Perspectives in Public Health

RSPH

EDITORIAL

Editorial

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Welcome to the November edition of *Perspectives in Public Health*, and as new Deputy Editors for the journal, it is our pleasure to share with you a special issue on Obesity that brings together a collection of papers focused on our practice and research interest.

Obesity is recognised to be a major public health concern. The World Health Organization states the prevalence of obesity across the world nearly tripled between 1975 and 2016 and has a marked gradient in line with inequality and deprivation. The environment and communities people live, work and raise children in are fundamental in shaping the factors driving the increasing levels of obesity. This is explained further in the article by our RSPH colleagues 'We can tackle obesity . . . but it has to be collectively', which summarises the current picture of obesity, impacts, costs and highlights the need for collective responsibility and collective action. The first step to achieve this collective responsibility is widespread acknowledgement that many of the problems we face in public health, including obesity, are complex and require us to approach these challenges in a new way.

In recent years, systems approaches have been recognised as a realistic and promising approach to addressing such complex public health challenges. Systems approaches can allow us to obtain a better understanding of the complexity of obesity and identify if and how actions we take contribute to reshaping the system in favourable ways. They require a paradigm shift in thinking, away from notions of simple cause and effect, to understanding that the way in which the many interconnected parts of the system interact determines the outcome(s) produced. In doing so, the focus of attention moves away from notions of siloed attribution to consideration of the contribution of multiple activities.

Promising as systems approaches may be, it is important to recognise that our understanding of how best to implement and evaluate them is still in their infancy. This special edition of *Perspectives in Public Health* moves us forward in this journey, bringing together papers highlighting how policy interfaces with systems thinking, with some ideas and suggestions of what does and could influence collective action to reduce levels of obesity. As a forerunner, collective action should start with having a 'shared understanding of the challenge' and Griffiths and colleagues propose a framework to bring together academic, policy, practice and community representatives to develop and to integrate action to bring about sustainable, long-term systems change.

Local government have a key role within the system, and as a result of the wide remit of local authorities including planning, environment, public health functions and transport, reducing the prevalence of obesity often falls at their door as the champion of systems change. An article by Taheem et al. explores if and how systems thinking is reflected in local authority plans to address levels of obesity. While finding an overreliance of downstream actions, the work also revealed some examples of upstream actions with the potential for high impact.

Regulatory methods are one example of systems work that can be championed by local authorities. Examples of this are well presented in papers by Bernhardt and O'Mallley. Fran Bernhardt and colleagues highlight the potential cost savings of up to £218 million to the National Health Service (NHS) through targeted work with advertising policies which feature high fat, salt and/or sugar (HFSS) foods and drinks. Their paper identifies an increasing interest from local authorities across the UK in considering this preventive approach. While O'Malley focuses on the local and national regulatory mechanisms to restrict hot food takeaways. Both papers push for the need to focus on upstream or higher leverage point activity and highlight the value of having a coalition with a shared vision led by willing stakeholders.

Stakeholders within a systems approach to address obesity must also include the voices of people in communities. Yet the extent to which community representatives are included in discussions is rarely reflected. Nield's piece on empowering seldom heard communities as key stakeholders within the system firmly sets out the challenge and encourages co-production approaches by policy makers and service deliverers to avoid inadvertently ignoring the needs of those at high risk of obesity and perpetuating further health inequalities.

Finally, Bontoft and Gadsby offer us insight from the evaluation of systems approaches. Bontoft and colleagues consider the enablers and barriers in the early stages of setting up and implementing a whole systems approach to address diet and healthy weight in two council areas of Scotland. Correspondingly, the team led by Gadsby provide a unique, retrospective analysis of the complexities of evaluating multistrategy, community-based approaches to obesity prevention on behalf of a public sector commissioner, offering key learning points for others engaging in this type of complex, real-world programme evaluation.

We hope you enjoy reading the excellent papers presented in this special edition, which has allowed us to bring together our previous roles and experiences working within obesity policy in local government and commissioning and delivering weight management services, and celebrates the advances in real-world systems thinking.

A complex systems approach to obesity: a transdisciplinary framework for action

In this article, Dr Claire Griffiths et al. present a simple framework of a complex problem, which provides all stakeholders with the foundation to implement a systems approach to obesity. It demonstrates the need for transdisciplinary working to ensure the individual, local, national and international perspectives are considered.

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Obesity is a major public health challenge which continues to increase and disproportionally affects vulnerable population groups, resulting in widening health inequalities.[1] There is consequently an urgent need for innovative approaches to identify and implement evidence-based policy and practice to prevent and treat obesity which has been accelerated by the COVID-19 pandemic.[2]

The population levels of obesity are driven by numerous interacting political, economic, environmental, social, cultural, digital, behavioural, and biological determinants. However, causal links between determinants and how they vary between different groups of individuals are not well defined. The identification, implementation, and evaluation of effective responses to the prevention and treatment of obesity require a set of approaches that work within this complexity.[3,4]

The limited efforts to date reflect a misunderstanding of the nature of the chronic and complex nature of obesity, and importantly, a limited understanding of how the multifaceted nature of the problem should influence how research, policy, and practice approach it. To date, the evidence underpinning the current approach does not reflect the complexity of the condition:

- Evidence is largely generated by tools and methods developed to answer questions about the effectiveness of isolated interventions, commonly grounded in linear models of cause and effect. This is the pathway between a cause, for example, exposure to fast food restaurants, and the outcome, obesity, is assumed to be linear, when it is far more complex than this.
- There is a focus on individual behaviour, yet social and structural determinants of health have a far greater influence on obesity and contribute more to health inequalities.[1] It is acknowledged that we live in an obesogenic

ISSN 1757-9139 DOI: 10.1177/17579139231180761

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environment,[5] yet most approaches to addressing obesity are focused on behaviour change to support individuals adopt healthy weight behaviours, with little (or no) consideration of the environment in which they live.[4]

- Outcomes are largely measured in the short term and the effects of efforts to reduce population obesity will take many years to be realised.
- Effectiveness is primarily determined by a narrow focus on weight change, which fails to capture the underlying complexity. Instead of investigating whether a single intervention is (cost-) effective in terms of fixing the problem (i.e. obesity), we need to understand how actions drive positive changes within the system.

A systems approach captures and responds to complexity through a dynamic way of working: bringing together academic, policy, practice, and community representatives to develop a 'shared understanding of the challenge' and to integrate action to bring about sustainable, long-term systems change.[3,4] The benefit of a systems approach to addressing population levels of obesity has been outlined: in 2013, the EPODE logic model[6] retrospectively provided insight

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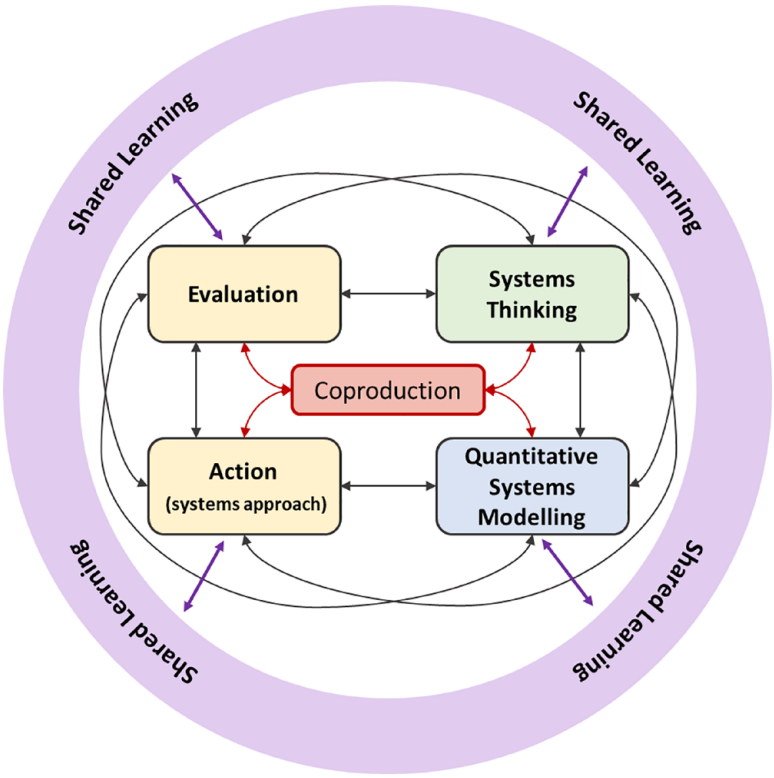
into the system dynamics of the programme; the 'Improving the Health of the Public by 2040' report[3]

Figure 1.

Complex systems framework for obesity.



acknowledged that responses to major public health challenges require a wider set of approaches; in 2017, Rutter *et al.*[4] called for 'a complex systems model of evidence for public health', which was echoed in 2019, as part of *The Lancet* commission on obesity.[7] More recently, the logic model underpinning the Amsterdam Healthy Weight Approach (AHWA) was published.[8] There are also examples of projects that have embraced system approaches in an applied setting,[9–11] as well as toolkits,[12] guidance documents,[13–15] and operational frameworks.[16–19] These resources demonstrate that the concept of a systems approach to obesity is not new, and importantly that systems methods do not have to replace traditional methods, but instead incorporate and enhance them.[20,21] Despite this activity and rhetoric, systems approaches are rarely operationalised in ways that generate relevant evidence or effective policies.

A TRANSDISCIPLINARY COMPLEX SYSTEM FRAMEWORK FOR OBESITY

The 'Improving the Health of the Public by 2040' report[3] highlighted the importance of transdisciplinary research to establish a robust understanding of the long-term impacts of many of the wider drivers of public health that cut across local, national, and global environments. We developed a transdisciplinary consortium, representing multidisciplinary academics, policy, practice, and community representatives, as well as individuals with lived experience (see study group details), to coproduce a complex systems framework for obesity (Figure 1). This framework brings together six concepts: systems thinking, quantitative systems modelling, action (systems approach), evaluation, shared learning, and at its core, coproduction to design, implement, and evaluate an approach to obesity which is consistent with the underlying complexity. Although arranged sequentially in a clockwise fashion, the concepts need not be implemented sequentially and can be repeated as necessary to support ongoing development. Each distinct concept could be considered in isolation; indeed, the current evidence base for systems approaches to obesity management and prevention is dominated by research with a 'system thinking' lens[20,21] and, although it is not necessarily wrong to consider these 'concepts' in isolation, it is important to understand how they fit together to drive system change. The value of blending multiple methods from the systems toolkit (rather than driving the research with a single tool as the lens) has been illustrated by the Childhood Obesity Modelling for Prevention and Community Transformation (COMPACT) team.[22] It is the synergy of the different concepts to truly capture the complexity that makes this framework innovative and ambitious.

Coproduction is at the heart of our systems approach, to ensure it is built

around the needs, experiences, and knowledge of academics, policy makers, practitioners, organisations, and community members. Stakeholder views may differ regarding the nature of the problem, appropriate strategies for addressing the problem, or how to implement those strategies. Although there is consensus from public health experts on how to address population obesity,[7] the multiple perspectives of stakeholders, which are a symptom of the complexity, challenge this consensus.

Systems thinking (qualitative system modelling) is concerned with the structure of a system and is underpinned by three core principles:[16,23] first, defining *system boundaries*, determining what is considered in or out of the system and how the system will be conceptualised vis-à-vis its external environment. Boundaries that are set too widely may overwhelm action or evaluation; boundaries set too narrowly exclude important system perspectives and partners. Second, we must make sense of the *inter-relationships* between parts of the system. Relationships include the formal and informal connections, exchanges, or interdependencies among system parts, whether they are professional partnerships, social relationships, collaborative networks, communications channels, funding streams, flows of information, data or knowledge. Third, it is important to view the system from multiple *perspectives*; system stakeholders will have different perspectives or pursue different agendas in a particular situation, which reiterates the importance of coproduction. System thinking methods used in obesity research may include group model building (GMB) and qualitative system mapping (QSM)[21,24] to facilitate stakeholders and evaluators in restructuring their individual and collective understanding of the system in question.

Quantitative systems modelling allows the characteristics of complex systems to be captured and embedded in quantitative models, to understand how interconnections among the various individuals and organisations give rise to emergent and dynamic behaviours or properties. System modelling methods used in obesity research include system dynamics modelling, (social-) network analysis, and agent-based modelling.[20] The aim of such models is not to replicate the 'real world' precisely, but rather to create a helpful abstraction to evaluate potential changes and the mechanisms that drive them. It is important that any quantitative systems modelling is informed by, and built upon, the insight gathered from system thinking methods, thus accounting for the multiple perspectives of various stakeholders. The evolution and utilisation of quantitative systems modelling aligned to outputs from systems thinking methods have been used to describe how system stakeholders use their social networks to diffuse knowledge about and engage with childhood obesity prevention efforts.[22]

Action (systems approach) needs to follow. Few system approaches demonstrate informed action in a real-world setting and no approach is informed by blending multiple methods from the systems toolkit (although many 'system approaches' have used components in isolation).[25] Although both system thinking methods and quantitative systems modelling pursue a process to create a systemic awareness of a problem situation, and their methods may (or may not) shed light on the same systemic elements, their merger is what provides the most comprehensive understanding of system functioning. For example, actions developed based only on the outcomes of systems modelling without a multiperspective understanding of the system (i.e. systems thinking) may not be practically implementable and might be viewed as flawed by stakeholders. Conversely, a system thinking approach that qualitatively describes the system with no formal modelling is likely to overlook key uncertainties and system behaviours that a quantitative modelling approach could identify. Fundamental to the *action of a systems approach* is understanding the different perspectives of stakeholders on what constitutes 'evidence' and what value different stakeholders place on 'evidence'. Action in practice is informed by a complex and dynamic range of factors beyond simply the robustness of the methods/strength of the evidence (e.g. political views and policies, vested interests, biases, public opinion, competing priorities).

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Evaluation is essential. Although guidance on how to evaluate complex interventions, including complex interventions within complex social systems, has been published,[13–15,19,20,26] they all call for new and innovative approaches to complex systems evaluation. System approaches are currently being used with limited knowledge of the likely effectiveness of any individual or collective action being taken.[25] More recently though, the ENCOMPASS framework[17] and the Scottish National evaluation protocol[27] have been published to support researchers in designing systems evaluations. Within our framework, the evaluation captures the attribution (i.e. what proportion of the outcome was produced by the action) but also the contribution (i.e. how reasonable is it to believe that the action(s) and the behaviours of individuals contributed to system changes). The inherent complexity of a systems approach, where the route to change could be nonlinear and cannot easily be predicted beforehand, requires a flexible, adaptive, and iterative evaluation design. Rather than undertaking a static response to an intervention or action at fixed timepoints and with predetermined questions, a system evaluation needs to adjust in response to potentially important outcomes that emerge.

Sharing learning is central to the success, impact, and legacy of a systems approach. All stakeholders need to be able to access information and data that is meaningful and useful to them; they must see their

place in the system and be aware as to how they are influenced by other factors in the system. The Academy of Medical Sciences report recommends that we should 'harness new technology and the digital revolution' requiring us to collectively address issues associated with data access, ethics, trust, regulation and skills.[3] Furthermore, decisions in the 'real world' are often evidence-*informed* rather than evidence-*based*, and decisions are sometimes taken quickly and for a range of complex reasons. The ambition of shared learning within our framework goes beyond publishing scientific evidence (although this remains important). We must improve the knowledge base and enhance capacity within the field leading to improved decision- and policy-making and improved service delivery. The full societal value of a systems approach will not be realised until it is translated into improved health and health equity, and this will take considerable time. We must ensure that all stakeholders actively contribute to the outputs, rather than simply receiving them, thus enhancing the real-world applicability. This will require iterative and meaningful engagement with all sectors of society, including practitioners, policymakers, the commercial sector, and the public.[3]

SUMMARY

Our complex systems framework (Figure 1) complements and extends existing international best practise by extending methodologies in the design, implementation, and evaluation of obesity actions. Perhaps most importantly, this is the first framework to be coproduced by a transdisciplinary team with a holistic understanding of the wide range of obesity determinants, and the skills and approaches necessary to address them (see study group details). The aim is that this simple framework, of a complex problem, will provide stakeholders with the foundation to implement a systems approach to obesity. To achieve this, research funding, research activity, and the evidence base need to rebalance the distribution of projects that take a complex system approach.[4]

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Empowering and including 'seldom heard' communities in systems thinking for weight management

This article initiates an important conversation about how underrepresentation of stakeholders risks perpetuating health inequalities by designing seldom-heard communities out of the system.

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Obesity research, service provision and policy have attempted to stem the tide of obesity to alleviate financial, social and healthcare pressures. While much of this work has been well-intentioned, well-designed and well-managed, outcomes for weight loss are poor, and weight regain is common.[1] The prevalence of obesity is associated with deprivation, gender, ethnicity, household income and geographic location,[2] confirming that obesity is a disease of inequality.

Weight management is recognised to be complex as highlighted by the Foresight obesity systems map which challenged the simple 'energy in vs. energy out' rhetoric.[3] In recognition of the complexity of factors at play, attention has turned to a whole systems approach (WSA) to address such complex issues.[4]

A system is defined as 'a set of inter-connected parts that have to function together to be effective'.[5] There is no single agreed definition of a health system, and as such, healthcare and public health are often described in academic literature as separate systems.[6] The health system is therefore separate from, but influenced by, larger systems including political and social systems.[6] Within a traditional biomedical-focused health system, 'health' may be attributed to individual factors including access to and participation in public health and healthcare services. However, the wider determinants of health recognise the significant influence of sociocultural, economic, environmental and political factors on health.[7]

The Institute of Health Equity report (2018) proposed a broad health system approach to improve and tackle health inequalities and advocated for a place-based health system which focuses on prevention and treatment of ill-health, understands local population health risks, collaborates across sectors, acts on social determinants of health and develops 'proportionate universalist' approaches.[8] Despite this, weight management policy and provision has not adequately addressed the multifaceted causes of obesity and continues to focus on individual behaviour change approaches putting the onus for weight loss on individuals, with success or failure dependent on their personal agency.[9]

Population health approaches drive public health outcomes and are key to systems thinking. Population health extends beyond the health system and is based on an ecological model of health, considering how individual, social and environmental determinants influence health and recognising[10] that people are active participants in their own health outcomes. It is, therefore, important to recognise that individual health and health outcomes are underpinned by both public health and healthcare activities and also by how individuals are enabled to interact with these systems and their broader social environments.[6]

The 2010 Marmot review highlighted the structural inequalities driven by the social determinants of health and argued for change to prevent ill-health and social injustice caused by inequality and to protect the health and wellbeing of future generations. It described how inequalities across communities are driven by inequalities in health and clearly articulated the need for community empowerment to reduce health inequalities.[11]

Many of the factors which prevent engagement with and adherence to current weight management services demonstrate that such interventions[12] are inappropriate for individuals from underserved and more deprived groups, and as a result, lack of engagement with these populations continues to drive health inequality. It highlights the need for a significant overhaul of current weight management provision, embracing a more systems-led approach and for the voices of

ISSN 1757-9139 DOI: 10.1177/17579139231180732

underserved and seldom heard communities to be involved in the design and development of weight management provision. Participatory methodologies such as co-design and co-production are crucial to systems approaches and understanding the needs and demands of these underserved groups in a considerate rather than tokenistic way.[13]

the need for a significant overhaul of current weight management provision, embracing a more systems-led approach and for the voices of underserved and seldom heard communities to be involved in the design and development of weight management provision

The inclusion of stakeholder networks is vital.[14] In the case of obesity, stakeholders should be representative of healthcare, actors within the wider system, and should also include users or potential users and beneficiaries of the system such as those living with or at risk of obesity.[15] Each stakeholder may have a different viewpoint which allows a broader perspective and new insights into how the system works, what the problems are and why, what can be improved or changed, and the impact of changes on other components in the system.[16] It is important that stakeholders are representative of the community and populations targeted by weight management systems. A recent systematic review concluded that the most successful WSA weight management and public health projects included effective community involvement where participants identified the needs and actively participated in solutions at a local level.[17] The review also highlighted that whole systems thinking is in its infancy and is not consistently embedded into the implementation or evaluation of interventions. This is exemplified with few published studies successfully targeting 'at risk' population groups, such as low socioeconomic status, those with low educational attainment levels, and Black and minority ethnic groups.[17] Not only does this restrict the usefulness of the findings but it also demonstrates how systems thinking in weight management has not always been inclusive and has engaged minimally with some communities, rendering them 'seldom heard'.[15,17]

In the case of obesity, stakeholders should be representative of healthcare, actors within the wider system, and should also include users or potential users and beneficiaries of the system such as those living with or at risk of obesity

The term 'seldom heard' refers to under-represented communities, groups, populations or people who use or will potentially use services but who are less likely to be heard by professionals and decision-makers.[15] However, the importance of including seldom heard groups in health and social care research is crucial on scientific, policy and ethical grounds.[18] The under-representation of these groups in health research impacts the validity and generalisability of data,[19] the development of services and interventions that meet their needs,[20] allocation and access to resources[21] and can perpetuate health inequalities, especially as some of these groups have more health needs.[22]

WSA success metrics have been proposed by the Public Health England (PHE) logic model which describes outcomes including a reduction in obesity levels and health inequalities, effective use of community and other assets and an overall improvement in population health and wellbeing.[4] While the move towards, and expansion of systems thinking is encouraged, this model lacks patient-led outcomes and an understanding of 'what matters most' to populations involved in, and targeted by, weight management systems.

It is, therefore, of paramount importance that future obesity approaches adopt a strong WSA that is inclusive of the voices of underserved communities and that actively recruits and engages people from seldom heard groups in the identification of systemic issues, challenges and barriers, service design, delivery and development, and the implementation of actions for systems change and evaluation. Co-production and co-development methodologies need to be embedded within WSA from the start, and effort needs to be made to ensure that the participants are truly representative of the target populations. Without capturing the voices of these communities, WSA to weight management (including weight management provision) may inadvertently ignore the needs of those at high risk of obesity and perpetuate further health inequalities.

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Regulatory mechanisms to create healthier environments: planning appeals and hot food takeaways in England

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Keywords

public health policy; public health; obesity; health policy; environment

Abstract

Aims: To explore existing regulatory mechanisms to restrict hot food takeaway (HFT) outlets through further understanding processes at local and national levels.

Methods: The Planning Appeals Portal was utilised to identify recent HFT appeal cases across England between December 2016 and March 2020. Eight case study sites were identified using a purposive sampling technique and interviews carried out with 12 professionals involved in planning and health to explore perceptions of and including factors that may impact on the HFT appeal process. Additionally, documents applicable to each case were analysed and a survey completed by seven Local Authority (LA) health professionals. To confirm findings, interpretation meetings were conducted with participants and a wider group of planning and public health professionals, including a representative from the Planning Inspectorate.

Results: Eight case study sites were identified, and 12 interviews conducted. Participants perceived that LAs would be better able to work on HFT appeal cases if professionals had a good understanding of the planning process/the application of local planning policy and supplementary planning documents; adequate time and capacity to deal with appeals cases; access to accurate, robust, and up to date information; support and commitment from elected members and senior management; good lines of communication with local groups/communities interested in the appeal; information and resources that are accessible and easy to interpret across professional groups.

Conclusions: Communication across professional groups appeared to be a key factor in successfully defending decisions. Understanding the impact of

ISSN 1757-9139 DOI: 10.1177/17579139231187492

takeaway outlets on health and communities in the long term was also important. To create a more robust appeals case and facilitate responsiveness, professionals involved in an appeal should know where to locate current records and statistical data. The enthusiasm of staff and support from senior management/elected officials will play a significant role in driving these agendas forward.

INTRODUCTION

Obesity is a significant health and social problem. Addressing factors that contribute to high energy intakes and subsequently excess weight gain is an important public health challenge. 'Dramatic actions' are needed, globally, to address food environments and thereby impact on the rise in obesity, cardiovascular disease and type 2 diabetes.[1] A population approach (as opposed to individual level approaches) is to address the environments that promote less healthy eating and high energy intake.

There is an urgent need to shift focus to a more upstream (or macro-level) whole systems approach to obesity[2], using cross-sector and multi-agency working to consider the multiple factors that influence individual determinants. Examples of upstream approaches could be through use of planning[3] or taxation of less healthy foods.[4] This research focuses on the Planning Appeals process in England, which is managed by The National Planning Inspectorate (PINS).[5] The environment has been acknowledged as a determinant of health,[6] and that (1) eating out of home is positively associated with risks of overweight and obesity[7] and (2) that food eaten out of home is usually less healthy and provides a higher energy contribution from fat compared to food eaten at home.[8] This potential role of the built environment and planning in creating healthier communities was reflected in the 2012 National Planning Policy Framework (NPPF) for England,[9] which sets out planning policies and how they are expected to be applied. The NPPF and associated Planning Practice Guidance was revised in 2019 and now includes more detail about promoting health and wellbeing, for example by citing access to healthier food, green space and building environments that promote walking and cycling as specific aims.[10]

We can define the food environment as any opportunity to obtain food; it includes physical, socio-cultural, economic and policy influences at both micro and macro levels.[11] The broader food environment includes the home food environment, food policies and school food policies in addition to the neighbourhood food environment.[12] This research focuses on the neighbourhood food environment and specifically hot-food takeaways, within the broader context of obesogenic environments. Takeaway and fast food, a fixture of our diet, is usually nutrient poor and energy dense.[8,13] There is a 'concentration effect', with a clustering of these fast-food outlets and neighbourhood exposure being greater in more deprived areas.[14,15]

Policy documents have highlighted the role that Local Authorities (LAs) have in tackling obesity.[16–18] An umbrella literature review[19] assessed the impact of the built and natural environment on health. The review concentrated on five key built environment topics: neighbourhood design, housing, healthier food, natural and sustainable environment, and transport. These are environmental issues that can be shaped by planners and have the potential to influence health.

There has been a recent interest in the role of LAs in shaping the food environment,[20] particularly via engaging small businesses[21] and planning departments,[22] but also the wider neighbourhood food environment. The latter is defined as a mixture of retail outlets (e.g. small convenience stores and supermarkets) as well as restaurants and take-away ('fast food') outlets and is *not* limited to the residential neighbourhood.[11] The neighbourhood food environment influences individual food choice and food intake through the concept of food *access*. Access, in terms of the food environment, includes five dimensions which are: *availability, accessibility, affordability, acceptability*, and *accommodation*.[23] Planning legislation can influence both availability and accessibility of these outlets.

Using The Town and Country Planning (Use Class) Order 1987, outlets are classified according to the use class order of the premises they occupy, dependent upon their primary operating model and premise size (Classifications of interest are in Box 1), and in 2005, a specific 'A5' Hot Food Takeaways was introduced. From September 2020, the classification of Hot Food Takeaways (HFTs) was changed to the sui generis class (meaning 'in a class of its own').

An increasing number of LAs are using Supplementary Planning Documents (SPDs) to control fast food outlet proliferation.[24] Barking and Dagenham

Box 1 The town and country planning (use class) order[a].

A1, retail – includes sandwich bars and internet cafes

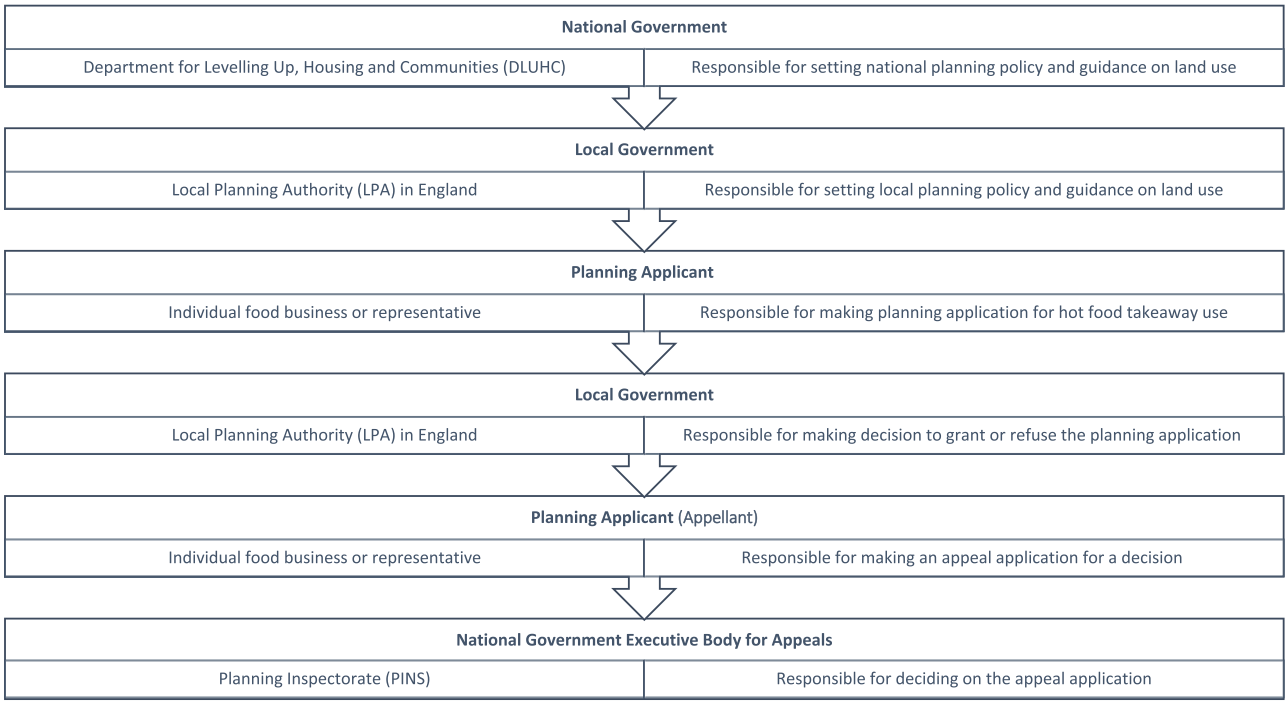
A3, restaurants and cafes

A5, hot food takeaways

[a]From September 2020, A1 and A3 have been replaced by Class E, and A5 has changed to Sui Generis.

Figure 1

End to end process for decision-making on hot food takeaways



was the first LA to introduce an SPD in 2010 which gave weight to health impacts, focusing on both public health and nutrition.[22] Such an approach is now suggested by Public Health England (PHE, now Office for Health Improvement and Disparities (OHID)) for LAs to influence the out-of-home food environment,[19] alongside use of the local plans, joint strategic needs assessments, joint health and wellbeing strategies, sustainability and transformation plans and the use of Health in all Policies.

Work published in 2019 by Keeble et al.[25] showed that 51% of LAs in England have a planning policy to restrict HFTs, and 34% of these (56 LAs) state protecting public health as a key driver. However, the effectiveness of these policies will ultimately depend on their successful implementation. In part, successful implementation will depend on enforcement when a prospective HFT owner (the 'appellant') appeals against an initially rejected planning application. Final decisions are then taken out of local hands and are made instead by PINS (the focus of this work) based on representations by the LA and the appellant. Decisions that are upheld are those that are in agreement with the initial LA decision, while decisions that are dismissed are those that overturn the initial decision. The end to end process for decision-making on HFTs is outlined in Figure 1. This research aims to build on previous evidence which explores decisions made by PINS[26] including perspectives from a variety of professionals involved in HFT planning appeals, providing a more holistic insight into the process.

METHOD

See Figure 2 for the project flow diagram. The Planning Appeals Portal (PAP) [https://appealfinder.co.uk/] was utilised to identify recent case studies across England. 47 HFT appeal cases across 34 LAs were found, spanning from 2016 to 2020. From these, eight case study sites were identified to further explore information considered in HFT appeal cases. The typology of action was applied as developed by Keeble et al.[25] to select studies. Cases were selected using a purposive sampling technique which is particularly useful in obtaining information that contributes to a deeper understanding of the topic of interest.[27] Cases were selected that; mentioned HFT appeals and health, cited health and/or obesity as a factor in the case decision and had textual information in relation to health and/or obesity as an addition to the final appeal decision. This included documents such as planning documents, policies, residential and/or business letters and LA responses etc. An even number of both cases that were upheld and dismissed were selected, ensuring each region was represented including North East and Yorkshire, South West, Midlands and London.

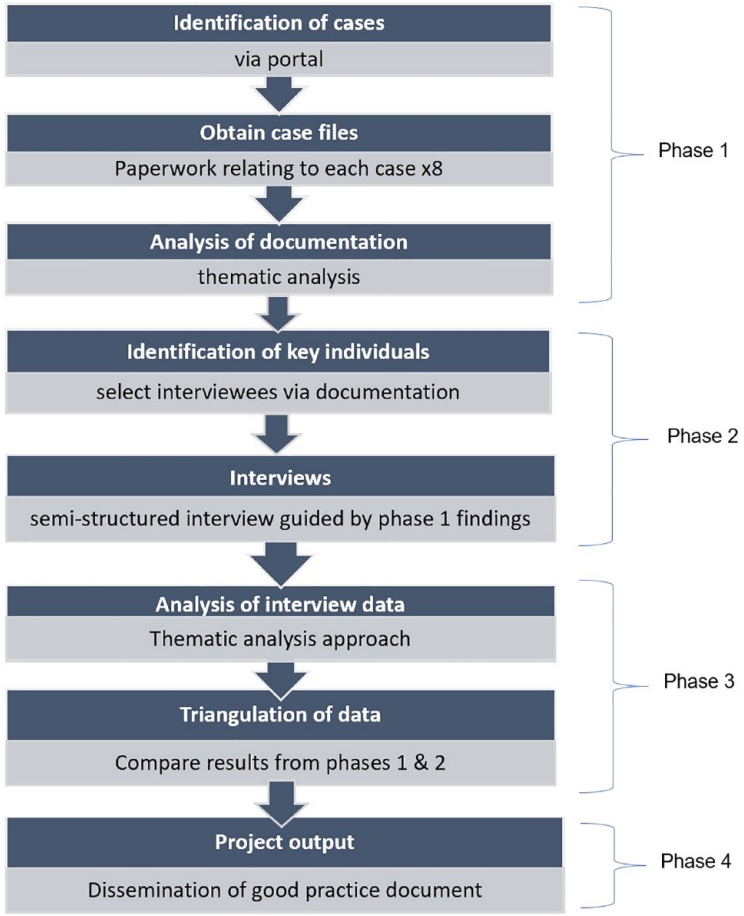
Data collection for each site took part in three phases:

Phase 1: identification of case study sites and documentary analysis

Characteristics of the 47 cases were obtained. Extracted data included the appeal decision (upheld/dismissed), Indices of multiple deprivation (IMD)

Figure 2

Project flow diagram



decile, authority tier, and whether any SPDs and Local Plan policies were cited. Documentation from each case was examined, evidence, where available, was extracted and analysed to provide contextual data for each case study site. For example, this included; appeal type, agent involvement, total number of documents attached to each case, key documents that contained health-related information, priority placed on health, application for costs, whether other cases were cited and use of statistics, reports, maps, academic documents and whether Local Plans and SPDs were in place at the time the case decision was made. Descriptive statistical analysis was conducted to explore possible associations.

Phases 2 and 3: interviews and online survey

Interviews were carried out with nine planners, one public health professional, one public representative, and a representative from the Planning Inspectorate (independent from the case studies) between October 2020 and January 2021. All interviews were carried out over Microsoft Teams or via telephone using a predetermined semi-structured interview guide, the development of which was directed by key stakeholders involved in the project and using evidence obtained within associated case documents (identified in phase 1). This ensured that questions were relevant to case players, added local context to the format and structure of the interviews and allowed for further exploration of any barriers and facilitators to the appeals decision making, identified in phase 1. Each participant was asked a core set of questions related to the appeals process in general, supplemented with case specific questions, where appropriate. Participants provided written and verbal consent prior to taking part and all interviews were recorded, transcribed and anonymised. Ethical clearance was approved by Teesside University's School of Health and Life Science Committee (Ref: 150/19).

We were unable to interview any business owners. The interview phase was carried out during the COVID-19 pandemic and availability of participants

was significantly impacted by this. This also posed recruitment challenges and an online survey was launched via Jisc Online Surveys to boost responses from across LAs (containing very similar questions to those used in interviews). The questionnaire was sent to those 47 LAs across England via our steering group members (however, professional groups already interviewed were excluded from the mailout).

Data analysis

Documentary case information for each case study site was analysed using a content analysis technique and interview data thematically analysed.[28,29] NVivo V.10 was used to assist with the organisation and analysis of data.[30] Analysis was performed by two researchers (CO and CB) and findings discussed with two other researchers (HM and AL). Data was drawn together from each phase using a triangulation technique and narratively synthesised to identify both barriers and facilitators to the appeals decision-making process and to make specific recommendations to inform the development of a successful appeal case.

RESULTS

Phase 1 (identification of appeal cases)

Characteristics of the 47 HFT cases

Forty-seven appeal cases (mentioning HFTs) between 2015 and 2020 were identified across England; 21 were upheld (45%) and 26 dismissed (55%). Most cases were based in more deprived areas (IMD deciles 1–4 $n=39$), although there was no association between deprivation and appeal decision (based on descriptive statistics). Twenty-five cases were decisions made by LAs in the North of England, compared to 22 in the South. However, this figure is not indicative of proportionality of appeal cases but attributed to the sampling approach taken which allowed for a geographical spread of appeal cases. Twenty-seven cases were under a unitary authority system, with 20 having two-tier systems. Cases under a two-tier system appeared marginally more likely to be upheld (55%), compared to unitary authorities (37%). Thirty-nine cases were aided by SPDs.

Documentary analysis of case-study sites (n=8)

From these 47 cases (see above), eight were purposefully selected as case study sites. Documents were available to review for six of the eight case study sites in urban/Metropolitan Unitary Authorities in England (two in the North East, two in the West Midlands, two in London and one each in West Yorkshire and the South West). The number of documents attached to each case ranged from 10 to 86. There appeared to be duplicates or missing documents in some cases, however all those available were reviewed for content and data extracted based on the following criteria; location, decision, appeal type, agent (Y/N), total no. of documents, key documents that included health related information, order health placed as a priority, other stated cases (Y/N), statistics used (Y/N), SPD (Y/N), Local Plan (Y/N), academic documents (Y/N), maps (Y/N), details on statistics, details of academic resources, application for costs included (Y/N). Characteristics of the eight case study sites are outlined in Table 1.

Appeal types were predominantly proposed changes of use, from class A1 to A5 ($n=5$) (see Box 1). Two of the remaining cases were proposed erection of new units (one involving demolition of an existing site) and the remaining case was a change of use from A3 to A5 (see Box 1). Planning Agents were used in 5/8 cases, of which 3/5 were upheld. Key documents ranged from the decision notices only (in cases where there were no other documents available or very little information pertaining to health) to an array of documents, including officer reports, planning statements, email correspondence, appeal statements, letters of support and decision notices. Health was cited as the primary reason for the decision made in 3/8 cases (one case was dismissed, and two cases were upheld). In all remaining cases ($n=5$), health was cited as a secondary issue/ reason or cited within 'other matters' concerning the cases. Reasons which superseded health issues were; effect on living conditions, the vitality and viability of city centres, character and highway safety.

Health statistics were used to support six of the cases; this included statistics from PHE (now OHID) documents, local obesity trends and statistics, % of HFT's locally, National Obesity Observatory stats, National Child Measurement Programme (NCMP) data, Office for National Statistics (ONS) data, ward population data and retail survey data. PHE reports (now OHID), LA reports (including council committee reports) and healthy weight strategies, as well as the Foresight report were referred to in four of the cases. The remainder had no documents attached so it was unclear if reports had been used. Only one case included the use of academic publications to support their case (used in a case that was dismissed (North East A). SPDs were present in 5/8 cases. Of these three were dismissed and one upheld.

Phase 2 (interviews)

The results from the interviews have been divided into themes and subthemes.

Perceived role of the planning inspectorate

Decision making throughout the process. The Planning Inspectorate (PINS) are the decision-makers in the appeals process. Individual Inspectors are appointed to make decisions on behalf of the Secretary of State (SoS); however, the SoS can step in to recover for determination if deemed appropriate, although this is very rare. When an Inspector makes a decision, it potentially becomes a material consideration in subsequent cases, allowing appellants and planning authorities to use them as a comparison and to argue for consistency in decision-making over similar issues. The appeal process was perceived as confusing and difficult to navigate for some, especially to the public and to those new to the practice, although procedural guidance is published and available to view on the PINS website

Table 1

Details of data collection for the eight case study sites

LA	Decision	Year	Sup. planning doc.	Interview			Doc. analysis	Regions
				Planning	Public health	Business		
North East A	Dismissed	2020	Yes	No	Yes	No	Yes	North East & Yorkshire
North East B	Upheld	2019	Yes	Yes	No	No	Yes	
West Yorkshire	Dismissed	2018	Yes	No	No	No	Yes	
West Midlands A	Dismissed	2018	Yes	Yes	No	No	Yes	Midlands
West Midlands B	Upheld	2016	No	Yes	No	No	No	
South West	Upheld	2017	Yes	No	No	No	Yes	South West
London A	Dismissed	2020	No/London Plan	Yes	No	No	No	London
London B	Upheld	2020	No/London Plan	Yes	No	No	Yes	

LA: local authority.

this was not referred to in any of the interviews:

> *It was exhausting . . . I was tearing my hair out. I enjoyed the process, but it was very very hard going*. (ID 9)

Only consider evidence presented to them. It was frequently noted how the PINS will only consider evidence if it is presented directly to them and that this was the responsibility of the case specific officer. It was stated that appellants should not assume that PINS know anything about the available evidence, requiring a systematic and thorough approach to pulling together all available evidence to support a case:

> *All the information needs to be out there, clearly so that the inspectorate can make the decision with ease*. (ID 8)

Moreover, it was suggested that the appeals process was one that was generally fair and clear from a planning perspective:

> *I think the planning inspectorate operate in a very clear and transparent manner, but they only consider evidence that is put before them.* (ID 5)

This was confirmed through speaking with a representative from the Planning Inspectorate who saw themselves a separate entity with the task of providing an impartial decision based on all available evidence:

> *Inspectors are there to provide rigor and to review the evidence on an objective basis, not just to say, oh, because it's agent X or company X, therefore it must be right. They are there to look, think independently for themselves and look to see if there are holes in that, in that evidence.* (ID 10)

Relevance and prioritisation of evidence

General consensus over certain types of evidence. Across interviews with all three professional groups (public health, planning, and the Planning Inspectorate), there was agreement that certain types of evidence were prioritised over others. Some forms of evidence were perceived to be undisputable and essential to a successful appeal (e.g. reference to Local Policy), while others were seen as 'anecdotal', unreliable, and to generally be avoided (e.g. the views of the public).

Local plan/ policy and statistical (data) evidence. Two forms of evidence were highly cited by respondents: reference to the local plan and or planning policy ($n = 5$) and statistical evidence or quantitative data ($n = 6$). These forms of evidence were regarded as the 'gold standard' and often necessary for an appeal to be successful. For councils based in London, the London Plan was perceived as carrying significant weight in comparison to the local plan which was considered more generic:

> *The London Plan. . .there's a bit more detail about, in particular hot food takeaways and obesity and that's given more standing.* (ID 5)

The most common example regarding planning policy was the minimum distance new HFTs must be from local schools; usually described as 400 to 800 metres, a distance which is usually deemed to be a 5-to-10-min walk. One participant noted trying to measure the distance between a new potential outlet and the local school but being unable to establish that the distance was below 800 m:

> *We said it was 816, we measured differently, but we could never get it under the 800, no matter how we tried.* (ID 9)

Interviewees often referred to statistics as a separate entity to that which cited planning policy; with participants consistently stating that statistical evidence was often fundamental to a planning appeal case, and always preferable if available:

> *You've always got to have a statistic to back it up.* (ID 3)

Again, a reoccurring example of statistics used was the NCMP, with planning authorities outlining that obesity in a certain area may already be above the national average, with local plans sometimes restricting the opening of new HFTs in such zones. Wider determinants of health could also be drawn out of Joint Strategic Needs Assessment or PHE (now OHID) reports, which were perceived as useful in identifying priority areas of concern.

Academic, authoritative and expert evidence. Academic, authoritative or expert evidence was likewise cited as useful in a planning appeal. Examples varied from peer-reviewed academic papers (particularly systematic reviews), data from PHE (now OHID), government publications, legislation, administerial statements, relevant authoritative groups or professionals, even comments from The House of Commons. However, this type of evidence was not referred to as frequently, and when referenced, it was often to endorse or complement a prior argument, which would have already been supported by one of the previous two primary sources of evidence.

> *I suppose, sort of systematic reviews, academic papers, PHE sort of data and any kind of supplementing evidence to kind of support that . . .* (ID 2)

'Anecdotal' evidence. Anecdotal evidence was rarely mentioned explicitly, however, evidence that did not fit into any of the previous categories was commonly described as 'anecdotal' and perceived to be less powerful. All professional groups stated a preference for material, binary evidence with little room for subjectivity, as such evidence was deemed the most difficult to argue against. Anecdotal evidence included the views of local residents:

> *. . . facts of the case . . . they're looking to base a decision on, on um, quantifiable evidence, not on anecdotal hearsay.* (ID 1)

Notable discrepancies. The previous forms of evidence discussed were largely agreed upon in terms of the amount of weight that is applied to them within the appeals process. However, there were some differences in opinion between professional groups regarding SPDs and the role of public health evidence. Both the Planners and the Planning Inspectorate were keen to point out that SPDs were often applied incorrectly in practice and were not considered to be particularly strong forms of evidence, while public health professionals tended to perceive SPDs as key to a successful appeal.

Most participants described public health evidence as being a fundamental part of their appeal cases and was cited as underpinning planning policies and constituting the majority of supporting information:

> *100% relevant. The public health evidence underpins our planning policy evidence base …* (ID 4)

However, there were some exceptions. Notably some planners stated that HFT appeals are rarely refused solely on a public health basis, but rather for other reasons such as highway safety, noise disturbances, or previous, similar planning decisions:

> *Well, in terms of most appeals we had in terms of hot food takeaways, not a great deal because the refusals have been on other grounds as well as health.* (ID 1)

Another notable point was that although the Planning Inspectorate was viewed across all professional groups as fair and neutral; the perception from public health was that they didn't think the inspectorate gave enough weight to public health evidence, or that they had to go out of their way to 'state the obvious', in that a new takeaway would be unhealthy and cause harm.

On the other hand, Planners and the Inspectorate were keen to point out that planning policy and the appeals process is not designed solely with public health in mind, and that achieving public health objectives is not as simple as limiting the number of HFT:

> *I think there seems to be an expectation from the public health side of things that planning will provide policy, so that we'll deliver whatever their aiming to achieve, y'know what I mean, like restricting take-aways will be the end of it from a health point of view, and of course planning is not actually designed to do that.* (ID 1)

Perceived factors to compiling a successful HFT appeal case

Communication. Communication played a significant role in putting an appeal case together. Cross-department working, knowing who to approach in an LA as well as where to find outside sources of information that could add value to a case (such as academic papers, reports and statistics) were believed to facilitate the process. Absence of working in a multidisciplinary way was perceived to impact on the ability to collate evidence for a case:

> *Some officers aren't so good at, knowing where all the information is, and in some local authorities, the teams don't work together.* (ID 4)

Accessibility of evidence and data. Access to both national and local data was considered important. Health statistics were cited as being central by some. This was also believed to be important even if there were already local plans and policies in place:

> *It's all well and good having the policy but it needs the evidence as well to back it up. So, having access to the public health team and the public health evidence is a really, really relevant part of the appeals process.* (ID 5)

Storage and updating of information. Having up-to-date information at hand was stated by some as being useful in helping to collate and respond to cases, making it less time-consuming to collect. It also meant that information was at hand and relevant. The additional effort to prepare and update information periodically was perceived as something that was worthwhile and beneficial in the long term, creating a stronger evidence base to draw upon when needed, in turn strengthening cases:

> *So, as a side matter, we always thought, if we keep on top of the hot food takeaway evidence, then when it comes to examination, all we are ever doing is just updating, we're not starting from scratch . . . each year we have a lot of Excel spreadsheets to plough through, to update this paper but each year we'll learn something new, or iron out a little crease, that, the more we do it, the more perfect it is. Whereas if we just left it, from 2017, for five years, we'd be like – how do we record this again?* (ID 4)

Format of evidence. It was not only important to have this information readily available but it was also important that it was usable. Often it was deemed to be in a format which was tricky to interpret or make sense of, and therefore could be difficult to use:

> *Often, I find that when I've had to do research for like health matters and planning, the data is there but it's very hard to kind of interpret or it's going across multiple sources.* (ID 5)

Understanding the importance of health. Understanding the importance of health and the implications of health on the wider planning agenda was considered valuable. Several participants felt this acknowledgement was lacking across professional groups, including planners. There were suggestions for additional training on the topic.

Passion, drive and commitment from elected members. The passion and drive of LA staff came through strongly in interviews. Individuals who appeared passionate about the topic were proactive, knew where to find data and had a good knowledge of their local area:

> *So, having the ability to talk to other people that also have conversations with other people, helps bring some of that information back to me, and it helps me feel more empowered to drive the policy forward, and not just give in and say ah go on we'll have another hot food takeaway, because I fully understand that it is having an impact on kids' lives.* (ID 5)

Some spoke of how elected members often provided input when cases were subject to a hearing. They spoke of decisions being dependent on the evidence presented by the officers and the elected members' perspective on this:

> *The officers make recommendations and the elected members make a decision based on officer advice and their own interpretation of the case. They often don't go with the officer advice and that's one of those things.* (ID 6)

Phase 3 (online survey)

In total, there were seven respondents to the survey, four of whom were from a planning background, and three from public health. Participants were based across various regions including North East and Yorkshire (3), the Midlands (1), London (1), and the South West (2). Two of the participants stated they were involved in HFT cases. Participants perceived that Planning Inspectors tended to have a focus on enabling economic activity, citing a lack of public health consultation and involvement in the process. Others suggested that the process was not in any way unfair, and that losing a case was nothing to do with the fairness of the system, but rather the balance of evidence on offer.

When asked what participants thought constituted evidence within a planning appeal, answers included the number of takeaways already open within the area, particularly around schools, as well as childhood obesity rates, mortality and morbidity data, socio-economic data, and academic evidence relating to behaviour and fast food. Participants also noted that evidence which is directly related to the locality and/or considers the economic aspects of a planning appeal carries the most weight in the appeals process.

Local Planning Policies, SPDs, and general articles which support the impact of hot-food takeaways were all listed as the health-related policies and documents which are frequently referenced in appeal cases. However, views on the relevance of health-related policy in an appeals case was mixed, with three stating 'sometimes' or 'maybe', and four answering 'very' relevant. Ways in which public health agencies could support the appeals process included lobbying for health to be a more material consideration in planning and providing more robust evidence which links the proliferation of takeaways with obesity rates. Suggestions for any changes that could enhance the appeals process ranged from speeding up the process, creating stronger national policies, and the NPPF explicitly stating that health is a material consideration for planning.

DISCUSSION

To the best of our knowledge, there are no studies that have explored the role of the Planning Inspectorate (at a national level) in planning for health. The aim of this research was to explore existing regulatory mechanisms to restrict HFT

outlets through further understanding processes at local and national levels. It also aimed to build on previous research carried out which questioned the importance of heath, the use of policy documents and other evidence within the decision-making process.[26] Findings from the case studies demonstrated that a takeaway's potential impact on the local populations' health was often cited as a reason against the change of land use or the construction of a new takeaway. However, this rationale was frequently referred to as a secondary concern and did not appear to make for a more successful defence. This is in line with the findings from the interviews and online surveys, where public health professionals felt the impact on health was not only based on evidence but common sense, describing a need to 'state the obvious' at every appeal. This led to a substantial level of tension with planning professionals on the other hand, who believed that public health professionals did not fully understand the role of planning, which was fundamentally about regulating land use and not about health policy.

These Internal relationships within LAs were important, including the relationships between different departments, how effectively they work together (particularly public health and planning), resources available and the size of the authority in terms of staff numbers. Interest from senior management and particularly political drive from elected councillors can be key in setting a LA's approach and providing resources. Where there is political commitment, a LA is more likely to find the time and resources to prepare a detailed case. Additionally, a solid legislative base for a LA case is vital, specifically the statutory local plan rather than, for example, supplementary planning documents.

There is minimal information available relating to the planning process in terms of HFT appeal cases and no other studies looking at the National Planning Inspectorates role within this process. However, in 2019 the House of Commons outlined the planning appeals process (in general), key players in the system and routes of access to further understand and challenge decisions.[31] While advocating transparency, specificity of how this might apply within a health context remains ambiguous due to a number of reasons including: conflicting policy priorities, lack of policy prescription and alignment at local levels and limited professional and institutional capacity in local government.[32] Additionally, this study also emphasised a holistic approach and need for direct engagement with planning professionals to provide opportunities for effective use of the planning system to promote healthier environments.

Strengths and limitations

While studies have explored the use of the planning system to regulate HFTs in England[33] and have reported on the decisions made by the Planning Inspectorate,[26] this article is the first to bring together the views of a range of professionals about the appeals process. The strength of this work is the first in-depth examination of the planning appeals process in relation to HFTs in England capturing the varying priorities, understandings and perspectives of the range of actors involved.

A key limitation of this research was the limited recruitment due to the COVID-19 pandemic response and lockdowns (2020-21). We had originally planned to interview at least 32 participants with stakeholders from LAs across England, as well as businesses and Planning Inspectors. Recruitment proved much slower and more challenging than anticipated. The COVID-19 pandemic and its impact on working conditions and resources meant that many LAs were unable to engage with the project due to their increased workloads, time constraints and other added pressures. We, therefore, changed our initial data collection method to incorporate a questionnaire/survey to maximise responses from LAs across England. Although this provided responses and captured a little more information in relation to the appeal process, only seven additional members of LA staff completed the survey. This method also had its own limitations, being less in depth and 'rich' compared to interviews yet did provide LA staff with an anonymous platform to share information and gave added perspective that would otherwise not have been achieved. On discussing this with our stakeholders, it became clear that the continuing effects of the COVID-19 pandemic would have made it difficult to engage with LAs in any given capacity, particularly those working in public health and planning departments. Additionally, businesses were either closed or under extreme pressures at the time of the data collection and we were unable to recruit any businesses to the study.

Implications for practice

Through the findings of this study, we summarised six suggestions for successfully defending a refusal of planning permission at appeal, outlined in Table 2.

CONCLUSION

Successfully defending a planning decision by a LA requires a range of issues to be in place; from having the appropriate planning policies to the correct application of these planning processes. It requires commitment from staff, building on communication between professional groups and clear lines of communication. Training on the importance of health in planning was identified; the Office for Health Improvement and Disparities (previously PHE) have commissioned and are developing this work. Further work is underway by this research group to develop and evaluate practical guides for use by both Planning and Public Health professionals working in this area.

AUTHORS' NOTE

The views expressed are those of the author(s) and not necessarily those of the NIHR or the Department of Health and Social Care. The NIHR School for Public Health Research is a partnership between the Universities of Sheffield; Bristol; Cambridge; Imperial; and University College London; The London School for Hygiene and Tropical Medicine (LSHTM); LiLaC – a collaboration between the Universities of Liverpool and Lancaster; and Fuse – The Centre for Translational Research in Public Health a collaboration between Newcastle,

Table 2

Suggestions for successfully defending a refusal of planning permission at appeal

(1) Local Authorities should ensure that a clean and robust local plan is in place and applied correctly
As stated, reference to a local plan is often necessary for a successful appeal, however, if there is any ambiguity to its application, defending a refusal becomes substantially more difficult.
Likewise, if Local Planning Policy and Supplementary Planning Documents are not applied correctly, a defence becomes more difficult, even if the evidence behind a line of argument is robust.
(2) Having adequate time and staff capacity to deal with appeals cases/acknowledging time required to deal with an appeal.
Those new to the appeals process were often surprised by the amount of time and effort required to defend a refusal. Without sufficient capacity a defence is very likely to fall short.
(3) Having access to accurate, robust, and up to date local information to use in the appeals case.
If there is a debate surrounding the accuracy of any information cited a defence can be undermined.
(4) Having firm commitment from elected members and senior management from various professional groups (such as Planning and Public Health).
A defence is more likely to succeed if professionals have permission from senior management to make it a priority, rather than relying on their enthusiasm to work beyond what would typically be expected of them.
(5) Good lines of communication with relevant local groups & communities interested in the appeal.
Although subjective evidence such as the opinions of the local residents are perceived as anecdotal, communication with the relevant groups can lead to invaluable information, and their passion for a cause can help drive a defence forward.
(6) Using clear, concise language that is accessible across professional groups.
Public Health and Planning professions have their own jargon which is often lost in translation when these groups communicate, the use of clear and accessible language can help prevent these problems and thus accelerate the appeal process.

Durham, Northumbria, Sunderland and Teesside Universities.

FUNDING

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This study/project is funded by/supported by the National Institute for Health Research (NIHR) School for Public Health Research (Grant Reference Number PD-SPH-2015).

CONFLICT OF INTEREST

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

ETHICAL APPROVAL

Ethical approval was sought and granted from Teesside University's School of Science Engineering and Design Ethics Committee (Ref:150/19).

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How do local authority plans to tackle obesity reflect systems thinking?

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Keywords

obesity prevention; systems thinking; public health; policy; local authority; qualitative

Abstract

Aims: A whole systems approach to tackling obesity has been recommended by Public Health England for several years. This qualitative study aimed to investigate whether systems thinking is reflected in local authority plans and strategies to tackle obesity, using the leverage points for intervention in a complex system, as a framework.

Method: We sought to identify obesity strategies/plans for Southampton and 19 other local authority comparators (based on children's services and Office for National Statistics data). A healthy weight strategy was available for 10 local authorities and a qualitative document analysis was undertaken. The policy actions proposed in the plans were coded against the leverage points for intervention in a complex system and themes were developed to characterise interventions in each category.

Results: A majority of actions included in the plans were categorised as 'Numbers, Constants and Parameters' which reflect downstream measures. However, there were examples of actions that could act on higher leverage points. In addition, some local authority plans included interventions that could act on 10 of the 12 leverage points suggesting incorporation of systems thinking.

Conclusions: Some local authority plans to tackle obesity do reflect systems thinking when viewed through the lens of the leverage points for intervention in a complex system. Interventions at higher leverage points should be prioritised by public health decision-makers, especially in a climate of competing agendas and limited resources.

INTRODUCTION

Obesity is a prominent UK public health concern, costing the National Health Service (NHS) annually about £6.1b in direct and an estimated £27b in wider societal pre-pandemic costs.[1] Driven by 'societal dynamics' comprising urbanisation, food systems (including marketing and food culture), cultural norms, sedentary jobs and an environment which encourages sedentary behaviour,[2] obesity is an emergent property of economic systems which prioritise Gross Domestic Product (GDP) growth without consideration of the adverse effects on health and the environment.[3]

Overweight and obesity in children and adolescents is a predictor of excess weight in adulthood.[4,5] A study in the US evaluating life-course trajectories of obesity showed that at any given age more people are obese than in earlier generations and are experiencing obesity for longer, which may impact on the onset of obesity-related diseases like type 2 diabetes.[6] For obesity prevention, the evidence points to the critical

SAGE Publications
ISSN 1757-9139 DOI: 10.1177/17579139221106337

importance of intervening in childhood as well as prioritising treatment.[7] The notion that obesity occurs due to excess calorie consumption in relation to energy expenditure, has long been considered too simplistic. It is now clear that environments during development and early life influence the way an individual responds to later environmental and physiological challenges, emphasising the importance of a life-course approach to preventing obesity.[8,9]

The socio-ecological model of health proposed over three decades ago sought to shift attention from individual to environmental causes of behaviour.[10] The model drew attention to several levels including institutional, community and public policy in relation to individual health behaviour. However, it did not take into account causes of poor health such as economic inequalities, discrimination, unemployment, exposure to toxins and genetic predisposition.[10] In contrast, complex adaptive systems models allow consideration of the dynamic reciprocal relationships between various factors at different levels and provide a means through which to view complex public health problems such as obesity.[11]

In England, in recognition of the poorer outcomes seen for people with excess weight, who become infected with coronavirus, the most recent government strategy proposed an expansion of weight management services and a ban on TV and online advertising of foods high in fat, sugar and salt before 9 pm and restrictions on their promotion by location and price.[12]

Local authorities also have a role to play in childhood obesity prevention. The UK government has devolved many public health responsibilities to local authorities (LAs), such as the development of the local urban environment, local transport and licensing powers.[13] Influencing LA policies may be key to promoting a healthy weight environment which in turn could impact on obesity. However, tackling obesity including childhood obesity is not mandatory for LAs.[14]

The term 'systems thinking' describes a way of considering how individuals, groups, services and organisations interconnect and influence each other.[15] In the context of obesity, a whole systems approach acknowledges the influences operating at different levels, by different actors.[16] Systems thinking helps to reveal the characteristics and relationships between different elements of a system and to bring to light potential solutions acting across it.[16] In the original work to identify points at which to intervene in a complex system, Meadows identified 12 'leverage points'.[17] She argued that many of these are counterintuitive, and in practice, most interventions focus on the least powerful (regarded as 'downstream') as they are seen as the easiest points at which to intervene.[17]

Systems science considers the complexity and dynamic relationships between different components of a system as well as the context of the system.[18,19] In 2014, the whole systems approach to obesity was recommended by Directors of Public health and PHE (Public Health England functions are now included in OHID-Office for Health Improvement and Disparities), this was well before the PHE guidance *Whole systems approach to obesity-a guide to support local approaches to promoting a healthy weight* was published in 2019.[20,21] It is an approach that responds to complexity by allowing stakeholders to develop a shared understanding of the challenge in the local system and identify opportunities for change.[21] The aim of the present study was therefore to investigate whether LA plans/strategies to tackle obesity and childhood obesity (through the broad frame of obesity prevention), reflect systems thinking.

METHODS

Framework for analysis

This qualitative study was undertaken using Meadows' 12 leverage points at which to intervene in a complex system.[17] A number of frameworks or models have been derived from Meadows' original work, including the Intervention Level Framework (ILF) which has five intervention levels (paradigm, goals, system structure, feedback & delays, and structural elements).[22] Also, the Action Scales Model developed by Leeds Beckett University with four intervention levels (system beliefs, system goals, system structures and events).[21] All models have their limitations, and in particular, the condensed models may not capture important differences between interventions operating at different levels. For example, 'system structure' encompasses physical structures, relationships and information flows, which are likely to require different types of intervention. Therefore, in this study, the leverage points originally described by Meadows (Table 1) were used as a framework to allow a more nuanced analysis. The leverage point 'Transcending paradigm' was not included as part of the framework; for this analysis, it was considered an unlikely point of intervention at local government level.

Selecting local authorities

As the lead researcher for this study is a Public Health Practitioner at Southampton City Council, Southampton and 19 other statistical neighbours were chosen as the LA research sites. LA statistical neighbours are based on demographic similarities (in this case, using children's services data and Office for National Statistics (ONS) data for 2018); statistical neighbours are used by Southampton City Council to benchmark National Child Measurement Programme data and therefore were considered suitable for this analysis. Statistical neighbours and ONS comparators for Southampton are routinely updated by Southampton City Council.[23]

To identify LA obesity strategies/plans, Internet and LA website searches were undertaken using the following search terms: 'healthy weight', 'obesity' and 'childhood obesity'. For each search term, the first 100 results from the LA website were reviewed for up-to-date local plans, policies and strategies for tackling obesity in their area. In addition, the Director of Public Health for each LA was contacted by e-mail to request a copy of their plan. The local authority plans and strategies analysed were developed before the release of the PHE guidance on the whole systems approach.

Table 1

Summary of the 12 leverage points to intervene in a complex system framework[17].

Intervention level	Description
Transcending paradigm	This represents one's view of reality and is unlikely to be influenced at local government level.
Paradigm	'Shared unstated assumptions' and 'deepest held beliefs' that are the hardest to change within a society, as it requires individuals to look at the system. Paradigms pave the way for a system's structure which includes 'goals' and 'rules' (titles of other leverage points). Potential actions to change a paradigm include highlighting flaws with the current paradigm.
Goals	The goals of a system are considered an important point for intervention. Actors operating in a system may not be aware of the goals and they are likely to be changed by those in power.
Self-organisation	Self-organisation is a key factor in a system's resilience. For a system to continue to exist, it must evolve as contexts change. This intervention point is concerned largely with encouraging variability and diversity in the system.
Rules	Rules include laws, regulations and incentives which help to structure a system. A fundamental point made by Meadows is that rules put in place must be made in the context agreed by a range of sectors in society to ensure they are fair and do not benefit some to the exclusion of many.
Information flows	This involves providing timely information to relevant actors which was not previously available to them, to support a course of action which may not have occurred without that information.
Reinforcing feedback loops	These are described as 'the source of growth, explosion, erosion and collapse' where more generates more. For example a high interest rate on higher savings, where a bigger bank balance accumulates more interest which in turn leads to more interest.[17] Meadows points out that there are few reinforcing loops and the emphasis for the leverage point is slowing the growth.
Balancing feedback loops	These are the feedback loops that self-correct impacts on the system, often called 'thermostats'. Balancing loops may be inactive a lot of the time and come into play at other times such as emergencies. An example could be tax on fuel emissions which are triggered once emissions reach a certain level. At this leverage point, an intervention would strengthen the feedback loop or prevent it from being weakened.
Delays	This leverage point focuses on timely information and timely responses. If feedback occurs too soon the system may overreact, if it receives feedback too slowly the system may become damaged.
Stocks and flows	Refers to physical structures in a system which may be difficult and costly to change. Intervening at this point would include building the appropriate structures at the start.
Buffers	This describes a physical entity, having enough of which helps to preserve a system.
Numbers, constants and parameters	This includes changes in people/staff and skills or having parameters for existing activities. Interventions at this point are unlikely to change the behaviour of the system unless they influence other higher leverage points. This is the commonest point of intervention.

Analysis

The first author undertook a document analysis of local government plans to tackle obesity using deductive thematic analysis as outlined by Braun and Clarke.[24,25] This study focussed on the priorities, goals and actions to tackle obesity. Local data, descriptions of the causes of obesity and information on the wider context of the local area were excluded from the analysis. The data were extracted into a separate document and categorised into one of the categories representing the system leverage points for intervention as defined by Meadows ('Transcending paradigm' was not included).[17] Each of the interventions/actions was given a code to capture its key features. Similar codes were combined and condensed. The themes developed under each category described the aim or nature of the interventions within that theme. The actions were interpreted in terms of how they aimed to change the system, for example, to change the physical environment, address socio-economic challenges, influence networks (at the higher leverage points) or target individual behaviour. This was consistent

with methods used by other researchers.[22,26] The coding, the coding frame and excerpts of the plans and strategies were shared and discussed with co-authors over several meetings during the coding process to agree the approach. The themes were also reviewed and discussed with co-authors to ensure that they reflected the data and to help improve the rigour of the analysis.[27] NVIVO 12 Pro was used to code the data.

RESULTS

Local authorities

The search for obesity plans took place during January to March 2019. Ten LAs had a healthy weight strategy, either shared by the Public Health team or accessible online. Two of the authorities provided two strategy documents (e.g. separate strategies to address physical activity and the food environment) which they collectively considered a plan to tackle obesity. Some plans were draft documents and the time period covered by the plans varied between 3 and 10 years. Not all documents included in this analysis were publicly accessible therefore the plans and excerpts taken were anonymised and names of cities were removed.

Four LAs confirmed that there was no plan in place and for six LAs a plan was not found through the Internet search and the LAs did not respond to emails requesting a copy of their plan, therefore it could not be determined whether an obesity plan was in place.

The results in Table 2 show which of the 11 leverage points (not including 'Transcending paradigm') featured in each LA plans to tackle obesity.

The majority of interventions identified in the plans/strategies acted on the least powerful leverage point 'Numbers, Constants and Parameters' (Table 2). However, a range of interventions acting at higher leverage points were identified, and two LA plans had examples of interventions which could act on 10 of the 11 leverage points looked at as part of this study. This suggests that systems thinking was incorporated in some LA plans to tackle obesity. However, for 'Paradigm' most strategies set out a vision for a better paradigm rather than highlighting flaws in the existing paradigm and setting 'Goals' to correct them. Few strategies included interventions that operated on the 'Delays', 'Balancing Feedback Loops' and 'Reinforcing Feedback Loops' leverage points.

For each category, between two and six themes emerged which describe the intervention or action. Table 3 gives examples of interventions at LA level to tackle obesity and illustrates how they were categorised. It also highlights the challenges of categorising local interventions in relation to a complex system. Specific issues for each leverage point are discussed below.

Paradigm

Vision statements which specified actions were considered to be interventions acting on the 'Paradigm'. A way to intervene at this leverage point is to highlight the problems with that paradigm, Meadows notes that to intervene 'you keep pointing at the anomalies and failures in the old paradigm' (Wright and Meadows 2009 p164).[17] One strategy (LA7a) directly highlighted flaws in the paradigm potentially linked to obesity, specifically in relation to food availability and policies on austerity and welfare reforms.

Most strategies set out positive aspirational vision statements for the city or residents. These statements are likely to be important to engage LA leaders. However, focussing on individuals, families and communities, moves attention away from the problems with the system and towards those affected by the system.

Goals

'Goals' in strategies added detail to the vision statements. As the flaws in the paradigm were not clearly articulated in most strategies, the goals did not directly attempt to reshape or 'improve' the system. However, some policies did reflect the negative effects of the current paradigm and sought to address issues broadly such as inequalities, crime, poverty and the obesogenic environment (including preserving green space and improving cycle infrastructure). Overall goals were aspirational in terms of how the future could be shaped.

Self-organisation

Evidence of 'Self-organisation' was apparent in most plans. The main examples were networks and partnerships set up to deliver part of the strategy/plan in relation to the food environment and promoting physical activity. They included strategic networks and networks of stakeholders and champions to promote, deliver or oversee elements of the strategy.

Rules

Many of the interventions coded as 'Rules' in this analysis could technically be considered as 'Numbers, Constants and Parameters' as they are not rules in the strictest sense; rather they are recommended standards or parameters within which to operate.

The interventions categorised as 'Rules' were supplementary planning documents. These are non-statutory documents which support town planners when making development decisions. They may provide LAs with strategies to regulate the food environment. However, they are non-statutory and any decisions can be appealed.

Other interventions classed as 'Rules' included voluntary programmes supporting standards on nutrition and physical activity aimed at schools and workplaces. In the UK, School Food Standards are mandatory, however, monitoring mechanisms are weak and not clearly enforced.[28]

Information flows

Examples of interventions acting on 'Information Flows' were found in most strategies/plans. At an individual level, this included feedback from the National Child Measurement Programme (NCMP). At a community level, it included plans to gather community insights on lifestyle choices. Interventions to influence the system included a public street audit to inform transport decisions. These 'Information flows' may change the course of action of the individual or group receiving the information.[17]

Table 2

Leverage points for intervention in local authority strategies to tackle obesity.

Local authority	Paradigm	Goals	Self-organisation	Rules	Information Flows	Reinforcing balancing loop	Balancing loops	Delays	Stocks and flows	Buffers	Numbers
LA1	*	*	✓	✓	✓		✓		✓	✓	✓
LA2	*	✓	✓	*	✓				✓	✓	✓
LA3a	*	*	✓	✓	✓						✓
LA3b	*	✓		*				✓			✓
LA4	*	✓	✓	✓	✓	✓	✓		✓	✓	✓
LA5	*	✓	✓	✓	✓	✓	✓		✓	✓	✓
LA6	*	✓	✓		✓			✓	✓		✓
LA7a	✓	✓	✓	✓	✓	✓	✓			✓	✓
LA7b	*	*	✓	*	✓	✓			✓	✓	✓
LA8	*	✓	✓		✓			✓	✓	✓	✓
LA9	*	*		*	✓				✓	✓	✓
LA10 Southampton	*	✓	✓	✓	✓				✓		✓

LA: local authorities.
Paradigm- * a new paradigm is described but problems with the current paradigm are not directly highlighted. Paradigm- ✓ if problems with the current paradigm are described.
Goals- * where goals are provided but do not address problems with the paradigm. Goals- ✓ if they address the paradigm.
Rules- * if they are voluntary parameters. Rules- ✓ include planning documents or regulatory functions.

Table 3

The leverage points to intervene in a complex system (not including Transcending paradigm) and local authority examples of interventions to tackle obesity.

Leverage point	Theme	Description	Examples of interventions (excerpts from local plans/strategies)
2. Paradigms – 'shared unstated assumptions' and 'deepest held beliefs' that are the hardest to change within a society, as it requires individuals to look at the system. Potential actions to change a paradigm include highlighting flaws with the current paradigm.	2a. Create a culture, environment and opportunities to promote healthy weight	Aspiration to create local culture and opportunities to promote and enable health, healthy weight, healthy eating and physical activity.	X city will be an active, healthy city where residents maintain a healthy weight from childhood through adult life and into older age. (LA4)
	2b. Make the issue everybody's business	Broad statement/aspiration to make the issue everybody's business.	Make healthy weight a priority for all: Ensure all partners at all levels view healthy weight as a priority and are actively engaged in supporting and contributing to increasing our healthy weight population (LA6)
	2c. Target those in greatest need	Broad statement/aspiration to target those in greatest need.	The aim is to create a 'healthy weight' environment where healthy choices are the easy choices for children; as well as ensuring early intervention targets those in greatest need. (LA10)
	2d. Tackle issues and risks caused by the current paradigm	Highlights current wider system problems that are contributing to the issue. Welfare reforms and austerity. **Directly highlights flaws in the current paradigm**	Welfare reform – the welfare system is increasingly failing to provide a robust last line of defence against hunger. Changes to the welfare system, performance of the benefits system and the increasing use of sanctions have contributed to increases in demand for emergency food assistance both locally and nationally. There is concern that the roll out of Universal Credit could worsen the situation by putting claimants into debt and rent arrears and by disrupting the allocation of free school meals by removing the current eligibility triggers. (LA7a)
3. Goals – the goals of a system are considered an important point for intervention. Actors operating in a system may not be aware of the goals and they are likely to be changed by those in power.	3a. Influence national and regional agenda	Aim to work with national government or influence the national agenda.	Lobbying – Increase in fiscal, food production and marketing measures that support children to be a healthy weight. (LA3a) To influence the regional and national agenda to promote healthy weight. (LA2)
	3b. Give children the best start.	Aim for children to have a healthy weight, giving children the best start. Families supported by a competent work force.	To tackle overweight and obesity effectively we need to adopt a life course approach – from pre-conception through pregnancy to preparing for older age. (LA1) To give all children the best start in life and halt the rising tide of childhood obesity across the city; (LA4)
	3c. Provide weight management support and campaigns	Aim to address obesity providing weight management support and signposting.	To offer effective support for families and individuals who want to lose weight. (LA2) Offer effective support for children and adults who want to lose weight (LA5)
	3d. Tackle wider determinants – crime, unsocial behaviour, poverty, inequalities and obesogenic environment	Goals to address wider/environmental determinants of health and tackle poverty, crime and narrow inequalities. **These goals aim to change the paradigm**	The current healthy weight inequalities gaps will be narrowed. The causes that put particular groups of children at higher risk of an unhealthy weight will be addressed.(LA3b) Wherever possible the proposed actions in the strategy will seek to support wider outcomes related to food including mitigating the worst effects of poverty, strengthening the local economy, reducing carbon emissions, increasing the resilience of our food supply networks and promoting social cohesion and general wellbeing through food. (LA7a)

(Continued)

Table 3 (Continued)

The leverage points to intervene in a complex system (not including Transcending paradigm) and local authority examples of interventions to tackle obesity.

Leverage point	Theme	Description	Examples of interventions (excerpts from local plans/strategies)
4. Self-organisation – self-organisation is a key factor in a system's resilience. For a system to continue to exist it must evolve as contexts change, which creates further complexity. This intervention point is concerned with evolving a system and adding to its resilience.	4a. Food partnerships	Food partnerships-stakeholders brought together to improve the local food environment.	The x city Food People is a network of food growers, composters, buyers, cooks and eaters passionate about a positive healthy food culture for the city. It is led through the third sector, with members currently hailing from a range of providers and programmes across the city. (LA4)
	4b. Healthy weight partnerships	Healthy weight partnerships – stakeholders brought together to oversee implementation of a healthy weight strategy.	Establish an accountable Healthy Weight Alliance to maintaining partnership action across the Healthy Weight Strategy action plan. (LA8)
	4c. Physical activity partnerships	Physical activity partnerships – stakeholders brought together to increase physical activity.	Increase opportunities for physical activity in our daily lives, reducing sedentary behaviour – (delivered through Fit for Life strategy and partnership). (LA1)
5. Rules- include laws, regulations and incentives which help to structure a system.	5a. Local policies, standards and best practice for healthy environments delivered through council policies, contracts and services	Using environmental health and the Healthy Weight Declaration to provide standards to promote healthy weight. Weight management standards in service contracts and policies for local partnerships.	Use council services such as environmental regulations, licensing and city centre management to engage private industry with responsible retailing and healthier food guidance (LA7a) X city Food Partnership is developing a Food ethos in regards to commercial partnership which can offer good practice for x City Council. (LA3a)
	5b. Planning mechanisms, principles and standards for external and indoor space	The Local Plan and other planning documents to restrict takeaways, impose parking standards and improve internal space standards. **These are examples of LA interventions that could be considered as acting on the rules leverage point. They are not rules in the strictest sense.**	Supplementary Planning Document on hot food takeaways drafted by City Development, consultation complete . . .x city Design Wellbeing group meet regularly and are developing principles for planning (LA3b) Implement internal space standards for new dwellings (to ensure adequate kitchen and dining space) (LA10)
	5c. Voluntary healthy food standards in settings and venues.	Healthy schools, healthy early years, UNICEF breast feeding, healthy workplaces, standards for vending machines.	Healthy Schools Programme – whole school approach to promoting healthy weight Healthy Children's Centre standards. (LA5) Partners in the city have achieved or are working towards UNICEF Baby Friendly Initiative (BFI) full accreditation. (LA4)
6. Information flows – this involves providing timely information to relevant actors which was not previously available to them, to support a course of action which may not have occurred without that information.	6a. Individual assessment	Physical fitness assessments and NCMP measurement and feedback.	All children in reception and year 6 are weighed and measured as part of the NCMP. Families are informed if their children are overweight and recommended to attend a Tier 2 family weight management programme. (LA4)
	6b. Community insights	Community insights. Understanding influences on food choice and lifestyle behaviours.	Undertake public consultation to gain insight into how local residents would like the council to use its place shaping powers to influence the food environment and support healthier food choices. (LA7a)
	6c. Evaluating services/provision	Evaluating services and provision in the public sector, including weight management services and food provision.	The Standard Evaluation Framework for Weight Management Interventions will be used to guide the evaluation of all commissioned interventions. (LA5)
	6d. Influencing other departments, sectors, leaders and wider agendas	Gathering information/auditing to influence others. Influencing through training others including licensing, planners, developers, partners, leaders. Influencing the regional and national agenda.	Commissioned insight to understand why there are a high number of adult pedestrian road injuries in X city centre. This informs the current Adult Pedestrian Casualty Reduction programme . . . needed to encourage modal shift to walking (and cycling). (LA4) Developing and delivering group educational and leadership workshops for senior managers across the City and from different organisations to ensure 'buy-in'. . .of promoting an active workforce – starting with Move More stakeholders. (LA7b)

(Continued)

Table 3 (Continued)

The leverage points to intervene in a complex system (not including Transcending paradigm) and local authority examples of interventions to tackle obesity.

Leverage point	Theme	Description	Examples of interventions (excerpts from local plans/strategies)
7. Reinforcing feedback loops – described as 'the source of growth, explosion, erosion and collapse' where more generates more. The intervention for this leverage point is to slow the growth.	7a. Reduce debts, poverty and food poverty	Reduce debts, improve financial ability to access healthy food.	Tackle poverty and deprivation by getting more local people into good jobs. (LA5)
	7b. Limit exposure to junk food	Limit exposure to unhealthy food in public sector settings and events.	Ensure food and drinks provided at public events include healthy provisions, supporting food retailers to deliver this offer. (LA4l)
	7c. Reduce and limit crime and remove cues that limit physical activity	Reduce crime or fear of crime. Remove cues that limit physical activity	Developing a programme of work to review and replace cues from the physical and social environment that re-enforce the message that physical activity is not important. For example; cycle paths that are not connected, not sufficiently wide or give way to motorists unnecessarily OR streets that are littered with 'no ball game' signs or city centres designed around car access rather than active travel access (i.e. lots of car parks and no safe cycle storage or changing facilities). (LA7b)
8. Balancing feedback loops – mechanisms that self-correct the impact on the system. Balancing loops may be inactive a lot of the time and come into play at other times such as emergencies.	8a. Limit unhealthy snack and food outlets	Limit adverts for junk food in council controlled places and events. Subsidies/ altered business rates to promote for healthier food.	Limiting exposure to cheap and appealing calorie-dense, nutrient-poor food in the wider environment and restricting opportunities for the marketing of this type of food (particularly in places where the council has some control or influence). (LA4)
	8b. Protect outdoor green spaces	Protect outdoor spaces and sports pitches from development.	Ensuring future development in x city creates/maintains healthy communities through the provision and protection of open space for physical activity and food growing, where possible and through restricting unhealthy uses (e.g. takeaways) in areas where it is deemed necessary. (LA5)
9. Delays–this leverage point focuses on timely information and responses.	9a. Timely health impact assessments	Timely strategic assessments.	Ensure Health Impact Assessments are carried out in a timely and appropriate way (LA8)
	9b. Timely identification of those with excess weight	Reducing delays for people who need services.	Children who are an unhealthy weight will be identified early and supported.(LA3b) Capitalise on early intervention and treatment: Support those outside the healthy weight category to become and maintain a healthy weight through a range of evidence-based interventions (LA6)
10. Stocks and flows – refer to physical structures in a system.	10a. Development of the local plan and SPDs for a healthy weight environment	Contribute to the local plan, supplementary planning documents (SPDs) for building design to enable environments for physical activity and healthy eating.	Ensure principles of planning for healthy weight environments are embedded in the new Local Plan. (LA10) Design and re-orientate buildings so that they promote opportunities for active living and at the same time reduce sedentary behaviour (e.g. enhancing signage to the stairs and improving the quality of stairwell environments). (LA7b)
	10b. Improve walking and cycling infrastructure and road safety	Develop cycling walking infrastructure and connectivity and improve road safety.	As part of an environmental approach to increasing physical activity the 'cycle-ability' and 'walkability' of x city will be improved via a programme of investment under the proposed banner 'Routes to Activity'. (LA7b)
	10c. Improve open and green infrastructure	Improve parks, open spaces, remove unnecessary signage (no ball games) and car- parking. Connected green spaces and playgrounds.	Develop a well-connected multifunctional network of green infrastructure. Review and improve availability of green spaces and playing pitches as well as safeguard against the loss of open space and recreational facilities. (LA1)

(Continued)

Table 3 (Continued)

The leverage points to intervene in a complex system (not including Transcending paradigm) and local authority examples of interventions to tackle obesity.

Leverage point	Theme	Description	Examples of interventions (excerpts from local plans/strategies)
11. Buffers – this describes a physical entity, having enough of which helps to preserve a system.	11a. Increase access to space and facilities for physical activity	Enable easier access to physical activity through increased availability of open green spaces, free physical activity or community facilities.	By making more space available for people to grow their own produce, designing buildings which encourage stair use and urban planning which facilitates active transport all help increase access to healthy food and opportunities to be more physically active. (LA8) Support schools to be community hubs providing access to their facilities in their local community to raise awareness and encourage families to be more active. (LA1)
	11b. Increase availability of affordable healthy food and drink	Increase availability of healthy food for target groups, increase access to free drinking water. Incentivise healthy food retailers. Increase: allotments for food growing, healthy vending machines, UNICEF venues.	Use of incentives/subsidies/differential business rates to attract healthier food retailers into areas where they are lacking. (LA7a) Voucher or subsidy schemes for individuals on low incomes or in deprived neighbourhoods to incentivise the purchasing of fruit and vegetables. (LA4)
	11c. Promote the living wage and welfare	Work to improve economic circumstances of residents in need.	Promoting the living wage and equal pay for women with local businesses, as a basis for good employment. (LA4)
12. Numbers – this includes changes in people/staff and skills or having parameters for existing activities. Interventions at this point are unlikely to change the behaviour of the system unless they influence higher leverage points.	12a. Community healthy eating initiatives	Cookery programmes. Growing schemes and community healthy lifestyle programmes.	Community-based cookery programmes for example: X City Farm cookery programme for mental health service users. Cookery programmes for young adults and older people in supported housing and volunteering projects to improve cooking and food growing skills (LA1)
	12b. Family and general weight management advice, programmes, initiatives and campaigns	Children and adult weight management programmes. Children's healthy lifestyle activities. HENRY/ Breastfeeding/ weaning/Postnatal programmes. Healthy start scheme promotion. National and local campaigns, signposting.	Interventions will be available to children and adults who are above a healthy weight. We will also widen access by offering a greater range of interventions at differing intensities that reflect level of need. (LA7a) Provide opportunities to engage the public in health promoting behaviours. Tailor information and support to groups at higher risk of overweight or obesity through activities provided by the Behaviour Change Programme. (LA2)
	12c. Initiatives to promote healthy settings	Projects/programmes to promote healthy early years settings, healthy school environments, healthy workplaces. Daily mile, school sport. Supporting resources and toolkits.	Provide advice and guidance for settings including schools, care settings and home care providers to introduce measures that encourage healthy eating, prioritising those with highest rates of overweight and obesity. (LA7a) We would like to ensure schools are supported to provide nutritionally healthy meals using this locally produced toolkit. (LA3b)
	12d. Initiatives to increase physical activity	Deliver/promote initiatives for reducing sedentary behaviour/ increasing physical activity/sports/recreation/use of green space. Encouraging active travel (walking and cycling), road safety. Exercise on referral.	Encourage bike-ability training for children and promoting urban cycling skills to parents including improving accessibility to equipment to enable safe cycling. (LA9) Work with partners, including leisure providers and local businesses to promote opportunities and projects which achieve a sustainable increase in physical activity among, families with young children, school aged children and young people, targeting those in greatest need (LA10)
	12e. Staff training and resources	Front line staff appropriately trained. Training and toolkits developed. Making every contact count training.	Provide brief intervention training for GPs and other front line health workers Ensure that messages about losing excess weight are consistently clear and concise by providing brief intervention training for GPs and other frontline healthcare workers involved in weight management interventions. (LA9)
	12f. Work with industry and develop guidance and incentives to promote healthy choices	Guidance for businesses/suppliers/ retailers. Develop commercial partnerships. Commercial concessions/pledges Promoting healthy choices.	Consider how commercial partnerships with the food and drink industry may impact on the messages communicated around healthy weight to our local communities. (LA4) Work with businesses and partners to promote city wide initiatives/campaigns which promote sustainable increase in physical activity (PA), makes use of green/open spaces and promotes healthy food choices (LA10)

LA: local authorities; UNICEF: United Nations International Children's Emergency Fund; BFI: Baby Friendly Initiative; NCMP: National Child Measurement Programme; PA: physical activity.

Reinforcing feedback loops

Feedback is an important component of systems thinking, 'Reinforcing Feedback Loops' in a system can reinforce healthy or unhealthy behaviours.[29] The aim is to slow down the feedback loop reinforcing the unhealthy behaviour. Systems diagrams for obesity were not included in LA plans, consequently interventions for 'Reinforcing Feedback Loops' were not identified. Therefore, community-based systems maps for obesity in the published literature were used as reference points to identify them.[30,31]

Three main types of intervention were identified which aimed to limit undesirable outcomes; first, making healthy food more available (e.g. through voucher schemes for food); second, supporting families to reduce debts, promoting the living wage and enabling access to jobs; and third, creating safe environments and removing cues that discourage physical activity.

Balancing feedback loops

Interventions acting on 'Balancing Feedback Loops' should self-correct a system, suggesting an in-built mechanism to moderate an effect which can be reinforced to move the system in the desired direction.[17,29] Examples included restrictions on the concentration of hot food takeaways and limiting developments on community green spaces. These interventions allow for development up to a point at which restrictions are triggered.

Delays

'Delays' are concerned with timely inputs and responses to influence a system. Whether the intervention is to speed up or slow down the response is dependent on the desired outcome.[17] The one example of an intervention acting at a structural level was the timely implementation of Health Impact Assessments (LA8). Several other strategies mentioned timeliness at an individual level, for early identification and treatment of obesity.

Stocks and flows

'Stocks and Flows' have been described as the 'plumbing structure' of a system and interventions for this are considered slow and costly.[17] Examples included actions such as 'green space improvements' or 'ensure spatial planning processes support promoting a healthy weight'. The interventions were not specific, which may have been deliberate and used as a 'catch all' statement of intent for obesity prevention. More specific actions focused on investments in cycling and walking infrastructure.

Buffers

Interventions acting on the 'Buffers' leverage point included; increasing the availability of healthy food, improving the availability of facilities for physical activity such as open and green spaces and providing a financial buffer for families. This leverage point was ranked low by Meadows in terms of influencing a system.

Numbers, constants and parameters

A majority of the actions in the LA strategies were coded as 'Numbers, Constants and Parameters'. There were numerous examples of interventions including developing and delivering staff training, or community education on a range of topics including Making Every Contact Count (MECC), healthy lifestyles and signposting to existing services. Interventions also included weight management support, healthy eating and physical activity initiatives.

DISCUSSION

This study investigated whether LA strategies/plans to tackle obesity reflect systems thinking using the leverage points for intervention proposed by Meadows.[17] The analysis revealed the majority of interventions could be categorised as 'Numbers Constants and Parameters'. However, a range of practice-based interventions which could act on most of the different leverage points were also identified in some plans, suggesting that systems thinking was considered by some LAs. Viewing interventions through the lens of leverage points highlighted the limitations of many interventions in a local context, but the analysis also revealed potential synergies between them.

More interventions were coded as 'Numbers, Constants and Parameters' than any other leverage point. This is in accordance with previous analyses of national and local policies which showed that most strategies focussed on downstream measures to improve lifestyle behaviours through health education.[14,22,32] Although this leverage point is considered the least potent, it could nonetheless be important if the intervention triggers action at a higher leverage point.[17] Finegood provided an example where information about the adverse effects of secondhand smoke led people to demand 'Rules' on smoke-free spaces.[29]

The three leverage points defined by Meadows as offering the best opportunities for change are also the most difficult points at which to intervene, namely 'Transcending Paradigm', 'Paradigm' and 'Goals'. This analysis provides examples of how interventions could act on the 'Paradigm' and 'Goals' but may not change the system at LA level ('Transcending Paradigms' were not included in the analysis). More research is therefore required to understand if and how interventions at these points could change the system to tackle obesity at a local level. For the remaining leverage points, Meadows suggests interventions should focus on how to prevent the system from producing undesirable outcomes.[17] Actions to change the paradigm include identifying its flaws.[17,33] For obesity, this could be through highlighting the influence of economic and political environments and social inequalities[29] and the links to powerful private sector actors.[33] This was observed in one strategy. Not clearly articulating the flaws of the current system may lead to 'Goals' which do not directly address the problems in the system, reducing the likelihood of actually changing it.

Flaws with the paradigm may be laid out in other relevant documents including independent Director of Public Health annual reports (e.g. Southampton 2017).[34] Nevertheless, highlighting the flaws in the local paradigm may be contentious in local councils which are political organisations, where councillors

decide on the policy framework and the officers role is to support its delivery.[35] However, this may be an important role that can be undertaken by experts and other leaders in the system.

Evidence of interventions that acted on the 'Self-organisation' leverage point focussed on setting up food/nutrition or physical activity partnerships to address obesity as part of local strategies. However, self-organisation should not be directed externally and should emerge (in response to a need) and regulate itself.[36,37] It is possible that public health driven partnerships could lead to the development of 'organic' community-led networks (e.g. community food networks) which would have greater fidelity to the notion of self-organisation.

The impact of interventions acting on the 'Rules' leverage point may be limited in local settings where they cannot be enforced, for example physical activity standards in schools. Therefore, consideration should be given to how a majority of the target audience/settings could be encouraged to adopt the 'Rules'. This could be through the rules becoming embedded through appropriate incentives to secure widespread compliance. Rules could also include informal structures such as customs, taboos and codes of conduct which can be deeply embedded in society and influence or limit action.[38]

Synergies between leverage points were also revealed, for example acting on the 'Buffer' to increase the availability of inexpensive, healthy food for people on low incomes, may inhibit a 'Reinforcing Feedback Loop' which normally causes people on low incomes to consume poorer quality diets. In addition, some interventions may work simultaneously on different leverage points; for example a supplementary planning document may contribute to local 'Rules' and could act on 'Balancing Feedback Loops' if it aims to slow proliferation of takeaways after a set parameter is reached. Other researchers have highlighted the importance of understanding the interdependencies of different interventions but more research is required to understand how this works in practice.[38] The analysis also highlighted that while leverage points such as the 'Paradigm' and 'Goals' of the system are unlikely to be changed locally, 'Stocks and Flows', a lower leverage point may be more readily influenced through the planning powers of LAs.[39]

The collaborative approach to systems thinking provided by systems dynamics requires the bringing together of stakeholders to describe the system (by producing a systems diagram) and identifying opportunities to intervene. However, in practice, points to intervene will be determined by collaborators who choose to participate and have the resources to do so.[40] Consequently, there is a risk that this approach may be biased and only tackle a part of the system.[17] The 12 leverage points framework could provide useful prompts for public health teams to help ensure a range of interventions including those acting on higher leverage points are considered. Viewing interventions through the lens of the leverage points to intervene may increase understanding of how a range of interventions could reshape a system as well as highlight potential constraints for achieving a system change. This is especially important where resources, as well as expertise in systems dynamics, may be limited and this analysis revealed practice-based examples of how interventions at these leverage points may work to address obesity at a local level.

There is no single system that causes obesity, but there are systems which may contribute, for example the economic system, the food system, the transport system and the welfare system.[3] Understanding how they influence obesity at a local level may help to identify different points at which to intervene. Complex systems will have feedback loops and information flows that lead to both desirable and undesirable outcomes, which are in some way linked.[17] Therefore, the aim is to strengthen the parts of the system that work, and weaken the undesirable parts. Meadows notes that 'systems can't be controlled but they can be designed and redesigned' (Wright and Meadows 2009, p 169).[17] It may be that the causes of optimum weight need to be conceptualised as a complex system. This system would change over time and through the life-course and the functions contributing to healthy weight could be strengthened.

STRENGTHS AND LIMITATIONS

This is the first study to provide a unique insight into how interventions aimed at tackling obesity in LAs could reflect systems thinking. It involved the analysis of strategies from 10 of the 20 LAs, selected for their demographic similarities (the remaining 10 local authorities either did not have a plan or it was unknown whether a plan was in place). Although the LAs included were from a wide geographic area, the plans may not reflect practice in other LAs in England.

In addition, the search terms used may have missed other LA strategies relevant to obesity prevention. However, this was a novel approach to view local interventions and should be seen as a starting point for the analysis of a broader set of local authority plans and strategies in order to develop the evidence base on how interventions could act on leverage points to change a system.

The analysis was undertaken before the release of guidance on a whole systems approach and it does not provide evaluative evidence about how interventions implemented by LAs change a complex system. However, viewing interventions through the lens of the 12 leverage points, as described in this study, could support LAs in prioritising interventions more likely to change the system.

While the strategies/plans were reviewed, and interventions categorised by one researcher, the approach taken to assign the interventions was discussed with other researchers with reference to Meadows' framework.[17]

The Meadows' framework was used in this study, although several other more recent frameworks derived from this have clustered the leverage points to 'operationalise' systems thinking.[22,38] However, understanding the intended function of an intervention is crucial during implementation and using aggregated models make this more difficult.

CONCLUSION

Many of the interventions to tackle obesity in LAs are downstream measures influencing the least important leverage point at which to intervene in a complex system.[17] However, this analysis revealed practice-based examples of interventions that could work upstream on higher leverage points. Using the whole systems approach to identify opportunities for intervention should be followed by considering how interventions acting on higher leverage points could be prioritised. This study highlights examples of interventions planned by LAs, however, more research is required to evaluate how these interventions could change a system in practice.

Given that, systems thinking is increasingly important in public health practice, training and professional development opportunities to build deeper understanding of these complex concepts should be considered.

CONFLICT OF INTEREST

The author(s) declared the following potential conflicts of interest with respect to the research, authorship, and/or publication of this article: K.M.G. has received reimbursement for speaking at conferences sponsored by companies selling nutritional products, and is part of an academic consortium that has received research funding from Abbott Nutrition, Nestec, BenevolentAI Bio Ltd. and Danone.

FUNDING

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: R.T. is funded by NIHR Southampton Biomedical Research Studentship. K.M.G. is supported by the UK Medical Research Council (MC_UU_12011/4), the National Institute for Health Research (NIHR Senior Investigator (NF-SI-0515-10042) and NIHR Southampton Biomedical Research Centre (IS-BRC-1215-20004)), the European Union (Erasmus + Programme ImpENSA 598488-EPP-1-2018-1-DE-EPPKA2-CBHE-JP), British Heart Foundation (RG/15/17/3174) and the US National Institute On Aging of the National Institutes of Health (Award No. U24AG047867). M.H. is supported by the British Heart Foundation.

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The theoretical and practical difficulties of evaluating a community-based 'whole systems' obesity prevention intervention: a research team's critical reflection

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Keywords

evaluability assessment; obesity; community-based interventions; complexity; Soft Systems Methodology

Abstract

Aims: This article critically discusses the purpose, pragmatics and politics of conducting commissioned evaluations on behalf of public sector organisations by drawing on the experience of evaluating a community-based 'whole systems' obesity prevention intervention for an English local council.

Methods: The study presented in this article incorporated two approaches: an evaluability assessment that interrogated the theoretical and practical difficulties of evaluating the intervention in a non-political way, and a retrospective analysis using Soft Systems Methodology that interrogated the more political difficulties of conducting such an evaluation in the 'real world'. The information and insights that enabled these reflections came from over 3 years of working closely with the programme team, attending and participating in stakeholder events and meetings, presenting to the Council's Scrutiny Committee meetings, four interviews with the programme manager, and multiple face-to-face group meetings, email exchanges and telephone conversations.

Results: The study reveals and analyses three key inter-related challenges that arose during the evaluation of the 'whole systems' obesity prevention intervention: the programme's evaluability, the evaluation purpose, and the nature, role and quality of evidence.

Conclusions: The evaluability assessment was important for defining the programme's theoretical and practical evaluability, and the retrospective analysis using Soft Systems Methodology enabled a greater understanding of the political tensions that existed. Key learning points related to the challenges that arose during this evaluation have broad applicability.

INTRODUCTION

Local councils in England are responsible for public health services and improving the health of their local population.[1] Many are faced with complex issues such as obesity and physical inactivity, as well as persistent inequalities. They are also expected to 'do more with less', as their populations steadily increase and budgets are squeezed.[2,3] In this context, it is difficult for decision-makers to make sense of and know how best to contribute towards improvement of their population health situation. In the midst of this uncertainty, decision-makers look for evidence – particularly in the form of local programme evaluations – to guide the often messy process of strategy making.

To inform future decisions on their child obesity strategy, a local council in England designed and implemented a 3-year (2015–2018) community-based intervention within a particular ward in the borough. They also commissioned a contractor to work with them to conduct a robust and independent evaluation.

ISSN 1757-9139 DOI: 10.1177/17579139231195700

The intervention

The intervention was a community-based programme that aimed to prevent overweight and obesity in children through a system-wide, multistakeholder approach. The intention was to mobilise and involve everybody who has a stake in the community (including children and families, childcare settings, the voluntary sector, private businesses, politicians, council departments, etc.); to enable local stakeholders to implement effective and sustainable activities to promote healthy lifestyles; and to create a local environment that better supports healthy lifestyle choices. It sought to raise awareness and knowledge of healthy eating and physical activity, as well as enable micro-environmental behaviour changes, through social marketing campaigns. Each campaign incorporated information dissemination, training opportunities for people working with children and families, working with council departments and local agencies, and development activities including a grant scheme, local events and other ad hoc support for local groups and organisations.

The evaluation

The aim of the evaluation was 'to assess the impact of the system-wide approach on the key areas defined by the specific themes' (as stated in the service specification). Ultimately, the commissioners expected that changes in awareness, knowledge, skills and behaviours of people who influence children's environments and of children themselves, would translate into an increase in the percentage of children with a healthy weight. However, as discussed later in this article, the evaluation's purpose – and consequent implications for design and conduct– warrants further critical reflection.

Purpose of this article

This article draws on the experiences of the evaluation team and critically explores the complexities of evaluating multistrategy, community-based approaches to obesity prevention on behalf of a public sector commissioner. It acknowledges the theoretical and practical difficulties of evaluating complex interventions, which are now well-rehearsed in the evaluation literature (see below). It examines these in relation to the intervention in question and describes the findings of an Evaluability Assessment conducted at the start of the evaluation. From a reflective viewpoint (after the completion of the evaluation), it then goes on to interrogate the more pragmatic and political difficulties of conducting such evaluations as a commissioned exercise, using systems thinking. The article reveals and analyses three key inter-related challenges that arose during the evaluation: the programme's evaluability, the evaluation purpose, and the nature, role and quality of evidence. Finally, it proposes key learning points related to these challenges that will be common to many situations.

BACKGROUND

Child obesity and whole systems approaches

Childhood obesity is recognised as one of the most serious health challenges of the 21st century.[4] The inequalities in childhood obesity are compelling and the widening of the 'obesity gap' over the past decade has prompted calls for more focused efforts to target those most at risk.[5] An interest in 'whole systems approaches' has emerged from a recognition of the complexity of obesity causation and prevention and a frustration with the lack of success of efforts over the last few decades.[6,7] Whole systems approaches seek to link together many of the influencing factors on obesity in a coordinated and integrated effort, across multiple sectors, to bring about change. Informed by complexity theory, their characteristics include the recognition of nonlinearity, dynamic interconnectedness between causes and influences, adaptive agents, networks and relationships, and the importance of understanding how the whole system can be 'more than the sum of its parts'.[8] However, the language, theory and practice of whole systems approaches – certainly within the public health field – is still young. There is no shared understanding of how best to apply systems thinking, what a whole systems approach to obesity looks like in practice, or of what is most likely to work and have meaning in systems at different levels. Little is known about the key mechanisms of change; they are likely to be many, as well as time- and context-specific. Robust and relevant evidence is needed to help identify and implement effective whole systems responses. But the challenges of producing such evidence in this area has prompted a call for a radical re-think around the traditional biases in public health research funding, activity and publication, as well as much discussion regarding methodologies.[9]

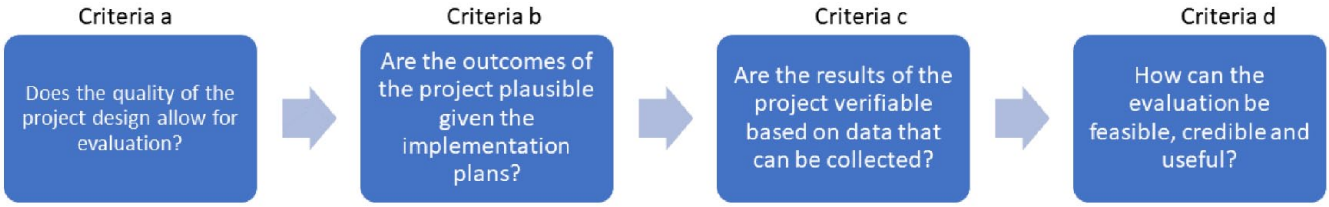
Evaluating whole systems approaches

The challenges of evaluating complex, systems-wide public health interventions are now well-rehearsed in the literature.[10–14] They relate to the presence of multiple programme components (with the belief that a certain synergy will be achieved among them), action at multiple levels (and the notion that there is interaction among those levels), the importance of context, the flexible and evolving nature of the interventions, the breadth and often long-term nature of the range of outcomes being pursued, and the absence of appropriate control groups for comparison purposes.[15,16] It is unsurprising, given these challenges, that there is a paucity of evidence on the identification, implementation and evaluation of effective community-wide programmes for obesity prevention.[17]

Theory-based approaches have demonstrated promise in helping evaluators to come to terms with the inherent complexity of certain types of interventions and to overcome the limitations of experimental evaluation designs.[15] Theory-of-change and realist evaluations are two prominent categories of theory-based approaches that have been used to evaluate health improvement interventions. While they are distinctly different approaches, both emphasise the importance of context in understanding how complex programmes can lead to changes in outcomes, and both are concerned with

Figure 1

Key criteria considered in the evaluability assessment



understanding the theory of an initiative, and with using that theory to inform the evaluation's purpose, focus and methods.[18] As limitations and challenges of these approaches have been identified, and experience progressed, evaluation practice has continued to evolve. Some researchers have, quite naturally, begun to draw on complexity theory to add value to theory-based appr oaches.[11,13,14,19–22]

Conducting commissioned 'real world' evaluations

In conducting an evaluation for a local authority commissioner, evaluators are thrown into the messy, poorly controlled situation of what Robson calls 'real world research'.[23] Evaluations operate within political constraints, and are politically articulated. For the commissioners, they are an important means through which local decision-makers develop and adapt their approaches to health improvement. They are also important in the context of council officers' and elected members' concerns with accountability to others. They must frequently defend their chosen course of action and their professional or organisational credibility to the public (their local electorate), to councillors and officers across the council, and to other stakeholders and external funders. Evaluation activities can be important, then, in managing some of the reputational risks that arise, particularly from developmental work, by demonstrating that a programme was effective in the face of potential criticism.[24]

Evaluators must make judgements that could have far-reaching consequences; a poor evaluation report, for example, may lead to termination of a particular programme or services.[25] Academic evaluators are also driven by the need to publish in peer-reviewed journals, and by codes of academic and professional integrity. Options are often severely limited by 'only-just-enough' budgets (particularly when contracts are won through a competitive tendering process), and evaluators find themselves walking a tight-rope between 'quick and dirty' forms of evaluation and 'evaluation research' that profits from a principled systematic approach and is concerned with generating new knowledge.[23] The sensitive and political nature of evaluation demands careful, strategic thinking regarding the purpose, design and conduct of the research. The remainder of this article describes the strategic thinking of the authors regarding the evaluation of the child obesity prevention intervention. The purpose is to draw out learning, based on our experience, for evaluators in similar situations.

METHODS: STRATEGIC THINKING REGARDING THE PURPOSE, DESIGN AND CONDUCT OF EVALUATION RESEARCH

The study presented here incorporates two approaches: (1) an evaluability assessment that interrogated the theoretical and practical difficulties of evaluating this intervention in a nonpolitical way; (2) an analysis using Soft Systems Methodology that interrogated the more political difficulties of conducting such an evaluation in the 'real world', as a commissioned exercise.

The evaluation team (from University of Kent) were contracted prior to the initial launch of the intervention and worked closely with the programme team over a 9-month period to understand the programme design, the underlying programme model and opportunities for useful evaluation. The programme team provided detailed baseline data, vision and mission statements, project plans/descriptions, and written goals and objectives. The programme's Theory of Change was elicited and clarified through discussion with the programme team. Through this process, assumptions were made explicit and evidence/theories supporting (or undermining) the Theory of Change were articulated. To assist in the planning of the evaluation, and to help explain and rationalise the evaluation design, the systematic approach of an evaluability assessment (EA) was adopted.[26,27]

The EA engaged the commissioners in considering evaluation challenges and limitations. A logic model was developed and refined in an iterative process. Discussions with programme staff tested, refined and further developed this logic model and helped the team to understand the proposed programme reality. Data needs were identified and reviewed and considered in relation to the logic model. Evaluation and subject matter expertise were then employed to form opinions regarding evaluability and the feasibility of alternative evaluation designs, based on key criteria adapted from an existing EA template:[28] (1) the quality of the project purpose; (2) the quality of expected outputs; (3) the availability of baseline and monitoring data; and (4) the feasibility of attribution (see Figure 1). The findings of the EA are summarised below under 'The programme's evaluability'.

Throughout the evaluation, problematic issues associated with conducting commissioned 'real world' evaluations started to emerge. To think strategically about the challenges of conducting this evaluation (and others like it), the authors conducted a retrospective situation analysis using the general principles and key elements of Soft Systems Methodology (SSM).[29] This organised, action-oriented process of inquiry helped the team to explore the situation in a holistic and pluralistic way, using models as intellectual devices. The methodology was used to reflect on the conduct and complexity of the *evaluation*, rather than to map the *programme* complexity (which had already been explored using the EA). Specifically, the situation was described and understood through the building of a 'rich picture' that aimed to capture, informally, the main entities, structures and viewpoints in the situation, the processes going on, and recognised issues. The structured process of SSM was used to inquire into the roles, norms and values of 'client', 'practitioner' and 'issue owner', to surface multiple worldviews, and to explore how power was expressed in the situation. While this was an introspective exercise, the information and insights that enabled this process came from over 3 years of working closely with the programme team, attending and participating in stakeholder events and meetings, presenting to the Council's Scrutiny Committee meetings, four interviews with the programme manager, and multiple face-to-face group meetings, email exchanges and telephone conversations. Research notes were recorded for all meetings and conversations, and a research diary was maintained throughout, recording the evaluation team's reflections and thoughts. The process of constructing a conceptual model of the team's 'purposeful activity' helped to identify learning for dealing with challenges related to the evaluation purpose, and the nature, role and quality of evidence.

THE PROGRAMME'S EVALUABILITY

Criteria 1: the nature of the project purpose

This criterion examined the extent to which the quality of the programme design allowed for evaluation in principle. The programme was established to target resources on a geographical community (an inner-city electoral ward) that had relatively high levels of deprivation and obesity compared with local and regional averages. The theory was that by engaging the whole community and stakeholders within the ward and across the council in a geographically focused initiative, locally appropriate and co-developed activities would be designed and delivered to raise awareness and understanding of the issues (in relation to healthy diet and physical activity), and encourage and support behaviour change among children and their families. The intervention aimed to engage with those with a role in shaping the local environments in which children live, learn and play: community partners (including schools, local businesses, service providers, etc.), parents and children. The Theory of Change is presented in Figure 2. Inputs included a full-time programme manager, support from a communications officer, and a modest programme budget. With this, the intention was to provide trusted information on healthy eating and activity, coordination and networking support for partners, and financial and practical support to new initiatives that would help to support the programme's aim. Most of the activities were geared towards the community partners, and included engagement events, workshops, training sessions, regular communications and access to funding via a grant scheme. Interim outcomes were expected to be changes in home, school and neighbourhood environments to better support children's healthy eating and activity, and changes in children's behaviours in relation to the six dietary and physical activity themes (such as swapping nutrient poor snacks for healthier alternatives, increasing fruit and vegetable consumption, decreasing screen time, and increasing active play).

The justification of the programme was realistic and based on a sound understanding of the local situation, a substantive review of existing obesity prevention interventions and international evidence on effective ways to prevent childhood obesity. The programme was consistent with the recommendation that attempts to influence people's behaviour should be aimed at changing both physical (or sedentary) activity and diet or healthy eating, and comprise multiple, potentially interacting methods of changing behaviour.[30] However, the programme theory was understandably complex, and it was difficult to achieve clarity, realism and shared understanding among the stakeholders around the objectives. The EA concluded that the programme theory was underpinned by many assumptions and that the desired behaviour change outcomes would be dependent on these, as well as many external factors (such as counteracting forces in the meso- and macro-environment). Moreover, the success of one aspect of the intervention (changing attitudes to motivate children and parents) would likely rely on the success of the other (managing the environment so that people have increased opportunities or abilities to undertake the desired behaviours).

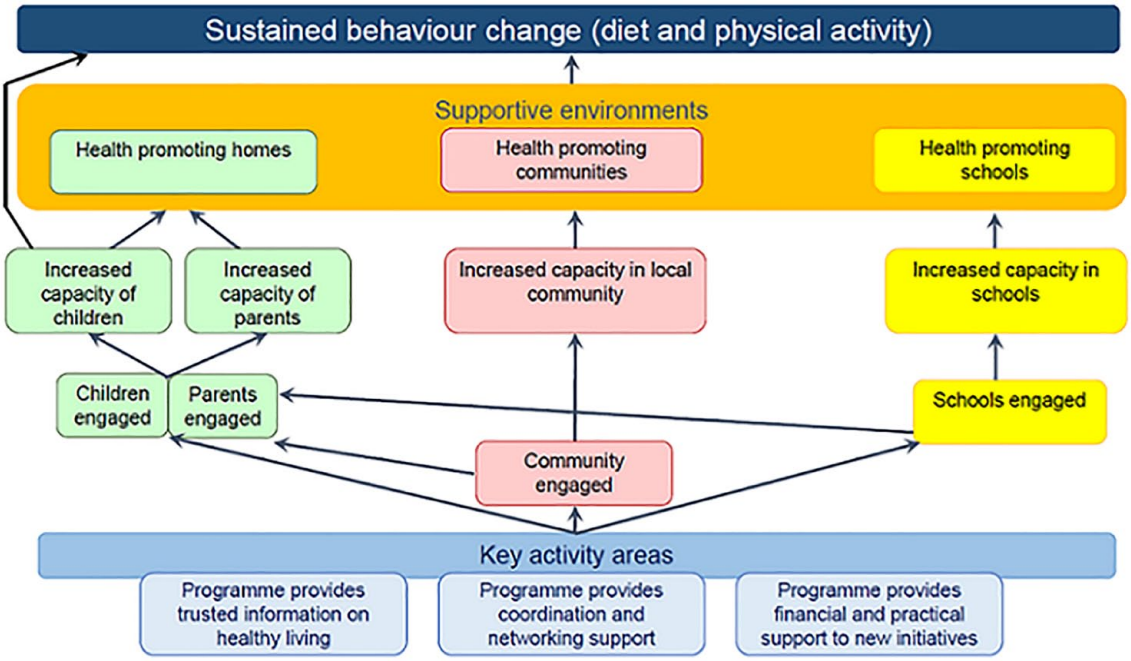
Criteria 2: the quality of expected outcomes

This criterion explored the extent to which the outcomes of the programme were plausible, given the way in which it was to be implemented. The expected long-term outcome was an increase in the proportion of children in the 'healthy weight' category, according to BMI (body mass index) centiles. Intermediate outcomes related to changes in behaviours among children, in relation to their own diet and physical activity, and among parents, teachers and community partners, in relation to supporting and encouraging healthy child behaviours. Short-term outcomes were the development of awareness, knowledge and positive attitudes among children, parents and stakeholders towards eating well and moving more, and increased capacity among key agencies and groups working with children to support healthy lifestyles.

The programme was adequately resourced, and the programme team had secured political support for the project and engaged local elected members. However, implementation relied heavily

Figure 2

Theory of change diagram



on one full-time programme officer who, in the course of several staff re-organisations, faced an uncertain future. The quality of the expected outputs depended heavily on that programme officer, their engagement with the stakeholders, and the continuity they could provide throughout. Since it was also one programme that interacted with others and with the context in which it sat, it also depended on continued investment by the health and local government commissioners in the broad range of health, social care and well-being services. In a context of financial insecurity, budget cuts and organisational upheaval, this continued investment was not a given.

Parents and children were to be targeted by the intervention both directly (through information provision, community events, regular communications), and indirectly (through the work of the community partners). By engaging all schools, and working through a wide range of partners, these actions were likely to increase awareness/knowledge about healthy eating and physical activity among many children and their parents, and would potentially contribute towards the development of positive attitudes towards eating well and moving more. These changes in behavioural determinants might then contribute towards behaviour change among children. Evidence on the complexity of obesity suggests that it would be a considerable challenge to significantly alter a population's weight status, particularly within a few years.[31] While this programme had the potential to contribute towards obesity prevention within its target ward, as part of a wide range of micro, meso and macro-level interventions, it was important to be realistic about its potential to alter the outcome of a system as complex and extensive as that driving the weight status of the populations, especially within a 3-year period. Significant, measurable shifts in population behaviours (where they happen), might be anticipated to take at least 2 to 3 years. The unpredictability and non-linearity of this programme is inherent within its community development approach.[13,32] It was decided that a strong process evaluation would be essential in order to learn lessons for future implementation plans.

Criteria 3: the availability of data

This criterion examined whether the results of the programme would be verifiable based on the data that could feasibly be collected. The EA considered it was feasible to collect a broad range of data, from numerous sources, that could track both process and outcomes across the logic model. This would, however, place a time burden on the programme team, who would need to collaborate in the creation and management of a data system. The programme team separately commissioned the collection of BMI data for children in the target community throughout the course of the evaluation, providing an objective indicator of population weight change. The evaluation team were employed from early in the programme's history for 4 years, so data could be collected intermittently over this time frame, allowing good opportunities for short-and medium-term follow-up. Much of the short- and medium-term outcomes data would be self-reported, which has clear limitations; behaviour data reported by young children should be treated with special caution. Achieving high response rates to parent and stakeholder

questionnaires is challenging, and those choosing to respond may exhibit particular characteristics over non-respondents. However, the EA concluded that the careful design of questionnaires, the addition of qualitative data collected through interviews and focus group discussions, and the collection of data at multiple time points to investigate change over time, could help ensure self-report biases are reduced, and add richness and understanding to the data.

Criteria 4: the feasibility of attribution

This criterion examined the extent to which an evaluation would be feasible, credible and useful. Problems associated with attribution, causation and generalisation are common to most health-promotion initiatives. While long-term objectives would be measurable (BMI is a usable indicator of population overweight), it would be difficult to attribute any change to the specific programme. Short-term objectives and proximal outcomes might be more readily attributable to the programme but would be more problematic to measure; SMART (specific, measurable, achievable, realistic and time-bound) indicators are more difficult to identify where the proximal outcome is related to, for instance, community development or capacity strengthening. The EA concluded that a theory of change approach was needed to go some way towards helping to strengthen the scientific case for attributing change in outcomes to the activities included in the initiative, by specifying at the outset how activities will lead to intermediate and long-term outcomes, and by identifying the contextual conditions that might affect them. In addition, the research evaluation would enable the 'testing' of some of the key assumptions underpinning the programme theory, which would contribute valuable knowledge.

The evaluation team found the EA to be extremely useful. It verified that the programme was theoretically sound, but highlighted the assumptions underpinning the programme theory and established a sense of realism related to the longer-term outcomes (criteria 1). It highlighted the value of the process evaluation, in helping the council to learn lessons from the pilot (criteria 2). The possibilities and limitations of data collection were made clear, and reassurance was given that the commissioned evaluation would gather sufficient data, of sufficient quality, to answer the key questions (criteria 3). Finally, the EA helped to justify (and explain the value and limitations of) a theory of change approach for this evaluation (criteria 4). Despite this, however, some stakeholders found the EA report challenging. To reflect on why, we now turn to two issues that emerged from our SSM analysis.

EVALUATION PURPOSE

While evaluations are typically requested to answer the question 'Does it work?', decision-makers and other stakeholders ask many questions about interventions that are not just about effectiveness. Questions might include: How does it work? Will service users be willing or want to take up the service offered? Is it the right service for these people? Are users, providers and other stakeholders satisfied with the service? In recognition of the complexity of social change and health improvement, where public health improvements are achieved through the reshaping of multiple interacting factors through multiple interventions, Rutter et al.[9] recommend that 'Instead of asking whether an intervention works to fix a problem, researchers should aim to identify if and how it contributes to reshaping a system in favourable ways'.

Our commissioner required the evaluation to

> *'assess the impact of this system-wide approach on the key areas defined by the specific [dietary and physical activity] themes . . . ultimately, we expect that these changes will translate into an increase in the percentage of children with a healthy weight' (quoted from the service specification for the evaluation).*

Specific research questions were not posed, although the pilot was intended to inform the potential replication of the intervention in other areas of the borough, and inform wider knowledge around community-based 'whole place' obesity interventions.

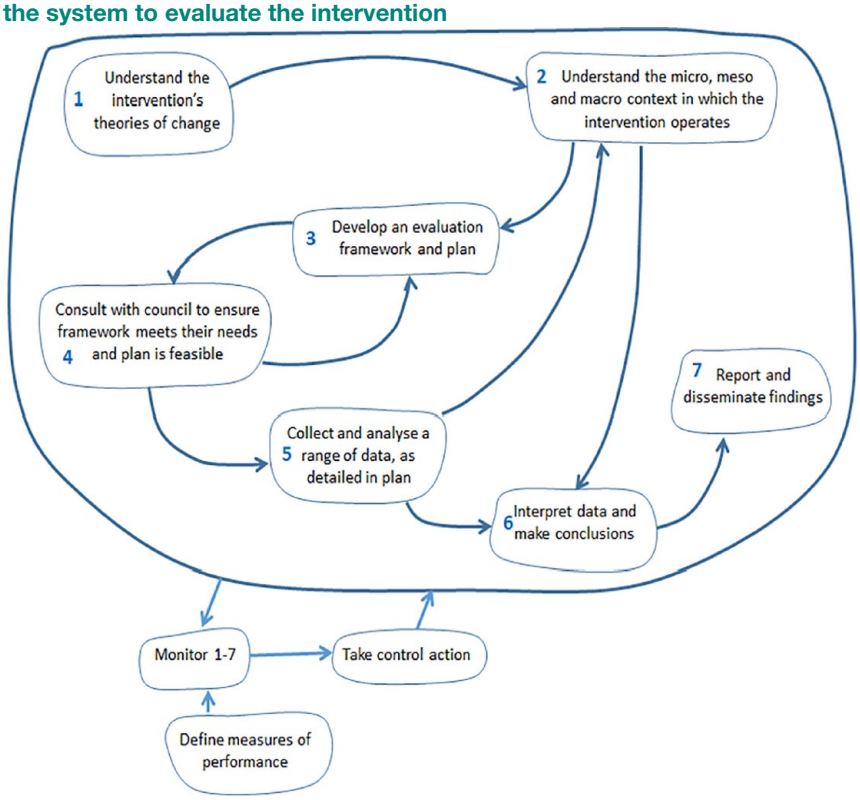
In our conduct of the EA, evaluation purpose was explored only with the immediate programme team, taking our brief from the service specification produced by them. In our retrospective analysis of the situation using SSM as a guide, we more critically considered the purpose of this evaluation, and the multiple perspectives on this. The analytical process helped to further explore important differences in worldviews related to the design, conduct and usefulness of the evaluation. One perspective holds that it would be possible to objectively measure whether this programme works to help tackle obesity, and from that, make evidence-informed decisions about future spending. However, as already alluded to, the assumptions about linear causal pathways both within the programme and in evidence-informed decision-making are problematic. During the EA processes of programme theory development, identification of indicators, and consideration of design and methods, the evaluation and programme teams sometimes found it difficult to identify the most suitable strategy for evaluation.

From our vantage point at the end of the evaluation, and drawing on the rich picture we had created, a 'root definition' was defined to describe our 'system of interest':

> *The evaluation team's system, enacted by them for the benefit of the council and for more general advancement in academic knowledge, to evaluate the intervention by means of collecting and analysing a range of information in order to better understand what contribution it makes, within this specific context, to tackling childhood obesity, within a four-year period and with a limited budget, and without placing undue financial or time pressures on either the intervention staff or members of the local community, in the belief that this will provide new knowledge*

Figure 3

A conceptual model of the system to evaluate the intervention



regarding the contribution, implementation and evaluation of community-based approaches to obesity prevention.

From this root definition, and from the analyses that contributed to the rich picture, the evaluation team constructed a conceptual model (Figure 3) to identify ways in which the evaluation process might have been improved. Conceptual models, in SSM, are devices that define and link the activities needed to make the required transformation (in this case, helping the council and wider academic and public health communities to better understand the contribution of community-based approaches to obesity prevention). The activity in the operational part of the model should be captured in 'the magical number 7 ± 2' activities.[29] The model is predicated on an understanding of different worldviews. From the evaluation team's perspective, two standpoints were important: the belief that it is not possible to objectively measure whether this intervention works to tackle childhood obesity, or to distinguish the contribution of this intervention from the contribution of other interventions at different levels; and the belief that in making decisions about spend/investment, the council should consider many issues other than simply 'does it work'. This is why we were drawn to a theory-based evaluation design. While theory-based approaches to evaluation are becoming more mainstream, their design, potential and limitations are harder to explain to the uninitiated. This leads us on to the final challenge described in this article, relating to evidence.

THE NATURE, ROLE AND QUALITY OF EVIDENCE

While the council understood the need for a strong qualitative dimension in the evaluation (as justified in the EA), they were not entirely free from what Schwandt calls the 'modernist paradigm of reason'.[33] This is perhaps not surprising, given the present enthusiasm for evidence-based approaches, and the financial squeeze further heightening the pressure to spend money only on 'what works'. Thus, there were assumptions made about the validity of different forms of knowledge and the value of different types of evidence that presented particular challenges to the evaluation. In our case, there was an overwhelming preoccupation with providing hard, reliable, factual data on children's dietary and physical activity behaviours. In this evaluation, the most practical and feasible method of accessing information about behaviours from approximately 1000 primary school-aged children was from the children themselves, via questionnaires self-completed in school time. In the absence of any validated survey tools that (1) could be completed by young children themselves and (2) covered the wide range of eating and activity behaviours the intervention sought to change, the evaluation team designed their own survey for this

purpose. In designing the questionnaire, the tussle between what was feasible (from an evaluator's perspective) and what was desired within a normative stance valuing objective, value-free knowledge (from a commissioner's perspective) was not easy to manage, and compromises were inevitably made. Meanwhile, the qualitative data garnered less interest, and was viewed largely as a supplementary way to explore notions of acceptability and aspects of implementation process. While both the provider and client were satisfied with the final evaluation design and data collection tools, substantial valuable time was taken to arrive at that point.

It was interesting too, that in correspondence and exchanges between the commissioner and evaluation team, there appeared to be a clear assumption that evaluation evidence coming from this pilot programme would allow decision-makers to either adopt this intervention elsewhere in their borough, either in a whole or modified form, or to strike it from their list of intervention options. However, such a rational, linear, evidence-to-policy pathway is neither realistic nor credible.[34] In this context, evaluators must be mindful of the potential influence (or not) of their evaluation, and take a pragmatic approach to ensuring the immediate usefulness of their work.

DISCUSSION

From an evaluation team's point of view, the EA established a sense of realism that was an important basis from which to design the evaluation. Prior to its launch, the programme team had fought hard to secure funding and commitment from elected members and other stakeholders, on the basis that this represented an opportunity to 'tackle child obesity' and reduce population overweight. Unrealistic expectations of the programme at the outset meant there was a high risk of determining it inadequate, and therefore of missing crucial opportunities for learning about this kind of approach. They also posed a threat to the evaluation team since stakeholders wanted and expected the evaluation to attribute improvements in long-term outcomes to this intervention. The EA was a thorough and structured way of justifying the final evaluation design, which was theory-led, incorporated a strong process evaluation, relied on bespoke data collection tools for self-reported data, and adopted an 'action learning' approach, with annual events for learning and reflection. However, when the EA report was presented to wider stakeholders, this realism was interpreted as overly negative and unconstructive.

While the EA helped to work through issues related to the programme's theoretical and practical evaluability, it did little to address the apparent tensions related to the context – of designing and conducting this evaluation on behalf of public sector commissioners, with a very limited budget, and with conflicting beliefs/attitudes related to evidence and evidence-based policy-making. The retrospective analysis of the situation using SSM helped the evaluation team to understand some of these aspects in more depth. In particular, it was found that the critical exploration of the evaluation purpose and design achieved in the EA only partially recognised the perspectives of other stakeholders – particularly the elected members.

In a recent paper, Dalkin et al.[19] explored the compatibility of SSM with realist approaches. In this study, SSM enabled the team to learn retrospectively from their experience. However, an incorporation of SSM into the evaluation design process might have helped the team to deal more effectively and constructively with boundary tensions arising from conflicts between contrasting perspectives. Indeed, in SSM, the user is at the centre of the SSM process – as captured by Checkland and Poulter in the LUMAS model.[29] The key learning points that emerged from our reflections were:

First, EA is a valuable approach to use in managing expectations and challenging underlying assumptions. High levels of continuous negotiation are required to ensure 'buy in' to the approach taken, and to help to ensure the evaluation remains 'utilisation-focused'.[35] This might be considered as an embedded approach to research, the relevance and utility of which is increasingly being recognised within efforts to improve complex real-world problems,[36] but which is difficult to achieve in a commissioned evaluation. An embedded approach contains many elements of action research and ethnography. Thus, researchers need to be equipped to easily navigate the tensions inherent in an embedded approach. Our experience highlighted the importance of building trusting relationships, and the difficulty of doing this where insufficient time has been allowed, and in an organisation/system that is in flux.

Second, multiple perspectives of evaluation purpose will co-exist and should be explicitly acknowledged at the outset. In our example, one measure of effectiveness was the degree to which the evaluation helped the council (and others) to make decisions regarding future spending/investments. This relates back to the role of elected members and their accountability to the public, and their importance as issue owners. The evaluation team were also issue owners, and wanted to produce a robust evaluation that they could be proud of. They therefore needed to maintain a degree of professional independence in order to preserve academic integrity. (This could be seen as a contradiction to the first learning point above – the challenge will be to manage these dialectic tensions). Another measure of 'system performance' might include scientific rigour, so issues of reliability and validity should be considered reflexively throughout, with careful considerations of the 'trustworthiness' of evaluation findings.[36] Thurston and Potvin recognise that programme evaluation is an inherently politicised process, rather than a benign technical activity, and argue for a 'politics of accountability'.[37] SSM can encourage difference to be understood, and clarity to be achieved regarding the purposes of the evaluation. It can also help to understand the dynamics of power which can shape an evaluation and its dissemination in a variety of ways.

Finally, the needs of the various issues owners should be recognised at different stages, and this should inform the timeline for analysis, reporting and dissemination. In our example, the early communication of 'quick wins' (short-term outcomes), and regular feedback on the evaluation process and findings reassured those who were not comfortable with this kind of complex evaluation research. We used 'evaluation stories'[38] and annual 'learning events' to great effect. Evaluation should be seen as a feedback system between the programme and its environment to facilitate local programme improvement.[39] The evaluation team therefore should be responsive to changes in the political context, recognising that the demands on the evaluation may change over the lifecycle of the programme. Time and budget place obvious restrictions on evaluation design, but evaluators must also avoid placing undue financial or time burdens on the programme team or members of the local community.

CONCLUSIONS

The analyses described here were valuable in helping to determine the role of and approach taken by the evaluation team, and to retrospectively reflect on the challenges encountered in order to learn from the experience. The EA process considered the programme history, design and operation, its implementation plans, the capacity for data collection, management and analysis, the likelihood that the programme will reach its goals and objectives, and why an evaluation will or will not help the programme and its stakeholders. This pre-evaluation activity helped to develop a pragmatic plan for the evaluation, through the process of collaborating with the programme team to identify the programme logic and make assumptions explicit. Given the rigorous and structured approach, it also helped to construct a solid rationale for the evaluation design. One limitation of this EA was the lack of involvement of a wider range of stakeholders, including members of the target community and elected members in the Council. Even though the programme had been co-developed by all key stakeholders, the EA report produced by the evaluation team challenged some stakeholders' expectations of the programme and the evaluation. However, among the core programme and evaluation teams, the EA helped to develop a shared mind-set around what might be expected to happen, how that can (and can't) be measured, and the key areas that the evaluation research should seek to illuminate.

The retrospective analysis of the situation using SSM helped to interrogate further some of the challenges we experienced, to reflect and learn from them. While the problem analysis using SSM was an introspective exercise, conducted retrospectively by the evaluation team, significant strengths of the method lie in its participatory approach. In future, it would be useful to explore the value of conducting an SSM enquiry *during* (or in the early stages of) the evaluation, as a joint endeavour. Nonetheless, analysis presented here helped the team to both reflect on their own approach, and to consider key learning points for others engaging in this type of complex, real-world programme evaluation. It is also recommended that local authorities consider the value of conducting or commissioning an EA before planning a full evaluation, and work closely with any commissioned evaluation teams to engage critically and systemically with the purpose, pragmatics and politics of conducting a proposed evaluation.

ACKNOWLEDGEMENTS

The authors are indebted to all those within the community in which this intervention was implemented, who participated so generously in the evaluation. Also, to the programme team at the commissioning Council, who collaborated in the design of the evaluation, and to the wider evaluation team whose research notes we drew on for this paper.

CONFLICT OF INTEREST

The author(s) declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

ETHICAL APPROVAL

University of Kent Research Ethics Approval was granted prior to the start of this project (SRCEA 150).

FUNDING

The author(s) disclosed receipt of the following financial support for the research, authorship and/or publication of this article: The commissioning Council provided the funding for the original evaluation; the subsequent analysis conducted for this article was not funded. Views expressed in this article are those of the authors and not necessarily those of the funding Council. This study was funded by departmental resources.

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Whole systems approach to diet and healthy weight: a longitudinal process evaluation in East Scotland

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Keywords
systems approach; obesity; policy; nutrition; health

Abstract

Aims: Obesity contributes to morbidity and early mortality, affecting people of all ages and sociodemographic backgrounds. Despite attempts to address obesity, efforts to date have only had limited success. Adopting a whole systems approach (WSA) may potentially address obesity and emphasise complex inter-relating factors beyond individual choice. This study aimed to assess implementation of WSA to diet and healthy weight in two council areas of Scotland, longitudinally exploring enablers and barriers. One area followed a Leeds Beckett WSA model (LBM) of implementation, while the other used a hybrid model incorporating existing working systems.

Methods: To assess the process of implementing a WSA, interviews and focus groups were conducted after initiation and 1 year later.

Results: Main enablers included: belief in WSA effectiveness; positive relationships between key personnel; buy-in at community and national levels; funding availability; the working group responsible for coordinating the system development comprising individuals with diverse expertise; good communication; and existing governance structures. Barriers included: insufficient funding; high staff turnover; inadequate training in WSA methodology; engaging all relevant stakeholders and reverting to 'old ways' of non-WSA working. The LBM provided a framework for system setup and generating an action plan.

Conclusion: This study provides the first independent longitudinal process evaluation of WSAs that have incorporated Leeds Beckett methodology, and offers insights into how a WSA can be implemented to address diet and healthy weight.

INTRODUCTION

The world faces an obesity epidemic that contributes considerably to morbidity and early mortality.[1] Obesity affects people of all ages and backgrounds, but it can exacerbate health disparities because members of sociodemographic and ethnic groups that experience poorer health outcomes are more likely to be impacted by obesity.[2] In Scotland in 2019, 66% of adults were affected by overweight, and of these 29% were affected by obesity. Prevalence of overweight including obesity was significantly higher among men compared with women (69% and 63%, respectively). Overweight and obesity rates were 40% of those aged 16–24, and 79% of those aged 65–74. Obesity rates are higher in the most deprived areas, particularly for women; 40% of women in the most deprived areas of Scotland experience obesity compared to 18% in the least deprived.[3] Despite

ISSN 1757-9139 DOI: 10.1177/17579139231203858

attempts to address this epidemic through policy and intervention, success has been limited.[4] Limited impact may be explained in part because single policies (e.g. introduction of a levy on sugary drinks) and intervention targeted at specific population segments (e.g. family weight management services) fail to address the complex array of interacting factors identified as causally impacting on population obesity.[5] Adopting a whole systems approach (WSA) to address influences on diet and healthy weight has been identified as having potential to tackle this complex area.[6,7]

A WSA incorporates a range of comprehensive initiatives targeted at system change by reaching government, policy decision makers, individuals, groups and community-level environments and drivers of human action.[8] A recent systematic review of 65 studies examining implementation and effectiveness of WSAs, 33 of which focused on obesity, identified improved outcomes including: body mass index (BMI) reductions; increased parental and community awareness; community capacity building; nutrition and physical activity environment changes; and improved safety and wellbeing of community members.[9] Our recent review-of-reviews of WSAs applied to diet, healthy weight and obesity[4,10] showed, however, that evidence for WSA effectiveness remains in its infancy, but some case studies where WSA were effective may aid new WSA adopters.[9] This echoes findings in an evidence synthesis of a WSA to obesity prevention, serving to inform the Northern Ireland Obesity Prevention Strategy[11] and the recent Academy of Medical Science report on what is next for WSAs to public health.[12] Therefore, there remains a need for robust longitudinal evidence to strengthen WSAs in government policy and practice.[4,10,11]

In addition, there is a paucity of evidence on factors important for successful WSA set-up and implementation. The National Institute for Health Care and Excellence (NICE) commissioned an evidence review of WSAs to obesity to inform the delivery of WSAs.[13] They noted that authentic WSAs draw on complexity science to explain how system features interact. The authors proposed 10 features of a WSA. However, from among 13 WSA studies that focused on obesity, Bagnall et al.[9] identified that success did not necessarily require all 10 features,[9,10] a conclusion supported by others.[11]

To empower public health leaders to utilise a WSA to tackle diet and unhealthy weight, Public Health England[6] developed a guiding framework for WSA set-up, often labelled the 'Leeds Beckett Model' (LBM). In 2019, Public Health Scotland launched a WSA pilot project in Scotland and provided funding to support local authority regions to set-up WSAs. Process evaluation of the pilots demonstrated how local systems can work more effectively to address complex public heath challenges.[14] In addition, WSA training has accelerated WSA interest. Areas adopting WSAs made progress in establishing new ways of working despite COVID-19 challenges.[14]

In this study, conducted in Scotland, two local authority (LA) areas receiving WSA funding, but not included in the national evaluation, were selected. This provided an opportunity to evaluate WSA implementation, including comparison of different implementation models (i.e. the untested LBM versus a hybrid model). This study assessed implementation of a WSA to diet and healthy weight and longitudinally explored enablers and barriers. Collected data also informed the range and extent of activity conducted by stakeholders in WSA delivery.

METHODS

Design

Focus groups and interviews were conducted with members of relevant WSA Core Working Groups (CWGs) and wider stakeholder networks in two LAs in East Scotland. CWGs are responsible for coordinating the local WSA with stakeholders, who were invited to participate in LA-led workshops to inform WSA implementation. Two council areas (labelled A and B to maintain confidentiality) were selected from among five potential localities. Selection was driven by their contrasting choice of methodology in implementing a WSA: Location A developed a hybrid WSA model without following specific guidance – details are presented in the next section, while Location B utilised the LBM.[6] Location descriptions and population demographics are included in the study protocol, alongside further study detail.[4]

Focus groups and interviews sought to explore: how stakeholders got involved with the WSA and their initial understandings of them; the process and experience of WSA implementation; enablers of and barriers to WSAs. Focus groups and interviews had been planned for three time points, with the third intended to collect data about implementation of WSA action plans. However, COVID-19-related implementation delays necessitated data collection ceasing after two time points. Time point 1 interviews and focus groups were conducted after each area's CWG establishment, and after their first workshop at which participants develop a local 'map' of the causes of dietary behaviour and healthy weight in their area. Time point 2 interviews were conducted after the second LA workshop and development of the WSA action plan in each area. Due to COVID-19, there was approximately 12 months between these workshops. Consequently, stakeholder interaction and initial momentum for action plan development was reduced.

CWG members participating in focus groups and/or interviews, along with stakeholders attending first workshops in each locality, were also invited to complete monthly surveys consisting of questions relating to: Ecological Momentary Assessment (EMA);[15] recording WSA delivery activities; and time spent on them. Response rates were low (Supplementary Table S1) and consequently we do not consider the EMA data further; however, as EMA has not been used in this setting previously, the Supplementary materials section include details about the utilised EMA to inform other researchers considering these techniques.

Model of WSA implementation

In Location A, a WSA was implemented based on existing partnership working practice alongside development of a new obesity map and action plan targeting diet and healthy weight. Two workshops were held to develop the obesity map and subsequently the action plan with stakeholders. While training was received by some members of the CWG in WSA development using LBM, the LBM was not included to guiding activities in this location. We have referred to Location A's approach as a hybrid model because they structured workshops on the basis of achieving an obesity map through discussions, and developed the action plan through stakeholder involvement of existing partnerships, they did not follow a pre-defined framework or model unlike Location B.

In Location B, the LBM was operationalised and implemented[6] – it has six distinct non-linear phases and consists of core elements that are required to support the phases (see Figure 1).

To facilitate LBM delivery, training was provided on its theory and practical phases of model implementation. Our evaluation research team were not involved in this training. Enablers in Location B engaged in training and followed the protocols described in the implementation manual.[6] Those WSA CWG members joining post initial training were provided with the implementation manual. At completion of our data collection, phases 1–4 had been implemented (see Figure 1).

Participants and data collection

Participants were recruited from the WSA CWGs and a list of workshop attendees, 32 email addresses were provided and therefore contacted. These potential participants were emailed an invitation, which included a link to further information and a Participant Information Sheet and Consent Form, hosted via REDCap,[16] a secure online research study management platform. Nineteen participants went on to take part in this evaluation (focus groups: $n=14$; Location A $n=5$, Location B $n=8$, both $=1$. Interviews: $n=2$; Location A $n=1$, Location B $n=1$. Monthly surveys only $n=3$; Location A $n=1$, Location B $n=2$). Of the 14 participants who took part in a focus group or interview, 11 also completed the monthly surveys (Location A $=7$, Location B $=4$). Three people took part in the monthly surveys only (Location B $n=2$, both $=1$).

Thirteen members of the CWG took part in either a focus group or interview (Location A $n=6$, Location B $n=7$). The participants included those working in public health management roles, project coordination, public health practitioners, community planning, community regeneration, community development, active schools' coordinators, post-primary school teachers, and social workers. All focus groups and interviews were conducted via Microsoft Teams, audio-recorded, and transcribed verbatim.

Data analysis

Focus group and interview transcripts were analysed using framework analysis,[17] a structured, systematic approach to summarising and analysing qualitative data. Creating the codebook from which to code subsequent transcripts used both inductive and deductive methods, accommodated by framework analysis.[18] First, the team members familiarised themselves with the data and conducted open coding of initial transcripts. They then met to discuss their codes and incorporate them into a framework.

Included in this team were three Public Involvement in Research group (PIRg) members who had particular interest in assisting this evaluation. After undergoing training in framework analysis, they were integrated into all stages of analysis. The PIRg is composed of 11 members of the public who act as lay people to support the research process and offer expertise through lived experience.

To further refine the framework deductively, data from a systematic review of the literature on implementation and evaluation of WSAs to diet and healthy weight was incorporated,[4] and information provided in Public Health England's[19] guidance on WSAs was also used. This information provided the research team with details on the core components of the LBM and examples of components of previously implemented WSAs. The process of developing the framework was iterative, with further analysis being used to refine the framework. Interpretation of data took a deductive approach, applying themes to each of our research questions.

To provide a broad understanding of the magnitude and range of contribution of staff time to WSA set-up, we totalled activity timings reported on the monthly surveys. We present total timings by activity and overall, separately for each area and exclude individuals working across areas. Some activities categorised as 'other' were regrouped. To provide 'an order of magnitude' indicative costs of employing staff to deliver these activities, we multiply total activity time by the hourly rate of employing a Social Worker in adult services of £42/h.[20] This is for the cost year 2021/2022, and includes salary oncosts and overheads, above the base annual salary of £36,000 – see the study by Jones et al.[20] for further details. Given the wide range of professions (administrator to teacher) and seniority (graduate to trust manger) of staff surveyed precluded, we do not conduct a more precise costing.

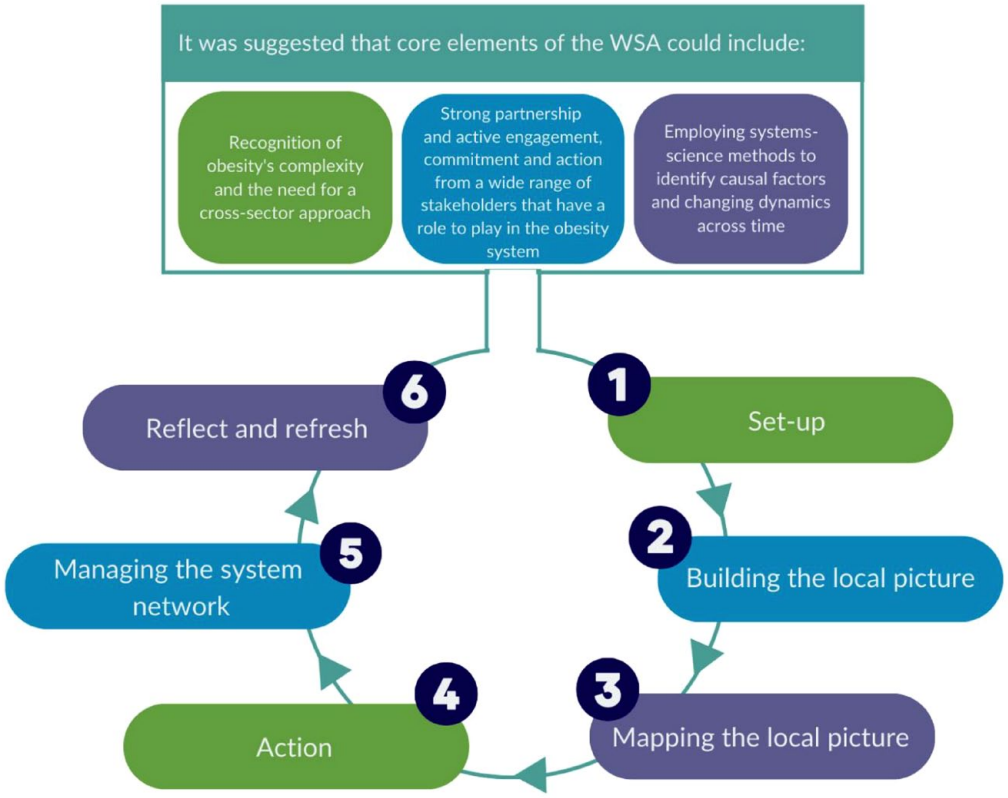
RESULTS

Qualitative findings

Several themes were identified to answer our research questions regarding what aspects of WSAs existed previously within the regions; the extent to which the two WSAs constituted a new working approach; and methodologies used for implementation and their effectiveness. The first two themes related to what existed previously and the extent to which WSA were new, these included: WSA and existing ethos and practice; and broad perspectives on WSA/pilot approach. The remainder of the themes related to implementation and effectiveness, these themes included the process of implementing a WSA; impact of WSA; meeting community need/community and stakeholder involvement; barriers; and enablers. Each theme is described below.

Figure 1

Core elements of the Leeds Beckett Methodology (reproduced with permission)[11]



WSA and existing ethos and practice

When participants were first asked about what a WSA was, they identified that, for them, a WSA approach was about 'changing beliefs' of those engaged and working in the system, but there was little mention of the complexity of factors influencing healthy weight, or changing the focus from individualistic to wider systemic influences on behavioural patterns. One person identified that a WSA was '*Focused on inequality, and for looking at the overall approach of how we deliver it to people. So being quite person-centred, thinking outside the box, not being judgemental*'. (Location A Time point 2 Interview). It was evident that there were mixed views towards how the WSA fits with existing ethos, knowledge, and practice. This ranged from some participants having no previous knowledge of WSA working while others viewed the WSA as a familiar concept:

> *whole systems in many ways isn't necessarily a new concept or certainly isn't in Scotland and many other areas, it's been used in things like youth justice and stuff for a while, so I think there was a degree of awareness in terms of that kind of systems thinking about kind of complex issues* (Location A Time point 1 Focus Group).

On closer inspection, there was broad knowledge of what a WSA is; however, this was not backed up with a detailed description or understanding. Not being aware of what a WSA entailed led to confusion where one participant felt the need for action to target obesity instead of 'structures'; and that the community had not bought into the WSA or the idea of systems change.

Despite some participants not being fully familiar with what a WSA entailed, it was felt that the approach fitted with existing ethos, goals, and ongoing work, and that there was value in applying WSAs given the scale of obesity and limited effectiveness of previous approaches. Ahead of further roll-out, it was reported that WSA obesity work may provide useful information ahead of scale-up to further areas of public services, and in some cases has prompted engagement with long-established complicated systems across government departments:

> *because normally I don't think we would do that [i.e., spend a large amount of time on planning and engagement with stakeholders], it's like you kind of leave those systems alone because they're too big, they're too established, they're too prescriptive almost. So, I think that's been the difficulty for us kind of here is that we are trying to do that and that's perhaps a bit alien to us even those of us who've worked, like been around forever* (Location B Time point 2 Focus Group).

It was apparent from the participant that there was a change in belief about how they can engage in the system and by adopting a WSA, a new way of working or method of engagement with the system was required. A further example:

> *Yeah, for me I think this example is something perhaps like normally we would just let it go as something that's kind of unachievable, but for me I suppose this is perhaps a test of the method to see like how do you do it?* (Location B Time point 2 Focus Group).

Process of implementing a WSA

Despite the implementation process being in part reliant on stakeholder engagement, limited engagement was reported, alongside difficulty in involving relevant representatives from partner organisations. Some of the difficulty related to participation in group sessions with remote/virtual workshops being considered a challenge.

Variable types of communication to stakeholders generated an initial sense of the WSA having momentum, and then losing this, leading to uncertainty about the next steps and what contribution was required of stakeholders. Overall, there was a perception of slow progress throughout the WSA implementation process primarily due to COVID-19, but also impacted by leadership changes in both areas:

> *I think we could probably have done more on just that sort of two-way communication with stakeholders over the longer term but it's been quite hard because the progress has been, I mean I don't know what we could have done differently because the progress has been slow* (Location B Time point 1 Focus Group).

Experience of the Leeds Beckett Methodology (Location B only)

The structure provided by the LBM was found useful for implementation. The LBM was viewed as a new process and way of working, and many had no previous experience of implementing it.

Some members who had received LBM implementation training had changed roles and were not involved throughout the full duration of the project, which meant those without training faced some barriers, mainly uncertainty in how to follow the process. Some viewed the implementation of the LBM as complex and some others as too abstract or theoretical in content. There were examples of when those in Location A rationalised needing to diverge from using the LBM to fit with their way of working and their existing system. However, in Location B, following each phase of the LBM was upheld and although it was perceived to be slow to implement, and at times a challenge to integrate or explain to the participants (e.g. Action Scales Model), it was considered a crucial part of the process.

Overall, views about the LBM were mixed, seen by some as challenging to work through, but by others as offering a useful step-by-step framework. While the LBM can be used as a structure for partnership working, its structure was perceived as complex, as the methodology needed subject expertise, and communicating this suitably to other colleagues or stakeholders during workshops was difficult. This was further impacted by changing communication medium:

> '*so it was the start of it that was quite tricky to get your head around it*' and '*people can only stay in an online workshop for a limited amount of time so you just end up with like disorganised thought*' (Location B Time point 1 Focus Group).

Some would have preferred more instruction on the LBM.

The LBM includes two workshops. A common view was that the time elapsing between these was too long, reducing momentum following the first, contributing to attrition, with fewer people returning to the second. It was felt that the lack of activity between workshops inhibited progress and that time between subsequent future workshops should be reduced.

Impact of WSA

Impact on partnership and collaboration

WSA implementation was viewed as promoting understanding of why collaboration and partnership across the system was important to improve health and wellbeing of the local community. Bringing together the CWG and other stakeholders supported establishment of new networks, engagement opportunities and knowledge about communities for whom outcomes are intended to be improved: '*there's definitely been connections made I would say just from the work that we're doing that probably weren't there, or they might have been there but maybe people just haven't really nurtured them*' (Location A Time point 2 Focus Group). The new networks were also viewed as strengthening partnerships and opportunities for collaboration, post the COVID-19 pandemic.

Understanding of the complexity of taking a WSA and acknowledging challenges

Driven by limitations in understanding a 'working' WSA, it was apparent that some members may be insufficiently focused on systems, and rather focusing on event-level activities. Event-level activities refer to reactive actions that offer little leverage for system change, often thought of as quick fixes. Examples include delivery of interventions, campaigns, or awareness raising to the public (e.g. educating people about high-sugar beverages, provision of weight management programmes, implementation of physical activity in schools). It was acknowledged that WSA work was challenging and with progress still to be made, necessitating a long-term approach and perspective. There was also recognition that the steering groups were at the early stages, resulting in limited direct impacts on obesity, but rather working together to establish a system for future impact. In this quote, the long-term impact of developing the system is acknowledged:

> *it has kind of made you, is there this whole systems approach is there a*

way that we can identify it or use that methodology in other areas of our work, maybe it is an opportunity for us to build up other partnerships with like, on different topics or different subjects, try and, and like [person's name] said, raising a kind of small amount of awareness with the key stakeholders that's been involved so far that there is something happening (Location B Time point 1 Focus Group 1).

Meeting community need/community and stakeholder involvement

Participants were not convinced their WSA met community need due to insufficient involvement of people from communities; some wanted increased involvement of community members, but COVID-19 had restricted this:

'*so doing a sort of other workshop with just, you know, community members being able to say to them well this is something that we're hoping to do within your area, these are some actions that we're hoping to develop, is it something that you think's good or do you think there's enough of something or would you change something about it. I would've liked that to happen*' (Location A Time point 2 Focus Group). There was some evidence of anxiety about public involvement, as there would be no-event level interventions in the near future. There was some concern that consultation without immediate intervention or action would not be welcomed by communities.

Some groups, which may have benefitted the WSA, were identified as missing; for example, health visitors, midwives, and the education sector in Location A; social work and housing in Location B. It was also felt that younger people could have been better represented: '*I think the people that you're trying to target and the people you're trying to improve the lifestyle choices of, those people weren't at that meeting*' (Location B Time point 1 Interview). Positively, the WSA was viewed as an opportunity to identify wider and important stakeholders, and consider how to subsequently engage them.

Enablers

Identified enablers and barriers to implementing a WSA to diet and healthy weight are summarised in Table 1.

Enablers of a WSA

There were many enablers for adopting a WSA in both LAs. Utilising existing structures where a local governance group had already been set-up, was viewed positively.

There were previous community action plans that were built on to form a new action plan.

we already knew what sort of things were actually important to them in terms of broader health and wellbeing, so wasn't then an opportunity for us to really build on some of that, so that kind of formed the basis if you like for our sort of informed future action plan (Location A Time point 1 Focus Group).

Participants described how their current role and involvement in Type 2 diabetes prevention work provided good context for being involved in the WSA, and that was also good alignment with their organisation's aims and objectives.

So I want to obviously try and do something like that. So, as I said, it fits in well with all of our school, it fits in well with what I was interested in and it fits in really well with my subject (Time point 1 Location B interview).

The WSA was also perceived to fit within pre-existing work on obesity where a system was already established – for example, coordination networks between services, holistic approaches. Involvement was also viewed positively due to funding availability for the establishment of the WSA, a focus on Scotland's WSA pilot areas by Public Health Scotland, and opportunity to impact beyond diabetes prevention: '*funding is very, very important because it wouldn't get done if there was no funding, people would not come, organisations would not come onboard if there was no funding*' (Location A Time point 1 Focus Group)

The benefits of funding were also mentioned at time point 2 data collection – '*funding was the gift, you know, funding's what got people to where we are*' (Location A Time point 2 Focus Group).

We're talking about Type 2 diabetes here, but you could use, you could use coronary heart disease or stroke where the things that we're trying to tackle through the whole system approach will have an impact beyond Type 2 diabetes, so that was something that really drew me to it (Location A Time point 1 Focus Group).

Some participants expressed personal interest in WSAs and were excited to get involved locally to create a 'real' difference and improve people's lives:

I've got a personal interest in nutrition so I suppose I was coming at it from that angle and I think the sort of social determinants of diet and weight are really interesting, so as soon as we started looking at where we were going to, where we were going to think about hosting the pilot you know, sort of really did drive home that link between deprivation and determinants of you know, risks, risks for diabetes in the future. (Location B Time point 1 Focus Group).

Pre-existing positive relationships with people already involved in the WSA contributed to some accepting invites to join the WSA initiative. It was also viewed that buy-in from strategic level partners contributed to real change and solutions to systemic barriers encountered previously:

the difference with this was that there is that buy-in from that it's strategic level and for me in particular even back in like pre, when public finances were good we still struggled to get involvement from like Social Work and NHS colleagues at that time, so I know it's not a clinical project but I felt

Table 1

Summary of enablers and barriers to WSA implementation

Enablers	Barriers
• Personal interest in WSA	• Covid impacts
• Links and relationships with key person/people	• Previous experience of consultation without action;
• Belief in approach/perception that WSA might lead to 'real' change	• Limited funding/constraints on use of funding
• Higher/strategic/national-level drive, change, and buy-in	• Daunting nature of workshops
• Sustained impetus in the WSA process	• Staff turnover
• Funding availability (appropriate and adequate)	• Tendency to revert to old ways of working
• 'Real', tangible action to encourage engagement	• Difficulty engaging community/stakeholders
• Engaging the 'right' people	• Lack of local leadership
• CWG comprising individuals with diverse expertise	• 'Taboo' nature of diet and healthy weight as a topic in community
• Communication and messaging of WSA work (e.g., in accessible/understandable language/terms)	• Publicity, marketing, framing of WSA • Multiple competing messages about diet and healthy weight
• Existing governance structures to build on;	
• Community buy-in	

WSA: whole systems approach; CWG: core working group;

that would be one kind of positive from this that we'd be able to pull those services in the mix and again just try to look at the bigger picture stuff and then see where it goes (Location B Time point 1 Focus Group).

Benefits accrued where the area WSA lead was familiar with the local community and its needs; pre-existing connections and relationships of the lead also positively impacted initial WSA adoption. The importance of the lead and their seniority was a motivator for WSA involvement. The regional Public Health Programme Director started the process, and this was seen as particularly encouraging for steering group members as it led to the community working with statutory organisations.

There was a perception that adequate resource and training would be provided and the establishment of formal procedures reassured participants of quality assurance in the process: '*we were asked to kind of go through rightly a kind of governance and accountability process around putting together an application*' (Location A Time point 1 Focus Group).

'*we had you know, two and half days altogether of training on the methodology and the principles and how to hold the workshop so I had that advantage*' (Location B Time point 1 Focus Group 1).

Connections and relationships between steering group members and other stakeholders were viewed as important.

'*it's knowing the agencies wider than (community name mentioned) that potentially could contribute to those conversations, and I think that's, that's been a strength too*'. (Location B Time point 2 Focus Group). Furthermore, the composition of the workshops was quite varied, and this aided communication and the establishment of potential partner organisations. It was recommended that the WSA CWG needed to have as diverse a membership as possible.

Barriers to a WSA

Barriers to adopting a WSA included some stakeholders being unfamiliar with a WSA and having consequent feelings of apprehension about engaging. Further elaboration indicated that use of nuanced WSA language was perceived as off-putting. For example, the language used to describe WSA mapping was perceived to need to be simplified and explained more clearly for the policy makers and the public. Caution was advised around the workshops as some individuals were more vocal at them, and sometimes more forceful with pushing their ideas forward for implementation.

While exacerbated by COVID-19, digital exclusion needs to be addressed to allow engagement with both key stakeholders and the wider community. Digital delivery was viewed as a challenge by a facilitator given the inherent visual aspect of mapping at the workshops:

> *it's a really difficult method to do online, to do on Zoom when people are still getting the hang of Zoom and it's probably the worst method to do online because of the visual aspect of it and how sort of wide the mark goes.* (Location B Time point 1 Focus Group 1).

Changing roles and staff turnover was viewed with concern, particularly where WSA leads changed, as happened in both locations; this contributed to a loss of momentum. It was recognised that this was attributable to COVID-19 and the demands on public health teams at that time, with many staff being 'stretched'. These factors also negatively impacted on community engagement.

There was a view that within communities there was limited awareness about WSAs. It was felt that the public did not perceive obesity as a system issue but rather one driven by individual decision-making; this may be improved by community education around WSAs and weight stigma. In addition, some participating professionals did not share a common understanding of inequality and poverty, and so making decisions about public involvement was queried: '*that core working group absolutely it was not right that that was made up of like public service workers because actually some of the attitudes and the understandings about inequality and poverty were way off the mark*'. (Location A Time point 1 Focus Group)

The time elapsing between the two workshops was identified as a barrier, given its impact of reducing momentum in establishing and maintaining stakeholder engagement:

> *so I think once we got into it we kind of got a bit of an explanation but I think it was just missing that next step, I guess for me I expected there to be a follow-up pretty quickly to that, probably around September time, October time, like it's kind of been left, if that's the best way of putting it, it's kind of been we've done this, I don't know if [name of participant] agrees, we done this in the summer and it's like well we'll follow-up with and then nothing really pretty much.* (Location B Time point 1 Focus Group 2)

Others, reflecting at time point 2, identified it as important to establish where stakeholder agendas compete, and how to resolve such to ensure 'buy in':

> *I think if I'm honest the biggest is just people's priorities, if it's not something that they don't see a direct impact or effect on their service, on their topic of work, they won't want to come on board with it, and it's quite difficult to get everyone on the same page because although everyone might be round that table everyone does come with their own agenda, so I think that, yeah, for me on paper it sounds amazing, in practice you still have some of that silo working and it's really hard to try and bring that all together.* (Location A Time point 2 Focus Group).

There was often pessimism around public messaging effectiveness, given the saturation of health messages: there was concern about whether a WSA would 'fit' and its acceptability. Given that the WSA was introduced at the time of COVID-19, this may explain the view that there were many health messages already in the public domain.

COVID-19 pandemic and the effect on WSA Steering Group progress

The COVID-19 pandemic had considerable impact on engagement with whole systems working. This was reflected in staff being re-deployed to support efforts focused on addressing the pandemic. Consequently, the impetus for WSA progression was downgraded. COVID-19 also restricted how the steering group could engage partners and community representatives with the constraint to move online restricting involvement. Referring to the delivery of the workshops, participants said '*it had to be done virtually because of all the Covid restrictions . . . I think if Covid hadn't had, had been there at that time it would have been a really different event*'. (Location A Time point 1 Focus Group).

Longitudinal views of WSA

Participants recognised that after setting up the CWG and facilitating the workshops, that the scale of implementing the WSA to target healthy weight and diet is substantial and that uncertainty surrounding funding can negate progress. There was a shared view that funders want to see change in a shorter period of time, yet WSAs are long term, and that some structures in a system are not likely to change, such as the funding timelines and expectations of creating a change in health outcomes. It was reported by some that a lack of funding long term can put a burden on human resources within a system, as it needs to be completed yet there are few people who stay involved long term due to staff turn-over or community group leads focusing on other prioritised actions (e.g. applying for funding). There was a positive view that the ongoing harnessing and connecting of networks is beneficial for planning and finally implementation. The long-term continued engagement of senior management in public health was perceived as being required as higher-level funding decisions, and human resource allocation are out of the CWG's control.

Activity timings from monthly surveys

Total time of activity, and their indicative costs, by location are reported below in Table 2 and plotted in Figure S1 (in Supplementary materials). The percentage of total time spent on each activity type is reported below in Table 3 and plotted in Figure S2 (in Supplementary materials). Proportionately, most time is spent on events and email administration.

Table 2

Total time (hours) spent on each activity by location and indicative total cost (£ 2021/2022 values) of employing staff to deliver these activities.

Location	Meeting/ events (attending/ planning)	Email admin	Phone calls	Reading	Other activity	Total time	Total cost (£)
A	118	20	2	4	6	150	6320
B	49	13	0.03	10	5	77	3219

Table 3

Percentage of total time spent on each activity by location.

Location	Meeting/ events (attending/ planning)	Email admin	Phone calls	Reading	Other activity
A	78	13	2	3	4
B	64	17	0	13	7

DISCUSSION

We aimed to assess implementation of WSA to diet and healthy weight in two council areas of Scotland, exploring enablers and barriers over time. One area followed the LBM of implementation, while the other used a hybrid model incorporating existing working systems. Factors that supported the pilot sites to progress with their WSAs included: stakeholders' belief in WSA effectiveness; positive relationships between key personnel; 'buy-in' by the public health authority at a national level; funding availability; CWG comprising individuals with diverse expertise; effective communication; supportive existing governance structures; and community buy-in. Several of these enablers have been identified previously.[6,9–12] A unique contribution of this article was in the assessment of enablers at two time points: demonstrating their relevance between initial WSA set-up and attempted implementation up to 1 year later.

Several highlighted barriers would be important to consider for those aiming to adopt a WSA to diet and healthy weight. These include: appropriate funding; minimising staff turnover (or planning ways to mitigate its effects); and ensuring adequate training in WSA is available at all stages – not just its inception (otherwise knowledge/familiarity is lost when staff leave). What might be considered appropriate or sufficient funding to achieve success in taking a WSA to diet and healthy weight is not yet known, but as an example, the Amsterdam Healthy Weight programme,[21] which has shown indicators of a significant impact on rates of obesity[22] involved sustained investment of millions of Euros over many years.[23]

Training approaches need to address apprehension around perceived WSA complexity. A suitably trained and confident 'workforce' may help combat the identified tendency to revert to 'old ways' of working, noted as a risk at time point 2 in our study. Our findings also showed that it would be beneficial for those adopting a WSA to integrate time for WSA training for all involved staff. Systems-based approaches involve the adoption of a broad perspective that focuses on the collective effects of a wide range of factors – such as people's beliefs, motivations, and capabilities; their social networks; societal structures and environmental exposures; therefore, the training offered to staff needs to take account of these factors and ensuring staff are aware of what a WSA entails and are negated from a reverting back to usual ways of working, that maybe intervention targeted.[12] Training delivery also needs to be robust to staff changes and turn-over – for example, it cannot only be delivered at one time (i.e. usually at the beginning). Considering ongoing support or mentoring for taking a WSA may also help to combat issues to do with staff confidence, competence, and turnover. According to the recommendation from a recent report by the Academy of Medical Sciences on what's next for WSAs in public health, there was an admittance that more work and evidence gathering is required, but importantly there is a need to develop a global community of practice for sharing what works in systems approaches in public health.[12] One way of building staff confidence and capability will be through connecting policymakers and public health practitioners with researchers. Such a community could provide a platform to share evidence, support the use of new methodologies, and promote the use of existing approaches for the betterment

of implementation and to facilitate change.

To our knowledge, this is the first independent longitudinal process evaluation of the LBM where participants have been followed up 1 year later. As the full components of the model were not implemented (phases 4–6 – see Figure 1), further follow-up is required to ascertain the complete value of the LBM; however, we conclude that for the initial phases of WSA set-up, the LBM was advantageous in Location B compared to not applying a clear guidance model as in Location A. It was also apparent that the model or approach used to implement the WSA should be aligned with the existing ethos of the organisations' goals and targets. We also suggest an emphasis be placed on reminding staff and stakeholders about the long-term commitment required to successfully adopt a WSA where focus should be on system development, stakeholder engagement, system mapping and planning, and not event-level programme development.

As the WSA considered here were delivered during COVID-19, with its required move to remote working, it is important that lessons are learned from this experience. The importance of staff leadership was highlighted to promote collective working and the need for stakeholder workshops to be delivered face-to-face. From the interview and focus groups at time point 2, a novel finding is that use of language like 'type II diabetes' was a hurdle to engaging partners; the narrative and language used to engage partners requires careful consideration. Participants also suggested the use of marketing to inform the public about WSAs to diet and healthy weight. Such marketing may support engaging young people and end-user groups.

The analysis of activity timings reported on the monthly surveys showed that email communication and delivering events (in that order) were the most commonly reported activities used to progress WSA implementation. Costs of funding staff to deliver on such a broad intervention over such a duration seem relatively modest (£6.2K and £3.2K – see Table 2), though these figures exclude other costs (e.g. pilot funding) and are subject to under-reporting.

We sought to utilise EMA to provide a longitudinal and quantitative perspective to our evaluation. Unfortunately, responses rates were very low and so did not provide suitably robust data to be reported here. This fits with findings from our systematic review, which highlight the difficulties of evaluating the long-term impact of WSAs.[10] However, we include details of the EMA in the Supplementary materials, so other researchers can build from this work. We believe a successful EMA would be fruitful because data can be collected more frequently, in close proximity to when an activity occurred in the system, and collected via survey so relatively low cost, with little intrusion on time. A successful utilisation of EMA would require overcoming the challenge of evaluating a diffuse intervention over long periods, engaging participants for whom it is likely not a main focus.

LIMITATIONS

The study was conducted during the COVID-19 pandemic so plans at each location on implementation were consequently adjusted – this may have impacted the number of participants recruited to the WSA workshops, subsequently impacting recruitment to the evaluation interviews and focus groups. The study design was longitudinal; however, further time would be required to establish what impact the WSA can have on diet and healthy weight outcome behaviours. Responses to the monthly surveys (detailed in Supplementary Table S1) were few so the indicative costs should be interpreted with caution, as it is likely these are significant under costings (missing the activity delivered by staff not completing the survey and, here, excluding the activity of staff working across both areas). In Location A, a hybrid model was used that relied on the functions of the existing system. It has been argued that a WSA aim is to perturb an existing system[12] not just 'fit in' to an already established system. However, as systems approach application lies upon a continuum from low, medium, and high, we were satisfied that the hybrid model in Location A was at least at a low level of application. It had the following characteristics: (1) identified the groups of people, institutions, and structures that influence diet and healthy weight in the area; (2) mapped the relationships of these 'agents' or 'factors' with target populations and with each other; and (3) carried out evaluations that capture multiple outcomes and process data (our current evaluation; Jebb et al.).[12] Location B shared similar characteristics with Location A; however, they also used the LBM, and Action Scales Model to identify potential points of intervention, which may mitigate or enhance the impact of potential interventions. To conclude, this study provides the first independent longitudinal process evaluation of WSA that have included the LBM, and offers useful insights into how to maximise likely successes in the early phases of setting up and implementing a WSA to tackle diet and healthy weight.

CONFLICT OF INTEREST

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

FUNDING

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This work is part of the National Institute for Health and Care Research (NIHR)-funded evaluation 'Whole System Approach to Diet and Healthy Weight – Community Pilots Project' conducted by the PHIRST (Public Health Intervention Responsive Studies Team; Project reference NIHR134423; Award reference NIHR131573). WW and APW are part-funded by the NIHR Applied Research Collaboration East of England. The views expressed are those of the authors and not necessarily those of the NIHR or the Department of Health and Social Care, or Public Health Scotland.

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SUPPLEMENTAL MATERIAL

Supplemental material for this article is available online.

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