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Original Article

Promoting health and wellbeing at health precincts: a rapid review of four built environment audit tools for assessing health precincts

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Abstract

In Australia, 'health precincts' are increasingly touted as the new innovation hub. They perform important health care functions, and often incorporate vital research and innovation roles. As such, they do not only assist patients in recovery but also promote health and wellbeing to safeguard their patients, visitors and workers. Although their functions in disease care are unquestionable, less is known about whether and how health precincts promote health and wellbeing. Over the past decade, several audit tools have been developed to assess the degrees of, first, sustainability and, more recently, health promotion of individual buildings. No comparable audit tools, however, exist that can account for the role of health promotion of multi-building and multi-functional spaces like health precincts. This paper reports on a rapid review on the suitability of four existing built environment audit tools—the Health Facility Audit Tool, health impact assessments, the WELL Building Standard checklist, and the Built Environment Assessment Tool—for assessing the promotion of health in health precincts. Twenty-six papers published in English between 2010 and 2022 were included in this rapid review, many ($n = 15$) of which were critical assessment of one of the four tools. Our findings show a lack of application of such tools at the precinct scale, with many instead focusing on the city or metropolitan scale ($n = 7$) or individual office buildings ($n = 5$). For each audit tool, we report on the benefits and drawbacks highlighted. We conclude with suggestions on how these audit tools may be adapted for application at health precincts.

Keywords: health precinct, audit tools, built environment, health promotion, impact assessment

INTRODUCTION

The emergence of the COVID-19 pandemic in late 2019 contributed to a growing interest in the relationship between the built environment and human health. The 'built environment' refers to a wide range of human-made settings where people live, work and play [1]. These include buildings and parks [1], hospital structures and other fixed and semi-permanent components of health facilities where health care personnel, patients and their families must interact [2]. This is because of the (factual or perceived) increasingly important role built environment features—for example, crowding [3], poverty, racism and poor indoor air circulation [4]—have had in the transmission of COVID-19 (e.g. [5]).

Moreover, there is also growing acknowledgment of the challenges and inadequacies of health care facilities, both in terms of sufficiently responding to major health emergencies (including the pandemic, but also their role in climate change, cf. [6]) and in promoting health and wellbeing to safeguard people from overwhelming health systems [7]. Ideally, built environments should be 'salutogenic' (health-making)—a quality that already has been recognized for the natural environment (e.g. [8]) and continues to emerge for the anthropogenic environment (e.g. [9]). When we are investing billions of dollars in health precincts, they should create and sustain human and ecological health beyond the disease care system.

Health precincts are defined 'to stimulate innovation and create employment', 'a means to share facilities and administration costs, and to support and encourage the private sector to locate in regional towns and cities', 'bringing together health service providers, researchers, investors and government stakeholders into one ecosystem that can maximize and amplify the investment required to truly make a differentiated impact' [10–12]. Although health precincts and integrated care facilities may be similar in built form—being neighbourhood-sized, multi-building areas—they function differently, with health precincts more likely to take on the functions of innovations and health promotion in addition to care and other service provision, which integrated care facilities primarily focus.

The current Australian precinct thinking is predicated on economic and productivity considerations [9]. Human, social or health impacts are largely absent from considerations in precinct

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development. This is affirmed by the Australian Government's *Statement of Principles for Australian Innovation Precincts*' [13] four development principles:

- local leadership in innovation precinct development
- removal of barriers to align policy
- building up capability and connections
- coordinating skills development within innovation precincts.

Such economic and productivity-focused thinking is, however, slowly changing, with the Government Architect New South Wales [14], for example, recently releasing a design guide that not only acknowledges the role of design in health promotion, it also provides principle-based guidance on how that might be achieved at different geographic scales ranging from neighbourhood, through precincts, to individual buildings.

Health precincts are considered 'geographically based integrated care systems incorporating primary, community and secondary care facilities' [7] that collectively work as 'more than the sum of its parts' [7]. In this way, health precincts are vital health care places frequented by patients, visitors and staff from diverse geographical and socio-economic backgrounds, often for extended periods of time. As such, they provide new and unique opportunities to concentrate and disseminate capabilities for better health. There is, however, little to no available information on how this can be achieved due to currently limited research on the relationship between public open space and physical activity in non-residential contexts, including the mixed-use and mixed-patronage space of health precincts [15]. The increased risk of exposure to diseases and other hazards and the vital functions precinct workers perform to help curtail these hazards and risks mean that a health-promoting environment is even more pertinent given this increased vulnerability.

It would be helpful, at least for some stakeholders in health precinct development, to be able to access a straightforward suite of tools and/or standards that would provide direction and evidence on the impact on health and wellbeing of built health care environments. The availability of such tools would appease the perceived need of some of these stakeholders to quantify and measure processes and impacts. We do share Kent, Harris and Thompson's [16] concern that measurement is but a small dynamic piece in a political decision-making puzzle.

That said, a vast number of developed assessment and audit tools exist to examine and investigate this co-dependent relationship between the built environment and human health. These include ones developed to assess potential impacts and outcomes at the policy, program or project levels, to broader level guidelines that may be applicable to specific built environments. Whether developed by government agencies, academia or industry organizations, these audit tools are becoming highly valued for assisting designers and policymakers in identifying the current state of an area or infrastructure regarding their health-safeguarding and promoting qualities. Although often applicable to a mix of built environments, none have been specifically designed for, or applied at, specialized developments like a health precinct. Because health precincts are intermediate in the scale to individual buildings and city level, it is desirable to first look at the existing built environment audit tools designed at these smaller and larger scales to assess their suitability for health precinct assessments.

This paper aims to address this gap in existing research through a rapid systematic review of available literature on four such built environment audit tools—the Health Facility Audit Tool, health impact assessment (HIA), the WELL Building Standard checklists and the Built Environment Assessment Tool—and assess their suitability for application at health precincts. HIAs were chosen over its broader predecessor of Environmental Impacts Assessments (EIAs), from which HIAs drew conceptual foundation. EIAs are generally considered quintessential mechanisms for shaping the planning parameters of large (infrastructural and social) change proposals. Although they do cover varying perspectives and permutations of determinants of health, including environmental (soil, air, water, etc.) and social (community and settlement variables including education and mobility) determinants, their applications are considered more general and, therefore, do not explicitly aim to evaluate and frame such variables in terms of health processes and outcomes [17–19]. For that to happen, specific HIAs are pivotal. Therefore, this is a focus of our research.

In this paper, we highlight the merits and drawbacks of each of the four aforementioned audit tools. We acknowledge that although each of these four tools may have originally been designed for different stages of planning—from conception, through development approval and construction, to operation—each is also used, to varying extent, for on-going monitoring. As such, our assessments took all these stages into account, with specific emphasis on their suitability for on-going monitoring, with the longer view to developing a composite tool that can be used for initial audits as well as periodic re-assessments that may be less onerous to undertake. The findings show notable developments in built environment assessments and audits in the past decade; for example, moving beyond just the design and operations of buildings but also how and by whom these buildings are used. Further reforms may, however, be needed among the existing audit tools for them to be applicable beyond the building scale, such as at health precincts. Analysis of evidence suggests an assessment and audit tool for health precincts should include the ease of use of checklists linked in with national and international benchmarks where appropriate. It also should consist of principle-based qualitative elements that can more easily account for the more socially oriented and less tangible user experiences and outcomes of these spaces.

The audit tools

The four audit tools included in this review all have different place and purpose of origin. This section provides a brief overview of each of these tools.

The Health Facility Audit Tool was developed by NSW Health's Mid-North Coast Local Health District. It takes inspiration from the WELL Building Standard checklists, and the Heart Foundation's Healthy Active by Design Ken Design Features and Premier's Council for Active Living (PCAL) Development and Active Living – Developers Checklists. It, therefore, follows a largely quantitative approach, covering five items—health food, buildings, public open spaces, community facilities and movement networks—with further differentiations under each item. It records the presence or absence of these items only, although space is available for adding additional commentary.

HIAs as described above took inspiration from the broader EIAs. Many practical guides (e.g. [20]) have been published that provide guidance on how to establish and undertake HIAs on existing and proposed built environment projects. It is largely qualitative in nature and incorporates assessments of both health protection and health promotion by identifying health hazards (such as the use of carcinogenic materials) and health benefits (such as fresh air from cross-ventilation).

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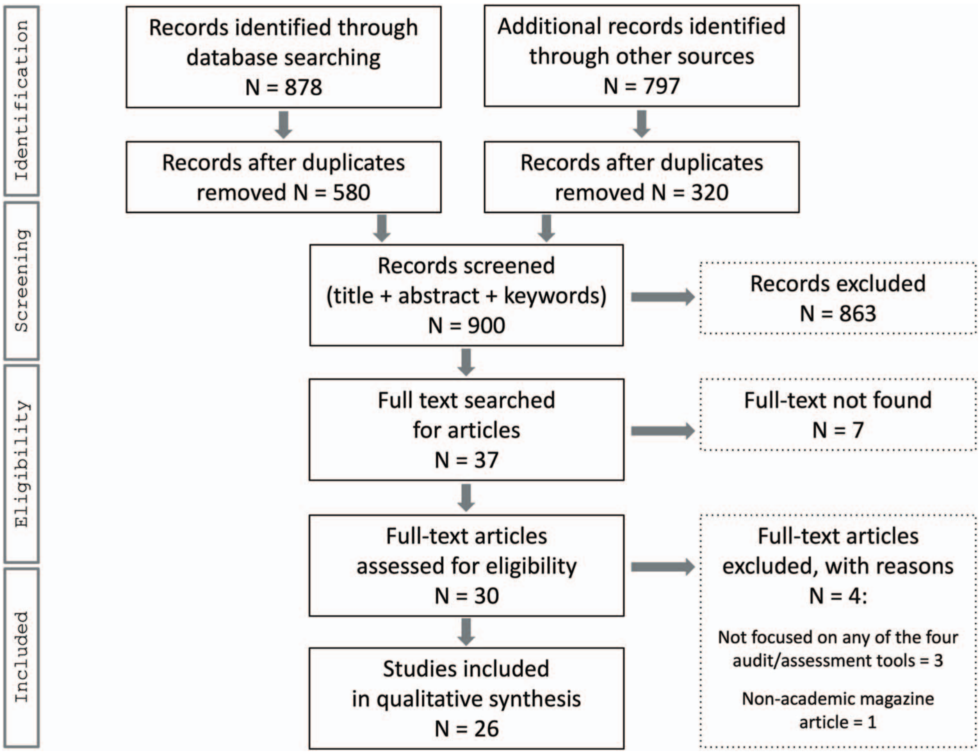

Figure 1. PRISMA diagram

The WELL Building Standard checklists were developed by the International WELL Building Institute. It is a comprehensive, quantitative measurement tool that has been updated to include a broader range of considerations. The current version (v2) comprises 122 features. The checklists are aimed at transforming the building industry to develop strategies 'to enhance human health and well-being' ([21], p.1). Like the Health Facility Audit Tool, they record the presence or absence of these items only, although space is also available for adding additional commentary. Assessments may be performed by anyone, and a certification option is available if the assessments were conducted by certified assessors.

The Built Environment Assessment Tool was developed by the US Centers for Chronic Disease Prevention and Health Promotion, with the aim to act as 'a direct systematic observation data collection instrument for measuring the core features and quality of the built environment related to behaviours that affect health, especially behaviours such as walking, biking and other types of physical activity' ([22], p. 1). Currently in its third version, it is a detailed checklist of 81 items that record a mix of presences/absences and, for a few questions, that reflect further levels of details. Item 43, for example, notes the steepness level of sidewalks by categories.

METHODOLOGY

We conducted a systematic rapid review following a protocol registered on Open Science Framework (OSF: https://osf.io/d58vh/). A systematic rapid review is an abbreviated form of a systematic review, where pre-determined methodological shortcuts allow the rapid collation of evidence while minimizing potential biases in the evidence synthesis process [23, 24]. Its validity has been proven to be similar to those of full systematic reviews that are significantly more resource-intensive [25].

Literature searches

Figure 1 presents the search and screening process as a PRISMA diagram [26]. In brief, we conducted searches for relevant literature using eight separate platforms: Scopus, Web of Science (Core Collection), Medline (via Web of Science), Embase (OVID), CINAHL (EBSCOhost), Bielfield Academic Search Engine (BASE, grey literature), Cochrane Library, ProQuest and WorldWideScience. The search strings were tailored for each platform and included combinations of keywords representing names of the four target audit tools and additional keywords related to built environment, precinct, environmental planning, health, health care, wellbeing and filtered by document type, as feasible. All used search strings and filters are shown in Table S1. We ran database searches on 19 April 2022. To find relevant studies that we might have missed, we conducted additional, forward (citing studies) and backward (cited studies) reference searches starting from the most relevant studies included from the database searches. This 'snowballing' was done using Scopus platform on 3 June 2022, and resulting bibliographic references were screened separately from the original searches. We also performed exploratory searches and used the 'related studies' function in Google Scholar to find studies similar to the already found studies that met our inclusion criteria.

Inclusion criteria

With screening records found by our literature searches, we applied pre-determined inclusion criteria, as outlined in our protocol. We included peer-reviewed articles, postgraduate theses or reports by major credible organizations (governmental, research institutes, peak bodies) that were published after 2010. We only included studies with main text published in English. The studies had to describe aspects, including advantages or limitations, of the four predefined target audit tools. We allowed any geographical focus (i.e. we did not exclude any study based on the location) so long as the studies concerned the interactions

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Table 1. List of the main study variables extracted and coded for the included studies, with relevant values

Study variable	Description
First author_year	Key (ID) of the article is created by concatenating the last name of the first author and the year published
Title	Title of article
Publication type	Type of publication, including SJR journal ranking quartile of the corresponding publication year where relevant
Audit tool	Audit tool(s) specifically discussed in the article
Geographic focus	Main countries/regions addressed in the article
Intervention target	Type of intervention reported in the article
Audit tool assessments and comparisons	Type of approach to assessing the audit tools reported
Study funding; conflict of interest	Funding sources declared in the article; conflicts of interests declared in the article

between the built environment and human health. However, we excluded studies with a narrow focus on a single health aspect (e.g. walkability, sustainability) or intervention type (e.g. pathways, lighting) or residential neighbourhoods (because health precincts are unlikely to be primarily residential). We prioritized secondary studies (reviews, syntheses of evidence), but given that for some of the target audit tools no such studies were found, we included case studies on the applications of that predefined target audit tool if they included critical assessment of the tool's performance. Where ≥20 studies eligible for inclusion in the review were identified using the combined eligibility criteria described above, we only included peer-reviewed articles.

A notable limitation of this methodological approach is that only papers written in English, published since 2010 and up until 3 June 2022 were included for consideration and assessment.

Screening process

We deduplicated and screened study records from the database searches using Rayyan QCRI online platform [27]. Two reviewers (E.L., M.L.) independently performed screening of bibliographic records using information in titles, abstracts and keywords from all records to identify potentially relevant studies by applying the inclusion/exclusion criteria described above. For the potentially relevant publications, the same two reviewers independently screened full texts. Then, from the included studies, we performed additional searches for missed papers by retrieving forward (citing studies) and backward (cited studies) references and following the analogous screening procedure to that for the main database searches.

Data extraction

For data extractions we used a data extraction sheet created in Microsoft Word and pre-tested with two included papers during protocol development. E.L. extracted the predetermined data from all included full-text studies, following the protocol. Data extraction was cross-checked by M.L. During data extraction we recorded the following study characteristics: study title, first author name, year of publication, type of study (e.g. case study, review), study geographic scope (e.g. global or specific country), main studied intervention target or aims as described by the authors, names of the audit tool described or used in a study, types of outcomes described and key study findings or conclusions. We also recorded the sources of funding for the study and noted whether the study acknowledged any conflict of interests. Table 1 presents the main extracted variables and their values.

Risk of bias in individual studies

Because included studies were very diverse in terms of the methodological approaches, we could not conduct a uniform formal assessment of risk of bias. Instead, we used the methodological approaches of the included studies as a proxy of their reliability. As such, we considered systematic-like reviews as being most reliable and potentially least biased, followed by narrative reviews, comparisons of multiple audit tools based on empirical data and studies focused on a single tool. We then used data on the sources of funding and acknowledgements of conflicts of interests as additional indicators of potential biases in the included studies.

RESULTS

A total of 26 papers were included in the final review. The main characteristics and summary of conclusions of the included studies are included as Tables 2 and 3 in Liu *et al*. [28].

These papers represent a mix of critical assessments ($n = 15$), case study applications ($n = 7$), an instruction manual ($n = 1$) and other reflections of one or multiple audit tools ($n = 3$). Given its extended history, HIAs were the most commonly reported audit tool among the included papers ($n = 16$). Ten papers reported on the WELL Building Standard checklists, either as their sole focus ($n = 8$) or in comparison with other audit tools ($n = 2$), including one with HIAs [29]. Only one included paper focused on the Built Environment Assessment Tool (its instruction manual; [22]), whereas none focused on the Health Facility Audit Tool. Such dichotomized foci on just two of the four audit tools likely reflect the higher international profiles and promotions of HIAs and the WELL Building Standard checklists than the other tools. In contrast, the Health Facility Audit Tool was largely designed for internal use by NSW Health (the health agency for the New South Wales (NSW) State Government) and is not publicized. A manual Google and Google Scholar search confirmed this lack of publicity and external applications, having yielded no further results.

The included papers covered case studies from a broad geographic range. Although most papers commonly only focused on a single country ($n = 14$), five papers included international, cross-country comparisons, whereas seven papers did not specify any particular geographic focus. Case study attention has predominantly been on Western, socioeconomically advantaged societies, especially the USA ($n = 11$), with Australia the next most common ($n = 5$). Most non-western case studies featured were part of one international comparison paper that contrasted local, national and international approaches to HIA applications [30].

In addition to broad geographic coverage, a range of built environments were also showcased throughout the included

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papers, ranging across scales and functions. Most included papers ($n = 22$) focused on the physical built form across different scales—from individual offices, through individual buildings and multi-building developments, to entire metropolises—with only two focusing on the users of these spaces [31, 32]. Three papers (all on HIAs) did not specify any particular built environment focus, instead providing a typology or history of development [33–35]. Most importantly, no papers focused on health precincts specifically, although two papers did discuss the principles of designing mixed-use precincts [29, 35].

The intervention types highlighted in the included papers also varied greatly, with policy interventions ($n = 9$) the most common, typically related to papers on HIAs (e.g. [30]). Most other papers discussed interventions concerning the design, construction and operations of different built environments, with fewer focusing on the users of these spaces, whether via specific engagement activities ($n = 2$; [35, 36]) or programs that promote and facilitate workers' general wellness ($n = 1$; [33]). Four papers did not discuss specific intervention approaches, instead highlighting (re)design potentials of the audit tools based on broader level discussions.

DISCUSSION

This section reports on the included papers' critical reflections of HIAs and the WELL Building Standard checklists, in terms of their respective usability. It, therefore, explicitly excludes discussions concerning the Built Environment Assessment Tool and the Health Facility Audit Tool, where no papers that met our selection criteria provided critical reflections of their applications. We conclude this section with our own reflections on the respective suitability of HIAs and the WELL Building Standard checklists for application at health precincts.

It is notable that the two audit tools discussed here take contrasting approaches to auditing the built environment from a health perspective. From the included papers, it was regularly highlighted that HIAs are guided by principles rather than specific, set structures. As such, it is a highly qualitative and customizable tool that can be flexibly adapted to suit specific purposes (e.g. [34, 35]). To these papers, this offers an unparalleled advantage over other existing audit tools where not only built but also non-built forms—such as an operation policy—may be easily and readily included and assessed.

At the same time, this unstructured flexibility is also highlighted as a notable downside. Because of its highly customizable nature, most HIAs then take on relatively unique forms that cannot be easily compared across studies, nor are they readily replicated whether across cases or time. For example, Nieuwenhuijsen *et al*. [37] note that, because most HIAs typically comprise few quantitative elements, this limits their potential for longer term monitoring of outcomes. This is especially when the conducting of HIAs are often highlighted as being resource-intensive both in terms of the financial investments required as well as the availability and capacity of skilled assessors. As such, most applications highlighted throughout the included papers were comprehensive assessments conducted before project development or implementation, with very few providing evidence of whether and how assessed cases continue to perform as initially designed and implemented.

In contrast, the WELL Building Standard checklists are a checklist-based audit tool, and are, therefore, decidedly more quantitative in approach. The current version (v2) involves 11 categories and 122 checklist items, ranging from design-oriented items concerning air quality and lighting; usability such as ergonomics and movements; environmental sustainability such as the materials used for construction and upkeep; to sociability and mental health promotion such as restorative spaces and diversity and inclusion practices. Its points-based approach offers a similar level of flexibility to that of HIAs, in allowing proponents to accentuate and de-emphasize individual elements as suitable to the project being assessed. Although the primary checklist is designed for building-level assessments, there are separate versions that focus on interiors, exteriors and furnishings so that different parts of the built environment may be assessed individually such as discussed in Nakamura *et al*. [31] and Taczalska-Ryniak [38]. If performed by certified professionals, the WELL Building Standard checklists offer the added bonus of certification, which can concurrently demonstrate to users in what ways the spaces have been designed to facilitate their health, as well as showcase the developers and operators of these spaces as industry leaders.

Although generally highlighted as easier to implement, and its quantitative nature more easily lend itself to cross-case comparisons, the professional certification process has also been highlighted by several papers [29, 39, 40] as costly in both financial and human resources terms. This is especially when certification may be time-limited, where upgrades and modifications would not be covered by the original certification. Further critiques of checklist-based audit tools more generally concern their common focus on the presence and absence of features, meaning that the depth and extent of impacts (whether positive or negative) may be hidden and difficult to gauge [41–43]. This includes its often lack of association with national or international benchmarks and/or minimum standards. Jones *et al*. [43] particularly highlight the drawback of the checklist approach, where the inability to measure and demonstrate anticipated benefits may prove difficult in convincing policymakers, developers and other stakeholders the value of such audits, and in turn could potentially limit their wider applications.

A further critique of both approaches is the point-in-time nature of assessment. Although a common shortcoming to most other assessments and evaluations, this may be particularly pertinent to health-focused assessments, given that some impacts—such as changes to air quality—may be more immediate, whereas others—such as improvements in mental health—may only emerge progressively over time. Some of these elements may also be less directly related to built environment designs and operations (such as that of a health precinct) but to diverse social, cultural, structural or other types of determinants of health [44]. Time-series tracking of outcomes is, therefore, needed to assist in the assessment of the realization of the anticipated outcomes of the built environment in focus over its lifespan. Repeat assessments and monitoring, however, may encounter the same financial and human resource cost barriers as discussed above, impeding appetite for over-time monitoring [29, 35].

Potential for health precinct audits

In the absence of audit tools specifically designed for assessing the health promotion qualities of health precincts, or non-residential precincts more generally, we compared the critical reflections on the more qualitative approach of HIAs and the more quantitative approach of WELL Building Standard checklists detailed above, to propose potential ways of moving forward.

Taking heed from Ross, Orenstein and Botchwey [35] regarding the potential refinement of HIAs, they noted that the benefits of 'the ability to use the output of other health assessments as inputs into the HIA process is a strategy worthy of consideration'.

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Indeed, several of the reviewed papers [29, 30, 35, 37, 45–47] highlighted that the principle-based approach of HIAs makes them more easily adaptable for broader level assessments beyond individual buildings, such as health precincts. This particularly recognizes that principle-based, qualitative elements may more easily account for the more socially oriented and less tangible user experiences and outcomes of these spaces. Given our proposal for a new, composite audit tool that is focused primarily (if not solely) on health precincts, qualitative assessments may include operational policies specific to the functions of health precincts, their coverage and potential extensions. The tool may also include provisions for other qualitative reflections, such as user experiences and case studies, whether as exemplars or as cases for improvements.

The flexibility of principle-based assessments may be complemented by some checklist-based elements to facilitate quantitative evaluations that may be more quickly and regularly monitored. This may be especially useful for elements that can be linked with national and international benchmarks to facilitate compliance fulfilment (or exceedance) as well as cross-project comparisons. To circumvent the resourcing challenges described above, some of these quantitative elements may benefit from advancing technologies and be collected through automated means, such as digital air monitors, to facilitate regular and on-going monitoring.

By comparison, elements that are more appropriately measured via qualitative means often take longer to emerge. The promotion of a socially cohesive work environment, for example, may take months or years to cultivate (e.g. [48]) and require broader inputs at the structural level beyond those of spatial designs and operation policies. As such, different qualitative elements may be assessed and updated in turn on a semi-regular basis, with a full assessment only conducted every few years, much akin to the approach undertaken by many statistical bureaus internationally where five- or ten-yearly population censuses are supplemented by smaller, representative periodic surveys. Such an approach may avoid the intense financial and human resourcing that is noted by several reviewed papers to be potentially prohibitive while facilitating recurrent updates.

The aspiration to produce a composite audit tool specifically for health precincts, and one that includes both qualitative and quantitative elements, would facilitate the measuring and monitoring of a wider range of health promotion qualities. The automating of some quantitative elements may ease the onus of repeat measurements. This could potentially free up resources for periodic monitoring of the qualitative measures that may complement the quantitative measures. An example may be the implementation and updates of air quality policies that may be complemented with the automated measurements of air quality throughout the precinct, the minimum standards of which may be updated in line with regulatory or operational changes. Another example may concern the inclusivity of internal policies that may be complemented by changes in employee, client and visitor satisfaction levels as updates are operationalized over time.

Given their neighbourhood-sized, multi-building designs that are also primarily not of residential use, health precincts, therefore, occupy a unique setting where existing audit tools or guidance may not be applicable. Taking on board aspects from tools that are generally applied to different geographic scales—such as those reviewed here—may inform the development of a new tool that can satisfy this missing middle ground of both geographic scale and purpose. The challenge remains in scaling up the building-centred tools, such as WELL Building Standard checklists, to the precinct level and integrating them into a holistic assessment that is both practical and delivers actionable insights. Similarly, more work is needed for developing semi-standardized HIAs, or the guidelines for such HIAs, that can be readily implemented at the precinct level to capture the effects of potential interventions or time-related changes in risks and benefits.

CONCLUSION

This systematic rapid review highlights the continued development and application of built environment-focused audit tools that provide guidance on how to safeguard as well as promote health within our built environments. Although these tools may have originally been designed specifically for different planning stages—from conception and design, through development and construction, to operation—most have been used, to varying extents, for periodic and on-going monitoring. Our aim, therefore, is to assess the approaches and qualities that may be combined into a new, composite tool specifically for auditing health precincts in future research.

This suite of audit tools departs from a plethora of other tools and guidelines, such as the internationally renowned Building Research Establishment Environmental Assessment Method and the Leadership in Energy and Environmental Design rating system, which promote environmental sustainability, many of which also have the added co-benefits of improving the quality of living and working environments. The four audit tools discussed throughout this article are, therefore, some of the very few health—rather than environmental sustainability—focused examples. This shift in focus to higher health consciousness is important, not least in a COVID-normal world that we now and will continue to live in, but also in demonstrating the symbiotic relationship between the built environment and health. As this systematic rapid review reveals, however, much of our understandings of this relationship remains relatively unidirectional. Specifically, that improving one—in this case, the built environment—could have positive and tangible impacts on the other—in this case, human health—rather than how the two realms may interact and be interdependent on each other. This especially concerns elements that may not be as directly related to the design and operations of built environments like health precincts, where diverse determinants of health also play critical roles.

Furthermore, there are also noted limitations on how the benefits and outcomes may be appropriately measured and monitored, to ensure that the interventions—whether from a spatial design perspective or from a policy implementation perspective—applied have and continue to achieve the desired outcomes, both in safeguarding and in promoting health. In lieu of existing audit tools that have specifically been designed to assess these qualities of the very unique, mixed-use space of health precincts, we take note of the critical reflections of studies that focused on the four target audit tools to propose a potential way forward for developing one that can incorporate the various methodological benefits while overcoming some of the associated challenges. The mixed-method approach suggested above may be developed further to filling this methodological gap.

Author contributions

E.L. conducted the rapid review and drafted the manuscript. M.L. conducted the rapid review searches and drafted the method section. A.R. contributed to the rapid review and drafted the

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introduction section. E.d.L. contributed to the introduction and edited the manuscript.

Supplementary Data

Supplementary data are available at *Oxford Open Infrastructure and Health* online.

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