



A qualitative evaluation from a complex systems perspective of a whole systems approach to obesity in an English local authority.

Una Geary¹

Correspondence: Una Geary, 126 Drakefell Road, London, SE14 5SQ, UK, **Email:** ugeary@tcd.ie, ORCID: <http://orcid.org/0000-0001-7052-5863>

Abstract

Aims: Current thinking suggests that whole systems approaches (WSAs) may be required to tackle obesity. WSAs are policy approaches designed to address problems in the context of the complex system in which they occur. Evaluating a WSA is a key challenge, and there is a significant lack of knowledge on this topic. The aim of this study was to carry out an evaluation, from a complex systems perspective, of the impact of a WSA on obesity implemented in the English county of East Sussex. This study addresses gaps in knowledge regarding methodological approaches to evaluating WSAs in general, and specifically the use of qualitative methods to evaluate system change.

Methods: Semi-structured interviews were conducted with 17 professionals in East Sussex County Council and eight partner organisations. Analysis was guided by a complex systems evaluation framework developed by McGill et al., with analytical output presented as a narrative of the system undergoing change. In an original addition, a local obesity system map was used to depict the location of changes within the system.

Results: Three key changes, all located in the 'Workforce development' area of the system map, were identified following implementation of the WSA: (a) it significantly influenced the creation of a new post at the County Council to address environmental determinants of obesity, (b) it increased knowledge of the role of wider determinants of obesity and (c) it improved partnership working.

Conclusions: This study illustrates how a WSA to obesity can be evaluated from a complex systems perspective using qualitative methods and offers practical insights for designing future evaluations of WSAs, particularly in relation to data analysis and the use of system mapping.

¹London School of Hygiene and Tropical Medicine, Keppel Street, London WC1E 7HT, UK

Cite as: Geary U, A qualitative evaluation from a complex systems perspective of a whole systems approach to obesity in an English local authority. *Impact Public Health*, 1(1), 1–8. 10.62463/iph.251

Introduction

The prevalence of obesity in England has tripled over the last 20 years and continues to rise, with 65% of adults and 36% of children aged 10–11 years now overweight or obese¹. Obesity is increasingly understood as the product of complex social

systems, involving interacting social, cultural, environmental, biological, and psychological factors, and there is now broad agreement that a complex systems perspective is needed to address it². Whole systems approaches (WSAs) describe policy approaches that seek to act on this complexity. A



recent systematic review defined WSAs to obesity as approaches “that consider the multifactorial drivers of overweight and obesity, involve transformative coordinated action across a broad range of disciplines and stakeholders, operate across all levels of governance and throughout the life course”³. In 2019, Public Health England (PHE) published guidance to support local authorities in implementing WSAs to obesity (hereafter ‘PHE guidance’)². This centres on convening a broad, cross-sector group of stakeholders for two workshops: first to understand and map the local obesity system, and second to identify actions to change it. An action plan is then developed based on these workshops to operationalize the local WSA. Evaluating WSAs remains a major challenge. With limited consensus on suitable methods. Conventional impact evaluations are typically based on linear models in which interventions are expected to have direct, measurable effects on predefined outcomes. In contrast, evaluation of a WSA requires a complex systems perspective; as Rutter, Savona, and Glonti et al. argue, “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”⁴. Complex systems differ from simple or complicated systems in that relationships between elements are nonlinear and outcomes are often unpredictable, with change characterised by dynamic, adaptive behaviour and unintended consequences^{4–5}.

Although qualitative methods are well-suited to exploring complexity and system change, they have been relatively neglected in complex systems evaluations, which have tended to rely on quantitative approaches such as simulation modelling⁶. A recent systematic review of qualitative evaluations using a complex systems perspective in public health concluded that “this is an emerging field in which standards of best practice have yet to be established”⁶. A recent systematic review of qualitative evaluations using a complex systems perspective in public health concluded that “this is an emerging field in which standards of best practice have yet to be established”⁶. In response, McGill et al. developed a framework to guide qualitative evaluations of interventions from a complex systems perspective “to ensure that the perspective

informs the evaluators’ theoretical position, the evaluation focus, sampling strategy, data collection methods, analysis, and interpretation of findings”⁶.

This study used a complex system perspective to qualitatively evaluate the impact of a WSA on obesity implemented in East Sussex, examining whether and how it contributed to changes in the local obesity system. Drawing on the PHE guidance, which operationalises a WSA through an action plan targeting the local system, the objective was to identify system changes (as defined by the local system map) arising from implementation of this plan. The study addresses gaps in how WSAs are evaluated, particularly regarding the use of qualitative methods to assess system change.

Methods

The methodological approach in this study deliberately departs from conventional public health evaluations, which typically adopt a linear logic model and focus on predefined, distal outcomes such as changes in disease prevalence. In contrast, this evaluation was grounded in a complex systems perspective, in which the primary interest lies in how an intervention interacts with, and reshapes, the wider system of interest rather than in single end-point indicators. From this standpoint, the effects of the intervention on the system are treated as mechanisms of effect, and the emphasis shifts from measuring impact on outcomes (for example, obesity prevalence) to understanding system-level change. Accordingly, this work is best characterised as a process evaluation rather than an impact evaluation⁶.

An exploratory design was used to identify potential system changes associated with the implementation of the whole systems approach (WSA) action plan. Outcomes of interest were defined as changes arising from actions taken in line with the plan, but they were not pre-specified in terms of their number, nature, or location within the local obesity system. At the study outset, it was assumed that the complexity of the system would make such outcomes inherently uncertain. In complex systems, interactions between elements are nonlinear and may generate feedback loops, time delays, and emergent properties, producing consequences that are difficult to predict in advance. As a result, introducing an intervention



such as the action plan is expected to trigger chains of change that unfold in varied and sometimes unexpected ways⁴. This justified an open, exploratory stance rather than a hypothesis-driven focus on a narrow set of predefined indicators.

Analytical framework

McGill et al.'s framework for qualitative process evaluations from a complex systems perspective⁶ (hereafter, the 'McGill framework') was used to structure the evaluation. This framework places a system map at the centre of analysis, which is used as a reference point for examining how an intervention influences different parts of a system over time. The system map represents key elements and relationships in the local obesity system, and the framework guides evaluators to trace how intervention-related activities may affect these components and their connections.

A core element of the McGill framework is the application of 'complexity concepts' to interpret emerging patterns of change. These concepts include nonlinearity, feedback, adaptation, unintended consequences, and emergent outcomes, among others⁶. Definitions of all concepts used are presented in Appendix 1. During analysis, relevant concepts were applied to the data to help explain observed changes in the system, with emphasis on those most useful for producing practice-oriented evidence that could inform local decision-making. The aim was not to apply every concept mechanically but to use them selectively where they illuminated patterns or mechanisms suggested by the data.

Analytical output recommended by the McGill framework is a narrative account of the system undergoing change, organised around key complexity concepts⁶. In this study, an additional visual element was incorporated into this output. The local obesity system map was not only used as an analytical tool but also as a device for communicating findings. System elements to which the identified changes related were located on the map and highlighted in selected excerpts. This graphical representation was designed to complement the narrative, allowing readers to see where in the system changes appeared to occur and how they clustered or spread across different parts

of the map.

Case study background

The evaluation was conducted in the English county of East Sussex. Implementation of PHE's WSA guidance was led by East Sussex County Council (CC), working through a pre-existing 'Healthy Weight Partnership' (hereafter, 'the Partnership'). The Partnership comprised representatives from several CC teams and from external organisations, mainly within the public sector, all sharing a remit or interest in tackling obesity⁷. In line with the PHE guidance, the Partnership developed a local obesity system map to capture drivers of obesity in the area and the relationships between them. On the basis of this map, an action plan was produced to set out priority actions intended to intervene in the local system⁸⁻⁹.

The action plan was formally launched in late April 2021⁷. Responsibility for its implementation rested with the Partnership, with different organisations and teams leading or contributing to specific actions according to their role and capacity. At the time of data collection, implementation was at an early stage, but sufficient time had elapsed to expect the emergence of initial changes or indications of shifting practices, relationships, or structures within the system. The evaluation, therefore, focused on these early system-level changes linked to the first phase of implementation

Data collection

Data on outcomes of actions aligned with the WSA action plan were collected using semi-structured interviews with key stakeholders involved in its implementation. The interview topic guide is presented in Appendix 2. It was designed to elicit participants' accounts of activities undertaken since the launch of the action plan, perceived changes in the local obesity system, and views on how and why these changes may have occurred. Questions were open-ended to accommodate the exploratory nature of the study and to allow unanticipated issues or outcomes to surface.

The action plan was launched in late April 2021, and interviews were carried out in July 2021, providing a short but a meaningful window in which early changes could be observed. Because the outcomes of interest were not known at the outset, the Healthy Weight Partnership was identified as the most



appropriate sampling frame. As the group with formal responsibility for implementing the action plan, its members were well placed to report on actions taken, emerging impacts, and contextual factors shaping implementation.

A key component of the McGill framework is the inclusion of multiple participant types representing different parts of the system⁶. Consistent with this, the sampling strategy aimed to capture a range of perspectives from within the Partnership, including individuals based in different CC teams and external organisations with varied roles in obesity-related work. Interviews, lasting around 45 minutes, were conducted online using Zoom with video enabled, which allowed for rapport-building while accommodating pandemic-related and logistical constraints. Audio recordings were made via the platform. Automated transcripts were generated using Zoom's transcription function and then manually edited for accuracy, with particular attention to sections later used in detailed analysis, which were checked against the original audio.

Sampling and recruitment

Purposive sampling was used to recruit interviewees. This approach ensured that a broad range of organisations within the Partnership were represented and allowed the research team to target individuals who were expected to be 'information-rich' in relation to implementation of the action plan. In practice, this meant prioritising stakeholders who had been closely involved in developing, coordinating, or delivering specific actions, as well as those with a strategic overview of the WSA in East Sussex. Potential participants were identified through Partnership membership lists and through consultation with key informants in the CC. Invitation emails describing the study and its aims were sent directly to selected individuals. Follow-up messages were used where necessary to confirm participation and arrange interview times. In total, 17 interviewees were recruited, including staff from East Sussex CC and representatives from eight external organisations involved in the Partnership. This provided coverage of a range of roles, sectors, and levels of seniority, supporting exploration of how the action plan was perceived and experienced across the system.

Ethics

Full ethical approval for the study was obtained from the London School of Hygiene and Tropical Medicine MSc Research Ethics Committee. All participants received information. Sheet outlining the study purpose, procedures, risks, benefits, and data handling arrangements. Written informed consent was obtained via email prior to the interview. Participants were reminded that involvement was voluntary and that they could decline to answer questions or withdraw at any time. Confidentiality and anonymity were maintained throughout data handling, analysis, and reporting; identifying details were removed or modified in transcripts and in write-ups to minimise the risk of recognition.

Data management and analysis

Framework analysis was used for data management and analysis, supported by NVivo software. Framework analysis is a systematic approach developed for applied social policy research that is particularly suited to studies with specific questions, a priori issues of interest, and a need to compare data across cases¹⁰. It uses a case-by-theme matrix structure, with 'cases' referring to participants, allowing data to be examined both thematically and by individual¹¹. This dual structure distinguishes framework analysis from many other qualitative methods, which often focus primarily on thematic categorisation without maintaining a strong link to individual cases.

The procedure began with familiarisation, during which transcripts were read in full to gain an overview of the data and identify recurrent issues. A thematic framework for data management (Appendix 3) was then developed, combining deductive and inductive elements. Deductive themes reflected study aims, and the evaluation focused on system change in relation to the WSA and the McGill framework. Inductive themes emerged from the data as participants described their experiences of implementation, perceived changes, and contextual influences¹¹⁻¹². Themes and sub-themes were descriptive rather than conceptual, as the framework's purpose was to organise and reduce the data rather than act as the final analytical product¹³. Using NVivo, interview data were coded according to



the thematic framework. Segments of text were indexed under relevant themes and sub-themes. These coded data were then used to construct summary matrices, one for each main theme, with sub-themes forming columns and participants forming rows. Summaries of the coded data were entered into the appropriate cells, capturing the essence of what each participant had said on each topic while preserving sufficient detail to allow interpretation.

The final stage of framework analysis involved working systematically across these matrices to identify patterns, similarities, differences, and deviant cases within and between themes¹¹. Attention was paid to how reported changes related to different parts of the local obesity system and to how participants explained or interpreted these changes. In line with the McGill framework, complexity concepts listed in Appendix 1 were then applied to the emerging patterns as potential explanatory lenses, helping to interpret, for example, instances of nonlinearity, unintended consequences, or emergent outcomes⁶. Drawing on these interpretive steps, the analysis generated a narrative account of the local obesity system changing, organised around applicable complexity concepts and supported by illustrative data extracts. Consistent with the 'system trajectories' concept included in the McGill framework⁶, this narrative described how the system appeared to be evolving in response to the WSA action plan. The local obesity system map was used alongside the narrative to show the location of observed changes, with relevant system elements highlighted to provide a visual representation of how and where the system was shifting.

Results

Overview of findings

The evaluation set out to identify changes in the local obesity system arising from the implementation of the East Sussex WSA action plan. However, during interviews, participants more often described the broader effects of implementing the PHE guidance itself, particularly the process of mapping the local obesity system and developing the action plan. Framework analysis confirmed that all reported changes in the system related to these general

impacts of implementing the guidance, rather than to subsequent delivery of specific actions in the plan. No system changes could be attributed solely to the implementation of the action plan. This is likely to reflect the short interval between the launch of the plan in late April 2021 and data collection in July 2021. Three main changes in the local obesity system were identified, all situated within the 'Workforce development' thematic area of the local obesity system map. These were the creation of a new post within the County Council, increased understanding of wider determinants of obesity among stakeholders, and strengthened partnership working. The narrative account of these changes is presented in Appendix 4, and their position within the system is illustrated in excerpts from the map, including the 'Workforce development' area (Figure 1).

Creation of a new Healthy Places Coordinator role

Implementation of the PHE guidance had a marked influence on the establishment of a new 'Healthy Places Coordinator' post within East Sussex County Council. The role focuses on addressing environmental determinants of health through closer work with planning authorities and embedding a 'Health in All Policies' approach. Participants described the system mapping. Process as drawing attention to the scale of environmental influences on obesity and revealing a gap in existing capacity to address them. This led to recognition within the Partnership and the Council that a dedicated role was needed, and the guidance process was reported to have had a "big influence" on decisions to create this post.

On the system map, this change is located within the 'Workforce development' thematic area and relates specifically to the 'Workforce capacity' element. The new role represents an expansion of workforce resources aimed at tackling environmental drivers of obesity.

Increased understanding of wider determinants of obesity

Participants reported that going through the PHE guidance process, especially the mapping workshop, significantly broadened their understanding of the wider determinants of obesity. Several interviewees contrasted the previous focus on individual



behaviour change with the more structural, environmental emphasis that emerged from mapping. They described the process as highlighting the importance of social, economic, and environmental drivers and of engaging partners beyond traditional health sectors to address them. Some participants reported applying this wider determinants perspective in other areas of their work beyond the specific action plan. For example, one interviewee described plans to strengthen recognition of transport and active travel in the local transport strategy in relation to obesity. Such examples suggest the potential for a positive feedback loop, with increased understanding generated through the WSA process influencing action in other domains of the system. On the system map, this shift is linked to the 'Skilled and knowledgeable workforce' element within 'Workforce development'.

Strengthened collaboration within the Partnership

Improved collaboration within the Healthy Weight Partnership was the most frequently mentioned impact of implementing the PHE guidance. Participants described the mapping and action-planning activities as helping partners to recognise the commonality of their goals and to see more clearly how their work connected to that of others in the system.

Interviewees reported that the process strengthened existing relationships, supported the involvement of new partners (including voluntary and community sector organisations working on food poverty and related issues), and encouraged more active engagement from Partnership members. Some described the Partnership as having become more participatory and inclusive as a result. These changes also sit within the 'Workforce development' thematic area of the system map and are most closely aligned with the 'Skilled and knowledgeable workforce' element, reflecting shifts in how partners work together and share understanding.

COVID-19 as an external system shock

Participants also discussed changes in the obesity system arising from the COVID-19 pandemic, which can be viewed as an external shock to the system. Although these changes were outside the original research aim, they formed part of the wider narrative

of system change. Interviewees gave examples of adaptation in response to the pandemic, such as modifying delivery of active travel training programmes for online formats and responding to increased demand. These adaptations affected elements of the system map related to 'Transport modes', including 'Cycle training' and 'Active travel'.

Complexity concepts in the system narrative

The system narrative developed from the data drew on three complexity concepts from the McGill framework: unintended consequences, feedback loops, and adaptation. The creation of the Healthy Places Coordinator post was interpreted as a beneficial unintended consequence of implementing the guidance; increased understanding of wider determinants and their influence on other work illustrated a positive feedback loop; and responses to Covid-19 exemplified adaptation within the system. Together, these concepts were used to characterise the early trajectories of the East Sussex obesity system as it responded both to the WSA process and to wider contextual change.

Discussion

This study set out to evaluate the impact of a WSA on obesity implemented in East Sussex by exploring the impact of the action plan developed to intervene in the local obesity system, as per the PHE guidance. However, no changes in the obesity system were identified due to the implementation of the action plan; the only changes identified were attributable to the implementation of the PHE guidance (i.e., the process of system mapping and action planning). This is likely due to the short timeframe between the launch of the action plan (in late April 2021) and data collection (in July 2021). It may have been too soon for any system changes to manifest. Nonetheless, this study makes an important contribution to our understanding of how a WSA to obesity may be evaluated from a complex systems perspective and provides an example of how to do so using qualitative methods. The findings indicated that, to date in East Sussex, the key impacts of implementation of the PHE guidance have been limited to the 'Workforce development' part of the obesity system. Arguably, the key benefit of implementing the PHE guidance in East Sussex was that it highlighted the importance of environmental



determinants of obesity to the workforce involved in the local obesity agenda. However, it is proposed that, in this respect, it did not provide added value over other well-established models of health improvement that could be used to guide obesity policy, such as Dahlgren and Whitehead's 'rainbow model' of the wider determinants of health¹⁵ (illustrated in Figure 1 below) or the concept of taking a 'place-based' approach.

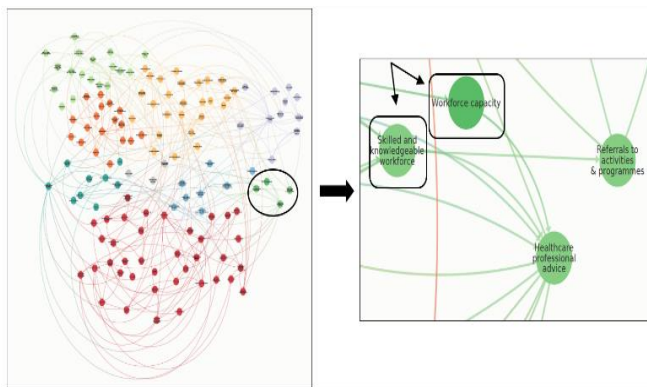


Figure 1: 'Workforce development' area of system map: System elements to which key impacts of implementation of the PHE guidance relate⁸

In the former, the impact of environmental factors on health is illustrated in the outer layer of the model. There is no single definition of a place-based approach, but the concept revolves around focusing on and collaborating across a given geographic area based on the principle that 'space matters'; that local social and environmental characteristics shape outcomes¹⁶. Further, such alternative models may also offer less resource-intensive approaches to guiding local obesity policy. This study contributes to the complex systems evaluation literature in that (a) it addressed a gap in the literature on the use of qualitative methods to evaluate changes in a system due to an intervention, and (b) it is an early application of the evaluation framework proposed by McGill et al. to undertake a qualitative process evaluation from a complex systems perspective for the purpose of evaluating a WSA⁶.

This study made an original addition to the McGill framework in relation to data analysis through the use of the system map to visually depict the location of identified changes in the system to complement their proposed analytical output of a system narrative. Application of relevant complexity

concepts set out in Appendix 1 in data analysis is a central feature of the McGill framework. However, these concepts were neither essential to nor comprehensive in conveying the system changes identified in the present study. It is proposed that a simpler, more practice-oriented way of analysing data and presenting findings in a qualitative complex systems evaluation is to inductively identify key themes in relation to system changes and visually depict the location of identified changes on a system map. Themes may be identified through inductive thematic analysis.

It is suggested that such an analysis would be easier to undertake and its output easier to understand (as it would require less theoretical knowledge on the part of both the researcher and the reader), and further, that it would provide a comprehensive account of findings (compared to a focus on application of specific complexity concepts). This study has thus generated learning on how to adapt the McGill framework for future evaluations of WSAs in relation to data analysis. A key limitation of this study in terms of its complex systems perspective was that the included sample represented only a limited part of the obesity system – most of those interviewed either work in public health or are 'traditional' public health partners in that their role is focused on health promotion. Given the inherent limitations of interview data, in terms of its self-reported and subjective nature, this would explain why the key impacts identified of the implementation of the PHE guidance were all confined to the 'Workforce development' part of the system map. Broader recruitment, representing multiple system elements, is needed in future WSA evaluations.

A further limitation is that the data gathered is not available to share, limiting transparency. In line with the General Data Protection Regulation, interview recordings were deleted following completion of the research. Anonymised transcripts and summary matrices are not further available in order to protect the confidentiality of interviewees. Many of them are the only representatives of their organisation in the Partnership, and given that interviews centred around aspects of the action plan on which participants had worked, they may be identifiable through references to their work.



Statements and declarations

Ethical considerations: Full ethical approval for this study was obtained from the London School of Hygiene and Tropical Medicine's MSc Research Ethics Committee.

Consent to participate: Written, informed consent was obtained via email from all interviewees prior to the interview.

Declaration of conflicting interest: The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding statement: The author received no financial support for the research, authorship, and/or publication of this article.

Data availability: It is not possible to share the data from this study. In line with the General Data Protection Regulation, interview recordings were deleted following completion of the research. Anonymised transcripts and summary matrices are not further available in order to protect the confidentiality of interviewees. Many of them are the only representatives from their organisation in the Partnership, and given that interviews centred around aspects of the action plan on which participants had worked, they may be identifiable through references to their work.

References

1. Department of Health and Social Care (DHSC). *Fingertips* [Internet]. Public Health England; [cited 2025 Dec 4]. Available from: <https://fingertips.phe.org.uk/search/obesity>
2. Public Health England. Whole systems approach to obesity. A guide to support local approaches to promoting a healthy weight. London. 2019.
3. Bagnall AM, Radley D, Jones R, Gately P, Nobles J, Van Dijk M, Blackshaw J, Montel S, Sahota P. Whole systems approaches to obesity and other complex public health challenges: a systematic review. *BMC Public Health*. 2019 Jan 3;19(1):8.
4. Rutter H, Savona N, Glonti K, Bibby J, Cummins S, Finegood DT, Greaves F, Harper L, Hawe P, Moore L, Petticrew M. The need for a complex systems model of evidence for public health. *The Lancet*. 2017 Dec 9;390(10112):2602-4.
5. Peters DH. The application of systems thinking in health: why use systems thinking?. *Health Res Policy Syst*. 2014 Aug 26;12(1):51.
6. McGill E, Marks D, Er V, Penney T, Petticrew M, Egan M. Qualitative process evaluation from a complex systems perspective: a systematic review and framework for public health evaluators. *PLoS Med*. 2020 Nov 2;17(11):e1003368.
7. Card A. East Sussex County Council Health Improvement Specialist. [Personal communication]. 17th August 2021
8. East Sussex County Council. *East Sussex Healthy Weight Systems Map* [Figure]. East Sussex County Council; 2021. Available from: https://new.eastsussex.gov.uk/media/qc4o1cba/eshwp-system-map_march-21.pdf
9. East Sussex whole-system healthy weight plan 2021-2026 [Internet]. Gov.uk. 2021 [cited 2025 Dec 4]. Available from: <https://www.eastsussex.gov.uk/social-care/providers/health/research/healthy-weight-plan>
10. Ritchie J, Spencer L. Qualitative data analysis for applied policy research. In *Analyzing qualitative data*, 2002 Sep 9 (pp. 173-194). Routledge.
11. Mays N, Pope C. Synthesising qualitative research. *Qualitative research in health care*. 2020 Jan 15;151-68.
12. Srivastava A, Thomson SB. Framework analysis: a qualitative methodology for applied policy research. *JOAAG*. 2009;4(2):72-79.
13. Wardle H. *FrameWork: an introduction*. [Presentation] National Centre for Social Research (NatCen Learning). Available from: https://projects.iq.harvard.edu/files/qualitative/files/FrameWork_an_introduction_v2.pdf
14. Department of Health, (dhsc) SC. Wider determinants of health [Internet]. Org.uk. [cited 2025 Dec 4]. Available from: <https://fingertips.phe.org.uk/profile/wider-determinants>
15. Dahlgren G, Whitehead M. Policies and strategies to promote social equity in health. Stockholm: Institute for future studies. 1991 Sep;27(1):4-1.
16. Avis W. Place-based approaches to aid investment and development impact. 2019 [cited 2025 Dec 4]; Available from: <https://gsdrc.org/wp-content/uploads/2019/08/1457-Place-based-approaches-to-aid-investment.pdf>