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Original Research

Evidence for the effectiveness of health impact assessment in spatial planning on health outcomes: A systematic review and stakeholder involvement from a UK perspective

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ABSTRACT

Objectives: Health Impact Assessment (HIA) is a decision support method used for evaluating the impact of actual or planned developments on health and wellbeing, including the wider determinants of health. There is a lack of evidence on the effectiveness of HIA in achieving health benefits in England, and no statutory requirement for the use of HIA. The aim of this review was to undertake an evidence synthesis and use stakeholder consultation to understand the relevant factors and mechanisms by which HIA may effectively influence population health outcomes.

Study design: Systematic review and stakeholder consultation.

Methods: We used systematic searches of eight academic databases and supplementary citation and reference list searches of included papers focusing on UK literature. We also identified any potentially relevant UK grey literature that was in the public domain. We extracted key data from the papers and synthesised the data thematically. We developed a typology of factors and themes. We involved a UK wide stakeholder group of UK planners, local and national government public health specialists, academics, and commercial HIA providers (n = 38 in total) in two workshops to help us to identify grey literature sources, interpret the evidence, and consider the potential for developing a statutory requirement for the use of HIA.

Results: From 5117 unique records we considered 147 full texts from databases. We also identified 58 grey literature sources. Nineteen UK studies met inclusion criteria. The data themes were grouped into three categories: (1) Who to involve: Teamwork – health and planning n = 9; Links with commercial developers n = 2; Community involvement n = 2; Wider stakeholder involvement n = 4. (2) What is needed: Resources n = 5; Knowledge and understanding n = 6; Training n = 1; National policy and guidance n = 10; Evidence base n = 4. (3) Aspects of the appraisal: Appraisal timings/approach n = 6; Outcome timescales n = 1; Health definitions n = 7; Quantifying impact n = 2. Our final stakeholder workshop identified the challenges in using existing frameworks to develop a statutory requirement for England including the lack of national policy imperative, and the challenges in developing an effectiveness evidence base. We were not able to link the use of HIA in spatial planning directly to UK health outcomes.

Conclusions: Evidence exists which could inform the development of a statutory requirement for conducting HIA in spatial planning in England. However, this evidence is not able to link the use of HIA in spatial planning directly to health outcomes. The qualitative themes identified in our review could however inform future discussion about the feasibility of developing the evidence base to include direct measures of health. A key challenge is motivating stakeholders to engage with developing the evidence base. It is also challenging to see how an evidence base could develop without a national policy requiring the use of HIA in the spatial planning process. In order to generate appropriate data to demonstrate the effectiveness of HIA in terms of health improvement, it might first be necessary to make them an explicit requirement of the planning process.

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1. Introduction

Health Impact Assessment (HIA) provides a "systematic yet flexible and practical framework that can be used to consider the wider effects of local and national policies or initiatives and how they, in turn, may affect people's health".[1] HIA is a decision support approach for health and wellbeing in spatial planning and policy making.[2] HIA is a process that identifies the potential positive and negative impacts of any plan or development project on health and wellbeing and health inequalities. A properly conducted HIA recommends measures to "maximise positive impacts; minimise negative impacts; and reduce health inequalities".[3] HIA can be conducted prospectively (at the start of the development of a project, proposal or plan), concurrently (alongside the implementation of a project or policy), or retrospective (to assesses the effect of an existing project or policy).[2]

In England, the use of HIA has recently been widely advocated within a 'Health in All Policies' (HiAP) context.[4] However, no statutory requirement for the use of HIA exists. In Wales HIA is a statutory requirement based on the Public Health Wales Act, 2017[5] with expert guidance, support and training for undertaking HIAs in Wales provided by the Wales Health Impact Assessment Unit (WHIASU). In Scotland, the Health and Inequalities Impact Assessment Network ('SHIIAN')[6] aims to provide training and capacity building for engaging with HIA. The National Planning Policy Framework (NPPF)[7] and the Health and Social Care Act 2012[8] represents a structural re-organisation of the government's national planning requirements and provided the impetus for closer collaboration between local authorities and Integral Care Boards.

There are many examples, including UK specific case studies[1–3,5] which describe the use of HIA in the planning process; but a significant evidence gap concerning how HIA can more effectively influence health outcomes.[4] Systematic reviews of the use and benefits of HIA have been conducted in Australia/New Zealand[9] and the US[10] but there is no recent synthesis of HIA in the UK context. There is guidance and some UK case studies to support best practice in the use of Health Impact Assessment to inform planning decisions,[2,3] but a lack of clear evidence on the effectiveness of HIA in achieving health benefits. The potential value of HIA to public health highlights the need for an up-to-date evidence synthesis to understand the current evidence for the effectiveness of Health Impact Assessment in spatial planning. Such evidence is now needed to promote appropriately evidence-based decision making about whether to invest resources in HIA.

2. Methods

2.1. Aim and approach

We aimed to identify, appraise and synthesise evidence that examines the effectiveness of HIA in spatial planning. We aimed to gain an evidence-informed understanding of the relevant factors in order to make evidence-based recommendations for policy, practice and future research priorities and to use stakeholders to help us shape these. Our objectives were to conduct a systematic review on the effectiveness of HIA in spatial planning; to identify evidence-based recommendations for HIA in spatial planning, and recommend future research priorities to address identified research gaps; to contribute to the discussion around developing HIA guidance for England.

2.2. The work was undertaken in two stages

The first stage involved completion of scoping searches and identification of relevant evidence including database and website searches. We included our group of 41 stakeholders and topic experts in this process (see supplementary material for the full list of stakeholders). Stakeholders input was used to refine the review questions and inclusion criteria, identify unpublished evidence, and ensure that the review will be meaningful to those working in HIA. Existing models of HIA were identified and used as a tool to guide and inform consultations with stakeholders who were asked to help to clarify the scope of the review, suggest keywords for searching, and identify potential sources of evidence.

We then undertook a systematic review, drawing upon both quantitative and qualitative studies and included policy reports as well as journal publications. We focused on UK evidence given potential differences in HIA policy and norms between the UK and other European and high-income countries. Additional research from other developed countries was also considered for inclusion; dependent on relevance to UK. We again consulted with our stakeholders to help interpret the review findings and make recommendations.

2.3. Literature search and screening

Subject headings and free-text terms and were developed on MEDLINE and adapted for the other databases. Stakeholders were consulted on the search terms. Search dates of 2012–2023 and were based on major planning and public health reforms in the UK.[11] Searches were completed between June and November 2023.

We searched MEDLINE, EMBASE, PsycINFO, Social Science Citation Index, Applied Social Sciences Index and Abstracts, International Bibliography of Social Sciences, CINAHL, Scopus. A sample search strategy is provided in Table 1. Database searching was accompanied by scrutiny of reference lists (included papers and relevant systematic reviews), policy documents, citation searches, web searches for relevant UK grey literature, consultation with local and national stakeholders. A list of grey literature sources and stakeholder organisations is provided in Supplementary material.

Search results were downloaded to a reference management system (EndNote) screened against the inclusion criteria by one reviewer, and checked for accuracy by a second reviewer. Uncertainties were resolved by discussion with the wider team. Searches were restricted to papers in English, and UK studies were selected for consideration. An iterative approach to evidence identification and synthesis was applied, with further searches undertaken by refining the terms as required.

2.4. Review scope and inclusion criteria

The target population were people living in the UK in an area which is subject to a HIA. We included quantitative, qualitative, and observational studies. Systematic reviews were excluded to avoid double-counting. Books and dissertations were excluded. Case studies were considered on an individual basis.

All outcomes that may impact on the health and wellbeing of the local population including potential impact on inequalities were included alongside impacts relating to the HIA such as behaviour change (i.e. use of services), community engagement and satisfaction. Wider outcomes relating to process evaluation were noted, but were not specifically searched for.

2.5. Data extraction and quality appraisal

Data extraction was performed by one reviewer, and checked for accuracy and consistency by a second. Data extraction forms were designed, piloted and refined. We extracted information referring to the country and setting/city/locality of the study; research aim and design; methods of analysis; study population; type of impact assessment and outcome measures.

Quality assessments was performed by one reviewer and checked for accuracy and consistency by a second. We used the CASP[12] appraisal tool for qualitative studies and the ACCODS[13] appraisal tool for grey literature. Papers were not excluded from the review on quality criteria.

Table 1
Sample search strategy.

Database: Ovid MEDLINE(R) and Epub Ahead of Print, In-Process, In-Data-Review & Other Non-Indexed Citations and Daily <1946 to June 12, 2023>
Search Strategy:
1 Health Impact Assessment/(942)
2 ("health impact assessment*" or HIA).mp. [mp = title, book title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms, population supplementary concept word, anatomy supplementary concept word] (2587)
3 1 or 2 (2587)
4 Evaluation Study/or Program Evaluation/(320,934)
5 evaluation*.mp. [mp = title, book title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms, population supplementary concept word, anatomy supplementary concept word] (1999153)
6 monitor*.mp. [mp = title, book title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms, population supplementary concept word, anatomy supplementary concept word] (1181459)
7 method*.mp. [mp = title, book title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms, population supplementary concept word, anatomy supplementary concept word] (10925275)
8 assess*.mp. [mp = title, book title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms, population supplementary concept word, anatomy supplementary concept word] (4132783)
9 tool*.mp. [mp = title, book title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms, population supplementary concept word, anatomy supplementary concept word] (973,084)
10 good practice.mp. [mp = title, book title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms, population supplementary concept word, anatomy supplementary concept word] (4768)
11 ((good or best) adj1 practice).mp. [mp = title, book title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms, population supplementary concept word, anatomy supplementary concept word] (23,276)
12 procedure*.mp. [mp = title, book title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms, population supplementary concept word, anatomy supplementary concept word] (1678968)
13 approach*.mp. [mp = title, book title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms, population supplementary concept word, anatomy supplementary concept word] (2319344)
14 influenc*.mp. [mp = title, book title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms, population supplementary concept word, anatomy supplementary concept word] (1781008)
15 "Pathway to impact*".mp. [mp = title, book title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms, population supplementary concept word, anatomy supplementary concept word] (447)
16 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 (15993561)
17 3 and 16 (2336)
18 limit 17 to humans (1897)
19 limit 18 to english language (1743)
20 limit 19 to yr = "2013–2023" (1310)
21 limit 3 to "review articles" (294)
22 limit 21 to (english language and yr = "2013–2023") (200)
23 limit 19 to yr = "2012" (66)
24 limit 19 to yr = "2023" (41)
25 limit 21 to (english language and yr = "2012") (9)
26 limit 21 to (english language and yr = "2023") (11)

2.6. Method of synthesis

Extracted data were synthesised narratively. We characterised key features of the literature including strengths, limitations and evidence gaps. Our synthesis was further validated by our stakeholder group. We describe the volume, quality and degree of consistency in the evidence.

2.7. Stakeholder involvement

Stakeholder consultation took place through an online workshop with 41 stakeholders from local council planning departments, local and national public health bodies, academic experts and commercial HIA providers from throughout the UK. The first workshop was used to refine the scope of this review (e.g. inclusion criteria and sources of evidence). A second online stakeholder workshop was used to gain feedback and advice on the interpretation and implications of the evidence synthesis, including presenting the review findings to diverse audiences. We identified stakeholders through contacts already known to members of the research team using a 'snowball' technique[14] to also include stakeholders not previously known to us.

3. Results

From 5117 unique records we considered 147 full texts from the database searches, along with 58 grey literature sources (Fig. 1). We identified a total of 19 UK studies and seven non-UK HIA framework studies (the latter for use in our stakeholder workshops) (Table 2). The UK evidence consisted of mostly qualitative studies on the factors which influence HIA effectiveness, plus one mixed methods (interviews and survey) (Ige-Elegbede 2020[15]) and two quantitative survey studies (Chilaka 2015,[16] Mueller 2018[17]). The evidence described qualitative factors which influence, or have the potential to influence HIA effectiveness in relation to measurable health outcomes. Quality appraisals can be found in Supplementary Material.

We identified 13 themes in the qualitative data (Table 3), which we were then able to group into three descriptive categories.

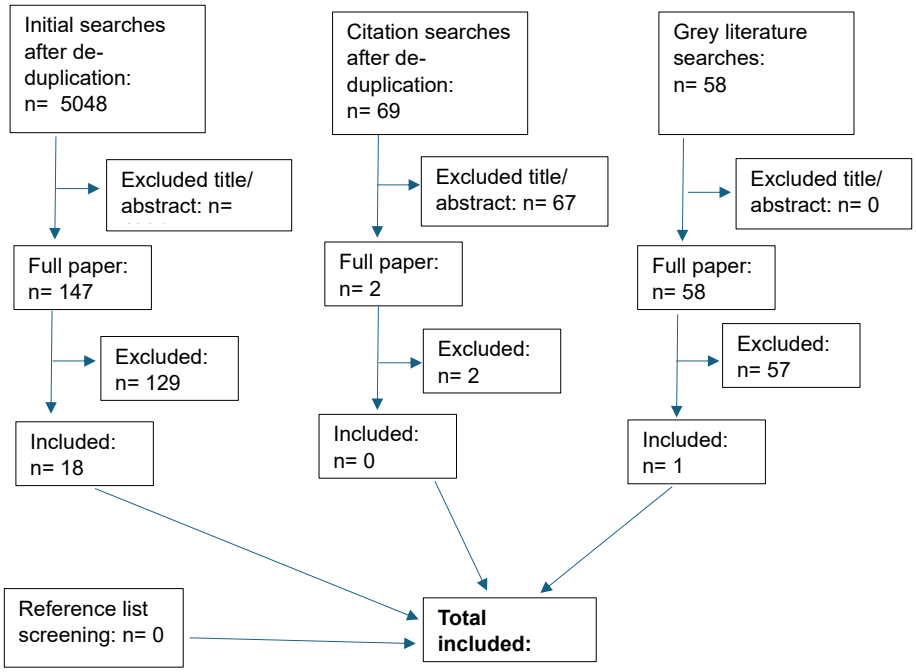

Fig. 1. Quorum diagram of include studies.

1. **Who to involve:** Teamwork – public health and planning n = 9; Links with commercial developers n = 2; Community involvement n = 2; Wider stakeholder involvement n = 4.

Teamwork between public health and planning was reported as both a barrier and facilitator to HIA effectiveness. Having a multidisciplinary team, knowledge sharing and partnership working, active involvement of planners with public health and other professionals, and innovative partnerships were all reported as positive influences. Negative outcomes included limited partnership working with public health professionals, a lack of a consultation authority, no named health professional contacts, silo mentalities, cultural and language differences between sectors, lack of leverage with colleagues or external bodies, lack of institutional support for appraisals, different sectoral priorities, lack of motivation, lack of trust, and a reactive planning regime. Specific links with commercial developers were also said to be important (negatively as a lack of engagement from/with developers versus the positive effect of building relationships with developers).

Wider stakeholder and community involvement was also seen as essential in terms of developing better participatory models and broad-based partnerships, common languages, social capital, a sense of community and well-being. Local knowledge was a very useful source of evidence in order to benefit from lessons learned and facilitate incremental changes among stakeholders, institutions, organisations and communities.

2. **What is needed:** Resources n = 5; Knowledge and understanding n = 6; Training n = 1; National policy and guidance n = 10; Evidence base n = 4.

Investing in planning was seen as crucial to the delivery of healthy, sustainable places and inclusive communities. Resources were mentioned negatively in terms of poor provision, lack of finance, lack of appropriate tools and guidance, and limited resources available to develop partnerships.

Frequent health restructuring and a subsequent loss of organisational memory was said to contribute to a lack of knowledge and understanding, alongside a general lack of health knowledge for planners. Conversely the limited understanding and aspirations with respect to planning typically expressed by health professionals was seen to have a negative impact on the process.

Leadership, innovation, collaboration and negotiation were deemed essential to overcome barriers and oppositions to including health outcomes with the whole process dependent on leadership, commitment and knowledge of politicians and all practitioners involved in the HIA process. There can be a genuine lack of understanding of what health is among those who are commissioning and conducting appraisals, leading to a narrow health focus, rather than a wider preventative public health approach.

Providing training to health and planning professionals was discussed as essential including justifying requirement for HIAs, data collection; and identifying local public health priorities. Public Health professionals requested support to identify high-impact interventions and work more collaboratively with planners.

National policy and guidance for conducting HIA was seen as key to moving the agenda forwards. This would require strategic guidance from government and improved legislation and policies with clear and explicit links to health. Practitioners felt that HIA could be strengthened by making monitoring and follow-up of HIA binding rather than advisory. National planning policy was not health focused and unlikely to influence local politicians, or national political will, to take the agenda forward. HIA was perceived as an added burden given the existence of statutory impact assessments such as Equality Impact Assessment.

The lack of a mandate for HIA was associated with the absence of clear epidemiological evidence demonstrating associations between the built environment and health outcomes making it difficult to assess the effectiveness of HIAs. Differences in interpretation and the use of 'evidence' between public health and planning professionals indicates the need to simplify approaches to presenting evidence with regards to language and accessibility.

3. **Aspects of the appraisal:** Appraisal timings/approach n = 6; Outcome timescales n = 1; Health definitions n = 7; Quantifying impact n = 2.

Putting principles of healthy placemaking into practice was seen as critical. Challenges were identified in relation to short deadlines for conducting appraisals and the late timing of appraisals in planning

Table 2
Include studies.

Author Year	Country City/ locality	Study design Analysis	Population	Setting	Type of assessment	Delivered by	Aim/research question	HIA details	Outcome measures
Baldwin 2014[18]	UK	Qualitative - ethnography	UK case study	Infrastructure and natural resource developments, housing and mixed-use projects.	HIA	n/r	Effects of infrastructure on health impacts.	National-level infrastructure project, 'Highway 5'.	Psychosocial orientation and attachment factors' (POAFs(.
Bond 2012[19]	UK	Qualitative surveys/focus group interviews	Planning Departments, Health professionals	Local authorities	Local Development Framework (LDF)	LA planning teams/health professionals	Examines active planning for health improvement.	Not specific to one project.	Integration of health into the planning process
Carmichael 2012[137]	UK	Qualitative Review of case studies	UK and non-UK evidence.	Any	Mainly EIA, SEA, HIA) of land use plans.	n/s	Integration of health into urban spatial planning.	four stages of the plan making process.	Physical activity, mental health and wellbeing, environmental health factors, unintentional injury and health equity.
Carmichael 2013[20]	UK	Qualitative Review Case studies	England	Local planning authorities	Health integration: HIA and EIA.	Local planners	How to incorporate health in land use plans.	Not specific to one project.	Health in land use plans and development decisions.
Chadderton 2012[21]	Cardiff, South Wales	Qualitative Case study -ethnographic	Inner city, high deprivation/ ill health	Waste plant (incinerator)	HIA	Community-(Communities First)	To facilitate community engagement in planning.	Rapid (8-week), participatory HIA.	No measurements - Economic and environmental impacts suggested.
Chang 2019[4]	UK	Qualitative events (n = 5) England and Wales	UK	Planning	HIA	Planners and public health	Collaboration between planning and public health.	Not specific to one project.	Effectiveness
Chilaka 2015[16]	UK	Qualitative Questionnaire	52 HIA practitioners in the UK	Planning	HIA	HIA practitioners	Investigate constraints of engagement/ usefulness of local knowledge.	Not specific to one project.	Effectiveness
Dannenberg 2016[22]	USA, Europe, Australia, NZ	Qualitative Process, impact, and outcome evaluation	n/r	n/r	HIA	n/r	Understanding the value of HIAs, and improving methods.	Not specific to one project.	Effectiveness
Fischer 2021[23]	UK England	Qualitative Workshops **FRAMEWORK**	England	Local plan making and project development	HIA	LA planners and PH officers/ external consultants	Current use and quality of HIAs in local (spatial) plan making.	Not specific to one project.	HIA quality
Fischer 2024[24]	UK England	Qualitative Semi-structured interviews Web searches	Devon/Luton case studies	Spatial planning	HIA	Spatial planners	Normative effectiveness of HIA.	Cranbrook New Town/ Marsh Farm Regeneration Programme	HIA improvement of health and wellbeing
Le Gouais 2023[25]	UK	Qualitative Interviews **FRAMEWORK**	UK	Urban planning	Not specifically HIA	Urban development, transport, public health, real estate, management, public policy, law and PPI	Exploring the complexity of urban development decision-making.	n/a	Health
Grant 2013[26]	UK	Qualitative **FRAMEWORK** grading tool	UK	Local authorities	EIA, SEA, HIA	Planners	Developing SPECTRUM framework for HIA.	Not specific to one project.	Health appraisal
Ige-Elegbede 2020[15]	UK England	Mixed methods: Interviews, survey	England	PH, planning and other built environment professionals	Spatial planning not HIA	Planning	Integrating health evidence into spatial planning.	Not specific to one project.	Barriers and facilitators. Health

(*continued on next page*)

Table 2 (*continued*)

Author Year	Country City/ locality	Study design Analysis	Population	Setting	Type of assessment	Delivered by	Aim/research question	HIA details	Outcome measures
Logue 2022[27]	UK Scotland	Qualitative semi structured interviews (n = 8)	SEA practitioners from six local authority areas in Scotland and two SEA consultation authorities	LA	Strategic Environmental Assessment (incorporating HIA).	Local authorities	Explores how SEA practitioners and SEA consultation authorities consider health.	SEA - a structured assessment of likely environmental impacts, which includes human health	Health - qualitative
Mueller 2018[17]	Bradford UK	Quantitative	Bradford (UK) adult residents (n = 393,091)	Urban and transport planning	Urban and TranspOrt Planning Health Impact Assessment (UTOPHIA)	Urban planning	Estimate premature mortality impacts of breaching international exposure guidelines for physical activity (PA), air pollution, noise and access to green space.	UTOPHIA methodology and estimated mortality, life expectancy (LE) and economic impacts of non-compliance with recommended exposure levels.	estimated mortality, life expectancy (LE) and economic impacts of non-compliance
Richardson 2012[28]	Plymouth UK	Participant workshop	Plymouth	Planning	HIA	Planning	Assess the potential health and well-being impacts of policies, developments and projects.	multi-agency project: stepping Stones to Nature	effectiveness of project (potential health and well-being impacts), not HIA
RTPI 2020[29]	UK	Qualitative 15 case studies and 10 interviews	UK and other	Planning	Healthy Place Planning	Planners	Explores local, national and international planning practices enabling the creation and delivery of healthy places.	Not specific to one project. Study conducted during Covid-19 peak.	Health
Sharma 2022[30]	England	Qualitative Survey	37 Planners, 34 as PHP and 27 as IA Practitioners	PH SP	HIA	Public Health Professionals, Planners and Impact Assessment Practitioners	Understand training needs of PH professionals and spatial planners in relation to HIA.	Not specific to one project.	Training needs (Tenuous link to effectiveness)
Simos 2015[31]	France, Hungary, Italy, Spain and the UK	Qualitative Case studies Realist Evaluation Framework	10 case studies contributed by 9 Healthy Cities	European Healthy Cities Network	HIA	Urban planners Healthy city coordinators	Evaluation of use of HIA during Phase V of WHO Healthy Cities Network (2009–13).	Not specific to one project.	health and health equity in all local policies and a requirement regarding capacity building.

policy process. This could be improved with moves to embed the use of HIAs earlier in the planning process and consistently apply procedural steps.

There were concerns in relation to the resilience of the procedural process and its ability to impose and sustain tight schedules: with a view that it was too late to consult on alternatives because of the procedural nature of the planning laws in England and Wales. Ensuring the quality of the impact assessment report and the proficiency of the process in terms of money and time was needed. However, observing changes in health and wellbeing outcomes as a consequence of spatial planning takes time with even a decade arguably still early to assess normative outcomes.

Contrasting with a typical public health use of the broad WHO definition of health,[32] a much narrower definition of health was used in appraisals by planners; typically including environmental hazards and greenspace but not mental or social wellbeing. This had the effect of focusing appraisals on physical and environmental health, with little consideration of health inequalities. Health was viewed as subjective and less tangible than other issues assessed in appraisals. There was often a focus on the negative health impacts rather than on maximising the positive health impacts. Whilst it was felt import to try to integrate health into the design of local plans, there was a view that it was often not practical to consider health within the current planning system. Conversely planners felt that health does not engage with the upstream contributions that spatial planning can have. It was noted that public health teams need support, capacity and skills to ensure that local health and well-being priorities are integrated into local planning documents and decisions.

Incorporating health needs and impact into the conceptualisation, design and planning of projects, policy makers, would mean that

Table 3
Factors reported in included studies by theme.

Theme	Factors reported	Reference
Team work between health and planning	Multi – disciplinary team (+ve)	Baldwin 2014[18]
	Knowledge sharing and partnership working (+ve)	Carmichael 2013[20]
	Active involvement of planners with health and other professionals (-ve)	
	Limited partnership working with public health professionals and the lack of a consultation authority able to cover all aspects of health (-ve)	Logue 2022[27]
	No named health professional contacts (-ve)	Bond 2012[19]
	Greater cooperation between public health, social care and the planning profession is essential. Innovative partnerships, communication and adequate resourcing often underpin effective models of cooperation which in turn leads to successful project implementation (+ve)	RTPI 2020[29]
	Lack of team capacity and technical skills (-ve)	Chang 2019[4]
	Closer working between health, environment and planning Professionals (+ve)	Carmichael 2013[20]
	Silo mentality in departments/teams/professions (-ve)	Chang 2019[4]
	Lack of leverage with colleagues or external bodies (-ve)	Chang 2019[4]
	Lack of institutional support and delivery structure for appraisals, different sectoral priorities (-ve)	Carmichael 2013[20]
	Lack of motivation nor the institutional culture (-ve)	
	Social scientists with experience of monitoring long-term changes (+ve)	Baldwin 2014[18]
	Cultural and language differences between sectors (-ve)	Carmichael 2013[20]
	Structural and strategic and differences between partners (-ve)	Carmichael 2013[20]
Links with developers	Lack of engagement from/with developers (-ve)	Chang 2019[4]
	Building relationships with developers (+ve)	Ige-Elegbede 2020[15]
Resources	Resourcing Planning adequately. Investing in planning is crucial to ensure the delivery of healthy, sustainable places and inclusive communities (+ve)	RTPI 2020[29]
	Lack of appropriate tools and guidance (-ve)	Chang 2019[4]
	Poor availability of resources (-ve)	Chanchitpricha 2013[34]
	Lack of financial resources (-ve)	Chang 2019[4]
	Limited dedicated resources available to develop partnership (-ve)	Carmichael 2013[20]
	Lack of institutional resources (-ve)	
National policy and guidance	National planning policy not health focused (-ve)	Bond 2012[19]
	Policy framework/political context (-ve)	Chanchitpricha 2013[34]
	Develop consistent national guidance and best practice on HIAs (+ve)	Fischer 2021[23]
	HIA can be strengthened by making it compulsory to follow up recommendations by making monitoring and follow-up of HIA binding rather than advisory (+ve)	Fischer 2023[24]
	Four cities, all from the UK, noted that HIA is voluntary and not a statutory requirement. Other mentioned that HIA was perceived as an added burden given the existence of statutory impact assessments such as Equality Impact Assessment. One said that this status may reduce opportunities to integrate health and equity issues into formal decision-making.	Simos 2015[31]
	Lack of national policy or guidance (legal mandate) (-ve)	Bond 2012[19]
	Lack of specific policy or statutory duty (-ve)	Chang 2019[4]
	Competing policy priorities (-ve)	
	Improving national guidance and having stronger policies for place-making and health (+ve)	Ige-Elegbede 2020[15]
	Lack of influencing local politicians/political will (-ve)	Chang 2019[4]
	High level commitment and leadership to guide capacity building, strategic guidance from government (+ve)	Carmichael 2013[20]
	Impact Assessment Practitioners expressed uncertainty about policy triggers needed to undertake HIAs citing that the scale of HIAs must be proportional to project scope, the challenge of identifying planning interventions and a need to apply consistent methodological approaches in HIAs.	Sharma 2022[30]
	Improved legislation and policies with clear and explicit links to health are necessary to empower built environment professionals with the leverage needed to secure health integration with developers.	Ige-Elegbede 2020[15]
	Substantive effectiveness could depend on several factors, such as, regulatory framework on implementing impact assessment in the decision making process, mechanism in decision-making context, public participation (+ve)	Chanchitpricha 2013[34]
	To enable healthier places interviewees suggested funding priorities needed to shift, particularly by national government since local government resources were limited, bidding for funding could be inefficient, and developers likely unwilling to pay additional costs (-ve)	Le Gouais 2023[25]
Evidence base	Lack of evidence at post-implementation stage means that it is difficult to assess the actual effectiveness of appraisals (-ve). Need stronger requirement for monitoring the actual impact of planning decisions.	Carmichael 2013[20]
	Lack of relevant evidence base to support decisions (-ve)	Chang 2019[4]
	Developing a stronger evidence base on broader determinants of health to inform developments (+ve)	Carmichael 2013[20]
	The lack of clear epidemiological evidence demonstrating associations between the built environment and health outcomes appeared to limit ability to object to planning proposals (-ve)	Le Gouais 2023[25]
	Differences in interpretation and the use of 'evidence' between public health and planning professionals (-ve)	Ige-Elegbede 2020[15]
	Spatial planning and health resources meet the practical needs of both planning and public health professionals	
	Lack of practical evidence to apply locally and lack of resource and staff capacity in local authorities (-ve)	Ige-Elegbede 2020[15]
	Simplifying presenting evidence (regarding language and accessibility (+ve)	Ige-Elegbede 2020[15]
Knowledge and understanding	Frequent health restructuring and a loss of organisational memory (-ve)	Bond 2012[19]
	Lack of health knowledge (planners) (-ve)	Bond 2012[19]
	Leadership; Innovation; Collaboration and Negotiation were deemed essential to overcome barriers and oppositions to healthy placemaking. Endowing planners with the right skills and giving them the opportunity to expend their knowledge and/or experience were considered critical to the implementation of health based approaches to placemaking (+ve)	RTPI 2020[29]

(*continued on next page*)

Table 3 (*continued*)

Theme	Factors reported	Reference
	The knowledge and experience that impact assessment professionals possess (+ve)	Chanchitpricha 2013[34]
	Depends on leadership, commitment and knowledge of politicians and practitioners involved (+ve/-ve)	Carmichael 2013[20]
	Limited understanding and aspirations wrt planning (health) (-ve)	Bond 2012[19]
	Lack of understanding of planning system by public health sector (-ve) public health professionals are seen as having a lack of understanding of the planning system, including the statutory assessment processes (-ve)	Carmichael 2013[20]
	Planning barriers to considering health more fully in SEA included low confidence in assessing health (-ve)	Logue 2022[27]
Timescales	Observing changes in health and wellbeing outcomes as a consequence of spatial planning takes time - even a decade is arguably still early to assess normative outcomes (-ve)	Fischer 2023[24]
Training needs	Musculoskeletal health and infectious disease were among specific health impacts where professionals welcomed further training. Planners expressed training needs around justifying requirement for HIAs, data collection; and identifying local public health priorities.	Sharma 2022[30]
	Public Health professionals requested support to identify high-impact interventions and work more collaboratively with Planners and a need to justify budgets for undertaking HIAs.	Sharma 2022[30]
Health definitions	Incorporating health needs and impact into the conceptualisation, design and planning of projects, policy makers, planners and built environment professionals are able to influence the development of sustainable communities: strengthesn the argument for an upstream shift to address key obstacles to healthy living via plan making (+ve)	RTPI 2020[29]
	Contrasting with their own broad understanding of health, most participants reported a narrower scope of health within SEA, including environmental hazards and greenspace but not mental or social wellbeing. None of the respondents reported consideration of differential impacts, although SEAs may include inequalities data in the baseline report. Health was viewed as subjective and less tangible than other issues assessed in SEA (-ve)	Logue 2022[27]
	Not practical to consider health within the planning system (-ve)	Bond 2012[19]
	Health does not engage with the upstream contributions that spatial planning can have (-ve)	Bond 2012[19]
	Integrating health into the design of local plans (+ve)	Ige-Elegbede 2020[15]
	Public health teams need support, capacity and skills to ensure that local health and well-being priorities are integrated into local planning documents and decisions.	
	Clarifying what was meant by 'healthy' development, using evidence, could increase objectivity for decision-making to prioritise health (+ve).	Le Gouais 2023[25]
	Quantitative measures, including framing health in commercial terms, may incentivise some stakeholders.	
	Provide greater clarity on consideration of health issues (+ve)	Fischer 2021[23]
	Criticism some health bodies inadequately focussed on wider determinants of health and suggestions that national government did not recognise the associations between urban development and health (-ve)	Le Gouais 2023[25]
	Practitioners were familiar with the Place Standard, which may have contributed to their understanding of links between health and spatial planning. This did not transfer, however, to a greater understanding of links with health inequalities. Further work should raise awareness of the equity impacts of planning (-ve)	Logue 2022[27]
	Defining 'healthy' development appeared a necessary, albeit often missing, step to clarifying how to improve health outcomes (-ve)	Le Gouais 2023[25]
Appraisal timing and approach	Short deadlines for conducting appraisals (-ve)	Carmichael 2013[20]
	Late timing of appraisals in planning policy process (-ve)	Carmichael 2013[20]
	Embed the use of HIAs earlier in the planning process and consistently apply procedural steps (+ve)	Fischer 2021[23]
	Resilience of the procedural process and its ability to impose and sustain tight schedules: too late to consult on alternatives because of the procedural nature of the planning laws in England and Wales (-ve)	Chadderton 2013[21]
	Not possible to submit HIA evidence at points in time that fitted with the local planning and regulatory frameworks (-ve)	Chadderton 2013[21]
	Increase transparency of the appraisal process (+ve)	Carmichael 2013[20]
	Seeing the HIA as part of an iterative process throughout plan preparation (+ve)	Carmichael 2013[20]
	The appraisal process itself takes place in parallel to the planning decision-making rather than blends with it (-ve)	Carmichael 2013[20]
	Putting principles of healthy placemaking into practice is critical. Focusing on effective implementation rather than on normative principles is now key to addressing place-based health challenges and reducing inequalities (+ve)	RTPI 2020[29]
	Quality of the impact assessment report: the proficiency of the process in terms of money and time invested (time, financial resources, skills, and specification of roles) (+ve)	Chanchitpricha 2013[34]
Community involvement	Community stakeholder engagement. Developing better participatory models and broad based partnerships, based on common languages (+ve)	Carmichael 2013[20]
	Active public participation (+ve)	Chanchitpricha 2013[34]
	Engaging communities in planning decisions is crucial to foster social capital, a sense of community and individual well-being (+ve)	RTPI 2020[29]
	Local knowledge a useful or very useful source of evidence (+ve)	Chilaka 2015[16]
Stakeholder involvement	Articulating wider benefits to multiple stakeholders (+ve)	Ige-Elegbede 2020[15]
	Lessons learned and incremental changes among stakeholders, institutions, organisations and communities (+ve)	Chanchitpricha 2013[34]
Impact	Study participants were keen to highlight the need for planners to be 'visionaries' in order to address the convergence of challenges around Public Health, Climate Emergency, and Economic Recovery. Harnessing the benefits of digital tools and principles of 'green recovery' were often cited as 'the best ways forward' (+ve)	RTPI 2020[29]
	Quantifying impact of planning on health, especially in monetary terms and monitoring success of HIA recommendations, were common challenges for all professions.	Sharma 2022[30]

planners and built environment professionals would be more able to influence the development of sustainable communities. Defining 'healthy' development appeared a necessary, albeit often missing, step to clarifying how to improve health outcomes. Quantitative measures, including framing health in commercial terms, may incentivise some stakeholders. Study participants in one study highlighted the need for planners to be 'visionaries' in order to address the convergence of challenges around Public Health, Climate Emergency, and Economic Recovery.

3.1. Stakeholder involvement

Through our initial stakeholder workshop and as a result of our searches we identified a small number of existing international HIA

frameworks many of which reflected the themes identified in the UK qualitative literature.[33–39] Our final stakeholder workshop considered the International HIA frameworks we identified including the key factors and potential relevance to HIA in the UK. Questions included which framework might be the "best fit"? Is it good enough? How can frameworks to guide HIA be useful in the UK? Do they reflect what is known (evidence base) about the situation in the UK (qualitative themes)? This identified the challenges in using existing frameworks to develop statutory guidance for England; including the lack of national policy imperative, and the challenges in developing an effectiveness evidence base. We were not able to link the use of HIA in spatial planning directly to UK health outcomes.

4. Discussion

Summary: From 19 UK studies describing qualitative factors which influence HIA effectiveness, thirteen qualitative themes provided evidence on who to involve, what is needed, and aspects of the appraisal which should be considered in maximising the health benefits of HIAs. Our analysis demonstrates the range and relative consistency of themes and that the more recent UK studies do seem to add to those already in the earlier literature, such as the relevance and nature of relationships with developers. Therefore, evidence exists which could inform the development of statutory guidance for conducting HIA in spatial planning in England. However, this evidence is not able to link the use of HIA in spatial planning directly to health outcomes in the long or short term.

We also identified a small number of existing international HIA frameworks many of which reflected the themes identified in the UK qualitative literature. Our final stakeholder workshop identified the challenges in using existing frameworks to develop guidance for a statutory requirement for England; including the lack of national policy imperative, and the challenges in developing an effectiveness evidence base. We were not able to link the use of HIA in spatial planning directly to UK health outcomes. The qualitative themes identified in our review could however inform future discussion about the feasibility of developing the evidence base to include direct measures of health.

A significant motivator to facilitate the evaluation of HIA is to define "success" in terms of health-related outcomes. Other authors who have attempted to define success include Davenport et al. (2006)[40] who reported that "a successful HIA is one where its findings are considered by decision makers to inform the development and implementation of a policy, program or project". Bourcier et al. (2011)[41] said that HIA should "be defined by both their impacts on decisions and on the environments in which decisions are made." Haigh et al. (2013)[42] writes that effectiveness (success) can be defined as "the extent to which the HIA succeeds in bringing about the desired changes to decision making and implementation. Therefore, there is an ongoing debate what constitutes 'success' in a HIA, particularly in relation to outcomes directly related to health.

Strengths and Limitations: We focused primarily on UK evidence and the applicability of HIA in the UK planning context. This may seem to limit interest and applicability in other populations. However, our comparison with international frameworks suggests that the issues faced by the UK may be mirrored in other settings, increasing the likelihood that the findings could be considered relevant elsewhere. A particular strength of the research was the inclusion of such a large, diverse and meaningfully engaged stakeholder group. The 41 stakeholders from a wide range of organisations and interests provided significant input into the evidence included in the review and in interpreting and refining the analysis and findings, thus helping to shape the research throughout the whole review process.

Conclusions: Evidence exists which could inform the development of a statutory requirement for conducting HIA in spatial planning in England in the context of understanding what can make HIA more effective in terms of influencing decision making that leads to better health outcomes. It is challenging to see how the evidence base could develop further without a national policy requiring the use of HIA in the spatial planning process. In order to generate appropriate data to demonstrate the effectiveness of HIA in terms of health improvement, it may well first be necessary to make them an explicit requirement of the planning process and undertake suitable robust evaluation through case studies of both short term and long term impacts on population health and health inequalities.

Based on the themes we identified and the views of our stakeholders, the following recommendations for policy, practice and future research priorities should be considered.

- Effective HIAs require comprehensive teamwork, adequate resources; better integration of health into planning processes are required in order to facilitate this.
- There is a need for enhanced national policies, consistent guidance, and a stronger evidence base to support HIA policy.
- The current practice often suffers from timing issues, limited definitions of health, and difficulties in quantifying impacts. These must be addressed by further research and stronger working partnerships
- Improved training and a more integrated approach to HIAs could address these challenges and foster healthier planning outcomes.
- In reality, the opportunities to develop these needs to sit mostly with commercial developers and urban planners, however further support and funding for health care practitioners could help to facilitate this.

Author statements

Ethical approval

Due to the secondary nature of the data used in this study ethical approval was not required nor sought. For the purpose of open access, the author has applied a Creative Commons Attribution (CC BY) licence to any Author Accepted Manuscript version arising from this submission.

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Competing interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Only secondary data extracted from the references provided, and presented in the tables included here was used in the preparation of this manuscript.

Author contributions

LB was responsible for leading the project management, acting as primary systematic reviewer and drafting the paper for submission. EH acted as second systematic reviewer and commented on the draft manuscript. AC was the information specialist for the work and commented on the draft manuscript. EG acted as guarantor as the senior lead for the project and also commented on the draft manuscript. All authors commented on and agreed the revised version of the paper.

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Appendix A. Supplementary data

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