Citation for published version:
Bates, G, Ayres, S, Barnfield, A & Larkin, C 2023, 'What types of health evidence persuade policy actors in a complex system?', *Policy & Politics*, vol. 51, no. 3, pp. 386-412.
https://doi.org/10.1332/030557321X16814103714008

DOI:
10.1332/030557321X16814103714008

Publication date:
2023

Document Version
Peer reviewed version

Link to publication

Publisher Rights
Unspecified

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What types of health evidence persuade policy actors in a complex system?

Accepted version (Policy & Politics, 13.04.2023)

Geoff Bates[1], Sarah Ayres[2], Andrew Barnfield[2], Charles Larkin[1]

[1]University of Bath, United Kingdom

[2]University of Bristol, United Kingdom

For more information: gb818@bath.ac.uk

Abstract:

The aim of this article is to explore the types of health evidence that diverse actors find most persuasive in a complex policy system. The impact of evidence depends on many factors, including how it is presented and translated to audiences. If diverse actors are to address complex health challenges collectively, it helps if they can draw on evidence that is accessible and meaningful to all. We explore how this can be done by drawing on a case study of promoting healthy urban development in the United Kingdom. Based on 132 in-depth interviews with critical actors from across the urban development system, we examined the types of evidence actors find most helpful. While there was some variation by sector, actors revealed a strong preference for narratives with a strong emotional impact, supported by credible evidence. Urban development decision makers are persuaded by both qualitative and quantitative evidence, although there was a slight preference amongst the public sector for quantitative data. All actors valued evidence on the impact of the urban environment on population health outcomes and the associated costs of ill health. There was, however, a preference amongst private sector actors for evidence showing economic valuations of health that demonstrate a commercial advantage. Our findings make an important contribution to the evidence-based policy literature by identifying the types of health evidence that appeal to diverse actors in the urban development system. These insights can be used to design evidence that meets the requirements of all actors in a complex system.

Key words:

Evidence based policy; EBP; complex systems; systems thinking; public health policy; urban development; urban policy; UK

Word count:

8,872

What types of health evidence persuade policy actors in a complex system?

Introduction

This article explores the types of health evidence that diverse actors find most persuasive in a complex system. Actors who shape and inform policy agendas and debates commonly use evidence as part of their efforts to reach decision makers to create a persuasive case for influence. However, influencing the policy process is a challenging task with actors adopting a range of strategies to achieve their ambitions (Cullerton et al., 2018). The challenge becomes even greater when working in complex policy systems with multiple stakeholders. A key challenge is to package evidence so that it lands with a wide range of stakeholders who have power to bring about change (Ward et al., 2018).

This article explores how to produce evidence to promote healthy urban development in England's complex urban development system. Complex systems represent 'a group of interacting, interrelated, or independent elements forming a holistic functional whole' (Crawford et al., 2005, p.793). To think about the outcomes of a system is to understand them as the result of a combination of many processes and decisions in different places and times, involving different actors. Crucially, it is not simply its multi-actor nature that defines the system, but that each part affects and is affected by other parts (Hawe et al., 2009). A change in one part of the system can affect many others, and the combined effect of multiple components will be different from any individual component (Luke and Stamakis, 2012). Best and Holmes (2010) argue that the implementation of research evidence in complex health systems requires the right kinds of evidence to be produced in a usable form. Likewise, Oliver *et al* (2022) note that actors in complex health systems have different incentives to engage with evidence, which shape their evidence requirements. Drawing on an original and large-scale transdisciplinary dataset, this article provides a unique opportunity to inform this debate.

Urban development is a good example of a complex system as power over the design and development of towns and cities is split across many actors (Durose and Lowndes, 2021). These actors work towards shared and disparate goals in diverse subsystems such as property development, transport networks, commerce and green infrastructure. These subsystems affect one another and their combined effects shape urban systems. In England, private sector actors such as property developers, landowners and investors drive the development of urban areas and hold power in the system (Tasan-Kok et al., 2019; Black et al., 2021). They strongly influence policy agendas but are themselves subject to policies, laws and regulations set out by central and local government. Public sector actors include politicians, civil servants and local officials who represent a range of interests affecting and affected by urban development, including transport, housing, planning and the environment. They need to coordinate their activities across governance tiers and non-governmental stakeholders (Connell et al., 2022). Additionally, a range of organisations seek to influence the delivery of urban development, such as charities and policy institutes that advocate for healthier and more equitable urban places (e.g., Centre for Cities, 2023; Impact on Urban Health, 2023).

The promotion of public health agendas in urban development is timely and of global importance (Giles-Corti et al., 2022; Hammerschmidt, 2022). The urban environment acts as an important determinant of numerous health outcomes (de Sa et al., 2022). Many features of towns and cities are increasingly evidenced as substantial factors affecting life expectancy, a wide range of mental and physical health outcomes and health inequalities (Marmot, 2020). Recent studies, since the Covid-19 pandemic, have drawn attention to the association between urban environments, health outcomes and inequalities. For example, greater rates of Covid-19 transmission and mortality have been associated with living in areas of greater air pollution (Bourdrel et al., 2021), overcrowded housing (Varshney et al., 2021) and buildings with poorer ventilation (Sanglier-Contreras et al., 2021).

While the associations between health outcomes and urban design are increasingly evidenced, those that control the development of urban areas are frequently failing to create the environments that will protect and improve health (Carmichael, 2020). Of greatest concern is that the most disadvantaged in society frequently live in the worst conditions, which is widening existing health inequalities (McHugh, 2022). Recognising the need for change, the World Health Organisation calls for health to be front and centre of urban development (de Sa et al., 2022). This is consistent with a Health in All Policies strategy, which aims to promote health and equity outcomes across the many areas of policy that act as health determinants but fall beyond the scope of health policymakers (Cairney et al., 2021). This article is timely in exploring how actors can use evidence effectively to support the centrality of health in urban development decision-making. The need to act on the wider determinants of health is a global issue both in the urban development system and other systems that influence public health such as education, employment, social services and agriculture (Leppo et al., 2013). These systems are similarly characterised by complexity and multi-actor environments driven by a range of agendas. Tackling poor health and inequalities therefore requires action by non-health actors who make the decisions that shape these systems (Greszczuk, 2019) and understanding how to use evidence to reach diverse groups of actors has wider generalisability.

This article is guided by the following question: How can health evidence appeal to diverse actors in a complex system? Based on 132 in-depth, qualitative interviews with a range of influential stakeholders in the UK's urban development system, we explored perceptions and experiences relating to what decision makers view as credible evidence, likely to influence their decision-making. Following this introduction, we review the evidence-based policy literature to provide a theoretical framework for exploring the use of evidence in policy systems. We then present the methods employed to undertake the study, followed by the analysis of our interviews. We discuss our findings under the following headings: i) using evidence to inform decision-making ii) provoking an emotional impact iii) demonstrating the credibility of evidence and iv) preferences for types of health evidence.

Our central finding is that presenting evidence as a well-constructed narrative is an effective way to reach decision makers throughout the urban development system. However, there are some sectoral differences in the types of evidence that actors view as useful. Our findings indicate a greater concern for the credibility of evidence and a preference for quantitative data amongst public sector decision-makers, most prominently those in central government. Moreover, while private sector actors are persuaded by health evidence that shows population health outcomes, they felt more able to base decisions on evidence showing economic valuations of health linked to commercial advantage. Our findings make an important contribution to the evidence-based policy literature by identifying the types of health evidence that appeal to diverse actors in the urban development system. These insights can be used to design evidence that meets the requirements of all actors in a complex system.

Literature review

Evidence as a tool in decision-making

One strategy that actors use to influence decision makers is to provide them with evidence that illustrates a problem or solution. However, there is a body of work that questions the extent to which policymaking can be understood as evidence-based (French, 2019). Critics have argued that evidence-based policy implies an unobtainable and possibly detrimental ideal (Parkhurst, 2017). Evidence is often lacking, inconclusive or points to uncertainty rather than providing clear messages (Stevens, 2011). This presents challenges for decision makers working in time pressured and complex policy environments, who are subject to influences that may inhibit making rational decisions based on evidence (Cairney and Oliver, 2017). Decision makers cannot overlook factors such as whether a change will be supported within their institution or organisation, or amongst the public or media

(Smith et al., 2023). The extent that decisions are evidence-based therefore varies. There can be willingness to use evidence, especially when it is deemed advantageous to do. For example, when it is time-effective and provides clear solutions to problems that are politically useful to pursue (Stewart and Smith, 2015) or to help give decisions legitimacy and authority (Boswell, 2009). Despite these acknowledged caveats, evidence undeniably has a role in informing policy making although its use may be better conceptualised as one source that informs ideas and values over time than in directly solving policy problems (Weiss, 1979).

Outside of the public sector, the debate around the benefits and realities of 'evidence-based management', where evidence informs leadership decisions and organisational practices (Rousseau and McCarthy, 2007), is like that in evidence-based policymaking. Using evidence is a way to act effectively and gain a competitive advantage over other actors (Hasanpoor et al., 2018; Pfeffer and Sutton, 2006). Evidence is commonly a part of decision-making for private sector actors, but the extent to which, and how, different forms of evidence are used varies and many important additional factors are recognised to influence decision-makers (Briner and Walshe, 2013).

Evidence, emotions and decision making

Evidence that can evoke an emotional response by relating to actors' values, motivations and beliefs can be particularly persuasive (Crow and Jones, 2018). Cairney and Weible (2017, p.620) argue that a better appreciation of the emotions involved in decision making is required because, 'policymaker attention is fleeting and they engage emotionally with information, which limits the impact of a lengthy evidence-based analysis and puts the onus on policy analysts to tell a simple persuasive story'. Instead, storytelling based on shorter narratives and vignettes can give meaning to busy decision makers in a timely fashion (Sundin et al., 2018). Lived experiences are thought to help an audience process information through the real-world examples that they bring to life (Tran, 2019). Narratives based on real life can convey messages in a way that lengthy documents and large datasets cannot (Davidson, 2017; Sundin et al., 2018).

The traditional view of rational policy making understood emotions as external factors that decision makers should try to minimise to enable rational deliberation (Smith, 2021). More recently, this perspective has been challenged. Emotions can contribute 'to rational behaviour rather than only undermining it' (Mercer, 2005, p.100). Indeed, purely rational decision-making is seen as insufficient to tackle complex and emotive social challenges (Ansell and Geyer, 2017). In their review of the social effects of emotions, Van Kleef and Côté (2022) conclude that emotions are more likely to be influential if they are perceived as authentic, of the right intensity and appropriate to the situation. This corresponds to the work of Cairney and Kwiatkowski (2017) who advocate communicating evidence by drawing on emotions and beliefs. They conclude that effective communication requires the producers of evidence to see the world from the perspective of their audience and to account for the contextual challenges they face.

Evidence credibility

'Evidence can take a variety of forms from peer-reviewed research to personal experiences and opinions' (Smith et al., 2023, p. 2). Some stakeholders pay close attention to the validity and rigour of evidence and suggest that high quality, objective evidence will lead to better decision making (Masood et al., 2020). This type of evidence is often associated with quantitative data, such as systematic reviews, randomised control trials and mathematical modelling. The propensity in some settings for so-called 'hard' science can result in other valuable methodological approaches being disregarded (Atkinson et al., 2022). While qualitative work, such as narratives and storytelling, are being

increasingly recognised, there are often challenges in integrating it into settings where importance is traditionally afforded to metrics. For example, Hill O'Connor *et al* (2023, p. 1) note 'growing interest in more in-depth understandings of publics (for example, via 'lived experiences') but uncertainty about how to use these qualitative insights in settings that have institutionalised quantitative approaches to evidence'.

MacKillop and Downe (2022, p. 3) note that the credibility of evidence is determined by numerous factors, including 'how the evidence is presented [and] the logic of the argument'. Actors can ascribe credibility to evidence less by its academic quality or methodological tradition and more by its salience to a particular problem. Here, evidence provided in the right place in 'real time' is seen as valuable, even if the science behind the claims is ambiguous (Cairney, 2021a, p. 90). The challenge of ensuring the credibility, relevance and accessibility of evidence is further compounded when working in systems. Ward *et al* (2018) acknowledge that multiple organisations are commonly tasked with collectively devising health and wellbeing policies that required them to create knowledge together. However, 'relatively little is known about how this occurs' (ibid, p. 477). Different values, priorities and accountability structures influence how actors from public, private and community sectors can produce and respond to evidence (Windle and Arciuli, 2022). Pfiffner et al (2021) suggests that managers in the public, private and non-profit sectors digest evidence in different ways to suit their sectoral priorities and accountabilities. Boye *et al* (2022) argue that managers from different sectors need to navigate varying levels of bureaucracy and autonomy that determines their receptiveness to evidence and their ability to act upon it.

Evidencing health and wellbeing

There are many types of outcomes that are used to demonstrate health which adds a further level of complexity when dealing with health evidence. The World Health Organisation (WHO) identify 100 core health indicators to understand health trends (WHO, 2018) from a wider and much larger list of indicators (WHO, 2023). The core list includes measures of health status such as mortality relating to different causes and morbidity across physical and mental health conditions, risk factors such as obesity rates or air pollution levels, health service and intervention coverage, and indicators of health system quality and capacity. It illustrates both the number of ways to measure health and how health is the result of a huge variety of factors outside of the health system. The widely applied social determinants of health model demonstrates how many different socioeconomic, cultural and environmental conditions in which people live and work influence population health (Dahlgren and Whitehead, 2021).

To evidence health impacts and risks of the urban environment, actors can therefore focus on many different outcomes depending on what data they have and is likely to have impact. For example, by looking at investing in improved cycling infrastructure they could evidence the mental health benefits for children of increased physical activity (Dale et al., 2019) or changes in life expectancy relating to physical activity (Reimers et al., 2012). Alternatively, they might demonstrate how improving cycling infrastructure leads to more physical activity (Winters et al., 2017). They could also demonstrate how improving the health of the population has wider societal impacts. For example, improving employee health by increasing rates of walking or cycling to work is suggested to enhance workplace productivity and reduce absenteeism, which has financial implications for economic and societal outcomes (Ma and Ye, 2019). This is an example of one of the many pathways linking the urban environment, health and economic outcomes (Frank et al., 2019). Including economic or societal outcomes that are linked with changes in health may help to persuade actors to think about health, even when it is not their top priority (Black et al., 2021).

Methods

The findings in this article draw on research conducted as part of a large UK Government-funded research grant (Black et al., 2021). The study explored decision making in England's urban development system and the factors affecting how health is included. A detailed description of the study methodology is provided elsewhere (Bates et al., 2023). The team involves five UK Universities and approximately 40 researchers from a variety of academic disciplines. The data in this article emanates from seven data collection teams (Table 1).

[Table 1 here]

Stage one of the research involved mapping the urban development system using a qualitative approach, facilitated by in-depth semi-structured interviews with critical actors. A purposive sample was informed by desk-based searches, a policy review, established professional contacts and snowballing. These activities generated a database of approximately 500 urban development stakeholders operating at a global, national and local level. They included a variety of roles within public, private and third sector organisations such as civil servants, government officials, chief executives, directors, consultants, third sector organisations and academics. Some stakeholders were selected due to their expertise and experience in major subsystems of urban development such as property development, transport systems, and land acquisition. Others had expertise in cross-cutting areas such as policymaking, law, sustainability and finance. To refine the sample further, while maintaining the breadth of the sample, the team identified two criteria for selection (i) high levels of influence over decision making and (ii) actor's in-depth knowledge of the system.

Individual data collection teams tailored their interview questions appropriate to sector. However, the design of interview questions was guided by a broader set of research question agreed by the whole team (see appendix 1). Interview questions were discussed extensively across the teams to ensure complementarity and the ability to triangulate data. One of the questions asked specifically about the types of health evidence that shape decisions on urban development and what evidence stakeholders find most persuasive. This question was asked by all data gathering teams. There were seven drafts of the interview schedule tailored to different parts of the system. An example of the questions used by teams 1, 3 and 4 (Table 1) can be seen in appendix 2.

In total 123 interviews were conducted with 132 interviewees across seven data gathering teams (Table 2). Semi-structured interviews were conducted on-line between May - September 2021. Interviews lasted on average 55 mins (range 26-112). Interviewees were assured of confidentiality and informed consent was obtained. Interviews were electronically recorded and professionally transcribed. Verbatim transcripts were subsequently 'processed' by individual teams to remove respondent identification and politically or commercially sensitive data.

[Table 2 here]

The team undertook a multi-stage, transdisciplinary analysis that started in September 2021 and ended December 2021. Transdisciplinary research integrates knowledge across academic disciplines to create a holistic approach (Simon et al., 2018). Coding involved a deductive and inductive process (Clarke and Braun, 2021). Deductive codes were identified through concepts in the literature and the research questions. Inductive codes were added after individual data gathering teams proposed them, provided a definition and discussed the new code with the wider team. Through this process the team developed a large coding framework, with over 300 individual codes grouped into 23 overarching categories. The coding categories can be seen in Table 3 in the appendix. The data was analysed using NVIVO 12. After coding, each of the seven data gathering teams summarised their own data within

each of the 23 categories (see appendix 3). This included the category 'evidence' which contained a broad range of codes relating to perceptions about, and experiences and use of, research and evidence. This procedure meant that the data was analysed first by the individuals who had collected it and who had the subject expertise to understand it. The team then split into a series of sub-groups to analyse data from across all seven data gathering teams. This process was facilitated by the online whiteboard platform MIRO. Patterns and observations from across the entire dataset were presented visually using MIRO and were extensively discussed as a transdisciplinary team to elicit findings.

An output of this transdisciplinary analysis was a high-level summary overview of study findings to help the team understand decision-making in the urban development system. This also helped to identify areas that warranted further investigation. Patterns included similarities and differences between stakeholders relating to, for example, power and control in the system, the relationships between local and central government and commercial determinants on urban development. One pattern identified was actor preferences for types of evidence. A team discussion of these findings led to the focus of this article. To get a deeper understanding of the data on actors' preferences for evidence, we did a further analysis of the 'evidence' category in our NVIVO dataset, using codes such as sector, credibility, motivations, qualitative, quantitative, narratives, emotions, and valuations. We extracted relevant insights and illustrative quotes around these codes from the evidence category in NVIVO. This data forms the basis of our findings in this article.

This methodology has several acknowledged strengths and weaknesses. First, regards its strength, large scale, transdisciplinary, qualitative interviewing is relatively rare due to the extensive resource and disciplinary expertise required. The research emanating from this project offers a unique and timely opportunity to explore urban development decision making across *diverse* actors from different *sectors* within a large *system*. Second, interviews have been conducted with actors at the heart of the UK urban development process. Access to these respondents was possible due to the established professional contacts of team members. Third, this study adopts an in-depth qualitative methodology aimed at providing critical insights into the day-to-day realities guiding decision making (Rhodes, 2013). This interpretive approach has been selected to generate 'thick descriptions' of the motives and factors influencing urban development decision making. Insights reflect what is happening in practice as opposed to desk-based assumptions about how the urban development system operates. There are, however, some acknowledged weaknesses. The study has produced an original dataset, representing approximately 121 hours of recorded interview, over 8 million words and over 1600 pages of transcription. Undertaking transdisciplinary, team coding of such a large dataset is a challenging task, and our experience was not without complication (Bates et al., 2023). This was caused in part by different disciplinary expectations about how to analyse the data. In large, transdisciplinary teams there are inevitable differences in interpretation of NVIVO code descriptions and data. However, this risk was mitigated by seeking advice and training from an external NVIVO expert prior to the data analysis process, extensive team coding discussions, the careful design of a team NVIVO code book and intermittent analysis and comparisons on how teams were coding the data. This has resulted is a robust transdisciplinary data set. The following section identifies our analysis from the interviews.

Findings and analysis

Using evidence to inform decision-making

Actors in the urban development system were motivated by a wide variety of contextual factors that shapes the way they make decisions (Smith et al., 2023). All actors in the system were processing some

kind of evidence when they make decisions. For example, a third sector public health consultant identified the need for robust evidence to justify a focus on health outcomes,

> *'We need to know what works, the difference that our suggested solutions make, and particularly if we're interested in making the case for interventions at scale … It will help me greatly to be able to point to some statistics that would back up the difference that sort of intervention will make'.*

The use of evidence was evident in all areas of urban development, including at different governance levels, sectors and policy areas (Connell et al., 2022). For example, at a local level, this might involve decisions about the location of new developments, as a planning consultant in the private sector indicated,

> *'The Local Authority will be looking for the best site which can best meet the needs of the area, and if we've got data and a developer has data that helps identify which one is the best [for health] then I think both parties would find that beneficial'.*

The quote above reinforces the value of developing a consensus over data to allow for collective decision making (Ward et al., 2018). Other examples explored how evidence is used to inform local and national policymaking. A senior official in the Environment Agency identified the need for evidence on the pathways between environmental factors and health,

> '*When we try to make a case for stronger green and blue infrastructure, we obviously want to be able to demonstrate that it's not just good for biodiversity and reducing flood risk and improving water quality. It has those wider health benefits, so evidence that illustrates that point is obviously very helpful to us'*.

While evidence clearly has an important role in informing decision making, the willingness and discretion of actors to utilise it varies (Masood et al., 2020; Salajan et al., 2020). We explore the reasons why below and identify several factors that appear to influence the receptiveness of actors to health evidence. We start this discussion by exploring how provoking an emotional impact can enhance the power of evidence.

Provoking an emotional impact

Findings revealed consistent support for creating narratives as an effective way to encourage urban development stakeholders to consider health in decision making. This supports existing literature on the value of narratives in influencing policy makers (Cairney and Weible, 2017; Crow and Jones, 2018). Indeed, our findings extend this thinking to show that assumptions about the value of narratives holds true when applied to a large system. Participants commonly referred to them as a mechanism to give data context or to clearly illustrate the case for change through relatable and meaningful examples of real experiences (Van Kleef and Cote, 2022). For example, an urban planner stated, '*I think it's about trying to make the numbers come to life and be real and give them a human side*'.

Storytelling has been commonly identified in the literature as a useful approach for engaging with public and private sector actors and bringing evidence to life (Boldosova & Luoto, 2019; Davidson, 2017). The structure will vary but a narrative takes a decision maker through the problem, solution and its impacts by drawing on relatable stories. This approached was recognised as valuable by a civil servant in the Department for Business, Energy and Industrial Strategy (BEIS),

> *'Ultimately it often does come down to almost like a vignette ... This is what actually either happens or doesn't happen as a result and this is what difference it makes to people's lives'.*

Interviewees from all sectors agreed that a key strength of a well-constructed narratives is when it has an emotional impact. This was perceived to be critical for catching the attention of decision makers and making them care enough to create opportunities for change. In the private sector, a property developer explained this as '*you need to sell the hearts and minds'.* Attempting to evoke an empathetic response to evidence however risks overlooking that individuals have differing values and biases that affect how evidence is interpreted (Crow and Jones, 2018). It cannot be presumed that a narrative will promote a similar emotional reaction amongst all stakeholders. That said, our findings show that including personal accounts can assist in evoking an emotional impact (Hill O'Connor et al., 2023). For example, a public health consultant in a third sector organisation pointed to how communicating lived experiences is '*very valuable in opening the door and in connecting with clients, or with decision-makers at an emotional level'.* The importance of the emotional effects of an evidence-based narrative is how it changes how actors process information and, therefore, how they think about the issue (Bilandzic et al., 2020). This supports previous work highlighting the importance of utilising emotions to influence actors across sectors (Boldosova and Lutoto, 2019; Cairney et al., 2016; McKee and Fryer, 2003). Once again, our evidence shows that this proposition was supported when applied to a complex system.

In some cases, respondents referred to opportunities for members of the public to communicate their personal experiences to decision makers themselves either in person or through other mechanisms such as videos or written accounts (Hill O'Connor et al., 2023). This was highlighted by several participants as effective in eliciting an emotional response. For example, in the case of a local property development, an elected local government official explained the power of first-hand accounts.

> *'An individual had a child who was on the autism spectrum. She explained what the impact was going to be on this child, and actually we listened. We turned the development down because it was a very personal story and we can all relate to personal stories in a way that we can't to stats and figures'.*

Real world accounts were also shown to be a valued source of evidence at a national policy level. A civil servant in the Department for Environment, Food and Rural Affairs (DEFRA) noted the importance of reminding ministers of the impact of their political decisions on affected communities,

> [We are always] '*trying to get groups like that [members of the public] in front of our ministers ... We try and remind people how important it is ... what they're working on and how it's going to impact people's lives and people's health ... It's important for decision makers. I think it's important for people working on these policies and initiatives as well'.*

This example illustrates how presenting a citizen's perspective can influence important urban development decisions, even when set in the context of powerful forces and interests at national level (Smith et al., 2023). Developing narratives around informative, sensitive or shocking examples was seen as an effective way to engage decision makers. Research interviews took place in the aftermath of a widely reported case in the media of a child who died after suffering an asthma attack. She was the first person for whom air pollution was listed as the cause of death by a Coroner (BBC, 2020). Several participants referred to this example during interviews, demonstrating how this type of case can have an impact. For example, a transport planner in the public sector reflected,

> *'I think number of deaths certainly is something that gets people's attention. I know there was that girl who died in the UK recently and I think she was one of the first people to have air quality as a leading reason, now that certainly gets the headlines'.*

Similarly, following the recent death of a child in the UK attributed to living in damp and mouldy conditions, the government instigated action to put pressure on housing providers to tackle this issue (Regulator of Social Housing, 2022). Findings indicate that evidence presented as narratives that are built on relatable, real-world examples are important across a complex system. Moreover, designing messaging that have a strong emotional impact was seen as particularly persuasive (Cairney and Kwiatkowski, 2017).

Demonstrating credibility of evidence in an accessible way

While respondents clearly valued narratives that provoke an emotional response, some found it difficult to base decisions on these narratives in the absence of underlying evidence. Real world evidence was viewed as powerful in getting the attention of decision makers. However, many felt that these narratives needed to be substantiated by if they were to have impact. A local authority planning officer identified the need for evidence '*that would be able to stand up to independent scrutiny through an examination type process'*. The need to ensure confidence in the evidence being delivered came through strongly across all sectors in the system. For example, a senior local authority official indicated that he did not trust narratives unaccompanied by data,

> *'I get a lot of stories across my desk and every one comes from someone with an agenda and every one can tell a story to suit an agenda or an outlook'.*

This position reinforces the warning from Crow and Jones (2018) that not all actors show empathy towards emotional stories. Indeed, this view was expressed even more starkly by a private sector property developer who suggested that some stakeholders seek to deliberately misrepresent evidence, '*people manipulate facts for their own agenda'. Likewise,* a Think Tank Director believed that some organisations '*really exaggerate the experiences that they've surfaced'.* For most respondents, narratives and storytelling are only meaningful if they are representative of a larger evidence base. While evidence was seen to take many forms (Smith et al., 2023), there is a perceived hierarchy of evidence that actors use to assess credibility. Data, statistics and modelling were often referred to as necessary to underpin qualitative accounts, thus supporting the view in parts of the evidence-based policy literature about a preference for quantitative approaches (Atkinson et al., 2022). A senior official in the Department for Transport (DfT) described the necessity for a good narrative to be underpinned by statistical data,

> *'What that [a case study example] would allow you to do would be to alert a decision maker to something or put it on their radar. But when it comes to actually taking the decision, you need to have something more than that to point to".*

Evidence-based narratives accommodate the importance of making an emotional connection and provide credibility in settings that have institutionalised quantitative approaches to evidence use (Hill O'Connor et al., 2023). A transport consultant in the private sector illustrated the point,

> *'What I found in my experience is that decision makers are much less influenced by statistics and much more influenced by personal stories. So, if you can find a personal story that tells what their statistics are saying, so what the evidence base is saying, they will be much more compelled to change their view and to make decisions differently'.*

Respondents in the voluntary and community sector also agreed with this position. Indeed, there was a strong emphasis in the third sector on utilising robust evidence to represent the voice of the communities they serve, as this health consultant opined, '*I've started to use the phrase "Evidence-based storytelling" … I pull in an anecdote or a talk, or a piece of writing, but that anecdote exemplifies*

and is backed up by robust evidence'. Our analysis shows that the combination of narratives and credible underpinning statistical evidence is most likely to secure influence in the system. '*Data on its own lacks context and doesn't feel real'* (Local authority official working in sustainability).

While the preference for combining different types of data to create credible and impactful evidence was common across the system, our findings suggested a greater strength of feeling amongst public sector actors. Public sector actors, particularly in central government, were more consistent and held stronger views in their requirement to think about the credibility of narratives and to scrutinise the rigour of the underpinning evidence. Indeed, they felt that assurances of validity and rigour in the evidence would lead to better and more justifiable decision making (Masood et al., 2020). For example, an official in the Local Government Association suggested that, for government departments,

> *'the thing that definitely makes the most difference is slides with numbers on them, hopefully which are robust and drawn from rigorous sources that we can prove or are well respected ... You have to be incredibly careful to be accurate and robust as well as easy to understand and be careful about which points you want to prove'.*

Indeed, this propensity for statistical data (Atkinson et al., 2022) was recognised and noted by other actors in the system who partner with central government. A director of an urban community organisation remarked, '*People talk about their individual mental health experiences, incredibly powerful. But then you have to take that and put it in a way that would make sense to policymakers. It would need to have some quantitative data'.* Respondents across the wider system perceived central government actors to place a higher value on quantitative data. A scientific adviser in a government department noted, *'there's been a focus on quantitative evidence no doubt within government … the quant stuff, the data, it just seems to trump it (qualitative data)'.* This observation was confirmed by a Whitehall data analyst who believed that personal accounts, on their own, '*wouldn't cut much ice with Ministers and Officials'.* Contextual factors determined how evidence was translated and subsequently utilised (Windle and Arciuli, 2022). For example, one proposition is that public sector actors are more highly constrained by their political and institutional environments so need to ensure the validity of data to persuade others in their organisations of the value of that evidence. Public sector bureaucracies also have clear lines of decision-making accountability in ways that may not always feature in the private and third sector organisations (Pfiffner et al., 2021). Being held to account may incline public sector decision makers to scrutinise more closely the evidence on which they base decisions. That is not to say that private and third sector organisations do not face the same accountability pressures. Just that the cultural expectations on supporting evidence could well be different. There is also an increased pressure in the public sector to think about equity and social justice across the population (Ansell and Torfing, 2021). This requires new policies to be scalable - a dimension most readily supported through large scale quantitative data.

Our interviews identified a further dimension in producing credible and impactful evidence, namely accessibility. Narratives supported by credible evidence were seen as effective only if presented in an accessible way. This was true for all but especially for decision makers with limited time and varying technical expertise (MacKillop and Downe, 2022). For the most senior decision-makers across in the system, providing evidence through lengthy accounts is impractical. A private sector consultant described the need for '*quantitative translation [*for] *the big decision-makers. They have very little time and you can't really go in-depth about the lived experience of people living there in too much detail'*.

Numerous respondents identified over-technical data as a barrier to utilisation. While some decision makers will have advanced technical skills, this is unlikely to be universal in a complex policy network. A senior official at the Department for Business, Energy and Industrial Strategy (BEIS) suggested it was important to '*having it [evidence] in a form that you know is quite understandable. You know people aren't necessarily technical experts'.* Likewise, two private sector consultants with expertise in transport and housing reflected,

> '*I've seen a lot of really interesting and clever pieces of work coming out of academia but the way that is presented is so hard to explain to decision makers that you can't keep their attention long enough for them to understand it'*

The other noted,

> *'If they're doing very fancy whizzy kind of multi-variate regressions and whatever, if you can't show that sort of more basic descriptor stuff then it struggles to have impact'.*

Preferences for types of health evidence

Our analysis also explored what types of health evidence critical actors would be most persuaded by. We specifically asked respondents about their views on two types of health evidence:

- First, data demonstrating the link between features of the urban environment and public health outcomes, e.g., number of deaths, asthma cases, obesity etc., and
- Second, data demonstrating the economic costs of poor health linked to the urban environment, e.g., costs to the individual, health sector, wider public sector and private sector through worklessness or reduced productivity.

Both types of health evidence were seen and persuasive and useful. First, demonstrating the link between features of the urban environment and public health outcomes was viewed as important, especially for those actors with a public remit or duty of care to communities. Several respondents were aware of data that demonstrated the link between the urban environment and incidents of disease and mortality, e.g., overheating, noise pollution and access to green space. For example, outcomes relating to how living conditions impact on children's health were suggested to be powerful and difficult for decision-makers to overlook, even if the actor did not have a remit to think about child welfare. A senior local authority illustrated the point,

> *'I think if you can say because of this road development there's going to be an extra 100 kids with asthma then I think that's going to make people stop and think'.*

Similarly, a scientific adviser to government recounted the importance of health evidence linking the urban environment to child health as persuasive,

> *'The link between nitrous dioxide and health, with acute and chronic health outcomes [was important]. Especially asthma exacerbations in children … [that] was one of the main things that led to the demonisation of diesel, I think, in the UK'.*

The usefulness of evidencing public health outcomes was more consistently associated with public and third sector decision makers. An urban planner in a local authority illustrated this point when faced with evidence linking a particular type of development with an increased risk of dementia, '*it's very hard to be directly linked to the type of approach that results in that adverse impact*'.

The second type of health evidence involves identifying the costs of poor urban development and who pays in the system. It is often assumed that the costs of poor health reside with the individual

themselves and the health sector. However, poor health, liked to the urban environment, can create additional costs for the education, welfare and crime and disorder sectors as well as to industry and commerce (Black et al., 2021). When population health improves following a change to the urban environment, this can be associated with cost savings across the system. For example, increasing active travel is evidenced to benefit health and wellbeing, which has been demonstrated to reduce the cost of providing healthcare (Jarrett et al., 2012). Moreover, reducing noise pollution can reduce attention-deficit hyperactivity disorder in children, thereby reducing associated costs for the education sector (Black et al., 2018). These so-called economic valuations of health can be persuasive in showing that actors outside health are affected by and have a stake in solving the problem (Black et al., 2021).

For example, a voluntary sector official was able to provide a compelling account of using economic valuations of health to persuade a local authority to provide free bus passes for people with disabilities and their companion. They explained that emphasising health outcomes and inequalities as an important value was ineffective. Instead, they utilised health evidence to show the additional costs to the authority if free passes were not provided,

> *'What worked was I pointed out what the potential subsequent cost to them would be … I pointed out that it could end up costing them a lot of money because people would have to apply for social care support to pay for that person to go on the bus with them'.*

This illustrative example demonstrates two things. First, the strategic capabilities of third sector organisations to utilise economic valuations of health to show critical decision makers that health outcomes are their concern (Ward et al., 2018). Second, where associated health costs have a direct financial impact on an organisation, they are energised to act.

Persuading urban development decision makers that health is their concern was identified as a significant challenge in the system, a point underscored by Marmot (2020). Several respondents observed that health is '*not as high on the agenda for most participants, whether that's a local authority or developer*' (Third sector social housing provider). Reflecting the different contextual influences on actors (Smith et al., 2023), private sector decision makers were comparatively more supportive of economic valuations of health, especially when it can show a commercial advantage. Discussing how to demonstrate to developers that urban development with positive health outcomes is in their interest was viewed as paramount,

> *'What we do is we create value for you (developers) because if you sell your street full of houses and it's full of trees, you will sell those houses much quicker and everyone will be prepared to pay more for that… There's a huge raft of stuff that we can point to that shows that we are creating value and they understand that'* (Private sector urban designer).

A property developer illustrated how the commercial benefits of health are persuasive stating, *'we absolutely felt it (healthy living conditions) added value and we felt that it would add value to our scheme. So that was a significant driver for us in taking forward the healthy agenda'*. Actors outside the private sector also perceived commercial interests to be more readily persuaded by economic valuations that would affect business. An elected local government official indicated,

> *'I would say the developers don't think about health and wellbeing … we're in a capitalistic situation where they're trying to make as much money as they can'.*

Likewise, an official in the Department for Business, Energy and Industrial Strategy (BEIS) believed that urban development has *'financial gain at its heart'* rather than health and wellbeing. Indeed, investors

and developers need to make decisions based on financial viability as opposed to public health outcomes. An urban planner explained,

> *'We do have massive viability issues with development across large parts of the city … and developers will always cry viability, you know, whether it's right or not but if you could give them ways of actually saving money, they'll like that'.*

Therefore, rather than emphasising health benefits or societal costs, economic valuations of health might also evidence the commercial advantages to developers and business. For example, 'r*ather than saying this will reduce health impacts in the NHS by millions of pounds per year … you provide the benefit to developers of having higher land value costs, land values and also they can charge more for developments'* (Local authority planner).

The primacy given to improving financial outcomes is rooted in the governance and regulation of the private sector. Population health has not yet been integrated into the legal, regulatory or best practice frameworks of governance or business practice that firms must follow in order to succeed. For example, in the UK private firms are subjected to an approach to governance that is outlined in legislation (Companies Act 2006). Directors will be concerned with the operation of the company within its constitution and how its actions align to the objectives of that firm. Their decisions must be made in the context of the need to increase the value of the company rather than improving health outcomes. Similarly, the main method of evaluating a firm's performance is via their financial statements (Financial Reporting Standards, 2022) and there is limited opportunity to include health evidence here. A social housing provider explained that '*if there isn't a planning requirement or a policy requirement to do something that would cost them (house builders) money, or they would perceive that it would cost money and add no value, then they won't do it'.* While private sector actors may choose to make decisions that benefit health outcomes, such considerations remain, as a necessity, secondary to their legal obligations. The following section summaries our key observations and sets out our original contribution to the field.

Conclusion

Many complex social problems require collective decision making, whereby diverse actors come together to look for joined-up solutions (Ansell and Torfing, 2021). This is especially true when trying to promote healthy urban development in the UK (Black et al., 2021). Our findings show that evidence is an important component in promoting a systems approach to policy making. It determines whether critical actors are incentivised to get involved and how they make subsequent decisions. Valuable work in the field of evidence-based policy making has offered insights into how to compile and present evidence to specific audiences, mostly to policy makers (Cairney and Oliver, 2017). However, comparatively little is known about how to produce evidence for collective use in systems (Ward et al., 2018). Our analysis seeks to address this gap and has been guided by a central question: How can health evidence appeal to diverse actors in a complex network? We have explored actors' preferences for different types of health evidence with a view to informing our understanding of producing evidence that will have influence across the urban development system. Our interviews with 132 urban development decision makers have revealed the following observations.

First, narratives, based on real-world and lived experiences, were valued as sources of qualitative evidence across the system. Our work extends the literature on the power of storytelling (Crow and Jones, 2018) by showing that most actors from different sectors value narratives, especially when they make an emotional connection with the recipient. Cairney and Weible (2017, p.620) remind us that 'policy maker attention is fleeting and they engage emotionally with information'. Findings show that

this observation also holds true for the private and third sectors. Our analysis indicates that actors across the system are receptive to ‘evidence-based narratives’ that are designed to have an emotional impact. This supports the conclusion of Van Kleef and Cote (2022) who suggest that emotions are more likely to be influential if they are perceived as authentic, of the right intensity and appropriate to the situation. Lived experiences were shown to be important in getting the attention of busy people and making them care enough to invest valuable time in seeking change.

Second, while narratives may be effective in drawing attention to a problem, our data showed that it was hard for actors to base decisions on storytelling alone. Compelling narratives need to be substantiated by data if they are to have impact. Actors across the system associated objectivity and credibility largely with quantitative data (Masood et al., 2020). This institutionalised preference for quantitative data is identified in the literature and was true across a complex system (Atkinson et al., 2022). Interestingly, the consistency and strength of feeling on this issue was most acutely observed in the public sector and especially in central government (French, 2019). This observation was confirmed by actors in the system who work with government. Navigating varying levels of bureaucracy and autonomy determines the receptiveness to and ability of actors to utilise evidence (Boye et al, 2022). The private and third sector were clearly influenced by commercial, legal and democratic requirements (Pfiffner at al., 2021) that shaped their need for credible evidence. Yet, there was a particularly strong emphasis amongst public sector actors for quantitative evidence to garner support in bureaucratic settings. While the literature is clear that policy makers are often willing to wave rigour and ignore robust evidence if it suits their political objectives (Cairney, 2021b), exploring this was beyond the scope of our investigation.

Third, actors in the urban development system were receptive to health evidence that shows (i) adverse health outcomes and (ii) the related costs. Evidence on adverse health outcomes, such as numbers of deaths or incidents of asthma or mental health, make an emotional connection with people (Sundin et al., 2018). Our evidence shows that this is powerful when it relates to ill health in children, for example. Public and third sector actors with a duty to care for populations and communities were particularly energised by this type of health evidence (Hill O’Connor et al., 2023). However, our data highlights that actors across the system are limited by institutional and regulatory requirements that determine their ability to accommodate health in decision making. Health outcomes are by necessity lower priorities than the legal and regulatory requirements that private firms are subject to (Companies Act 2006). There was preference amongst private sector actors for evidence showing the economic valuations of unhealthy urban development, where some kind of commercial advantage can be identified. Success in incorporating health therefore requires persuasion to change governance principles and regulations to create the space for decision makers to fully consider health evidence alongside other requirements (e.g., Financial Reporting Council, 2022).

In conclusion, our original, large-scale, transdisciplinary dataset has permitted an analysis of the evidence preferences of diverse actors across an entire policy system. A dataset of this scale and coverage is rare in empirical work on evidence-based policy. It has provided a unique opportunity to compare responses across sectors, which advances our understanding in the following ways. First, much of the evidence-based policy literature refers to tailoring evidence to the specific needs of political decision makers (Atkinson et al., 2022; Oliver and Cairney, 2019). However, tailoring evidence for this audience is problematic if you are trying to influence a complex system, involving many different sectors. Our evidence offers new insights into the evidence requirements of private and third

sector decision makers, where comparatively less work has been done (Ward et al., 2018). Moreover, it advances our understanding of the evidence requirements of complex health systems by incorporating an analysis of the wider determinants of health (Oliver et al., 2022).

Second, our data has shown areas of commonality across sectors in their evidence preferences and where there may be differences. If one wants to produce evidence that speaks to the whole system, then these insights are of value. While our evidence focusses on the urban development system in the UK, there is scope for lesson drawing to other systems that influence public health, such as education, employment, climate change, social services and agriculture (Leppo et al., 2013) and to other international contexts. The need to act on the wider determinants of health is a global issue, involving the same configuration of actors and dependencies in cities across the world. Lessons from the UK, therefore, have wider resonance. Finally, we conclude that it is better to have evidence that is meaningful to all if there is to be a shared understanding of the problem and potential solutions. Insights from this article can be used to inform the design of evidence to meet the requirements of diverse actors across the whole urban development system. For example, a logical next step would be to ascertain *how* to write a good narrative that has emotional impact or *how* to demonstrate commercial advantages to the private sector. Getting this right requires close co-production between academics and partners in policy and practice. Our research has identified the evidence requirements of actors across the system and points to the need for more research on how to design it for maximum impact.

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Funding details: This work was supported by the UK Prevention Research Partnership under Grant MR/S037586/1, which is funded by the British Heart Foundation, Cancer Research UK, Chief Scientist Office of the Scottish Government Health and Social Care Directorates, Engineering and Physical Sciences Research Council, Economic and Social Research Council, Health and Social Care Research and Development Division (Welsh Government), Medical Research Council, National Institute for Health Research, Natural Environment Research Council, Public Health Agency (Northern Ireland), The Health Foundation and Wellcome.

Conflict of interest: The Authors declare that there is no conflict of interest

Acknowledgements: We would like to thank members of the TRUUD research team for their contributions to the development of this study and to data collection. We also thank peer reviewers for their helpful suggestions to improve the article.

Table 1: Data collection teams

Data gathering teams	Academic expertise
1	Local government
2	Urban development
3	Central government/health
4	Private developers/health
5	Real estate
6	Management
7	Spatial and urban planning

Table 2: Profile of interview respondents

Stakeholder primary role	Local/ Regional government	National government	Private sector	Other	Total
Property development	5	2	24	0	**31**
Urban planning	15	3	5	3	**26**
Finance	0	3	18	0	**21**
Transport	6	3	3	1	**13**
Public health	7	2		2	**11**
Politician	8	1	0	0	**9**
Environment/ Sustainability	3	2	1	1	**7**
Other	5	4	2	3	**14**
Total	**49**	**20**	**53**	**10**	**132**

Appendices

Appendix 1: Study research questions

1. Who are the actors and how are actor networks structured?
2. What are the institutions that shape urban development and the context for decision-making?
3. How is power and influence structured in urban development actor networks?
4. What are actors' values, motivations and narratives?
5. How do actors perceive the problem (why healthy places are not created) in the urban development system and related to their activity and sphere of influence?
6. What is the process by which relevant decisions are made? To what extent are health outcomes (non-communicable diseases) and health inequalities being considered in decision making?
7. What resources (& evidence/ tools) are available, and how are they (not) used in relation to actors' activity and sphere of influence?
8. How do actor networks function and what evidence and regulation do they need to deliver healthier development?

Appendix 2: Sample interview questions

Examples of interview schedules from three of the data collection teams are provided. The specific questions that relate to evidence use are highlighted.

Local government & third sector interview team questions

1. Can you start by explaining your role and how that relates to decision-making in urban development?
2. Who are the main people you work with when making decisions about urban development?
3. What are the most important influences on your decision-making for urban development?
4. Where do you think the important decisions are made that influence urban development?
5. To what extent do you think that laws and policies relevant to urban development influence decision-making at your organisation?
6. What motivates people working in this area to think about health and wellbeing in decision making?
7. Are health and wellbeing outcomes considered in urban decision-making? If so, how?
8. To what extent are health and wellbeing outcomes a priority for your organisation?
9. What do you think restricts the ability to create healthy places?
10. **What are the main forms of evidence that your organisation uses when making decisions about urban development? What do you find most and least effective to use?**
11. **If you were to consider health in your decision-making, what evidence on health would you find most useful or clear?**
12. How can the public's everyday experiences of health be effectively communicated to decision makers?
13. Is there anything that you would like to raise that you think we have missed in this discussion?

Example 2: National government interview team questions

1. Can you tell us a bit about your role and how it relates to decision-making in urban development?
2. Who are the main actors that you interact with in your work relating to urban development?
3. Where do you think the important decisions are made that influence urban development?
4. How (if at all) do legal considerations influence policymaking?
5. What do you think are the important influences on discussions and decision-making relating to urban development?

6. What dominant ideas or narratives are currently most influential on your organisation's thinking?
7. What are the priorities of your organisation for urban development?
8. To what extent do you think that health and wellbeing is a priority in urban development in your organisation/ institution?
9. How do you think health and wellbeing relates to your department's important policy priorities?
10. What do you think restricts the ability to create healthy places?
11. **What are the main forms of evidence that your department/ organisation use when coming to policy decisions? What do you find most and least effective to use?)**
12. **What do you think could be introduced into the policy development process to support healthier development? For example, evidence, regulations, processes.**
13. **If you were to consider health and wellbeing in your decision-making, what data would you find most useful or clear?**
14. How can public experiences of health and wellbeing impacts be effectively communicated to decision makers?
15. Is there anything that you think we haven't asked you about that would be important for you to tell us?

Example 3: Private sector interview team questions

1. Can you describe a typical process you go through to make an important decision on a project?
2. Who or what influences you most when you are making important decisions related to a project? How do they influence you?
3. How (if at all) do legal considerations influence the way you/your organisation make decisions?
4. What in your view are key aspects of [your sector] decision-making relevant to health and wellbeing outcomes?
5. When you/your organisation are/is making decisions, where are considerations of health incorporated into this process? How are they incorporated?
6. If you had to pick one or two central cultural or historical influences on the sector, what would they be and why?
7. **What are the key resources (pieces of evidence/ tools/ guidance/ policies/ etc.) that shape how you think about your work? Do these resources discuss health and wellbeing? In what ways do they discuss health and wellbeing?**
8. **What data on health and wellbeing would you find most useful or clear when incorporating health and wellbeing considerations? In what form would that data be best presented? Who should produce that data?**
9. Thinking about the health and wellbeing impacts of project X, how would the health and wellbeing impacts experienced by the public best be communicated to you? In what form?
10. Can you think of an example when health and wellbeing were featured in the decision making on a project? How was it included and why? Why do you think this logic was used?
11. Can you think of an example when health and wellbeing were excluded in the decision making on a project. How was it excluded and why? Why do you think this logic was used?
12. If you were responsible for integrating health and wellbeing into the core of how your sector makes decisions, what would you change and why?

Appendix 3: Coding framework

All data was coded during analysis into the following 23 categories. Each category contained multiple codes.

- Actor networks
- Barriers
- Characteristics of the urban development system
- Data relating directly to project case study sites
- Development type
- Economics
- Environmental sustainability
- Evidence
- Financial value
- Governance
- Health inequalities
- How health is included in decision-making
- Institutions
- Interventions
- Land
- Legal considerations
- Political considerations
- Power and influence
- Public involvement
- Risk
- Values
- What is needed to deliver healthier development
- Other