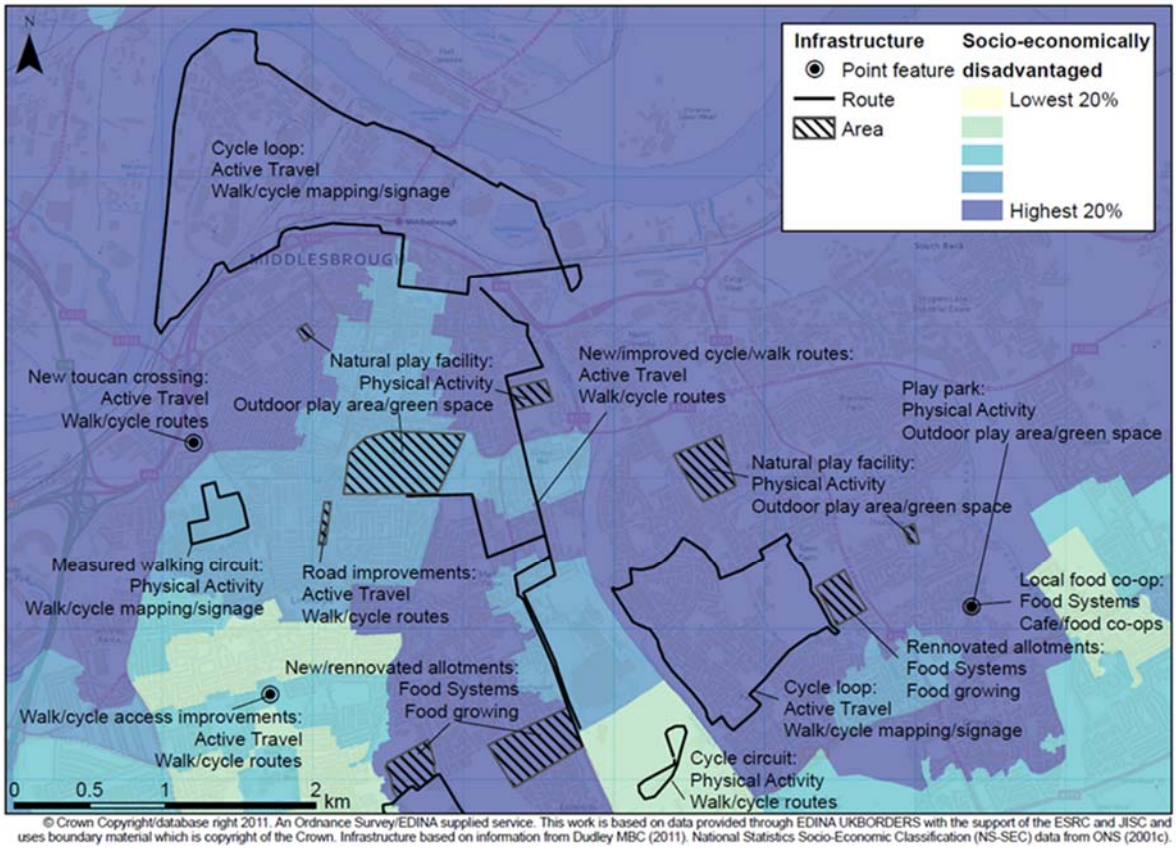
Locations of physical infrastructure were identified and obtained from the Healthy Towns database (see previous chapter) developed as part of the overall programme evaluation. The database consisted of information extracted from reports and documentation provided by programme managers from each local area. This was augmented with further information from local area-specific websites, council maps, and planning applications. Updated maps and information were then reviewed by the relevant programme managers, and were amended where appropriate. Only infrastructure that was confirmed as complete or in progress was included.

Each item of infrastructure was classified according to four categories based on the primary function of that intervention: active travel (infrastructure to promote walking or cycling to access a location), food systems (outlets and facilities for growing and eating healthy food), healthy lifestyles (behaviours which positively influence health), and physical activity (movement and exercise). Classification by the type of facility provided was also

undertaken. Interventions included advice/information, cafe/food co-ops, facilities for cycling/walking (e.g. cycle parking), food growing, green gym/dance studios, outdoor play area/green spaces, walking/cycling routes (e,g. paths and crossings), and walking/cycling mapping/signage. Each facility was mapped as a point, line or area as appropriate. Some components had multiple facilities that could be classified into different types or different categories. In such cases, each facility was considered separately.

Figure 1 (below) illustrates the classification of infrastructure with the example of an area of Middlesbrough. This area is categorised according to socio-economic disadvantage relative to the rest of England; the percentage unemployed and in lower quality employment according to the National Statistics Socio-economic Classification.

Figure 1. Example of healthy towns-funded physical infrastructure, Middlesbrough. Example of Healthy Towns-funded physical infrastructure, Middlesbrough, displayed on quintiles of socio-economic disadvantage (socio-economic classification according to NS-SEC)



2.4.2 Defining populations Two populations of need were identified for each intervention. Firstly, specific target populations were identified according to the group(s) specified for each intervention in each area's project initiation document. These were varied and included, for example, black and minority ethnic (BME) groups, children (various ages specified), inactive/overweight individuals and retired households. Each intervention was aimed at between one and six target populations. In order to identify the geographical distributions of these populations, data were obtained from the 2001 Census of Population in England and mapped to the smallest possible spatial unit: the Output Area (each containing an average of 297 individuals). Estimates of obesity were only available at the coarser Middle Super Output Area level (each containing an average of 7247 individuals). The data used to define the populations are detailed in Table 1.

To enable a broader examination of equity in intervention provision we also evaluated each intervention in terms of the distribution of generally disadvantaged population groups. After reviewing evidence from the equity literature and considering the target populations identified by each Healthy Town, these were determined to be four population groups comprising BME groups, retired households, all children (aged 0 – 18), and the socio-economically disadvantaged. These groups were also identified spatially and defined as the total count of people or households present in each of the four groups, using the relevant data listed in Table 1.

Table 1. Data used to define population

Population of need according to Healthy Towns database	Definition used for analysis[1]
All people	Total resident population
Black and minority ethnic (BME)	Total number of non-white British people (white Irish, white other, mixed, Asian or Asian British, black or black British, Chinese or other)
Children	Total resident population aged 0 – 18 years
Children/youths [specific ages]	Total resident population by appropriate age categories

Disabilities and/or learning difficulties	Total resident population with limiting long-term illness, health problems or disability
Employers and employees	Total workplace population
Families	Total number of families in households with one or more dependent children (0 – 15, or 16-18 and in full time education)
Households living in social housing	Total number of households living in social rented accommodation
Inactive/overweight	Model based estimates for percentage obese, converted to number of people based on the proportion of adults aged 16 and over in the resident population
Over 50's	Total resident population aged 50 and above
Resident adults	Total resident population aged 18 and above
Retired households	Total number of households with pensioners (one person; one family and no others, all pensioners; other households, all pensioner)
Single parent families	Total lone parent households with dependent children (0 – 15, or 16-18 and in full time education)
Socio-economic disadvantage	Total number of people in National Statistics Socio-Economic Classifications (NS-SEC) semi-routine occupations, routine occupations, never worked and long-term unemployed

[1]Source for all datasets is Office for National Statistics (2001d) except for the measure for Inactive/overweight which is Office for National Statistics (2005)

2.4.3 Equity analysis Analysis was conducted to assess the equity of infrastructural provision from the Healthy Towns programme in relation to the locations of each population of need. Firstly, populations with 'good' access to infrastructure were spatially identified. Good access was defined as living within a ten minute walk (represented by a straight line distance of 800m) of facilities, a distance used in previous analyses of accessibility based on how far people are willing to walk to access services. For route infrastructure, a distance of 100m either side of the centreline was used to capture characteristics of populations through which the route passed.

The number of people with good access in each of the populations of need (defined as the target populations and generally disadvantaged populations) was estimated by comparing

census data boundaries containing population counts with the boundaries delineated around the infrastructure (the 800m or 100m distance as defined above). For each group, the number of individuals or households falling within the boundaries for all interventions was then estimated, and these groups were defined as having good access. In cases where a census area was only partially classified as having good access, populations were estimated based on the size of the area of overlap. This procedure was undertaken for each population of need group, as well as the remaining population group of the town. It allowed 'targeting ratios' to be computed to assess if interventions were well-located spatially for the different groups. A targeting ratio above unity indicates that the population of need were more likely to live within areas classed as 'good access' compared to the rest of the population within the town, whereas a value below 1 means that the population of need were spatially disadvantaged. Associated 95% confidence intervals were calculated.

Funding for each Healthy Town was examined to investigate resources allocated in relation to the number of people classified as having good access to interventions. Towns were grouped into three categories of population size based on natural breaks (small 17-22K, medium 82 -132K, large 195-500K), and the average amount of funding for the towns in each category was calculated according to the total disadvantaged population and the disadvantaged population with good access.

The geographical diversity of disadvantaged populations was explored in order to investigate whether interventions were better located spatially in those towns with more clustered population groups. Within each town, the geographical distribution of each population of need was mapped, and a Global Moran's I statistic was computed. This produced an index value on a scale of -1 to +1, where +1 indicates clustering of population groups and -1 indicates dispersion of population groups (0 indicates random distribution). Index scores were divided into tertiles and the mean targeting ratios were compared across tertiles by computing Kruskal-Wallis H statistics. The Kruskal-Wallis tests were chosen because the distribution of targeting ratios was positively skewed. In order to test for the potential presence of trade-offs in cases where the interventions were specifically targeted

at more than one group, average targeting ratios were examined according to the number of population groups the intervention targeted, with the association again being tested using Kruskal-Wallis H statistics.

3. What kinds of interventions were delivered within Healthy Towns?

This chapter systematically characterises and describes the delivered interventions in the Healthy Town's programme. Interventions are coded using the Behaviour Change Wheel (BCW) and then used to summarise activities across the nine towns. The methods and coding processes are described in detail in Chapter 2.

Nine local areas were awarded Healthy Town status and received funding of between £900,000 and just under £5 million from the HCCF between 2008 and 2011 (see table 1). All nine Healthy Towns produced a theoretical model to underpin the development of their programme of interventions although these ranged from highly detailed logic models set clearly within the local context, to delivery models with minimal detail that were not well adapted to the Healthy Towns agenda.

Table 1: Overview of the Healthy Towns

Healthy Town	Area Description	Population	HCCF funding (£)*
Sheffield	Large urban area, city	530,000	4,858,872
Manchester	Large urban area, metropolitan borough	458,000	4,600,000
Dudley	Large urban area, metropolitan borough	305,253	4,500,000
Tower Hamlets	Large urban area, London borough	232,000	4,680,000
Portsmouth	Large urban area, city	199,400	3,099,625
Middlesbrough	Mid-size town	138,400	4,099,180
Halifax	Mid-size town	82,000	2,000,000
Thetford	Small town	21,588	900,000

Tewkesbury	Small town	17,000	1,200,000

* Figures obtained from Department of Health (Health Improvement and Protection Directorate - Department of Health, 2011)

Healthy Towns is supported by evidence that community based programmes, such as the Fleurbaix-Laventie Ville Santé Study (FLVS), a nutritional and physical activity information programme set up in Northern France 1992-2007, can contribute to reducing overweight prevalence (Romon et al., 2008). FLVS was the precursor to the ensemble prévenons l'obésité des enfants (EPODE), an integrated method to sustainably prevent obesity by focussing on nutrition and physical activity, developed in France in 2004 and now widely implemented across Europe (Cross-Government Obesity Unit, 2008).

3.1 Findings

A total of 305 interventions, encompassing 228 activities commissioned directly by local authority and NHS partnerships and 77 Community Led Projects (CLPs) developed and delivered by local community groups, were developed across the nine Healthy Towns during the funding period of the programme. The number of interventions constituting local Healthy Town programmes varied, ranging from 6 individual interventions in Manchester to 81 in Middlesbrough. Within the Healthy Towns programme there were 77 activities across three local areas (Middlesbrough, Tower Hamlets and Halifax) termed 'Community Led Projects' and although they were funded using allocated Healthy Town monies, they operated with more autonomy and on a smaller scale than the other interventions.

Table 2 presents a summary of the interventions and their resulting policies delivered across the nine towns by BCW category. An illustrative example of each category is given in the final column. Many interventions had multiple constituent components which is reflected in the higher totals for interventions compared to the preceding paragraph. The most popular interventions were enablement (21.2%) and training (20.2%), followed closely by environmental restructuring (17.8%). The least popular were coercion (0%), restriction (0.5%) and modelling (1.2%). The resulting policies and delivery mechanisms for these interventions were predominately service provision (49.4%) and environmental and social

planning (22.8%) and which reflects the balance of the intervention portfolio delivered within the towns.

Table 2: Summary of the Behaviour Change Wheel categorisation of the Healthy Towns programme

Behaviour Change Wheel category	Definition	Total % (n)	Examples from the Healthy Towns programme
Intervention function			
Education	Increasing knowledge or understanding	13.6% (55)	A range of sessions on healthy lifestyle choices run [Healthy Town]-wide, offering practical cooking sessions dealing with issues like cooking on a budget and preparing healthy lunchboxes
Persuasion	Using communication to induce positive or negative feelings or stimulate action	10.3% (42)	Using social marketing techniques to improve health and encourage people to engage in health-related activities, specifically a campaign around challenging barriers to PA
Incentivisation	Creating expectation of reward	4.2% (17)	Establish a social enterprise through which Manchester population can receive points for buying healthy food, using leisure facilities and taking part in physical activity
Coercion	Creating expectation of punishment or cost	0% (0)	N/A
Training	Imparting skills	20.2% (82)	Provide free cycle training courses for secondary pupils. Including 'bespoke' training for pupils targeting specific journey to school.
Restriction	Using rules to reduce the opportunity to engage in the target behaviour (or to increase the target behaviour by reducing the opportunity to engage in competing behaviour)	0.5% (2)	Develop a strategy using the planning framework to control the further growth and spread of unhealthy fast food takeaways. Develop a strategy to implement action based on the overconcentration "test" as set out in the Core Strategy
Environmental restructuring	Changing the physical or social context	17.8% (72)	Provide more allotment spaces throughout the town, creating shared growing spaces. This involves working with the town council to map existing provision and ensure existing allotment spaces are being used, and aiming to expand provision by creating new plots
Modelling	Providing an example for people to aspire to or imitate	1.2% (5)	Use the power of 'positive peer influence' to train 96 young people aged 16 - 19 to become local Health Champions and model a positive and healthy lifestyle including advocating healthy diets, leading active lifestyle and advising their peers of obesity risks.
Enablement	Increasing means/reducing barriers to increase capability or opportunity (capability	21.2% (86)	Employment of a healthy urban planner to contribute to the design of environment that support healthy lifestyles

	beyond education and training; opportunity beyond environmental restructuring)		
Unclassifiable activities	Incompatible with existing Behaviour Change Wheel categories or insufficient project information available	11.1% (45)	Partnership working with Sustrans Link to Schools, Living Streets and [a regional organisation] in the development of active travel corridors
	Total	100% (406)	
Policies			
Communication/ marketing	Using print, electronic, telephonic or broadcast media	8.4% (28)	Development of C4L marketing materials and creation of Healthy Town Brand. Awareness raising of town's activities through presentations in selected locations
Guidelines	Creating documents that recommend or mandate practice. This includes all changes to service provision	2.7% (9)	Development of an authority-wide stay-on-site policy for secondary schools
Fiscal	Using the tax system to reduce or increase the financial cost	0% (0)	N/A
Regulation	Establishing rules or principles of behaviour or practice	3.6% (12)	Schools to implement a physical activity policy - (play audits, training, routes to play)
Legislation	Making or changing laws	0% (0)	N/A
Environmental/ social planning	Designing and/or controlling the physical or social environment	22.8% (76)	Working with Groundwork to develop new natural play facilities (1 large area and 6 smaller areas) in schools and community centres
Service provision	Delivering a service	49.4% (165)	Gym sessions for adults are run alongside sports sessions for children, enabling parents and their children to exercise under the same roof but doing something that is age-appropriate and fun
Unclassifiable activities	Incompatible with existing Behaviour Change Wheel categories or insufficient project information available	13.2% (44)	Local communities involved in the identification of barriers to neighbourhood walking, cycling, access to green spaces and active play - these barriers are then examined to see if there are any opportunities for changes
	Total	100% (290)	

Table adapted from (Michie et al., 2011)

3.1.2 Intervention themes Interventions fell into four main intervention themes: physical activity, active travel, growing and urban planning. Box 1 gives illustrative examples of each activity type using interventions developed as part of the Healthy Towns programme. The most common component of interventions was physical activity encompassing sport and exercise classes, active play and staff appointments to facilitate

engagement with activities. All of the Healthy Towns developed projects involving physical activity, totalling 79 interventions. Active travel projects were also popular with all nine of the areas electing to include elements of active travel in their local programmes. These mainly comprised cycling and walking initiatives to try and promote more active forms of travel as viable alternatives for local commutes to work and school as well as to local places of interest. Tower Hamlets planned the largest number of interventions to promote physical activity and active travel and the second largest number of interventions in total.

Initiatives to encourage growing healthy produce in allotments and other community spaces were more sporadic and less numerous than other intervention themes; Portsmouth and Middlesbrough developed 11 and 10 growing interventions respectively and five other towns planned three or fewer growing related activities totalling 31 interventions. Planning projects were less common than other intervention themes but projects tended to operate at higher levels such as employing planners with a health remit and influencing and designing long term policies and infrastructure. Seven planning interventions were developed in six Healthy Towns.

Box 1: Examples of Healthy Town interventions in each theme

Physical Activity

Five parks and play areas transformed into family health hubs including the construction of community buildings at each site from which activities and events can be organised. The parks were chosen to ensure a health hub is easily accessible to all in the town.

Active Travel

Develop a walking and cycling centre for green exercise involving the creation of new walking and cycling routes with signage and maps provided to encourage their use. Routes will connect the centre with local attractions.

Growing

A site outside a well-used community centre has been cleared (by Youth Offending team) and some raised beds have been built for vegetable growing. The community centre has good links with local allotment whose users have donated plants for the new site.

Urban Planning

Employment of a healthy urban planner to contribute to the design of environment that supports healthy lifestyles.

Other

Develop Breastfeeding friendly venues to support parents. Establishments to achieve 'breast-feeding friendly status.'

The 'other' category was populated by interventions that involved overarching coordination of projects or initiatives that did not align well with the other thematic categories or where there was insufficient information to accurately categorise them. Sheffield dominated this group with 17 of its 31 interventions being grouped as other. In total, 50 of the 305 (16.4%) interventions were designated as 'other' for the intervention theme demonstrating the thematic heterogeneity of Healthy Towns' interventions.

The Behaviour Change Wheel was used to unpack the mechanisms of the interventions of the Healthy Towns programme. Categorising Healthy Towns interventions according to the

BCW demonstrated the heterogeneity and diversity of the programme (see table 3 and 4) and the clustering of interventions to key categories. Enablement, training and environmental restructuring codes collectively comprised 59.3% (n= 240) of BCW categories used to describe intervention function. Almost half of associated policies were coded as service provision and 23.0% (n= 76) of codes were for environmental and social planning. Community led projects (CLPs), developed in Middlesbrough, Tower Hamlets Community Led Projects and Halifax, were strongly oriented towards service provision with 76.7% (n=33), 94.1% (n=16) and 66.7% (n=16) of intervention policies coded to this category respectively. 'Coercion' as an intervention function and 'fiscal' and 'legislation' policies were not used in the Healthy Towns programme. On average each intervention was coded with 1.3 intervention functions and 1.1 policies.

Table 3: Behaviour Change Wheel categorisation of intervention function in each Healthy Town

Town	BCW Categories % coding										Total % (n)
Middlesbrough	**E** 6.9	**P** 13.8	**I** 3.4	**C** 0	**T** 22.4	**R** 0	**V** 31.0	**M** 1.7	**N** 19.0	**U** 1.7	100 (n=58)
Middlesbrough CLPs	**E** 12.9	**P** 1.6	**I** 1.6	**C** 0	**T** 32.3	**R** 0	**V** 11.3	**M** 0	**N** 40.3	**U** 0	100 (n=62)
Portsmouth	**E** 18.8	**P** 0	**I** 9.4	**C** 0	**T** 21.9	**R** 0	**V** 37.5	**M** 0	**N** 9.4	**U** 3.1	100 (n=32)
Tewkesbury	**E** 7.3	**P** 12.2	**I** 7.3	**C** 0	**T** 24.4	**R** 0	**V** 17.1	**M** 0	**N** 14.6	**U** 17.1	100 (n=41)
Tower Hamlets	**E** 10.5	**P** 15.8	**I** 1.8	**C** 0	**T** 12.3	**R** 1.8	**V** 15.8	**M** 0	**N** 24.6	**U** 17.5	100 (n=57)
Tower Hamlets CLPs	**E** 29.2	**P** 8.3	**I** 4.2	**C** 0	**T** 20.8	**R** 0	**V** 4.2	**M** 4.2	**N** 25.0	**U** 4.2	100 (n=24)
Halifax	**E** 18.8	**P** 12.5	**I** 0	**C** 0	**T** 12.5	**R** 0	**V** 18.8	**M** 0	**N** 12.5	**U** 25.0	100 (n=16)
Halifax CLPs	**E** 22.2	**P** 2.8	**I** 2.8	**C** 0	**T** 16.7	**R** 0	**V** 5.6	**M** 5.6	**N** 25.0	**U** 19.4	100 (n=36)
Thetford	**E** 9.1	**P** 31.8	**I** 0	**C** 0	**T** 9.1	**R** 0	**V** 13.6	**M** 0	**N** 27.3	**U** 9.1	100 (n=22)
Dudley	**E** 9.1	**P** 9.1	**I** 0	**C** 0	**T** 0	**R** 0	**V** 63.6	**M** 0	**N** 0	**U** 18.2	100 (n=11)
Sheffield	**E**	**P**	**I**	**C**	**T**	**R**	**V**	**M**	**N**	**U**	100 (n=35)

	17.1	11.4	5.7	0	25.7	2.9	2.9	2.9	11.4	20.0	
Manchester	**E** 11.1	**P** 22.2	**I** 33.3	**C** 0	**T** 11.1	**R** 0	**V** 22.2	**M** 0	**N** 0	**U** 0	100 (n=9)

Table 4: Behaviour Change Wheel categorisation of policies in each Healthy Town

Town	BCW Categories % coding								Total % (n)
Middlesbrough	**C** 8.9	**G** 0	**F** 0	**R** 2.2	**L** 0	**E** 37.8	**S** 44.4	**U** 6.7	100 (n=45)
Middlesbrough CLPs	**C** 2.3	**G** 0	**F** 0	**R** 0	**L** 0	**E** 16.3	**S** 76.7	**U** 4.7	100 (n=43)
Portsmouth	**C** 3.4	**G** 0	**F** 0	**R** 3.4	**L** 0	**E** 41.4	**S** 48.3	**U** 3.4	100 (n=29)
Tewkesbury	**C** 17.6	**G** 5.9	**F** 0	**R** 2.9	**L** 0	**E** 20.6	**S** 35.3	**U** 17.6	100 (n=34)
Tower Hamlets	**C** 11.5	**G** 7.7	**F** 0	**R** 7.7	**L** 0	**E** 19.2	**S** 40.4	**U** 13.5	100 (n=52)
Tower Hamlets CLPs	**C** 0	**G** 0	**F** 0	**R** 0	**L** 0	**E** 5.9	**S** 94.1	**U** 0	100 (n=17)
Halifax	**C** 18.8	**G** 0	**F** 0	**R** 6.3	**L** 0	**E** 31.3	**S** 37.5	**U** 6.3	100 (n=16)
Halifax CLPs	**C** 0	**G** 0	**F** 0	**R** 0	**L** 0	**E** 8.3	**S** 66.7	**U** 25.0	100 (n=24)
Thetford	**C** 10.5	**G** 0	**F** 0	**R** 5.3	**L** 0	**E** 21.1	**S** 47.4	**U** 21.1	100 (n=19)
Dudley	**C** 9.1	**G** 0	**F** 0	**R** 0	**L** 0	**E** 63.6	**S** 9.1	**U** 18.2	100 (n=11)
Sheffield	**C** 12.5	**G** 6.3	**F** 0	**R** 9.4	**L** 0	**E** 6.3	**S** 43.8	**U** 21.9	100 (n=32)
Manchester	**C** 0	**G** 12.5	**F** 0	**R** 0	**L** 0	**E** 25.0	**S** 37.5	**U** 25.0	100 (n=8)

3.1.3 Unclassifiable and non-compatible interventions 9.5% (n=29) of Healthy Towns interventions were categorized as unclassifiable for both intervention function and policy category. Reasons included insufficient detail to adequately classify the intervention according to the BCW, interventions with multiple components and poor alignment of the

primary activity with the BCW categories. Similarly 12.1% (n= 89) of intervention codes were partially unclassifiable (either intervention function or policy). Therefore approximately one-fifth of the interventions from the Healthy Towns programme could not be fully classified according to the BCW.

Grouping the unclassifiable interventions gave rise to two new emergent themes derived from the descriptions of the interventions (see Table 5). It became obvious that there was a lot of preparatory work included in the Healthy Towns programme, particularly for completely new projects, and the focus of some interventions was on formative work to facilitate intervention planning pre-implementation. Preparatory activities (described as interventions by towns) consisted of collecting initial data about public usage patterns, identifying gaps in services and/or knowledge, undertaking needs assessments and audits of existing services and piloting of activities. Interventions that included any of these activities were labelled 'intervention preparedness' to describe the formative nature of the work and highlight the importance of this preparation phase in intervention design and implementation.

A second group of interventions shared commonalities around partnership working, building professional networks, collaborating at the individual and organisational levels and investing in increased amounts of interaction between intervention participants. We assigned the name 'collective action' to describe these activities. Although these types of interventions had less tangible outcomes than some other activities, they were numerous within the Healthy Towns programme; many interventions incorporated elements of collective action even if this was not the primary focus of the intervention.

Table 5: Examples of interventions that fit the emergent themes of intervention preparedness and collective action

Emergent BCW theme	Intervention description	Intervention theme	Justification for new coding theme
Intervention preparedness	Audit of the cycle network to understand pattern of current use, location of current facilities and awareness of complex pattern of journeys, both existing and potential. Propose measures	Active Travel	An audit constitutes formative work to collect data that may inform a future intervention to improve active travel options

	to enhance network and encourage more people to cycle		
Collective action	The establishment of a food policy council to bring together the community, public, private and voluntary sectors with a commitment to source food within 50 miles of [Healthy Town]	Other	Partnership working and forming collaborations constitute the primary activities which are not well captured by the BCW

There was some incompatibility between intervention functions and policy categories. 3.0% (n = 9) of Healthy Towns interventions were assigned to categories that are not linked according to the original BCW work (Michie et al., 2011). Incompatibility arose between intervention functions linked to communication/marketing and environmental/social planning.

3.2 Discussion

Healthy Towns is a very heterogeneous programme of interventions which builds on existing projects, observed local need and individual town aspirations, to fit the brief advocating an innovative approach to reducing the prevalence of obesity. Thematic analysis of intervention descriptions and categorisation by activity theme and using the behaviour change wheel provides a systematic description of the different kinds of interventions in the Healthy Towns programme. Intervention activities can be grouped into five main thematic areas; physical activity, active travel, growing, planning and 'other'. The BCW offers a useful tool to impose order on this heterogeneity and categorise and describe the Healthy Towns interventions. The summary presented here demonstrates the dominance of 'service provision' interventions developed through HCCF funding.

Although the total amount of HCCF funding allocated to each Healthy Town has been publicised, no cost effectiveness data is available making any additional assessment of the funding very difficult. Most Healthy Towns interventions were either explicitly or implicitly targeted to certain sub-groups or communities (often the most deprived) in the local area therefore cost per individual receiving the intervention is likely to be high and vary greatly. Additional analysis of the spatial equity of Healthy Towns activities (see Chapter 5)

suggested interventions were generally well located for targeting those with the greatest need.

Education and enablement activities exemplify problems with the categorisation of interventions. The former is indicative of a structured learning experience and may not be as applicable to more informal activities where the onus is on informing participants rather than delivering a set syllabus of knowledge, for example developing maps of local walking and cycling routes to improve awareness of active travel options. We used the BCW to give a broad description of the programme however it was difficult to fully capture multi-level or ecological activities funding from the HCCF as these were often diffuse and poorly defined. This resulted in huge diversity of target population, expected outcome and operational level, which made coding to specific intervention functions and policy categories complicated and difficult.

The data for this study were the intervention descriptions taken from the project initiation documents submitted by each Healthy Town at the start of the programme. There was considerable variation in the detail and structure of information given, which may have reduced the accuracy of the coding of some interventions if these descriptions were misinterpreted. Although every effort was made to update interventions that changed during the funding period, it is possible that not all amendments were captured and some interventions may not have been implemented as originally planned. The BCW is a useful l tool to categorise interventions but was not able to capture some of the detail and certain types of interventions that were included in the Healthy Towns programme. The integrated system of behaviour change within the framework was useful to gain an insight into the mechanisms that interventions may operate through but the multiple components and complexity of some interventions did not map well onto this model.

3.3 Conclusion

The BCW is an easy to use, theoretically grounded framework which provides a systematic method to categorise interventions such as Healthy Towns, a programme of complex, heterogeneous and multi-component interventions that vary considerably in their theoretical basis. Using Healthy Towns as an empirical test showed the BCW is capable of

being used as a taxonomic tool to provide clarity about programme activities although given its origins in behaviour change theory, cannot be used to categorise all interventions in this programme. The emergent themes of 'collective action' and 'intervention preparedness' may be useful in addressing some of the existing limitations of the framework and broaden its use for categorising and describing complex interventions but capturing sufficient detail of interventions remains an issue. Using the BCW to provide a comprehensive yet simple descriptive overview of a heterogeneous programme of interventions enables a clear understanding of the core activity functions and mechanisms.

4. Were environmental and infrastructural interventions equitably delivered?[2]

In this chapter we assess whether the physical infrastructure interventions were equitably distributed in each of the nine towns. We investigate whether infrastructure developed from the Healthy Towns programme was optimally located in relation to community need, according to the socio-demographic characteristics of neighbourhoods.

4.1 Methods

We assessed the spatial equity of the delivery of these interventions by identifying the spatial extent of the infrastructural developments in relation to the distribution of key population groups. We examined whether particular groups were advantaged or disadvantaged in terms of local provision. In addition, funding allocations per town and by population diversity were examined to see if successful delivery of interventions varied according to the funding context. The evaluation considered the possible existence of trade-offs whereby interventions aimed at more than one population group, may have favoured one group at the expense of others in a given location. A full description of the methods employed is given in Chapter 2.

4.2 Findings

A total of 183 individual pieces of infrastructure that were either complete or in progress were identified across eight Healthy Towns. Of these, 80 (44%) were classified as 'physical activity' (e.g. green gyms and play areas), 59 (32%) as 'active travel' (e.g. walking maps and signed cycle routes), 39 (21%) as 'food systems' (e.g. community cafes and allotments) and 5 (3%) as 'healthy lifestyle' (e.g. advice centres and information trails). The most common types of intervention were outdoor play areas/green space (27%), walking/cycling mapping/signage (23%), food growing (18%) and walking/cycling routes (11%).

[2] This chapter is based on the paper: Dalton A, Jones A, Ogilvie D, Petticrew M, White M, Cummins S (2013) Using spatial equity analysis in the process evaluation of environmental interventions to tackle obesity: the Healthy Towns programme in England. *International Journal of Health Equity* 12:43

Table 2 shows the relationship between town size and per-capita funding according to the number of people in each town and those within a ten minute walk. Greater overall funding was associated with lower per-capita funding for the majority of population groups.

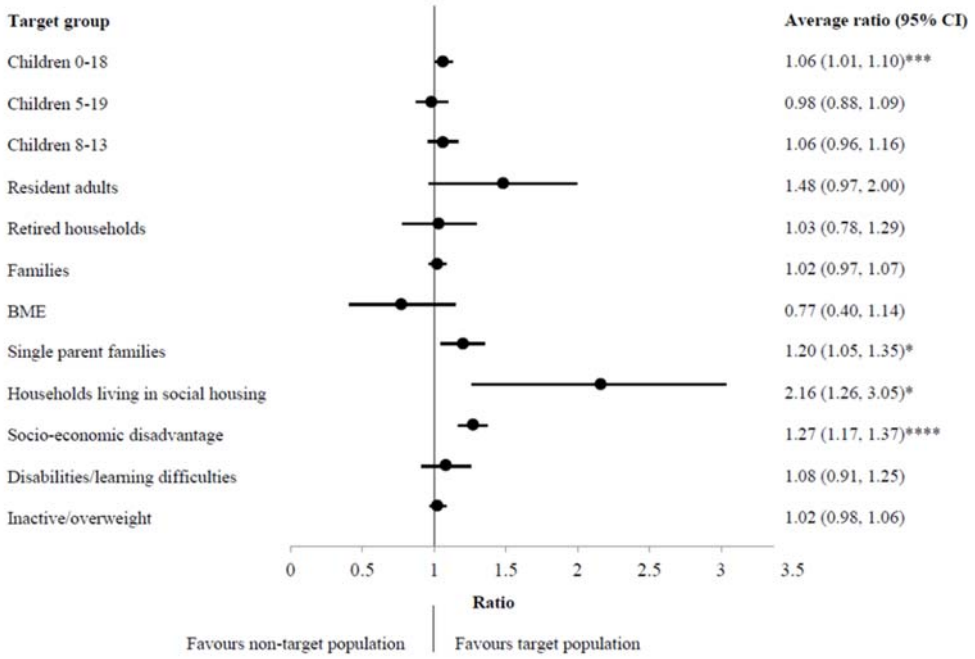
Table 2. Per capita funding from the Healthy Towns programme

		Funding per capita (£)[1]									
Town size group	Mean fund per town (£M)	All people	All people with good access	BME	BME with good access	Child	Child with good access	Retired	Retired with good access	Socio-economic disadvantage	Socio-economic disadvantage with good access
Small	1.05	59	63	1538	1590	237	249	666	693	272	283
Medium	3.07	20	29	240	288	79	116	203	299	95	134
Large	4.68	14	43	96	406	58	172	183	504	68	196

[1]Values are per capita except those for retired populations, which are per household. Funding per capita refers to the money spent divided by the number of people in each population group. Good access refers to the number of these people that live within a ten minute walk of new infrastructure.

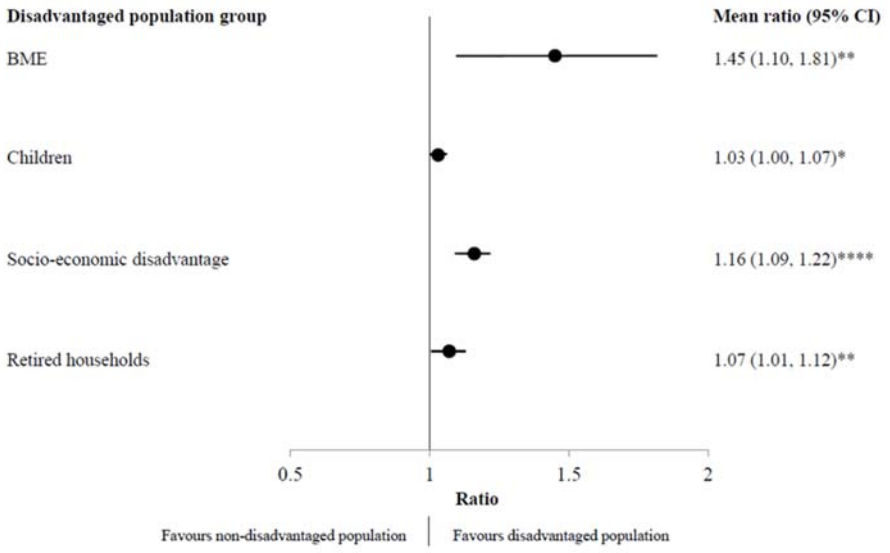
Figure 2 shows the target population group of each town along with the associated average targeting ratio. For all population groups except BMEs and children aged 5-19, ratios were above unity suggesting that infrastructure tended to be positioned in areas where the associated target population group lived. However, few of the estimated targeting ratios were statistically significant. While the targeting ratio for interventions targeted at socio-economically disadvantaged populations showed the highest statistical significance (targeting ratio 1.27, 95% CI 1.17 to 1.37, $p<0.001$), the largest targeting ratios were observed for social housing households (2.16, 95% CI 1.26 to 3.05) and resident adults (1.48, 95% CI 0.97 to 2.00). When targeting ratios were examined in relation to the four identified generally disadvantaged population groups (Figure 3), the ratios were all above unity, suggesting that the locations of infrastructure tended to favour these groups even if they were not necessarily the target population. Indeed, a comparison with Figure 2 shows that BMEs were more favoured overall (1.45, 95% CI 1.10 to 1.81) than for infrastructure specifically targeted at them (0.77, 95% CI 0.40 to 1.14).

Figure 2. Mean targeting ratios by target population group



Notes: * p <0.1, **p <0.05, ***p <0.01, ****p <0.001; p values from Student's t-tests

Figure 3 Mean targeting ratios by disadvantaged population group



Notes: * p <0.1, **p <0.05, ***p <0.01, ****p <0.001; p values from Student's t-tests

Analysis of the mean targeting ratios according to intervention type and category showed that the majority of average ratios were above unity, suggesting that these populations were generally well-served by the items of infrastructure, although most did not reach statistical significance.

There was no evidence that overall population clustering was associated with targeting ratios (Table 3). However, when disaggregated by population group, there was evidence that targeting ratios were lowest in the most clustered populations for BME populations, whilst for socio-economically disadvantaged populations the highest ratio was observed in the most clustered tertile.

Table 3. Mean rank of targeting ratios for disadvantaged populations by tertiles of clustering

Group	Tertile 1 (least clustered)	Tertile 2	Tertile 3 (most clustered)	p value[1]
All	359.9	367.5	371.5	0.83
BME	111.2	96.9	72.3	<0.001
Children	82.1	98.3	96.3	0.18
Socio-economic disadvantage	85.7	73.5	111	<0.001
Retired households	81.4	98.2	94.1	0.2

Notes: [1]Kruskal-Wallis test

The average targeting ratio, according to mean rank, was significantly associated with the number of target groups for each intervention (p = 0.003), although the highest mean rank (139) was found for interventions targeted at the largest number of different groups (six), suggesting that multi-target population interventions tended to be better rather than more poorly targeted (full results not shown).

4.3 Discussion

Our findings suggest that infrastructure developed within each Healthy Town generally met our criterion (the targeting ratio) for spatial equity and this was independent of the amount of funding received. This was most statistically significant for socio-economically disadvantaged populations, which is in keeping with the evidence that some of the towns specifically identified generally disadvantaged areas to be targeted in their project initiation documents. We suggest that certain types of intervention may be less easy to locate with respect to populations who may particularly need them due to the nature of the resources they require. An example is food growing and food systems, reflecting limitations caused by

the need for suitable land for these types of infrastructure programme. Spatial clustering of population groups was not associated with the success of spatial targeting in general, although areas with the high concentrations of socio-economically disadvantaged groups did experience highest targeting success. This illustrates how infrastructure providers can face particular challenges in areas where populations of need are not concentrated in particular places. We found no evidence that interventions targeted at more than one population group were less well located.

Examining where interventions were located in relation to who they were aimed at and the local context, as recommended by UK guidance, suggested that the Healthy Towns intervention was operating as it was initially intended in this respect. Thus, incorporating spatial equity analysis into the process evaluation of an environmental intervention allowed us to examine if the resources were directed to the most appropriate locations, a question which is appropriate to the current early stages of an intervention such as the Healthy Towns programme. This is important in the context of evaluating environmental interventions, as health inequalities (and therefore population need) vary spatially and therefore need careful spatial planning to ensure intervention success. The findings from this initial analysis may inform subsequent evaluation stages, providing explanation for outcomes, impacts and costs/benefits that may otherwise not be detected: our findings suggest that if the Healthy Towns programme is not successful and health inequalities are not reduced, it will be for reasons other than poor spatial planning. Indeed, qualitative evaluation of the implementation of the Healthy Towns programme has suggested that these reasons may include insufficient time, lack of evidence and poor alignment with national priorities. We have generated new knowledge in the form of explicit, transparent and accurate information about the locating of infrastructure, thereby improving the evidence base for decision-making.

Our work has some limitations. Defining the area of an intervention required a number of assumptions. The definition of a ten minute walking distance to approximate ‘good’ access was based on distances commonly used in the research literature, although some people will walk further to reach certain amenities, whilst others will be less mobile. In reality accessibility will vary by these individual characteristics. Because we did not have

information on the locations of pedestrian only cut-throughs, common in urban areas, we used straight line distances rather than network distances when calculating accessibility. As just 183 new pieces of infrastructure were funded from the Healthy Towns programme, the sample size was limited for statistical analysis, particularly stratified analysis. In addition, we had no information regarding the quality of the interventions. Our population data were taken from the most recent (2001) Census of Population in England and Wales but this does mean that they reflect the local population almost ten years prior to the introduction of the Healthy Towns infrastructure.

4.4 Conclusions

We have established that infrastructure provision from the Healthy Towns programme in England was generally spatially equitable in that it was located in areas of highest population need, suggesting that in contrast to the literature on environmental disamenities, disadvantaged populations do not necessarily lose out when environmental modifications are made. With careful planning and implementation of interventions, therefore, interventions need not necessarily result in deprivation amplification.

5. How was the Healthy Towns programme theorised and translated into practice?[3]

In this chapter we report findings related to programme theory and early intervention development. We investigated how key informants understood and 'theorised' the Healthy Towns approach to obesity prevention policy, and how these 'theories' were then translated into practice. We then reflect on how far interpretation and implementation of the programme mirror current academic thinking around environmental and 'systems-based' approaches to obesity prevention.

5.1 Methods

Participants were purposively selected to represent local programme management members, and key national policy actors involved in the development and delivery of the programme. The final sample included nine programme directors, nine board members and two national policy actors. In the six towns where programme directors were not involved in programme development from the early tendering and implementation stage, we interviewed board members who were.

Semi-structured qualitative interviews were undertaken and included questions surrounding the origins and history of the programme; its underlying rationale, and programme design, development, implementation and management. Within these broad questions participants were specifically asked about their understanding of the 'obesogenic environment', what they thought of national support and guidance offered for intervention development, and how the approach promoted by the fund informed the way the local programmes were designed and developed. Analyses were guided by two core research questions: (1) how had key informants understood and 'theorised' the Healthy Community Challenge Fund approach to obesity prevention; and (2) how were these 'theories' then translated into local programmes of interventions? Direct quotes from national policy-makers were removed to preserve anonymity and a summary of their responses presented instead.

[3] This chapter is based on the paper: Sautkina E, Cummins S, Petticrew M, Jones A, Goodwin D, White M, Ogilvie D (2014) Lost in translation? Theory, policy and practice in systems-based environmental approaches to obesity prevention in the Healthy Towns programme in England. *Health & Place* 29; 60-66

5.2 Findings

Findings suggest that there was a clear disconnection between how a 'systems-based' environmental approach to obesity prevention was theorised by informants, and what was then implemented in practice. Despite having a general theoretical understanding of what such an approach might entail, informants in the nine towns instead described implementation in terms of delivery of a traditional multi-component approach, which excluded references to the key characteristics of systems, such as complexity. It was suggested that a greater steer and some supplementary support from central government on how 'systems-based' environmental approaches should be designed and implemented would have been helpful in this regard. Below we illustrate how this approach was theorised at the national and local levels, how it was translated into practice, and which factors have affected implementation.

5.2.1 A new approach to obesity prevention When designing the Healthy Community Challenge Fund, national policy actors described a strategy that prioritised an environmental approach to obesity prevention but recognised that it would be desirable to undertake this with within a broader 'systems' framework. Taking such a perspective would allow policymakers and practitioners to learn how different elements of a programme focused on environmental approaches to prevention would work individually, in relation to each other, and as a whole 'system'. At the same time, the acknowledged need to develop a comprehensive approach to tackling obesity suggested that although environmental approaches were necessary, they represented a partial solution. Within this context national level policymakers expected that local areas were to adopt a 'systems' approach to delivery.

However, despite the intention to implement a 'systems' approach, there was a lack of a "shared understanding" about how to communicate this in the policy context of Healthy Weight, Healthy Lives. Thus, there appeared to be difficulties reconciling the aspiration to implement an innovative 'systems-based' approach, as described in the HCCF tender

document and the way such an approach had been described in Healthy Weight, Healthy Lives. In this context local actors had to interpret the aims of Healthy Community Challenge Fund independently and then implement the programme on the ground.

5.2.2 Theorising the healthy community challenge fund 'on the ground' Local actors understood that tackling the 'obesogenic environment' was the primary focus of the fund, but their definition of the 'obesogenic environment' was expressed in two separate, though related, ways that mirrored the articulation of this approach in Healthy Weight, Healthy Lives. Though the dominant narrative was holistic, describing a 'system-wide' perspective, other informants expressed a more reductionist approach centred around isolating single or multiple environmental or other determinants of obesity as targets for action.

'System-wide' perspectives were primarily expressed through references to interrelationships between elements of the 'obesogenic environment', as well as interactions with the wider context:

The 'obesogenic environment', it is not just the physical environment, it is about the physical, it is about the social, the psychosocial, all of those things influence our environment. It is almost like remapping the wider determinants of health really, but you could just put obesity at the top of it, everything influences that. (Programme manager, Local area G).

It is a spider model of web of causation, just as everything and anything finds its way back contributing obesity and the wider environment. (Bid development manager, Local area F).

This perspective was often accompanied by references to a multi-scale view of the 'obesogenic environment' that emphasised the broader context in which particular towns were located:

I think everywhere is an 'obesogenic environment', as far as I understand it, (…) Britain today, as opposed to particular cities or towns in general. And I think we could go on all day about 'obesogenic environment' and all the different things that impact on it; I don't think G [name of local area] got anything particularly. (Programme manager, Local area G).

You know, C [name of local area] is much like other [places] in the country in the sense that a lot of these elements of society are nationwide rather than locally specific. (Programme manager, Local area C).

This suggests that respondents' understanding of the 'obesogenic environment' was not tied to any particular "locally specific" context but was embedded within, and symptomatic of, a wider, inherently obesity-promoting system.

While other informants referred to the various elements that comprised the 'obesogenic environment', references to interactions, feedback loops and other key characteristics of systems, such as complexity, were noticeably absent from these descriptions:

We took quite a simplistic view around things like the environment can obviously either hinder or support walking for example, and it can hinder or support children playing out in an informal way. (Programme manager, Local area B).

Yeah, it was on one particular issue around healthy eating, active travel and physical activity, subsumed under 'obesogenic environment'. (Bid development manager, Local area D).

Informants instead emphasised an approach taking a "simplistic view" rather than one which embraced complexity, focused on identifying specific risks that are hypothesised to contribute directly to an obesity-promoting local environment.

5.2.3 Translating theory into practice Despite the majority of local informants having some understanding of the 'systems-based' theories and concepts underlying the programme, when it came to the task of translating these into practice, informants outlined the challenges they faced in implementing a 'systems' approach:

We did put a lot of effort into trying to join up the different interventions, and we have project leads meeting regularly, so some of them have developed strong connections. But otherwise it falls to the central team to knit all that together, and that's quite a big challenge, there's so many things that we could try and make a stronger connection with, but you can't, you have to come back and say: 'I've got to manage my programme and my projects, and make sure they deliver'. Sometimes people say: 'Isn't sport the answer to this?', and you're quite conscious of it, but you can't do everything. Having said that, there's lots of other people who have those connections, so you have to some extent rely on the fact that those people are making those connections. (Programme manager, Local area D).

This informant suggests that generating links between projects was challenging, particularly in an environment where there was focus on specific programme strands in order to "make sure they deliver". This organisational focus on the delivery of individual programme elements was replicated in other towns, which did not correspond with the aim to implement a 'system-wide' approach. As a result, the majority of towns focused on multi-

component approaches and placed an emphasis on tackling specific environmental determinants in order to reshape the wider physical environment:

It is about changing the environment so that it's easier for people to be more active, and just generally lead a healthier lifestyle, which is things like making it easier for kids to cycle to school, putting in cycle routes, but it's also looking at things like when building schools for the future, think about health. (Programme manager, Local area A).

We wanted to see whether we could change aspects of the environment to make it easier for people to get out walking, or playing, or growing their own. It's just about getting people outside. (Programme manager, Local area B).

Approaches adopted under the banner of the programme also included existing health promotion and physical environment interventions, and it appeared that respondents had not often thought about the possible synergies and interactions between these interventions, or with the wider context:

We were not too prescriptive about the interventions to implement. (…) Some people are doing food growing projects, so there are some that would have an environmental impact, but probably some of them are more around just behaviour changes and about getting people think about the issues, others are about physical activity. (Bid development manager, Local area D).

Only one of the nine towns could be said to have described a focused attempt to implement a 'systems' approach which sought to modify multiple health behaviours, at multiple levels, in the spirit of Tackling Obesities and Healthy Weight, Healthy Lives:

Although this is a physical activity promotion programme, we have factored in facilities for cooking classes, so if people come for one lifestyle behaviour change, we're going to capitalise on that one; and while people come for the cooking classes—whatever service we are doing on the physical activity. So we're trying to capitalise on the two behaviours, because you cannot separate out one from the other. (…) And now that we have changed the environment physically we need to change it philosophically, but we cannot change it philosophically if there is no environment to support it. (…) And it will have long reaching impact on a lot of agendas: schools, police, older people, intergenerational activities, health values, etc. (Programme manager, Local area C).

Overall local informants demonstrated a basic abstract theoretical understanding of what a 'systems' approach to obesity prevention might involve. However, in terms of delivery, a traditional multi-component approach to implementation and practice was described. References to key characteristics of a 'systems' perspective, such as complexity, synergy, feedback, and interaction between programme components or the wider context, were almost entirely absent in descriptions of programme delivery.

5.2.4 Theory versus action As outlined above, for the most part, the nine towns did not adopt a true 'systems-based' environmental approach. There appeared to be a gap between thinking about such an approach and implementing it in practice. Informants suggested that this may partly reflect assumptions made at the national level about the degree of knowledge and understanding of what constituted a 'system-wide' approach at the local level.

At the first stage of tendering, this lack of clarification was seen as one of the main reasons for differences in interpretation of the aims of the programme. Proposed approaches to tackle the 'obesogenic environment' varied in nature, and 'systems-based' approaches were not articulated in the majority of first-stage applications. At the second stage of the tendering process, innovation and diversity were favoured as key attributes of successful

bids, in order to generate evidence on how best to tackle the 'obesogenic environment'. This situation was echoed by key actors in local areas who referred to uncertainty surrounding the idea of an 'environmental' approach to obesity prevention. In particular, they were concerned with how oriented towards 'systems' or 'physical environment' interventions local programmes were expected to be:

We were told: 'There is Food, Nutrition and Physical Activity', on the other had we started to get steers saying: 'Well, we are actually looking for environmental, walking and cycling changes', so we were unclear when we put our bid in whether we had done enough around walking and cycling. (Bid development manager, Local area H).

Although this national programme was about testing the environmental approaches to tackling obesity, which for me meant things like Foresight [Tackling Obesities] and some of the NICE guidance material, it felt like quite a lot of the programmes chosen were more individually focussed; I wasn't sure how much the environmental theme was sustained across. (Bid development manager, Local area D).

5.3 Discussion

The Healthy Community Challenge Fund was established to pilot and test community-based environmental interventions to prevent obesity within a broad 'systems' framework. Our results demonstrate important differences between how informants theorised a 'systems' approach, and how this was then translated into practice. Despite articulating a general theoretical understanding of what a 'systems-based' approach to obesity prevention might entail, in practice towns instead tended to rely on more 'traditional' multi-component risk-factor based approaches to programme delivery. Only one town could be said to have attempted to develop and implement a set of environmental interventions within a 'systems' perspective, but even here this approach was implicit rather than explicit.

5.3.1 Clarity and uncertainty Informants emphasised uncertainty about the aims and objectives of the programme at both the national and local level. At the national level this included a limited 'shared understanding' between policymakers about what a 'systems-based' response to obesity might be. Although policy documents such as Healthy Weight, Healthy Lives advocated a 'joined-up' strategy, there was limited existing guidance about how this should be achieved in practice. In addition the Guidance for Local Areas, (Cross-Government Obesity Unit, 2008) an appendix to Healthy Weight, Healthy Lives which was intended to clarify this strategy, presented "the delivery chain" in a structured, linear and hierarchical way, which did not correspond to the 'systems-based' environmental approach described in the Tackling Obesities. This highlighted as a problem by informants in each of the individual towns, who would have benefited from a greater steer and some supplementary support from central government on how 'systems-based' environmental approaches should be designed and implemented. As a result there was uncertainty over what programmes and interventions should have been prioritised and developed as a result of the fund, which in turn led to a reliance on less risky and more traditional interventions and modes of delivery.

5.3.2 Translating 'systems' thinking Overall, informants had a broad understanding of the main elements of an environmental approach to obesity prevention, but this was not matched by their articulation of 'systems thinking'. Instead, this articulation reflected a more linear and established 'risk-factor' approach, whereby the task was to identify individual environmental determinants of diet and physical activity and then develop and deliver appropriate interventions that might influence them. This articulation was a direct response from clear 'steers' to focus on physical environment programmes which were seen by some informants as being somewhat at odds with the original aims of the programme. There was little articulation of more abstract properties of systems such as synergies and interactions between interventions, non-linearity, multiplier effects, phase shifts and feedback loops (Shiell et al., 2008) and little evidence of these abstract ideas being implemented in practice. In part, this may have been due to insufficient time for teams in local areas to think through the strategies for developing and implementing the programme (Goodwin et al., 2012). This finding mirrors much of the current research and policy

literature on 'systems thinking' in public health, which tends to focus on developing the underlying concepts around 'systems' thinking, (Hawe et al., 2011 and Diez Roux, 2012) but provides little guidance about what might actually constitute a 'systems-based' intervention, how it might be delivered in practice, and how it might be evaluated.

5.3.3 Bridging the gap between theory and practice: the challenge of localism The Healthy Community Challenge Fund was presented as an opportunity to shift obesity prevention from an approach focused purely on the individual to one which included environmental and population-level strategies. While it is apparent that a true 'systems' approach was not implemented in the programme, towns did seize the opportunity to develop and deliver environmental programmes and interventions which represented a clear break from past practice. The aims and objectives of the Healthy Community Challenge Fund were seen as important, and there was an appetite to deliver them; but the results reported here suggest that policymakers need to produce clearer articulation of the policy vision in situations where this is substantially different from approaches undertaken in the past.

This has implications for the current 'localism' policy agenda in the United Kingdom which decentralises decision-making and responsibility for the delivery of public health and other services to local areas (Department for Communities and Local Government, 2010). Understandably towns responded to the complex, daunting and risky task of implementing a system change to affect a health outcome via a set of complex and poorly understood causal pathways by relying on existing approaches. In this context it may be important for central government, in the future, to provide the tools, knowledge and intelligence to support the local delivery of true 'systems-based' approaches in order to avoid uncertainty at the local level. Failing to do this may result in 'default' to a simple "aggregation" of individual intervention components and may therefore result in weak prevention (Hawe et al., 2009).

5.4 Conclusions

'Systems-based' and environmental approaches to obesity prevention are currently being promoted by researchers and policymakers as solutions to the obesity epidemic (Government Office for Science al., 2007, National Institute for Health and Clinical Excellence, 2012). Much of this work has focused on theorising a 'systems' approach; however our results identify clear challenges to implementing these theories and policies in practice. Though towns had some understanding of what was required from the spirit and ethos of the Healthy Community Challenge Fund, there remained a degree of uncertainty over programme content and delivery. This resulted in towns retreating back to traditional multi-component approaches to prevention. When implementing 'systems-based' approaches, local practitioners would benefit from a clear policy vision at a national level in order to reduce uncertainty over the 'what' and 'how' of delivery, along with sufficient time to develop their approaches. The development of clear, practical guidance on implementation should form a central part of future 'systems-based' approaches to obesity prevention

6. How was evidence used and generated in the design and evaluation of interventions?[4]

The example of the Healthy Towns programme allows us to answer questions about how interventions and programmes can be developed in policy areas where the evidence base is still in its infancy, where the rapid development of policy may outpace the evidence, or where there is a particular policy impetus to be seen to 'get things done' (Petticrew et al, 2004).

With these broad questions in mind, this chapter presents findings gathered from interviews designed to collect information from the key stakeholders in the development and implementation of the Healthy Towns programme at the national and local level. The aim of the chapter is to first examine how evidence was sourced and used for programme development, and second to assess the potential for the programme to contribute to the evidence base on the effectiveness of environmental interventions in tackling obesity and obesity-related behaviours. We focus on what stakeholders regard as evidence and the influence of these views on programme development and policy innovation.

6.1 Methods

Participants were purposively selected to represent successful HT bid and management teams and key national policy actors involved in the implementation of the HCCF and the allocation of HCCF funds. The final sample included nine HT programme directors, nine HT board members, and two national policy actors. In six towns where programme directors were not involved in programme development from the bidding and initial implementation stages, interviews were conducted with programme board members. One or two board members were interviewed in each of the towns. All participants provided written informed consent to be interviewed.

[4] This chapter is based on the paper: Goodwin D, Cummins S, Sautkina E, Petticrew M, Ogilvie D, White M, Jones A, Wheeler K (2013) The role and status of evidence and innovation in the Healthy Towns programme in England: qualitative stakeholder interview study. *Journal of Epidemiology & Community Health* (67) 106-112

Interviews were semi-structured, allowing the interviewers to explore emerging themes as well as salient issues in relation to the HT programme. Interviews with stakeholders included questions surrounding the use of evidence in the development of HT interventions and the potential for the generation of evidence that might contribute to local or national policy. Interviews with policy actors explored the role of evidence in the genesis of the programme, the aims of the bid and selection process, and requirements for evidence generation through programme evaluation. The majority of interviews were face-to-face, with one conducted over the telephone. Interviews were conducted during July and October 2010 by two authors (ES and KW), and lasted between 50 and 110 minutes each. Interviews were audio-recorded and then transcribed verbatim.

Thematic analysis was guided by three broad research questions: [1] What was considered to constitute 'evidence'? [2] What role had evidence played in programme and intervention development, and the stimulation of innovation? [3] What was the HT programmes' capacity for evidence generation in order to inform policy and develop and refine environmental interventions to tackle obesity? Interview transcripts were coded and analysed thematically. Transcripts were read and coded by the two lead authors (DG and SC), using the broad research questions as an initial coding framework. Codes were abstracted, and resultant themes clarified through discussion. In addition, the coding process also generated a list of emergent themes within the context of the broad research questions. Themes were then discussed by DG and SC, and dominant themes related to the three broad research questions were identified and mutually agreed. These initial analyses were then explored with all authors, with the two lead authors refining the coding on the basis of group discussion. Throughout the analysis the interpretation was compared with the verbatim data. Direct quotes from national policy-makers were removed to preserve anonymity and a summary of their responses presented instead.

6.2 Findings

Accounts of sourcing evidence to support bids and programme development suggested that while the prevalence and causes of obesity were considered well documented, there was a

lack of national practical and empirical evidence-based resources to support the design and implementation of interventions. The use of evidence on the effectiveness of interventions was rarely mentioned by stakeholders, with national policy actors stating that research was not considered beyond that which was reported in the original Foresight report.

"We recognised at the end of the day we wanted to reduce obesity levels, and as you know the evidence base in terms of how best to do that is very, very poor, there's no model approaches anywhere to do that. […] I remember going through various relevant NICE guidance reports and I was thinking 'well it's all very interesting, but at the end of the day it doesn't really amount to much'. It says like well walking's a good thing, so we've got quite a big emphasis on walking in our programme. It doesn't really take you much further in terms of how to do it. So we felt we had to work that out pretty much ourselves. So certainly I think we were aware of the evidence base but we were fairly sceptical as to really how useful it was or is now frankly."

(Town B Programme Development Manager)

"Well as I say some things definitely did have evidence, like the standard transport, travel data and in terms of accidents, travel to school, the high ratio of car-borne or whatever. So there was evidence there to support some projects, but I don't know how strong an evidence base was for all of those projects. I suspect not fantastically strong and that's something which with the evidence from this programme, and from the joint investment programme work that evidence-base will be there now going forward to some extent."

(Town F Programme Development Manager)

6.2.1 What is considered as evidence? Towns considered three main sources of evidence to inform bids and intervention development. The first was anecdotal evidence, primarily produced within each town and largely based on local evaluations of existing interventions and previous public consultation. The second source was local routine data, such as those from travel surveys or the National Child Measurement Programme, which were used to identify gaps in existing provision. Thirdly, national policy and guidance

documents such as the Foresight report, Healthy Weight, Healthy Lives, and National Institute for Health and Clinical Excellence (NICE) guidance were examined to ensure that interventions addressed barriers related to health inequalities and were in keeping with existing political priorities.

"So the interventions were chosen based on evidence from what we know, that perhaps had been tried before either here or elsewhere, because not everything is written up nicely. We all say it far too many times – we are too busy doing the job to write up what we've done."

(Town G Programme Development Manager)

"From reviewing the available evidence at the time, we recognised that walking-based interventions were said to be quite promising, active play similarly with children. Growing your own fruit and veg was something else we were keen to explore, although I don't think there's any particular evidence base. Also healthy food options was a fourth sort of component we were keen to see covered in the programme."

(Town B Programme Development Manager)

"So another way which informed the selection of topics or choices, but it happened at the strategy development stage, was that you looked at the evidence like Foresight. We looked at what are the barriers and we actually put that in our bid. For each area around environments we looked at the barriers and then said how our interventions would address the barriers."

(Town D Bid Development Managers)

"We've got quite a big food team in the city, working in health improvement, so they had done quite a lot of work on some of the interventions which we expanded. So there was evidence there that it worked and we had other things that we've had prior to this that didn't work, so obviously we didn't want to expand or use those or we knew we'd have to do

more work to look at whether those could work in a different way. But everything we did, we ensured that it was evidence based."

(Town A Bid Development Manager)

Town bid managers applied concepts and approaches that had been implemented elsewhere in England or were currently taking place in their own towns to inform intervention development. They predominantly relied on anecdotal evidence – which they considered abundant and influential – in governing their bid development, even though these data could not support robust inferences regarding what the likely effect on health outcomes might be. For example, the case for expanding existing programmes where an infrastructure was already in place was enhanced by the individual experiences and expertise of practitioners working within their respective fields. This was justified on the basis of the experiences and observations of professionals who had already delivered similar programmes within a community setting "*because not everything is written up nicely".*

6.2.2 An innovation – evidence paradox? Because one of the aims of the programme was to pilot innovative interventions, some interviewees described the unique opportunity afforded by the funding whereby new approaches could be developed and tested by taking a *"leap of faith"* and *"giving it a go"*, in order to produce evidence to inform the design of future programmes and policies.

While the opportunity to be innovative and pilot new interventions was welcomed by the towns, many were also aware of the political need to implement interventions that could not be seen to fail and could produce favourable outputs. In the initial bidding and implementation process, the Department of Health (DH) advocated for innovation in programme development and piloting, while also requesting details of potential outputs. This collation of detailed information on anticipated intervention outputs was viewed as challenging as stakeholders often felt unable to predict what would work as a result of system change, and therefore what the likely health impacts might be.

"The [outdoor facility] for instance, there's no evaluation been done on that… There's three or four of them that were put in the country, but there isn't any real evidence base to say 'Spend £150,000, that outdoor facility will work.' But the Department of Health had been clear that some of the things were for piloting; some things were to give them a go. […] There is an assumption that more people will cycle if you sign it right, if you promote it right, if you give people opportunities but actually the evidence isn't there that in 10 years' time you will have more and more cycling. […] it's more than a leap of faith, but if you give people the opportunity to be more physically active, if you promote it right, if it comes with something that the community wants to do, it has more viability and more potential to work."

(Town H Bid Development Manager)

"So you know I read into this bid that I think the government had deliberately put aside a pot of money to actually try some new things which were not evidence based in order to try and produce evidence of the kind that it doesn't work or it does work or like that, which I think was a challenge…"

(Town F Bid Development Manager)

"We have had it emphasised to us over and over again that this is a pilot, we just want to see how it progresses, we're learning from this. But actually my instinct told me that at some point it was going to be about bums on seats, which actually has happened because it has tightened up a lot more in terms of outputs, how many people have you had going through and that's because of this, […] the politics of having a new government and all that sort of thing, in fighting to get the funding and that's happened."

(Town B Programme Development Manager)

"I think we wanted a bit more understanding really because the government on the one hand they were saying 'Look, be very creative, be very exploratory, be very developmental,

let's learn lessons from all of this', yeah that was one of their angles which was great, we were very much in favour of that. However on the other side the same people were saying 'Look we want it all tied down in great detail, you know in the old style in terms of inputs, processes, outputs and stuff', and that didn't really match up to well."

(Town B Programme Development Manager)

"We want to know what your outcomes are… I think, we all struggled with that because what we were saying is, 'you can do pilots and tests and what doesn't work is as important as what does work, but we want to know what you think your outcomes are' […] I can understand that we want outcomes, because that's important, but to do that in three years, realistically is not going to happen. This is a longitudinal, hopefully, attitudinal change… So I think that, we could have done with some help around what do you class as an outcome and what do you class as cost-effective and I think we asked for workshops around that originally, but we did not get them."

(Town H Bid Development Manager)

6.2.3 Generating a legacy: missed opportunities and the potential for local learning In addition to using evidence, it was expected that evidence would also be generated. The sheer heterogeneity of developed interventions made it difficult to for towns to synthesize findings across their programmes, reducing the opportunity to evaluate programme level impact. There was a general view from programme directors and board members that a lack of clarity around what constituted an impact evaluation created barriers to producing robust evidence on the health impact of interventions. Interviewees suggested that the DH should have provided a stronger and more focused direction for evaluation at the start of the programme.

"I think if you are giving away £30 million you should be really clear at the beginning: 'This is what we expect the evaluation to look like.' We know that there are individual nuances within each project, but actually it's the evaluation… it is as important as the product that

we are delivering and the services that we are delivering. And I think that they just said: 'If you evaluate it that will be fine'. I think we've lost something around what works in this process because people have done it differently [...] I think there was a real potential to get some real good evaluation out of this."

(Town H Bid Development Manager)

"A lot of our evaluation will be about process but we clearly need to… we have attempted to try and at least head towards some outputs and some outcome evaluation measures. But as you can appreciate it's a real challenge because we've got something like 30 different projects across four themes doing a whole range of different things, all trying to achieve something slightly different […] We clearly couldn't end up with nor afford, nor would it be right, to evaluate each one in terms of the outcomes."

(Town F Bid Development Manager)

Interviewees deemed process measures, such as demographic and performance indicators (e.g. attendance figures) as realistic outcomes to assess in the time available. They also viewed the generation of such data as a unique opportunity to produce local evidence on what worked to assist with future intervention selection. Even if interventions were not successful, the evidence would still provide a learning opportunity and help ensure any mistakes were not repeated in future interventions.

"Obviously with all the budget cuts, I think it will help us to be very clear about how we choose to spend our money in the future. So it will actually enable us to be clear about what really works well and using that as evidence for why we should do things and why we should not do things. So I think that's going to really have an impact on our local policy and practice."

(Town A Bid Development Manager)

"So if something hasn't been a particularly good project or it hasn't delivered the outcomes we wanted as long as we've learnt from that, the success will be our learning and making sure we don't make the same mistakes again. So I see everything as a positive, an opportunity to review what we've done and to ensure we take some learning from it."

(Town I Programme Development Manager)

"We've got a model of best practice here and what we need to do is again leave that as the legacy for healthy towns about what is possible. We now have the evidence, you know we were saying there's not a lot of evidence, we have it locally now and it's about utilising that evidence and pushing it out there and saying right what else can you do."

(Town B Programme Development Manager)

6.2.4 The evidence generation imperative Healthy Towns was initially conceived as a learning programme intended to generate evidence to inform and substantiate future community-based initiatives for obesity prevention, and stakeholders were aware of this imperative. Overall stakeholders viewed the timeframe for the programme as ambitious and too short to produce robust evidence of effectiveness. While stakeholders considered changes in obesity prevalence important, evaluation of impact was considered difficult to report during the funding period. Timeframes were considered to be too short, and there was a desire among some stakeholders for support longer term, and for more carefully considered impact evaluations that would provide more opportunity to better assess the health impact of the programme.

"What really is the impact of what you've done? […] We can model answers saying oh it might be this or it might be that, or evidence might suggest that it might be this but you know it isn't always a way of convincing people, they need those hard facts […] I mean that's an issue for public health in general."

(Town B Programme Development Manager)

"I think one of the things that we've all said, is that it's quite difficult after a year to start seeing very much of that long-term impact happening and that's going to really take longer than that. And I think that's an issue in itself in a way because within organisations like local authorities, and I suppose the same with central government, people want to see the change happening quickly. They're not actually terribly patient about waiting."

(Town D Programme Development Manager)

"Two and a half years to produce the evidence for the kind of big scale outcomes and there was town wide measures to improve physical activity and reduce obesity. I think that was a little bit too ambitious."

(Town F Bid Development Manager)

"You're only evaluating it for three years and that would be one of my issues. I would have said, well, we've got a good evaluation, we would love to continue our evaluation over another five… we'd like to do this survey even every other year, for another three times […] and that would give us maybe a five to ten year evaluation. We've got a three year evaluation which is possibly skewed because the activities are on-going at the time we were promoting it [...] How do we know that would be a sustained lifestyle change in five years' time, which is what we are looking for?"

(Town H Bid Development Manager)

6.3 Discussion

Overall informants believed that the evidence base underpinning programme development was relatively under developed. As a result Towns often filled these 'gaps' using anecdotal and observational evidence. The programme was considered an opportunity to trial new and innovative approaches, but found it hard to predict likely specific health impacts. Towns felt that they should be adopting an evidence-based approach but this was sometimes

viewed as being in conflict with the secondary aim of evidence generation. Stakeholders believed there were missed opportunities to develop the existing empirical evidence base due to relatively under developed evaluation plans and the short time scales involved.

6.3.1 The existing evidence base Accounts of the evidence sourced to support programme development suggests that stakeholders agreed there were limited national resources and an incomplete evidence-base on community and environmental approaches to reduce obesity prevalence. There is a need to identify and generate 'trusted' sources of evidence for effective interventions that are transferable to other contexts beyond the programme in order to complement locally specific information. From the data presented here, it is clear that what is considered as evidence, how this is shaped by local context, and how this evidence then translates into local policy needs further interrogation.

6.3.2 The innovation and evidence paradox Towns felt there was paradox between the call for innovation and piloting in the HT programme, and a requirement for detailed reporting of expected outputs and targets where they felt the likely effects were unknown. While stakeholders did not dispute the need for evidence generation, the expectation that they should produce detailed evidence of 'success' or 'impact' of innovative interventions that were primarily designed to be formative was seen as difficult.

This was compounded by the programme spanning a change in government which inevitably resulted in a shift in local and national priorities and funding. In an environment where there was increasing competition for resources, town felts that this increased the pressure to deliver 'successful' programmes in order to protect their activities.

6.3.3 Generating evidence: addressing time and tension The programme placed a special focus on its potential to generate an evidence base for the effectiveness of environmental interventions in a policy area where there has been a lack of evidence. While reducing the population prevalence of obesity is a central goal of public health policy, interventions have often been implemented in ways that make it difficult to carry out

impact evaluations. Evaluation has tended to lack the level of analysis and detail required to measure health impacts that meet the expectations of government agencies, policy makers and politicians. Elements of this were recognised by stakeholders who cited the limited time allocated to plan and implement research as a major drawback, with evaluations often starting after interventions had been introduced precluding robust outcome evaluation.

Stakeholders would have liked greater guidance from the DH on what constituted acceptable outputs in evaluating the effectiveness of town programmes in order to help further synthesise evidence and practice across the nine towns. Furthermore, stakeholders felt that towns did not have the opportunity to develop long term impact evaluations beyond the three-years of HT programme funding.

In order to generate robust evidence of effectiveness, the evaluation of population obesity prevention programmes should be commissioned before interventions begin to allow time for the collection of baseline data. Sufficient time to properly design and conduct evaluations that assess the impact of population interventions on the health of local communities should therefore be built in to the policy process. However, while interventions should be routinely evaluated in order to ascertain whether they are appropriately implemented, and are achieving the expected outcomes, careful consideration should be given to the purpose and priorities of any evaluation to avoid evaluating for evaluation's sake.

6.3.4 An evidence legacy? Although the range of HT interventions and approaches meant it would be extremely challenging to synthesize all findings across the entire HT programme, the outlook for local learning was still considered good. HT stakeholders believed the opportunity to develop interventions within their towns, combined with the funding for evaluation, was a positive step in obesity prevention. Supplementary evaluations carried out by locally commissioned research teams were viewed as useful in informing the selection and development of future health interventions and for local policy-

making, particularly in times of austerity. Such a model for local control supported by local learning has been proposed by recent national obesity policy. Local evaluations are thus thought important in order to enhance the ability of most HTs to devise a system of local commissioning and implementation of strategies to tackle obesity, tailored to the needs of that particular context.

6.4 Conclusion

The development of innovative population-level programmes to tackle obesity is beset by tensions and contradictions. The mantra is that programmes and policies should be based on evidence of effectiveness, but often policy implementation is hampered by a lack of evidence of what works, and instead is driven by a political imperative to 'do something'. If innovation is advocated by policy-makers, then innovative programmes and interventions should not be unduly constrained by the demands of evidence-based practice, but be implemented in such a way that the impacts of 'risky' programmes and interventions can be meaningfully evaluated in order to contribute to developing the evidence base.

The Healthy Towns programme was viewed as an opportunity by stakeholders, but development was hampered by the lack of an evidence-base on the effectiveness of environmental interventions. Towns were generally positive about the possibility of generating locally specific evidence through evaluation to inform local level planning. However the potential for evidence generation and synthesis across the entire programme would have been greater if intervention development and evaluation had been better aligned. Future population-level obesity programmes should build in the necessary time and commitment to robust evaluation that includes an assessment of what outcomes are deemed important for policy and practice prior to programme implementation. The current findings pose a number of challenges as to how best to develop and support evaluation capacity in future interventions in order to foster knowledge translation practice, as without appropriate processes to develop the evidence base then this will be slow to develop and there will be little locally-generated knowledge to translate back to policy and future practice.

7. Barriers and facilitators to a systems approach to obesity prevention?[5]

This chapter uses data gathered from the Healthy Town programme stakeholder interviews to understand the challenges of implementing a whole systems approach, as envisaged by Foresight, as part of an obesity prevention strategy. In this chapter we focus on the barriers and facilitators that influenced operation of the principles and consider whether existing delivery structures are 'fit for purpose' in implementing whole systems approaches.

7.1 Method

Participants were purposively selected with the assistance of managers from across the nine successful towns to represent stakeholders who were involved in the planning and/or delivery of the programme. Towns were aware an evaluation of the programme would be conducted at the outset and as part of the funding agreement were required to participate in the evaluation where possible. The final sample included 72 participants who were all involved at different levels and stages of their respective town's programme, with nobody declining to participate. The breakdown of staff included members of teams that contributed in a substantial way to the initial bid in their respective towns (N=six); 2 local board members who contributed to the management of the HT programme in their towns (N=two); programme managers (N=nine) and their successors (N=six); and intervention staff who were involved in implementing and delivering interventions in five delivery themes (N=49). The five delivery themes were physical activity, community led projects, growing projects, healthy urban planning and active travel.

Interviews were semi-structured, allowing the interviewers to explore emerging themes as well as salient issues in relation to the programme (Spencer et al., 2003.) Interviews discussed the development, implementation, running and sustainability of the programme. This included questions related directly to programme governance, staffing, partnerships

[5] This chapter is based on the following paper which is currently under review: Goodwin D, Jones A, Cummins S, Sautkina E, Ogilvie D, White M, Petticrew. Is it possible to take a systems perspective in obesity prevention? Evidence from the Healthy Towns programme in England**.** *Social Science & Medicine*

working, management, evaluation, sustainability and political or economic impact. Throughout the interview stakeholders were asked to discuss any barriers and facilitators that may have influenced the achievement of each stage of programme development and sustainability.

The majority of interviews were face-to-face, with 6 conducted over the telephone. Interviews were conducted by two of the authors (DG and ES) and one other member of the research team (FM) during July and October 2010, with a second wave of interviews conducted during October 2011 and February 2012. The second wave interviews were conducted to gain further insight into programme developments and potential sustainability of HT programmes post funding. Interviews lasted between 50 and 110 minutes each and were audio-recorded and transcribed verbatim. All participants provided written informed consent to be interviewed, with ethical approval for this research given by the Queen Mary, University of London Research Ethics Committee.

Interview transcripts were coded and analysed thematically using a computer-assisted qualitative data analysis software program (NVivo10). The thematic analysis was guided by the five core principles for tackling obesity (Government Office for Science, 2007; Kopelman, 2010), more specifically focusing on the barriers, facilitators and relationships and links across all interviews. These five core principles as outlined by Kopelman (2010) were:

1. A system-wide approach, redefining the nation's health as a societal and economic issue
2. Higher priority for the prevention of health problems, with clearer leadership, accountability, strategy and management structures
3. Engagement of stakeholders within and outside government
4. Long-term sustained interventions
5. Ongoing evaluation and a focus on continuous improvement

To reduce researcher bias, transcripts were independently read and coded by the two lead authors (DG and AJ), using the broad principles as an initial coding framework. Themes were then discussed by DG and AJ for comparisons and consistency of coding, with dominant themes related to the five core principles then identified and mutually agreed. These initial analyses were then explored with all authors, with the two lead authors refining the coding on the basis of group discussion. Throughout the analysis the interpretation was compared with the verbatim data. Direct quotations from interview transcripts are used to illustrate key themes. The names of the HTs are anonymised as HT A to I. Interview extracts are labelled with the HT label, the interviewee.

7.2 Findings

Stakeholders discussed the processes involved with the development, implementation, running and sustainability of the HT programme. The following outlines the key barriers and facilitators impeding the implementation of a systems approach as identified from interviews with stakeholders organised under Kopelman's (2010) principles.

7.2.1 A system-wide approach, redefining the nation's health as a societal and economic issue

Healthy Towns engaged with a variety of organisations that view health (including obesity) as a primary concern in addition to those that consider this as a secondary outcome. Membership of HT boards included a broad representation from different sectors and organisations that could potentially impact the determinants of obesity, although it was not clear how much influence the organisations represented on the boards were able to exert. For example, one programme manager spoke about how the breadth of representation on the project broad led to a culture of positive action and leadership:

> '*It's got public health, it's got children's, it's got local councillors, it's got the physical activity side of the council, we've got some academics, and it's saying actually this board is very important for that leadership of the obesity agenda*

and I think they are rising to that and saying "yes, we're going to take that on"'. (HT E, programme manager)

Despite representative board membership, towns had difficulty operationalising a systems approach. In particular, some towns found it hard to effectively link programme strands, because the delivery structure (including the workforce) failed to adapt and put too much emphasis on individual programme outcomes (e.g. attendance figures). One programme manager described the challenges of linking different programme themes and components within the current system of delivery:

'We did put a lot of effort into trying to join up the different interventions, and we have project meetings regularly, so some of them have developed strong connections. But otherwise it falls to the central team to knit it all together, and that's quite a big challenge. There's so many things that we could try and make a stronger connection with but you can't. You have to come back and say I've got to manage my programmes and my projects and make sure they deliver.' (HT H, programme manager)

The limited timescale from the initial bid to the implementation phases of the programme resulted in a number of procedural barriers. These included the administration of programme funding and the availability of resources. As one of the programme managers described, this was a particular barrier with new active travel initiatives and community led projects that were reliant on the local authority and political procedures to gain required resources for projects to begin:

'The actual administration of the system, of the scheme was quite onerous. I don't think we realised how difficult that would be simply because we didn't have anything to start with, we had to create it from scratch […] somewhere down the line some learning has to go into these things, to actually have proper lead-in times that allow people to think through exactly what they want to do, get the

right partnership in place and cost it all up and think through the work-programme before they start.' (HT A, programme manager)

The tight timeframes with which the programme was initially bid for and then delivered also had an impact on potential synergies between stakeholders and projects within some of the towns, which did not support a system-wide approach. One programme manager explained that the tight timescales to start implementation of the programme impacted the opportunity to plan and develop synergy between projects:

'The other thing that could have been slightly better is that because of the timescale, when the bid went in, it went in as a group of projects and we've actually had to build the synergy between them, after we got the money. And again ideally had we had a bit more time we would have scrutinised all those elements a bit more. I think we'd have had something that started out as being cohesive rather than something that once we'd actually got the money and started the projects we had to build that cohesive nature into it' (HT A, programme manager)

Finally, interview analyses did not find any data to support the second part of the first principle of *redefining the nation's health as a societal and economic issue.* However, what the findings did show was a commitment from towns to increase the awareness and action on tackling obesity across multiple sectors that influence the issues within their respective towns. This helped raise the profile of health and put the subject on some sectors agendas (i.e. local planners) that may not have otherwise been as engaged.

7.2.2 Higher priority for the prevention of health problems, with clearer leadership, accountability, strategy and management structures

One of the facilitators for the programme governance was that each town established a programme board to oversee and ensure delivery of the programme. Board stakeholders generally included representation from the Primary Care Trust (PCT), local authority, voluntary and community and academic sectors. One programme manager emphasised the importance of engaging with many senior managers and stakeholders who influence the public health agenda:

> *'Obviously the aim of the partnership board was first of all to actually get people onto it at a senior level, we really wanted to have the kind of movers and shakers within the key organisations on the board. So for example we've got quite a few corporate directors within the council who are the most senior people in charge of the main areas of service delivery and then obviously we've got senior people from the NHS. It's chaired by the joint director of Public Health, we've got the lead Councillor for health and wellbeing as well.' (HT B, programme manager)*

Despite the emphasis to develop the obesity agenda within the towns, one of the main barriers was that programme delivery took place during a time of government change and significant budget cuts within the public sector. This resulted in many of the services in towns being reduced, or ceasing to exist, resulting in staff redundancies and a loss of skills and capacity within the area. It was identified by stakeholders, that a system to tackle obesity did not work without the right people and right skills; budget pressures meant the loss of many key stakeholders involved not just in the HT programme, but across local authorities. The following programme manager expressed the impact of staff losses, while an intervention staff member explains the interruption caused to programme delivery during the change of government:

> *'A lot of those people we've been nurturing and developing relationships locally have all left, Chief Exec's gone, Director of Adult Social Care went, both in the last three weeks, I think as the cuts bite there seems to be quite a lot of movement at the top, which is a shame because one of our lessons is that you need those champions'* (HT D, intervention staff member)

'We have had several, I suppose, major hiccups, certainly where it comes to funding, because what's going on nationally, you just think 'oh, there might be money' every time there's a slight hiccup and there's this question 'is the funding coming down?' all the public sector partners just go 'stop' which means the project goes stop start stop start stop start stop start stop start. […] I think if we set it up again, we would… and it was in one of the models that we looked at, you need to set it up as an arm's length organisation where the public sector buy-in and say "yes, we're involved, here is the money, get on and deliver it".' (HT G, programme manager)

Lastly, there was a lack of data from the interview analyses to report on whether 'accountability' was considered within the programme. While the production of evidence was a requirement of the programme, interviewees did not comment on whether these figures were attributed to any personnel, programme or even 'town-wide' accountability.

7.2.3 Engagement of stakeholders within and outside government The funding made available for interventions managed by local organisations proved to be a strong facilitator for engaging key stakeholders to the Healthy Towns programme, particularly among the third sector. One programme manager explained how the funding had attracted new partners to the programme:

'You know people have been banging on our door because we are a healthy town now, seeing if we've got money, and that enables us to look again at partnership working with people. So it's enabled a lot of work to be generated [...] the fact for a time we had a chequebook in our back pocket, it was a great facilitator and enabler.' (HT C, programme manager)

Although the engagement of stakeholders was widely reported across the programme, there were instances where the organisational and political processes of central organisations (particularly those within the local authority) were not adaptable within the

existing structures and impacted on the stakeholders' ability to deliver. As the following intervention staff member voiced, this was a particular issue with third sector and community led groups who relied on central resources and the cooperation of central departments:

> *'The problem we came up against, the park is not ours it belongs to the council obviously but we couldn't go in, even though we had five thousand pounds, we couldn't go in and say "right we'll put potatoes here, spring onions here, strawberries here", we had to wait for them to allocate us an area where we could plant stuff. We're still waiting. [...]so once again we've come up against the council.'* (HT C, intervention staff member)

7.2.4 Long-term sustained interventions In some instances funding was used as a facilitator to build on existing programmes, which meant some programmes already had longevity and were simply expanding or strengthening existing activities. As one intervention staff member explained, this was particularly relevant for physical activity and growing schemes that had already drawn on previous short term funding streams:

> *'We have got a cycle forum already and the cycle forum existed well before Healthy Towns came along, and indeed we've tapped into those resources to help us shape some of the work we've done and use them as a good sounding board from a consultation point of view.'* (HT F, intervention staff member)

Volunteers were viewed as an important resource for the longevity of some interventions beyond town funding. Again this was more likely among physical activity and growing initiatives where physical resources required to sustain projects were minimal and training could be delivered cost effectively. Although within the current prevention system, there was consensus that volunteers would only be able to deliver projects under the guise of a funded project manager. The following statements from two intervention staff members provide examples of the value of volunteers, but also the importance of dedicated staff to ensure programme maintenance and wider development:

'So once a project has finished, once the funding comes to an end, there will be more that are being led and delivered by volunteers and by the 101 different kinds of organisations, hopefully, that's the idea anyway.' (HT F, intervention staff member)

'In terms of either a dedicated resource as a worker or a commitment that it becomes part of people's jobs to actually deliver it, somebody has to make it happen and it won't happen on its own. Just giving people some vegetable plants will not make it happen. We've committed resources in terms of our caretakers delivering, taking things out to people, we've committed resources in terms of printing, photocopying, providing materials out to people. There is a staff time, there's got to be somebody who helps people through that process of developing it, so those are all things which have to happen…' (HT C, intervention staff member)

However, budget constraints threatened the long-term sustainability of interventions. Stakeholders initially expected to continue programmes through central or extended Healthy Town funding streams, but this was not a viable option for many programmes. The following extracts from interviews with programme managers illustrate the impact of the change in government and subsequent resource pressures on the programme and the continued reliance on central systems to support longevity. As the second extract highlights, although there was organisational restructuring, this was unlikely to change how the system worked to support the programmes aim of reducing obesity:

'I suppose we were in a very different place financially when it started and expecting funding to be more achievable and more things to be able to be mainstreamed because mainstream funding would be there but it's not been so, I don't think we could have planned for that too much...' (HT E, programme manager)

'So not necessarily the government but the government plus the fact that we were going into a recession made everybody kind of withdraw a little bit, and the fact that we were being restructured, every organisation was being restructured to some degree, really took the impetus away a little bit from what this project could do.' (HT G, programme manager)

7.2.5 Ongoing evaluation and a focus on continuous improvement From the outset of the programme it was made clear within the terms of the Healthy Community Challenge Fund that an evaluation was a fundamental requirement. The need for an evaluation was fully recognised by stakeholders across all aspects of the programme to contribute towards future evidence based practice. The following intervention staff member recognised the importance of planning the evaluation at the start of initial delivery to ensure it was not afterthought:

'I think one of the big things for me is the importance of evaluation and the importance of getting the kind of, um, I don't know what the word is, but thinking about evaluation really early on and putting things in place so that it doesn't all get left until the last bit.' (HT C, intervention staff member)

However one of the main barriers to this process was the lack of guidance and full understanding as to what procedures needed to be in place to optimise this opportunity. This was voiced by one programme manager who discussed how a tighter brief from the centre would have helped them better develop their local plans:

''I think DH could have had more time with local evaluation teams and set a tighter brief for them, it would have made everybody's job a lot easier.' (HT F, programme manager)

Big chunks of this programme weren't really very clear before we started and the whole evaluation local and national is one that no-, we all put this thing in not

really knowing what that bit was going to be and that would have been helpful, and it would have got a lot more if that had been clearer at the start and we'd had more time to build that in at the start.' (HT A, intervention staff member)

While stakeholders were aware of the need to conduct quality evaluations that would help them to gain further funding and recognition of the importance of such programmes in tackling population obesity, as one programme manager explained, this element was hindered by the tight timescales involved in the implementation of the programme:

'When we're getting the partners to look at this as a priority, we haven't got the short-term evidence that says what we are putting in here is going to work and when we're functioning in these short-term cycles all the time, that's all people are interested in because people just have to get through... I think they can appreciate where we are with it, I think we've done a really good programme but on paper the bottom line is, "so what"?' (HT C, Programme manager)

7.3 Discussion

The Foresight systems map helped to illustrate obesity as a multi-faceted problem and establish that single intervention approaches are likely to be ineffective in prevention efforts (Government Office for Science, 2007; Finegood et al., 2010). This has led to whole systems approaches increasingly being advocated as a 'solution' to complex health problems like obesity. While, in theory, whole systems approaches that follow the five core principles outlined by Kopelman (Table 1) appear to offer a promising solution, our findings suggest that there are challenges when translating theory into current practice. Evidence from the interviews conducted here shows there are a wide a range of barriers and facilitators that impact individual stakeholders' ability to implement a systems approach.

Table 1: Key findings from the HT programme for implementing the 5 core principles for tackling obesity.	
1. A system wide approach, redefining the nation's health as a societal and economic issue	Engaged with wide range of local stakeholders, however implementation of a systems approach was not achieved through a failure to link and synergise programme strands and the limited timeframe.
2. Higher priority for the prevention of health problems, with clearer leadership, accountability, strategy and management structures	Prevention of health problems was clearly a high priority for HTs (<200 interventions funded). Health boards helped to identify leaders who influence the public health agenda and develop management structures, however austerity measures resulted in staff loses.
3. Engagement of stakeholders within and outside government	An abundance of stakeholder engagement at a local level, although a lack of systems working impacted on programme delivery.
4. Long-term sustained interventions	HT funding helped develop new and existing programmes, however limited HT funding and austerity cuts resulted in reduced programme delivery. Volunteer recruitment assisted sustainability, but dedicated staff were identified as important for programme maintenance and development.
5. Ongoing evaluation and a focus on continuous improvement	Evaluation included in HT programme, although further guidance on procedures and requirements were viewed necessary to optimise opportunity and evidence produced to inform future programme development.

7.3.1 Application of a systems approach based on the five core principles: a realistic challenge? The financial benefits associated with gaining Healthy Town status was one of the most significant facilitators. In particular funding provided an opportunity to develop initiatives, create new jobs and engage stakeholders from within the public, private and third sectors. This included the development of representative health boards within each town to support programme management. Paradoxically however the biggest barriers were contemporaneous reductions in public funding that had a direct impact on each of the

towns' capacity to sustain their programmes. Loss of funding streams led to staff redundancies, particularly at the management level, which meant key skills, experience and continuity of staff particularly were lost. Austerity measures were an unexpected factor that could not be accounted for during the initial programme planning and therefore can be viewed as an exogenous factor or 'external shock', (Fligstein & McAdam, 2011; May 2013). While effort was made to centralise some services, and strategies to developing volunteering were introduced to manage this, it was recognised by stakeholders as a significant barrier that affected each town's ability to deliver programmes and put into operation sustainability measures.

The relatively short timeframe from the bid process to implementation and finally completion (<3 years) also proved to be a significant barrier. In particular programme implementation was rushed, which led to limited consideration of the central administration processes that needed to be established to support local delivery structures. Furthermore, while evaluation of the programme was stipulated as essential, the lack of time to properly plan evaluations affected learning. Interviewees suggested that time to adequately plan interventions at the bid and development phases would have better supported a more developed strategic plan for implementing a systems approach, such as building relationships and identifying leverage points. Long term funding to facilitate sustainability and the ability to deliver ongoing evaluation to feedback into programme development would have assisted in retaining staff and developing new and existing networks at the local level.

A stronger steer at the national level was also identified as something that could have been strengthened within the programme in order to support programme development and encourage shared practice across towns. This is particularly important given that shared practice has been identified as an area that can be invaluable in developing organisational structures through learning from pilot scheme experiences to inform future programmes (Lanham et al., 2013). For these purposes, a stronger link and coordination between local

and central policy and practice systems, coupled with identified leadership of programmes, would have provided support for health programme development and dissemination of experiences and local evaluation.

7.3.2 Were towns 'fit for purpose' in implementing the Foresight systems approach?

Applying a systems approach to obesity has a number of policy implications that require multi-sector actions and not just those involved directly with health (Gortmaker et al., 2011). Moreover, adopting a systems approach involves looking at the 'bigger picture' and ensuring key stakeholders understand this and do not just focus on their particular part of it (Finegood et al 2010). This did not occur here - often interventions were reported as being developed and implemented in isolation, lacking strong connections and synergistic working across whole programmes. Such an approach is reminiscent of a 'traditional' multicomponent approach to prevention, rather than the desired systems approach. Stakeholders largely expressed the desire for better central guidance and support with examples of 'innovative' delivery program ideas (see Goodwin et al, 2013), which could support the development of systems thinking. Stakeholders found it hard to articulate what a systems approach was, and how it could be applied in the local context. Furthermore, the tendering process was itself ambiguous, with no clear suggestion about what constituted a systems intervention (see Sautkina et al, 2014). With no clear framework for defining what the features of a systems intervention might be, stakeholders were unable to describe it, nor articulate what one might look like and thus often reverted to existing practice.

While the majority of HT's followed a traditional model of implementation, one town described a focused attempt to implement a system approach that accounted for multiple indicators of obesity at multiple levels of the system (see Sautkina et al, 2014). In this instance, while the practitioner did not fully articulate a system approach to obesity, the approach indicated the innate ability of some practitioners to think about systems approaches. If this realisation was further exploited with training in systems thinking, then the ability to recognise systems constructs such as leverage opportunities and alignment of resources would have potentially amplified the ability of this and all other towns to develop the programme within a systems approach.

The Healthy Towns example raises questions surrounding whether existing delivery structures are equipped or able to adapt roles and align agendas for whole systems working. For example, changes within the local and political contexts led to a number of barriers to developing systems approaches. In particular central government guidance and support, was largely unable to support the actions required to implement systems approach at the local level. Kopelman (2010) suggests that although action is required from stakeholders across all levels of the system, the lead must ultimately come from government.

While cross government working is undoubtedly happening when developing policies aimed at tackling obesity, our findings suggest more needs to be done to inform local practice on what a systems approach entails and to align the objective actions of the multiple agencies involved in obesity prevention (Gortmaker et al, 2011). This was illustrated recently in results from a survey led by Public Health England, whereby local Directors of Public Health reported a need for central advice and assistance for the promotion of a whole systems approach to tackling obesity (PHE, 2014). This further highlights that while a systems approach is advocated as a way of tackling obesity, how to implement the approach is not clear among the health and prevention sector.

7.3.3 Future programmes? It remains unclear whether implementation of the five core principles is a realistic aspiration within current delivery structures. In this chapter, we suggest that, while positive steps are being made to develop delivery structures to support a systems approach including the five core principles, such an approach will require sustained support and commitment and will not happen 'overnight'. In this context it may be hard for the rhetoric to match the reality of systems approaches unless there are clear sets of tools, guidance and commitment over the long-term to develop these approaches. Stakeholders need space and time to develop as systems thinkers in order to help instigate the change required affect population level obesity prevalence. While the HTs programme has delivered in emphasising the importance of developing innovative ways to encourage health behaviours, the most effective interventions have developed from building on existing partnerships and resources. This finding is aligned with a systems approach.

Based on our findings from the HT study, in table two we propose six recommendations to assist the implementation of future 'town-wide' programmes aiming to adopt a systems approach guided by the five core principles.

Table 2: Recommendations to improve implementation of future 'town-wide' programmes aimed at tackling obesity.	
1. Obesity System Toolkit	Central administration (e.g. Department of Health) to provide access to toolkits outlining the principles of implementing an obesity systems approach that can be tailored to local needs and existing delivery structures.
2. Flexibility of delivery	Allow interventions to vary across delivery structures and be tailored to local context.
3. Central leadership	Clear programme leadership identified centrally to increase the communication and support available for local delivery teams beyond funding allocation, to support programme development.
4. Early identification and engagement of stakeholders at all levels of the system	Implementation team to identify stakeholders at all levels at an early stage of project implantation to avoid unexpected delays.
5. Long-term 'financial backing'	Longer term initial funding (beyond 3 years), with a lead in time for systems preparation before delivery commences and includes a sufficient evaluation to assist further investment decisions.
6. Monitoring and evaluation	Conduct a holistic approach to evaluation in addition to key performance indicators, whereby programmes are evaluated across sectors with joint outcomes.

7.4 Conclusion

While the Foresight report provided an important conceptual step forward in the understanding of the causes and prevention of obesity, this theoretical development was not matched by a similar level of development in implementation and delivery at the local level within the programme. However, insights from the programme could be used to further develop systems-based resources that could be applied in community settings. The programme showed that substantial funding can act as an initial catalyst for engaging

stakeholders and building networks beyond the health sector, and developing and implementing interventions that could impact on obesity prevention. However, national bodies should provide a clear lead in areas where substantial innovation and major shifts in thinking are required. Greater support and guidance for practitioners to help them better conceive, develop and implement programmes and interventions is required if the 'idea' of systems-based approaches is be fully realised in practice.

8. Summary and conclusions

Healthy Towns was conceived as a way to take a 'whole-town' approach to combating the obesogenic environment by tackling the environmental determinants of diet and physical activity. The preceding chapters discuss findings from each of the research questions posed at the start of the report. This summary briefly outlines three key over-arching messages from the evaluation.

8.1 The need to develop a shared understanding of systems-based approaches to obesity prevention

Throughout the Healthy Towns programme there was a lack of shared understanding of what constituted a systems-based intervention as evidenced by the reliance on traditional risk-factor based approaches to intervention development and programme delivery. This was the result of some misunderstanding as to what a systems approach was by towns, the provision of limited guidance (in terms of documentary information and other guidance) from central government, a weak and under-developed evidence base, and an emphasis on using a traditional linear delivery chains which is at odds with a systems approach.

The notion of a systems-approach can sometimes be seen as to abstract and out-of-line with the reality 'on the ground'. This is compounded by their being no concrete examples of successful delivery of such programmes in the UK or elsewhere. A clear challenge is to develop a way of describing systems thinking that resonates with policy makers, local public health managers and practitioners and enhances their understanding. In addition local practitioners require a clear 'policy narrative' at a national level in order to reduce uncertainty over the 'what' and 'how' of delivery, along with sufficient time to develop their approaches.

8.2 Systems approaches to obesity prevention can be hard to implement

There was a clear 'gap' in the translation of systems theory into local practice within the towns, with a wide range of enabling and disabling factors which positively or negatively influencing each town's ability to implement 'systems' approaches. Although systems

thinking has a strong and relatively well-developed theoretical basis it requires a clear (and simple) set of tools and guidance to be developed in order to be implemented successfully. In addition, as with any programme that represents a significant break from past practice, time is required to develop capacity amongst the workforce and develop individuals at all levels into systems thinkers and leaders.

8.3 The need to foster innovation and reduce fear of failure in obesity policy and practice

Part of the rationale for the Healthy Towns programme was that there would be opportunities for innovation and risk-taking in order to fulfil its function as a formative, learning programme that would generate evidence on environmental and systems-based approaches to obesity prevention. There was an expectation of innovation in order to help populate a sparse evidence base and, at least at the outset, that idea that the failure of innovative interventions and programmes would be acceptable as long as learning was generated in order to inform future policy. However the reporting mechanisms put in place to monitor the programme, which included producing evidence of effectiveness in relatively short timeframes, acted as a disincentive to the pursuit of risk and innovation where the rewards might be high, but the risk of failure was also high. Many informants felt that, in reality, in a time where there was pressure on budgets, it was never truly safe to fail leading to a reliance on the 'tried-and-tested' rather than the new and risky.

8.4 Strengths and limitations

The research presented in this report afforded an opportunity to explore the development and implementation of environmental and systems-based approaches to obesity prevention in England. It allowed us to undertake in-depth interviews with national and local stakeholders across all nine towns over two time points in the programmes cycle. However there were limitations. The number of national policy actors interviewed were small due to changes in the obesity team during the life of the programme. In addition, during interviews with local informants, it became apparent that some programme managers were not involved with initial bidding and programme set-up, due to staff turnover and role changes in the early part of the programme. In addition the increasing pressure on budgets as a result of cuts to government funding due to the recession meant that informants were lost

to the study and their replacements had limited knowledge of what had one before. Though this was mitigated by interviewing board members in each town we could not avoid the possibility of losing potentially relevant information.

8.5 Conclusion

This report suggests that 'whole-town' approaches to obesity prevention are seen by local public health leaders and practitioners as a potentially important to way to reduce obesity prevalence in an area where progress has been challenging. As such the programme was welcomed as a timely and important initiative. The study has important implications for a number of current policy initiatives such as Heathy New Towns, recently launched by NHS England which is similar in nature to the 'Healthy Towns' programme.

In particular the evaluation describes a number of challenges related to execution of the programme at the national and local level. This included the level of central support and guidance provided, timing and duration of the programme, the existence of a weak evidence base to guide decision-making, effectively stimulating innovation, and whether existing delivery structures are suited to environmental and systems-based interventions. Thus this evaluation provides a timely opportunity to implement the important lessons learned from Healthy Towns into future national policy and local public health practice.

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Appendix A. ***When to evaluate public health interventions: a guide for Department of Health***

In the early part of the evaluation we were asked to prepare a document about when to evaluate public health interventions. This was made available as a resource for policy colleagues (see picture below). The text below is reproduced below.

Government policies and programmes to improve public health can often be regarded as complex interventions, in that they typically involve the flexible or tailored implementation of multiple interacting activities in a variety of settings to bring about population behaviour change and health improvement (Craig et al. 2008). However, evidence to support their development and implementation is often weak. Recognition of this 'knowledge gap' has led to repeated calls for more and better evaluation of the health impact of these complex

'natural experiments' (Wanless 2004; House of Commons Health Committee 2009; Sallis et al. 2009). Not only would this provide more robust assessments of the overall impact, effectiveness and cost-effectiveness of different approaches, but it would also improve our understanding of how they work (or do not work) and how their effects are distributed within populations (Craig et al. 2008).

In the UK, revised guidance to support the development and evaluation of complex interventions of this kind has recently been published by the Medical Research Council (MRC) (Craig et al. 2008). Few may disagree with the principle enshrined within the guidance, but its implementation raises a number of scientific, practical and prioritisation issues. The original MRC guidance, which drew on examples from public health and health services research, focused on the challenges of developing and defining interventions composed of several components and of evaluating such interventions using randomised controlled trials (Medical Research Council 2000). The subsequent revision of the guidance reflects attempts to address some further challenges, such as the fact that some interventions are largely driven by political rather than scientific considerations. Such interventions may not be easily accommodated in the framework of the original guidance, which describes a phased, theory-based approach to the development of interventions as well as to their evaluation (Medical Research Council 2000; Craig et al. 2008; Ogilvie et al. 2009). The current fiscal climate brings a further challenge, in that evaluative aspirations need to be tackled in the light of greater constraints on research funding and research capacity (Leviton et al. 2010). Writing about existing evaluation guidance for health promotion, Windsor notes the need to ensure that an evaluation is 'realistic, prudent and efficient' because 'Every component of a program usually cannot and, in most cases, should not be evaluated' (Windsor et al. 2004). This emphasises that decisions need to be made about how best to deploy scarce resources for evaluation in order to maximise the new learning and evidence produced.

There are, however, few simple tools to help researchers, policymakers, and funders and commissioners of research to make these decisions. One established tool is that of evaluability assessment (Wholey 1979), a systematic method of assessing whether a given intervention programme is ready for evaluation and how an evaluation would help to improve the programme. Evaluability assessment can also help with the planning and

delivery of interventions, for example by providing feedback on implementation to staff. The processes involved in evaluability assessments have recently been reviewed elsewhere (Leviton et al. 2010).

Evaluability assessment, as it is usually defined, depends on articulating a specific theory of change for a particular intervention under consideration. This may not always be possible at the time when decisions about allocating evaluative resources need to be made, particularly where choices between interventions or their components are involved. We therefore draw on the inspiration of evaluability assessment in developing a more general approach to considering what types of knowledge might be expected to be generated at different points in the evolution of a complex public health intervention and how evaluative resources might best be deployed. Our approach is focused on the scientific principles to be considered in answering those questions rather than on the detail of the processes involved.

We articulate our approach using as a case study the Healthy Community Challenge Fund (HCCF), a government-funded programme of interventions to modify the obesogenic environment in nine demonstration 'Healthy Towns' in England (Department of Health 2008b). Although the HCCF is used as an example, our approach is potentially generalisable and should therefore be capable of being tested, refined and applied in the context of other complex public health and social policy interventions. We begin by introducing the HCCF and the three general evaluative decisions that need to be made about complex interventions of this kind. We go on to describe two particular components of the overall HCCF programme to serve as worked examples. Having set the scene, we then outline three general principles that underpin our approach before presenting the core of the chapter, the 'five questions' we proposed earlier. We then return to our worked examples and show how considering the five questions could help in making the three evaluative decisions required.

Given the variable use of terminology in this area, it may be helpful to state that in this chapter we use the term 'intervention' in different places to refer both to large scale, complex packages of measures (such as in the overall programme) and to more discrete projects or components within those (such as the worked examples).

Healthy Weight, Healthy Lives makes clear that the Healthy Towns programme is intended to 'test and validate holistic approaches to promoting physical activity and improving diet'.

The expectation expressed in Healthy Weight, Healthy Lives was that Healthy Towns would therefore 'invest in infrastructure improvements that implement the lessons of a variety of programmes […] combined with efforts to galvanise local members of the community to take action to change both food and activity habits' (Department of Health 2008b). The interpretation of this brief varied considerably between the nine successful towns, reflecting differences not only in specific local health concerns (such as the needs of particular immigrant communities, for example in Tower Hamlets or Thetford) but also in the modes of intervention emphasised in the proposals (such as individual incentives in Manchester or healthy urban planning in Sheffield). Each Healthy Town project team prepared a logic model summarising how their overall programme of activities was expected to work, some of which were expected to be initiated almost immediately. Having been commissioned to evaluate the Healthy Towns programme from a national perspective, we required a framework to guide three critical evaluative decisions within this complex intervention landscape: first, to identify which elements might be evaluable; second, to prioritise which elements ought to be evaluated; and third, to clarify from what perspective those elements should be evaluated to produce the most useful new evidence for science and policy (Nutbeam 1998).

Examples of Healthy Town interventions

We use two specific examples based on real interventions in the Healthy Towns may help to illustrate the utility of our approach.

Family health hubs A key element of the programme for the Dudley Healthy Town is the development of five 'family health hubs' — new buildings with exercise equipment and activities for families, located in parks, staffed by activity rangers and accessed by improved infrastructure for walking and cycling from nearby local neighbourhoods and schools (Dudley Healthy Towns 2010). Sites were selected on the basis of size, purpose, existing usage, geographical spread and the feasibility of improving access by walking and cycling. The hubs provide a range of instructor-led fitness classes, access to low maintenance outdoor gym equipment, and healthy eating and physical activity events organised by rangers in the local area (such as guided walks, dance classes, healthy eating barbecues and cooking demonstrations). The overall aim is to provide a family-friendly community 'hub' for behaviour change linked to obesity prevention in both adults and children. This intervention

should provide opportunities to contribute new evidence on research questions such as the impact of making recreational facilities available closer to home, the impact of providing new infrastructure for walking and cycling, and the potential to change social norms concerning the use of structured opportunities for physical activity and healthy eating in children in deprived neighbourhoods.

Healthy urban planning A key element of the programme for the Thetford Healthy Town is the redesign of the existing built environment to encourage health-promoting behaviours (Breckland Council 2009; Thetford Healthy Town 2010).Thetford has 'growth-point' status, meaning that the town is expected to grow rapidly over the next 20 years, creating demand for new housing, transport and community infrastructure. This intervention is therefore a long-term strategic activity to ensure that 'health' is fully incorporated into urban design and planning policy related to future growth and regeneration. Mechanisms by which this may occur include incorporating health in the strategic masterplan, ensuring that active travel is reflected in the local transport plan, and embedding public health principles into the assessment of planning applications and the design of new neighbourhoods and communities. As such, this is a long term aspiration related to the gradual enlargement of the town (Moving Thetford Forward 2010), a timescale well beyond the horizons of most evaluation teams.

Three underpinning principles

Testing theories rather than interventions The problem of how to evaluate complex social programmes is not new. One major impediment highlighted in a recent report of the UK House of Commons Health Committee is the tendency for new initiatives to be introduced quickly, without sufficient opportunity to collect baseline 'before' data from the populations served by the initiatives (House of Commons Health Committee 2009). The Healthy Towns programme was specifically identified in that report as having been introduced in a way 'which is likely to make [rigorous evaluation] impossible', and in the absence of a national surveillance system with the capacity to track changes in dietary and physical activity behaviour and anthropometric measures (other than height and weight in selected school year groups) at the local level, the likelihood of being able to evaluate the

overall outcomes of the Healthy Towns by conducting a before-and-after study of the target populations appears remote. Moreover, the Healthy Towns encompass multiple dimensions of contextual variation that may affect the outcome of a given project within the overall programme. Taking as an example the construction of a new cycle path, these may include the epidemiological context (e.g. the local prevalence of cycling), the environmental context (e.g. the congeniality of the local topography and climate for cycling), the socio-political context (e.g. the local political balance of power between 'green' and 'pro-car' views) and the organisational context of the municipality (e.g. whether cycling is regarded as falling within the remit of a roads department, a parks and recreation department, or a dedicated cycling unit). Drawing on the insights of realistic evaluation, developed by Pawson and Tilley, we therefore adopted the principle that rather than attempting to test whether programmes of this type 'work' in an aggregate or generalisable sense, evaluative research in this area should aim to test more general theories about how interventions work by aggregating evidence for and against such theories across a range of situations or 'context-mechanism-outcome' (CMO) configurations (Pawson and Tilley 1997).

Seeing the 'big picture' of an intervention programme Second, the original concept of the CMO configuration implies a somewhat linear relationship between context, mechanism and outcome, but in practice these relationships are likely to be more complex. For example, it may be understood in one town that certain actions (such as the appointment of a 'healthy urban planning' officer) need to take place first in order to change the organisational context, preparing the ground for the mechanism of a second wave of actions (such as the adoption of new planning guidelines); in another town, early adopters of an intervention (such as parents and children who accept the offer of a 'walking bus' to the local primary school) may help to alter perceived social norms about travelling to school in their community, thereby altering the context and catalysing the mechanism by stimulating further uptake of the intervention by other families (Lorenc et al. 2008). It may therefore be unhelpful to regard any particular intervention project in isolation. In this chapter, we use the term 'intervention' not only in the narrow sense of providing people with resources that might help to change their behaviour — such as a healthy eating leaflet, an exercise referral scheme or a new cycle path — but in the wider sense of the deliberate introduction of a perturbation into an existing system (Hawe et al. 2009). In the context of obesity

prevention, the latter definition might encompass less immediately tangible actions such as efforts to change established ways of doing things in local statutory agencies, for example by attempting to influence the priorities of a planning authority with respect to neighbourhood design, or the priorities of an education authority with respect to physical education provision in schools.

Favouring judgement over checklists Our third principle reflects the tension between an understandable desire on the part of various evaluation stakeholders for criteria, checklists and scoring systems on the one hand, and the need for a more nuanced consideration of the scientific issues on the other. Our approach builds on the Standard Evaluation Framework (SEF) produced by the National Obesity Observatory (NOO) for England (National Obesity Observatory 2009), which mainly comprises a checklist of issues to be considered in the evaluation of weight management or weight loss interventions targeted at individuals, but our approach has a somewhat different purpose. We have retained the fundamental objective of assessing 'evaluability', but we have also drawn on Bradford Hill's concept of 'viewpoints' (Bradford Hill 1965). Bradford Hill explicitly cautioned against any attempt to treat his principles — developed as an aid to appraising the evidence for putative causal associations in aetiological epidemiology — as a checklist of necessary or sufficient criteria. We have adopted the same position in developing our five questions: the questions need to be considered, but the answers are not necessarily straightforward and the list of questions does not replace the need for judgement as to the weights that should be applied to the various points. Nonetheless, the stronger the evidence for each of the points, the stronger the case for evaluation.

Five questions to assess evaluability

We now turn to the key questions. We propose that decisions around priorities for evaluation made by researchers, funders and policymakers should take into account the answers to the following five questions:

Where is a particular intervention situated in the evolutionary flowchart of an overall intervention programme?

In order to clarify the value and nature of a potential evaluative study of a given intervention, it may be useful to situate it in an evolutionary flowchart (Figure). This

flowchart builds on previous flowcharts (Nutbeam 1998; Medical Research Council 2000; Craig et al. 2008) but also aims to reflect better the wider sociopolitical context in which complex public health programmes take place, the importance of considering the degree to which an intervention is embedded in organisational contexts (Yin 1979), and the fact that the evaluative opportunities evolve in tandem with evolution of the intervention. Put simply, evaluating an intervention too early in its development runs the risk of reaching unhelpful or misleading conclusions — for example by concluding that no tangible effects have occurred — but this risk can be averted if the correct evaluative questions are asked (Nutbeam 1998). For example, the evaluation of the early stage of a new community gardening project might focus on understanding the process by characterising the incentives and barriers for participation, the socioeconomic profile of the participants and the success of their growing efforts, rather than on attempting to measure changes in behavioural or health-related outcomes such as eating habits or nutritional biomarkers, which are unlikely to be detectable without both a larger sample of participants and a longer period of detailed follow-up.

What difference will an evaluative study of this intervention make to policy decisions?

This question reflects an initial assumption that 'Conducting evaluations of programs that are useful to decision makers is the hallmark of successful evaluation' (Trevisan and Huang 2003), implying that if a piece of evaluative research has no identifiable 'customer' who cares about the results then it may not be worth doing. A proposed evaluative study may appear to 'fail' this test if (a) the results would have no bearing on any current or predictable policy question, (b) the key policy decisions that could have been informed by the results are going to be made before the results are known or (c) the study aims to examine the health impacts of an intervention primarily intended to achieve a policy goal in another sector such education or transport. Closer engagement between the producers and users of research, and between policymakers in different sectors, is likely to improve the utility of research in this regard by helping to bring the streams of 'problems, policies and politics' into alignment (Exworthy 2008; Ogilvie et al. 2009). In less clear-cut situations, a more nuanced assessment may be required to estimate the 'policy prior' on the question (in other words, what policymakers are likely to do or recommend on the basis of what they already know) and the likelihood of the 'policy post' changing as a result of a new evaluative

study. It is important to note that this analysis should not be limited to an assessment of policymakers' potential reactions to new data on efficacy or effectiveness; in some situations, the key new data required to alter the 'policy post' may relate to the acceptability, implementation, reach, uptake, mechanism or dissemination of an intervention (Bond et al. 2010; Mackenzie et al. 2010) or on a cost-effectiveness or cost-benefit analysis (Wanless 2004).

On the other hand, neither researchers nor funders should allow themselves to be shackled to an excessively instrumental or pragmatic view of the value of research, because that may sometimes conflict with the wider public interest. Aside from the potential (and sometimes serendipitous) value of 'blue skies' research in general, even in a highly applied context researchers should bear in mind that some studies may identify important evidence of adverse effects that is unwelcome to certain stakeholders, or provide answers to policy questions that are not currently being asked but turn out to become highly topical after the study is finished. Research with policymakers has shown how some 'historical' research findings can have a remarkably long shelf life in terms of their influence on their thinking (Petticrew et al. 2004).

What are the plausible sizes and distribution of the hypothesised impacts of the intervention?

Epidemiologists use the concept of population attributable risk to quantify the importance of a risk factor for the population at large: a particular risk factor may greatly increase the risk of disease, but if only a small proportion of the population is exposed to that risk factor, the overall impact on the population will be small, whereas another risk factor that confers only a modest increase in risk may have a greater overall impact on the population if a high proportion of the population are exposed to that factor (Last 2001). The same principle can be applied to the selection of interventions for evaluation for public health purposes: all other things being equal, the interventions most worthy of evaluation would be those expected to have large effects in a large number of people. To put it another way, the overall public health impact of, say, a small local community gardening scheme in which only 20 people take part is going to be minimal, however life-changing its effects on the individuals who do take part. It would, of course, be important to base such a 'plausibility analysis' (Leviton et al. 2010) on a realistic effect size, drawing for example on evidence

from previous studies of effectiveness rather than efficacy, or from aggregated evidence for and against similar theory-based approaches to changing other health-related behaviours, rather than on the unsubstantiated claims or aspirations of the agents promoting a given intervention.

It is, however, important to note that small-scale, novel or untested interventions should not automatically be ruled out of the evaluative court on the basis of a small estimated population health impact. The case for investing evaluative resources in such situations may be strengthened if they are predicted to have important adverse effects, co-benefits in other policy sectors, or differential effects that may contribute to widening or narrowing health inequalities; if they are potentially scalable to widespread implementation; or if they contain a particularly novel and promising germ of an idea that could lead to an entirely new class of intervention. In the latter case, however, it may be particularly important to cross-reference the novel approach with existing theory as a means of distinguishing the brilliant insight from the ludicrous scheme before plunging in, in much the same way that Bradford Hill highlighted the importance of identifying a plausible mechanism before treating evidence of an association between a disease and a putative risk factor with excessive respect (Bradford Hill 1965).

How will the findings of an evaluative study add value to the existing body of scientific evidence?

The mere fact that a new intervention is being introduced does not in itself confer a requirement for that intervention to be evaluated, at least not in the scientific sense: the scientific evaluation of a project is a completely different proposition from auditing the execution and financial management of a project, which may well be required by the funders of an intervention but contributes little to scientific knowledge. In many cases it may be sufficient merely to record that the project has taken place and to describe and characterise its content as part of the overall package of measures. It may also be considered unethical in principle to conduct further evaluative research on already well researched interventions in the absence of genuine equipoise or uncertainty concerning their effectiveness (Freedman 1987).

Having said that, even if the effectiveness of an intervention is unequivocally established with respect to one particular outcome, critical uncertainty may remain regarding its effects in different settings or populations from those in which it was previously studied; its effects on other outcomes; the mechanisms by which its effects are achieved; or its scalability, sustainability, generalisability or distributional effects. For example, interventions that improve health in an aggregate sense may have the potential to widen inequalities in health if their uptake or effectiveness is socially patterned (Thomson et al. 2004; White et al. 2009). Such considerations may be particularly applicable to interventions whose impacts have the potential to span multiple health and non-health domains or policy sectors. The added scientific value of one more study (and the interpretation of its results) should therefore be assessed in the context of the cumulated existing evidence pertaining to the same question (Wilson et al. 2008; Ogilvie et al. 2009), whether that evidence is aggregated across multiple instances within one programme (such as Healthy Towns) or across a more general set of intervention studies, which may permit more generalised causal inference from a group of studies that are each quite specific to their local contexts. It is important to note that this is not the same thing as assessing the value of a new study in informing a policy decision, since those making policy decisions may be influenced more by certain key findings of research than by the weight and methodological rigour of scientific evidence as synthesised in a systematic review (Petticrew et al. 2004).

To return to the example of a community gardening scheme, the overt focus of the intervention may be on its direct effects on the food supply or dietary behaviour of the participants, but it may also produce co-benefits on other health outcomes (e.g. by increasing physical activity through gardening) and in other policy sectors (e.g. by contributing to environmental sustainability by reducing the frequency of car-based food shopping trips). The opportunity to evaluate wider impacts of this kind may tip the balance in favour of investing evaluative resources, even if the answers to the more obvious evaluative questions are deemed to be sufficiently known already.

Is it practicable to evaluate the intervention in the time available?

Particularly where the design, allocation or delivery of interventions are outside the control of the researchers, some interventions may be introduced too early to permit a meaningful outcome-oriented evaluation (for example, by leaving insufficient time to collect baseline

data) or too late (for example, by leaving insufficient time to collect and analyse data before the end of researchers' contracts.) In some cases, it may be possible to bypass such limitations by using routinely collected surveillance data: this may be a more feasible and more affordable solution than collecting original data, although for many health-related behaviours the surveillance data available may be of unknown validity, insufficiently precise to detect change, or subject to other major caveats in their interpretation (Stamatakis et al. 2007).

On the other hand, even if sufficient time and resources are available for a meaningful evaluation of the long term effects of an intervention, it does not necessarily follow that anyone will be interested in the results by the time the intervention has been fully implemented and evaluated. A further risk of long term evaluation is that the 'signal' of the effects of one specific intervention may become lost in the 'noise' of everything else that has happened in the meantime, particularly if the implementation of the intervention or the study design do not provide for a counterfactual or control group.

In all of these situations, researchers may need to consider reconfiguring apparently simple evaluative research questions to suit the practical realities of the situation. For example, where the content of an intervention and the contexts in which it operates change over time (Hawe et al. 2009; Shepperd et al. 2009), the focus of evaluation may shift from comparing the effects of 'intervention' versus 'control' to comparing the effects of different 'doses' of intervention, or the effects of the intervention in different contexts.

Two worked examples

We now return to our worked examples to illustrate how the approach we have outlined may help guide evaluative decisions. Although the examples are based on real interventions, the working below is hypothetical.

Family health hubs

At first glance, an intervention of this kind provides the opportunity to evaluate the physical activity benefits of providing recreational and other facilities in parks and improved infrastructure for walking and cycling in local neighbourhoods. A consideration of questions three (plausible effects) and four (contribution to scientific evidence) would reveal that

research recommendations published by the National Institute for Health and Clinical Excellence (NICE) have identified both of these as important potential means of improving health for which little robust evidence currently exists (National Institute for Health and Clinical Excellence 2008). However, reflection prompted by question one (evolution of the intervention) may indicate that this is a new and untried type of intervention currently located at the 'intervention development' stage of the evolutionary flowchart, and careful investigation of the local context prompted by question two (relevance to policy decisions) may reveal that concerns about improving community safety and reducing antisocial behaviour take precedence over concerns about the physical activity impact of the hubs. It may therefore follow that a qualitative evaluation of the safety perceptions of users and non-users of facilities in parks with and without one of the new hubs might provide the single most influential piece of evidence to justify future investment in parks and recreational services.

Further 'proof of concept' evidence from early, small-scale implementations of the 'hub' concept — demonstrating at least an acceptable level of uptake and usage by the local population, as shown in the 'in practice' evaluation box in the figure — may be sufficient to justify the funding of further roll-out which would lead, in time, to the opportunity to mount a more considered, outcome-oriented evaluation (question five: time available) examining the influence of hub location and content and level of usage on changes in family physical activity behaviour, perhaps stratified by household or area-level socioeconomic status. It may then be possible to cumulate evidence derived from the family health hubs with evidence from evaluations of other types of local physical activity provision to test more general theories about the role of the physical environment in promoting active living.

Healthy urban planning

The long term population health impact of a major redesign of the built environment is unknown (question four: contribution to scientific evidence) and potentially substantial (question three: plausible effects), but very difficult to quantify using short term empirical data (question five: time available). In the early years (question one: evolutionary flowchart), it may therefore be more appropriate to evaluate the degree to which the principles of 'healthy urban planning' espoused in the original proposal turn out to be expressed and embedded in organisational practice (Yin 1979; Nutbeam 1998; Hawe et al.

2009) and to develop a theory of how this type of intervention is expected to work in the longer term. Short term research questions might therefore include how widely across the municipality the principles have become evident (which might be addressed by seeking evidence of partnership working between education, health, planning and transport departments), or how deeply the principles have penetrated routine practice (which might be addressed through ethnographic study of the proceedings of planning committees, or by auditing planning decisions against evidence-based guidance such as that issued by NICE (National Institute for Health and Clinical Excellence 2008). Evidence of this kind may be crucial in building support for maintaining the general policy direction or for promoting its more widespread adoption (question two: relevance to policy decisions).

Conclusions

We have developed a set of questions to help guide decisions about the use of evaluative resources within and between complex public health interventions. We have assumed that the purpose of evaluation in this context is to contribute to the scientific understanding of the process and impacts of interventions rather than merely to justify their existence. Unlike some previous approaches to assessing evaluability, our approach involves neither a checklist of criteria (National Obesity Observatory 2009) nor a structured linear process (Trevisan and Huang 2003). Rather, it comprises a set of questions to be considered, debated and reiterated (Leviton et al. 2010) between researchers, funders and policymakers as a complex intervention evolves from its initial concept through developmental and pilot stages to the testing, refinement and dissemination of a concrete intervention programme. Although our approach was developed in one particular context — that of the Healthy Community Challenge Fund in England — the principles are potentially generalisable, and could therefore be tested and refined in the context of other complex public health intervention programmes and social interventions more generally.

Our questions are designed to be useful not only to researchers but also to policymakers, by helping to identify the types of knowledge that might be generated from any possible evaluation given the strength of evidence available in response to each of five questions; and also to funders and commissioners of research, by helping to support more systematic consideration of resource allocation decisions depending on the types of knowledge required. Ideally, the questions should be used to stimulate and structure debate between

all parties as part of the ‘iterative, bidirectional circuitry of scientific discovery’ involving knowledge exchange and research translation (Ginexi and Hilton 2006; Ogilvie et al. 2009; Simmons et al. 2009).