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Article

Accessible and Inclusive Cities: Exposing Design and Leadership Challenges for Bunbury and Geelong

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Abstract
This article compares research identifying the systemic barriers to disability access and inclusion in two regional Australian cities, and discusses some of the leadership and design challenges that will need to be addressed by government and industry to embed universal design principles within the planning, development, and redevelopment of urban infrastructure. In Geelong, Victoria, given the often-opaque decision-making dynamics at play in the urban planning and development of cities, the disability community sought a more holistic and consultative approach to addressing access and inclusion. Systems-thinking for a collective impact approach was used to generate recommendations for action around improving universal design regulations, community attitudes to disability, access to information, accessible housing, partnerships, and disability employment. At Bunbury, Western Australia, a similar project analysed systemic factors affecting universal design at a local government level, and recommended a suite of safeguards for universal design including staff training, policies and procedures, best practice benchmarks, technical support and engagement in co-design. We describe the process followed in both studies to identify how, through collaborative and action-oriented research methods, the studies identified key technical, cultural, political, and structural changes required to achieve equitable access and inclusion in the urban landscape.

Keywords
accessible cities; Australia; Bunbury; co-design; disability; Geelong; inclusion; inclusive design; participatory action research; universal design

Issue
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1. Introduction

This article compares research from two Australian regional centres—Geelong in Victoria (Deakin HOME Research Hub, 2019) and Bunbury in Western Australia (Johnson, 2019)—that shared a similar goal of gaining recognition as exemplar cities in disability access and inclusion. We describe the collaborative and action-oriented research processes followed in both studies and discuss some of the technical, cultural, political, and structural changes identified to help achieve greater access and inclusion within the urban landscape. The projects bare comparison because of their alignment in terms of the research processes adopted, which in both cases relied on holistic understanding of their cities through wide-ranging community engagement, and the overlap in recommendations made by the studies for government and industry more widely that were aimed

at embedding universal design (UD) principles within the processes of planning, development, and redevelopment of urban infrastructure.

In Geelong, the perception of an extremely slow rate of progress being made by different tiers of government and the commercial sector to improve access and inclusion in the community, despite years of lobbying by disability advocates, suggested the need for a more holistic process to effect lasting structural change. This perception of slow progress by the "system" drew study participants' attention to the complex underlying dynamics and patterns of interaction at play in their city, and the notion that "the problem of inaccessibility is embedded within the wider socio-political processes that frame the production of space in Western societies" (Gleeson, 2001, p. 252). Systems thinking, an analytical approach to the complexity that is applied to issues, problems, and contexts where there are many possible solutions or ways of creating solutions, was harnessed into a collective impact approach to develop a deeper understanding of the complex and interdependent structural, social, economic, and political processes that obstruct or drive change.

In Bunbury, a vision to become the "most accessible regional city in Australia" (City of Bunbury, 2017, p. 7) led to a partnership between the City of Bunbury and Edith Cowan University to co-fund an industry engagement scholarship for a PhD candidate to research the barriers and enablers of disability access and inclusion at a local government level. The project used participatory action research (PAR) methods to recruit a group of people with lived experience of disability as co-researchers. They were tasked with the role of analysing structural and cultural factors impacting disability access and inclusion outcomes within the City of Bunbury. Through deliberative dialogue with key decision-makers at the City of Bunbury, and framework analysis of the data gathered, the group identified significant technical and cultural barriers operating at the design stages of public infrastructure that were leading to inaccessible design outcomes and the experience of being "disabled by design."

This article describes the processes followed in the Geelong and Bunbury studies to uncover key cultural and systemic themes related to UD and discusses the various recommendations made by both studies for embedding and safeguarding UD in public-realm design processes, including enhancements to regulatory standards, best practice benchmarking, staff training, accreditation, disability awareness, policies and procedures, and leadership and advocacy. At the heart of this comparison is understanding the very nature of making a change in the context of the seemingly insurmountable challenges facing people with lived experiences of disability within Australian cities.

While both projects were conceived of independently, they commenced with strikingly similar aims—reflecting a broader increase in societal responsiveness towards disability access and inclusion. The City of Bunbury's aspiration in 2014 was to become the most accessible regional city in Australia, a goal underpinned by a desire to understand how disability access and inclusion in Bunbury compared to other similar-sized regional cities in Australia. This effort was restrained by the lack of reliable indicators by which a local government could conduct a comparative baseline self-assessment regarding their progress towards disability access and inclusion.

Five years later, the Accessible & Inclusive Geelong Feasibility Study sought to ascertain the feasibility of making Geelong "a world-class accessible and inclusive city aligned with global benchmarks" (Deakin HOME Research Hub, 2019, p. 2). Like Bunbury's aim, this was a highly aspirational goal that was difficult to evaluate progress towards. During the early stages of the project, a review of global evidence on benchmarking accessible and inclusive cities found that, when it comes to measurement, accessibility is a slippery concept even when applied only to the built environment. While the United Nations Convention on the Rights of Persons with Disabilities (United Nations, 2007) did much to set an agreed definition of inclusion and equal access, the most direct explanation of built environment accessibility defines access only in terms of "equal" access, the elimination of "obstacles and barriers," the "implementation of minimum standards and guidelines," and the provision of "appropriate forms of assistance and support" (United Nations, 2007, Article 9). Measuring inclusion might be said to be even more boundless than accessibility, and there is certainly no agreed method (Neely-Barnes & Elswick, 2016).

Taken together, the lack of clarity about the concepts of accessibility and inclusion poses significant difficulties when applied to the task of defining the characteristics of an accessible and/or inclusive city. Without clear goals and baseline assessment, the achievements of both Bunbury and Geelong would be difficult to compare against other cities. However, both projects recognised an opportunity to instead focus attention on uncovering the often hidden and complex dynamics of decision-making that were leading to inaccessible and discriminatory design outcomes in the first place and thereby identifying key strategies that could facilitate lasting structural and cultural change with UD as the central focus.

2. Background

2.1. Models of Disability

People with disabilities have historically been stigmatised and segregated from the rest of society, mainly due to pervasive negative societal attitudes and barriers encountered in the built environment (National People with Disabilities and Carer Council, 2009). As we shall summarise here, the root of such discrimination originates in the way disability has been socially and culturally constructed through public discourse over the past 100 years.

During the 19th century, disability was largely constructed as a personal tragedy or the result of individual moral transgressions. Disability was considered a burden to be endured and even a eugenical threat to society (Mathieson et al., 2008). The dominant charitable response to disability was through the benevolent provision of institutional care (e.g., convalescent homes) for the physically "disabled," and asylums for the mentally "impaired." The charity model, which typically involved forms of dislocation from one's family and community, led to people with disabilities being kept "out of sight, out of mind." Effectively, this removed any pressure from designers of the public realm to provide accessible or inclusive environments outside of the specialised institutions, asylums and convalescent homes provided for the elderly or "infirm" (Imrie & Imrie, 1996; Kitchin, 1998; Mathieson et al., 2008).

Advances in medicine, together with two world wars causing widespread injury-related disability in the general population during the early part of the 20th century, saw a conversion or redevelopment of many asylums into medical hospitals. The medical model offered people with an impairment the hope of rehabilitation and reintegration into the community, but also saw a massive rise in numbers of people with permanent disabilities effectively removed from society. From the 1960s, Western governments began to re-integrate people with disabilities back into their families and communities, leading to the widespread closure of institutions (Carling-Jenkins, 2014; Cocks et al., 1996). However, after being "locked in" for so many decades, many people with disabilities now found themselves effectively "locked out" of society due to the overwhelming prevalence of physical and attitudinal barriers—an experience that lingers even up to the present day (National People with Disabilities and Carer Council, 2009).

In 1981, the United Nations began raising concerns about the global phenomenon of inaccessible urban landscapes and began to develop strategies for removing physical and social barriers to full participation in the community (United Nations, 2004). The social model of disability, developed from the late 1970s through to the 1990s, reframed the problem of disability by challenging charitable and medical model discourses that constructed disability as resulting entirely from personal tragedy or individual impairments. The social model instead critiqued the cultural and structural shortcomings in society that compounded impairment and even created it. Social model proponents argued that people experience impairment as a normal, expected condition of life, but that they become "disabled" by society when barriers manifest in the form of physical barriers and attitudinal prejudices (Oliver, 1990). The social model strongly influenced the creation of Australia's first National Disability Strategy (2010–2020), which aimed to unite state and federal governments with the purpose of removing barriers to a full and inclusive life for citizens with disability (Australian Department of Social Services, 2011).

More recently, the universalist model of disability, as an evolution of the social model, defined ability in terms of a diverse spectrum, challenging the common binary of "disabled" and "non-disabled" (Bickenbach et al., 1999). This shift has had significant implications for public-realm design by positioning diversity as a core consideration for all design projects rather than an adjunct and adding an imperative to carefully consider the full spectrum of human abilities and limitations in all public-realm design (Australian Network on Disability, 2015).

2.2. Disability Participation in Built Environment Design

According to Owens (2015), no policy should be developed, or course of action taken without the full and direct participation of those who will be affected. People with disability should therefore be actively involved in design-related policy developments and decision-makings that enable them to defend their rights and lifestyles (Baum et al., 2006). Accordingly, researchers, architects, and urban planners have highlighted the need to foster participation in urban design by people with disability. It is argued that the presence of people with disability in informing the design of the built environment as valued partners and experts will mitigate the adverse stereotyping of disability and promote wider cultural and social acceptance of disability as a normal human condition (Nirje, 1985; Wolfensberger et al., 1972), and, in turn, lead to empowerment (Taket et al., 2013).

When people with disability are partners in the process of designing public spaces, via processes known as co-design or participatory design, public-realm design becomes a natural expression of an inclusive and participatory culture. Such co-design is described as a "reflexive dialogue" where the designer tries to shift the existing scenario into an optimal scenario through collaboration with key end-users (Sarmiento-Pelayo, 2015), a process leading to trust, dependability, and increased social capital (Ho et al., 2011). Yet there are significant hurdles to including people with disability in design, such as social isolation, their long history of oppression, time or energy constraints, and physical barriers to participation, to name only a few. However, Cook (2002) suggests that people with disabilities are perceived as "hard to reach" not so much because of their impairments, but because of the unwillingness or inability of authorities to make accommodations and involve them in decision-making processes in the appropriate manner.

2.3. Regulatory Framework

It is worth reviewing the role of planning frameworks and design guidelines in setting and implementing standards for accessibility in the built environment. Under Australian legislation, the major federal law relating to access to built environments is the Australian Disability Discrimination Act (1992). This act stipulates that a person may not be discriminated against by denying them

access to or use of public premises unless such barriers existed previously or removing them would impose "unjustifiable hardship" on the owner of the premises. In 2010, the Australian government committed to codifying individual rights to access public premises. Today, the Building Code of Australia sets minimum standards for building design and construction throughout the country. The standards are currently being reviewed so that they are consistent with the requirements contained within legislation, particularly the 1992 Australian Disability Discrimination Act. A common criticism of the Building Code of Australia is that it does not encourage developers and designers to go beyond the "minimum'' standards it sets, to the degree necessary for creating built environments that are universally accessible (Hamraie, 2017).

As part of the Geelong study, a review of all planning regulatory documents relevant to the region was undertaken. This review highlighted that while these 25 documents mentioned "access" over 700 times, they did not always define or necessarily mandate this principle for the built form of planning over the region. This deficiency echoes the situation in most locations across Australia. For instance, the Planning and Environment Act (1987) and the Victoria Planning Provisions do not define the term "accessible." Whilst definitions of access and inclusion remain ambiguous in principal planning frameworks, local governments commonly try to embed equality and rights in their local plans. For instance, the vision of the Geelong Access and Inclusion Plan is to "uphold the rights of equal and dignified access for everyone while setting out how we will work towards full equality for people with a disability to participate and be included in our broader community" (City of Greater Geraldton, 2018, p. 5). While the design of the built environment, access to public spaces and services, and decision-making process for those of all abilities are consistent concepts across these plans, they often lack precision (Johnson, 2019).

Out of new conceptions of disability as diversity has come strong advocacy for new approaches to built environment design for disability. Two commonly advanced approaches are worth describing here for their prominence in the results of the research described in this article: UD and co-design. UD, also known as "inclusive design," "design for all," "accessible design," or "barrier-free design" (Persson et al., 2015), is defined as "the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design" (Mace et al., 1991, p. 7). The message behind UD is that the full range of human diversity can, and therefore should be, anticipated in design and that public-realm designers should seek to educate themselves about the spectrum of human abilities (Steinfeld & Maisel, 2012) and "learn from the margins" (Rappolt-Schlichtmann & Daley, 2013, p. 311). Despite the growing acceptance of UD principles, their use in practice is still in its early stages (Steinfeld & Maisel, 2012). A prime aim of UD is to far exceed minimum standards as a means of reducing discrimination and enhancing social participation. This approach to design is called for internationally by the United Nations Convention on the Rights of Persons with Disabilities (United Nations, 2007) and, in Australia, by a range of national, state, and local policy directives.

3. Method

3.1. Principles and Methodology

For both studies, principles of inclusion, participation, and collaborative inquiry provided a methodological starting point to inform data collection. In Bunbury, PAR was used to engage people with lived experience of disability as co-researchers, who together investigated the barriers and enablers of UD within the City of Bunbury local government authority. PAR positions the traditionally powerless and oppressed as researchers and activists, engaged in a concurrent process of learning, sharing, and influencing. It also shares control over how the data is interpreted and applied, with the expectation that findings and recommendations will be acted upon within the immediate setting, rather than generalised and decontextualised for use in other settings. Even the process of inquiry itself can catalyse immediate action, without waiting months for the data to be translated, which is part of the intentionally transformative effect of PAR (McIntyre, 2008).

Similarly, in Geelong, an emancipatory and inclusive research approach provided a conceptual, ethical, and methodological starting point that necessitated the inclusion of people with disability throughout. This approach ensured that the issues examined were those identified by people with disability and that the outcomes would be owned by and more easily translated to inform social change by people with disability themselves. Furthermore, systems thinking was applied to the data collected, based on the principle that undesirable system behaviours (such as inaccessibility and social exclusion) can be identified and corrected through structured analysis that does not try to examine individual problem factors in isolation, but rather as parts of an interconnected whole. This framed the data analysis process by helping participants to connect individual or local concerns with larger cultural and systemic issues such as deficiencies in government decision-making, leadership, resource allocation, policies, regulations, and so on (BeLue et al., 2012). The methodology offered three key advantages: (a) directly sharing knowledge and experience between people with and without lived experience of disability on the barriers to accessibility and inclusivity, (b) allowing diverse stakeholders to generate a mutually agreed plan of action for overcoming city-scale obstacles to accessibility and inclusivity, and (c) maximising sustainability of change through collective impact, by providing an opportunity for positive

attitude shift towards disability in the process of conducting the research.

3.2. Data Collection and Analysis

Two modes of primary data collection were used in Geelong: three systems thinking workshops using the systems thinking in community knowledge exchange (STICKE) tool, and focus groups with people with lived experience of disability. STICKE workshops are based on the group model building methodology, which guides stakeholders through a series of participatory tasks to examine their mental models (cognitive representations of interdependent causes and effects) of a given situation or problem. Here, a series of four guided activities was facilitated by a team of 21 trained researchers across the three workshops: (a) introduction to the nature and scope of the problem, (b) identifying the various factors contributing to the problem over time, (c) identifying the interconnections between those factors, and (d) after being given theoretical background on how to identify potential points for intervention within causal loop diagrams, generating and prioritising actions to overcome the obstacles to change highlighted by these intervention points. Next, Meadows's (1999) framework of leverage points in systems analysis was used to evaluate the priority actions identified in the systems thinking workshops. Leverage points denote places within a complex system where interventions can be staged. Meadows (1999, p. 1) termed these "points of power." For this evaluation, each priority action was allocated by the research team (via a workshop) a value between 12 and 1, from *tinkering* (the least effective, given a 12-point value) to *paradigm-shifting* (the most effective, given a 1-point value). After all actions were allocated a value, Malhi et al.'s (2009) intervention level framework was used by the researchers to collapse the 12 leverage points into five corresponding intervention levels—paradigm, goals, systems structure, feedback and delays, and structural elements. These five levels were further synthesised by the research team into five themes that could be readily narrated and disseminated for validation back to participants with lived experiences of disability in focus groups. This process allowed participants with a range of abilities to assess the analytical process performed by the research team and assess the wider stakeholder evaluations made in the STICKE workshops.

In the Bunbury project, data collection involved the recording of a facilitated dialogue between participants using a method known as "deliberative dialogue," to identify current experiences of barriers encountered within the urban landscape and how the City's design culture and practices were creating or eliminating barriers. Not unlike the processes of consensus building used in systems thinking, deliberative dialogue is a process of inquiry that involves "listening deeply to other points of view, exploring new ideas and perspectives, searching for points of agreement, and bringing unexamined assumptions into the open" (London, 2005, p. 1). Deliberative dialogue aims to move discussion between stakeholders "beyond the clash of opinions and arrive at a deeper and shared level of understanding" (London, 2005, p. 3) so that by actively thinking together, weighing the strengths and weaknesses of alternative points of view, and searching for a common understanding, new approaches to dealing with seemingly intractable problems become apparent. This occurred over a 12-month period. The results were analysed using framework analysis, a form of "thematic analysis" or "qualitative content analysis" (Ward et al., 2013), to identify thematic links and associations in the qualitative data, examine relationships between different parts of the data, and draw descriptive and/or explanatory conclusions clustered around themes (Gale et al., 2013). The themes identified via the process were used to guide further inquiry in an iterative process, and to generate key findings and recommendations.

3.3. Stakeholders/Participants

In Bunbury, two key participant groups were identified: co-researchers (people with lived experience of disability; n = 11) and city informants (City of Bunbury employees or councillors with influence over public-realm design decisions; n = 32). The co-research group was made up of six people with disabilities, three parents of people with disabilities, and two support workers, making 11 participants altogether. All group members had lived experience of physical, sensory, or cognitive impairments resulting from spinal injury, stroke, learning difficulty, autism, low vision, or cerebral palsy. City informants were City of Bunbury employees occupying positions ranging from chief executive officer to on-the-ground technical officers, who held decision-making power in relation to urban development or redevelopment and associated services.

In Geelong, stakeholders from a range of backgrounds were recruited. To gather a comprehensive understanding of the factors influencing the accessibility and inclusivity of Geelong, it was important that the sample was diverse and included people of a range of ages, professions, and abilities. Participants in the STICKE workshops (n = 49 in total across three workshops) were drawn from disability support organisations, service providers, and key government personnel. Three focus groups were held with a mix of persons identifying as having a disability and living with a range of physical, cognitive, and sensory impairments. Each focus group was made up of members of the local community: a customer reference group for a disability support provider with 12 participants, six local members of a support group for survivors of stroke and acquired brain injury, and seven representatives from a project taskforce set up from the beginnings of the project to regularly advise the research team.

4. Findings

This section compares key findings and recommendations from the Geelong and Bunbury studies, especially as they relate to urban planning and development in regional cities. Both studies were catalysed by a similar intent: to achieve the highest standard of accessibility and inclusion in relation to other regional Australian cities. Upon commencement, both research groups encountered the same problem: Standardised measures of accessibility for urban landscapes and social inclusion did not exist. An analysis by the Geelong study of documented initiatives revealed few concrete, measurable recommendations, timelines, evaluative criteria and/or budgets related to accessibility, with poor integration across initiatives, frequent duplication, and gaps in coverage. The Bunbury study likewise found that existing measures for promoting access and inclusion at a local government level (such as disability access and inclusion plans and related committees and reporting mechanisms) lacked efficacy in guaranteeing consistency in UD outcomes, particularly as they had no power of compulsion beyond mandated Australian design codes.

4.1. Overview of Geelong Study Recommendations

The Geelong study identified five key principles of action to inform progress towards an accessible and inclusive city:

1. Adopt inclusive co-design and co-research approaches for the development, implementation, and evaluation of actions;
2. Embed principles of UD into the implementation of all actions;
3. Ensure built environment improvements and provision of affordable and appropriate housing, dedicated services, and employment are available for all, especially in areas with high immediate demand;
4. Prioritise attitudinal change towards inclusion and access;
5. Adopt inclusion as a core value for Geelong.

The study further identified six priority actions:

1. Regulations: Improve planning legislation and other regulatory measures to define and safeguard access and inclusion within the planning framework;
2. Attitudes: Raise awareness of and improve attitudes towards access and inclusion across different policy initiatives, platforms of communication, events, and spaces;
3. Information: Establish a Geelong accessible visitor and information centre run and managed by people with disabilities, with accessibility support staff, as an exemplar of the five principles of action;
4. Housing: Increase the supply of accessible and affordable public and community housing;
5. Partnerships: Increase business groups' collective participation in developing initiatives around inclusion;
6. Employment: Raise expectations and aspirations of employment and economic participation by co-designing work arrangements with people with disability.

4.2. Overview of Bunbury Study Recommendations

The Bunbury study developed recommendations based on a proposed model of "universal public-realm design" intended to embed and safeguard UD in public-realm design and development activities, particularly at a local government level. The model consists of five concurrent actions:

1. Co-design: Engaging people with lived experience of disability in co-design opportunities on a regular and structured basis;
2. Training: Upskilling all design practitioners in UD principles and general disability awareness through accredited training;
3. Technical support: Routinely engaging qualified UD technical specialists (for example, access consultants) as informants in complex public-realm design work;
4. Benchmarks: Capturing and standardising best practice benchmarks for UD over and above minimum mandated standards;
5. Procedural safeguards: Developing or enhancing design-related policies and procedures to include checklists, inspections, reporting, and other accountability mechanisms that ensure all design and development work is consistent with UD principles.

Based on the research in Geelong and Bunbury (Deakin HOME Research Hub, 2019; Johnson, 2019), the recommendations of both studies are listed and compared in Table 1.

5. Discussion

This section will discuss some of the key themes shared across both studies, including a range of recommendations related to technical, structural, and leadership improvements intended to embed and safeguard the practice of UD in urban planning and design activities.

5.1. Regulatory Standards and Best Practice Benchmarking

Both studies identified an urgent need in Australia for a more comprehensive suite of mandatory standards for accessibility to be applied to the built environment,

Table 1. Summary of recommendations.

Aspects	Bunbury	Geelong
Co-Design	Enable people with disabilities in decision-making about public infrastructure through co-design on a regular and structured basis	Co-design as a valuable and impactful method to achieve complex aspirational goals by engaging people with disabilities as partners in the development of a regulatory framework
UD	UD as an important and relatable concept to revolutionise public-realm design	UD as a means of overcoming access inequalities to the built environment
Benchmarks	Develop best practice benchmarks for similar design contexts over and above minimum mandated standards	Establish benchmarks for Geelong to become a world-class accessible and inclusive city
Incentives/Accreditation	Incentives for achieving beyond minimum standards	Incentives for achieving increased accessibility
	Information and assurance to the public through accreditation	Recognise best practices of world-class levels through accreditation
Employment/Economic Participation	Equal employment opportunity policy in place with innovations in employment and progress towards the "most accessible regional city in Australia" aspiration	Engage people with disability to identify current barriers to participation in employment and the economy

based on UD principles. In some design scenarios such as housing, public transport, tourism, and public facilities, existing standards were seen as totally insufficient for safeguarding best practices in UD, as they overlook too many elements within the design scenario and fail to adequately ensure that people experiencing a range of impairments can access public spaces with confidence. In many instances, no mandatory guidelines exist to regulate, for example, accessible museum and art gallery exhibits, accessible gyms, or even minimum levels of accessibility in new private dwellings (although that last issue is currently being addressed through the adoption of the Liveable Housing Guidelines in Australia). However, it was recognised that mandatory standards can have the unintended effect of creating a "compliance mentality," whereby compliance with minimum mandatory standards is valued above setting aspirational targets and incentives for UD. It was further suggested that compliance frameworks may negate in some minds any need for further consultation or co-design with people with disabilities.

Developing "best practice benchmarks" was suggested as an interim measure to provide guidance with, for example, streetscapes (to include elements like universally accessible drink fountains, barbeques, picnic benches, and wayfinding signage), playgrounds (including accessible play equipment, shade, footpaths, picnic facilities, and so forth), public transport (including accessible station platforms, bus stops, footpaths, information, and customer service), and a range of other scenarios. A key issue identified with aspiring to UD was the current absence of published guidelines over and above the minimum mandatory standards. One possibility suggested to progress this was that organisations such as local, state, and federal governments could take the initiative to document and implement new best practice guidelines for UD within their own scope of practice, either developed in-house or by a third party (such as the Access Institute of Australia) or developed and disseminated by a peak body organisation such as the Australian Local Government Association. These benchmarks would not be intended to become mandatory in the short term but might inform regulated standards in the future. Notably, in 2019, the City of Bunbury did adopt UD benchmarks for the built environment developed by the Access Institute of Australia to apply to their own buildings and facilities, but these benchmarks were only made available as part of the institute's training program or for a fee via their website.

Better standards and benchmarks for UD in the built environment may help to make a comparative evaluation possible between cities, and it was suggested that any city-scale accessibility evaluation should include both quantitative and qualitative (user-centred) indicators of mobility, proximity, connectivity, affordability, convenience, and social acceptability. It was also observed that measuring social inclusion is more elusive and would entail the development of multiple indicators of user perception, to help create cities that move beyond a focus of "being present here" to one of "belonging here."

5.2. Training, Accreditation, and Awareness

Both studies recognised that societal attitudes to disability in Australia, while greatly improved over past decades, remain generally negative and discriminatory (according to study participants and a range of research papers and reports cited within the studies). Such negative attitudes tend to translate into inaccessible built environments through low priority given to UD, and a general lack of understanding and awareness of the technical measures needed to achieve it. Compounding this problem, both studies observed that UD principles were not consistently included in design-related training courses at college or university, leading to significant technical skills gaps and a lack of awareness. Furthermore, while some organisations such as the City of Bunbury were now routinely training staff in disability awareness, and occasionally in the technical aspects of UD (depending on role), the frequency and quality of such training were not regulated and so tended to be sporadic.

To address this training deficit and lessen the UD knowledge gap, a few options were identified. One option was to introduce UD accreditation for employees with design responsibilities, similar to the manner in which local government engineering staff are currently required to maintain certain technical competency "tickets" through ongoing professional development or refresher courses. Another recommended option was the systematic use of accredited access consultants to help inform UD in built environment projects, which was otherwise found to occur in a somewhat ad-hoc manner. A further option identified was to develop a system of accreditation (like a star rating system) for buildings, streetscapes, and public amenities, which would provide for certification of compliance with a prescribed level of accessibility, and in the process of audit, systematically identify measures that could be taken to reach a higher level of accreditation.

Finally, both studies identified the need for people with disabilities to be informed and empowered through access to information about accessibility features and inclusion opportunities in their local communities. For Geelong, an idea was proposed to build an accessible visitor and information centre that would be managed by and for people with disabilities, as a centralised resource. Bunbury participants likewise identified difficulties in accessing information, especially in wayfinding, accessible parking, and inclusive activities and events, and suggested a range of improvements based on UD principles, such as improved wayfinding signage, accessible parking maps, promotion of accessible and inclusive event features, and so forth.

5.3. Co-Design

Co-design with people with lived experience of disability was recognised as a critical strategy in addressing inaccessibility in the built environment and recommended by both studies as a key strategy for achieving UD across built environments and social inclusion endeavours. Co-design was recognised as a "deeper" form of engagement than the types of stakeholder consultation that often occur with so-called "special interest groups," like people with disabilities. Co-design is described as involving end-users as partners in the design process from beginning to end, and even as part of the design team with shared responsibility for decision-making (depending on the scope of the design project and the willingness of the organisation to share control). In a co-design framework, people with disabilities are viewed as possessing valuable and essential expertise, derived from lived experience, that can be brought into dialogue with traditional forms of design expertise gained through technical training and professional experience, and harnessed towards producing a universally accessible urban landscape. Co-design, it was observed, ought to involve people experiencing a diverse range of impairments (including physical, sensory, and cognitive impairments), as well as those who support them, such as family members, support workers, occupational therapists, advocates, and so forth, who are not only concerned with individuals' physical constraints but also with the social, attitudinal, and legislative parameters. The Geelong study recommended that co-design could permeate urban design by further engaging people with disabilities as partners in the development of regulatory frameworks, including policies, procedures, standards, best practice benchmarks, auditing tools, auditing activities, staff training, and other measures that embed UD into organisational culture and practice.

The Bunbury study recognised that competent facilitation is likely to be critical to the success of co-design, whether facilitated by members of a project team or by suitably skilled and qualified third parties (such as a community development officer in the local government context). It was argued that the success of co-design may depend almost entirely upon the quality of the relationships that can be established and maintained by the process facilitator, who must be capable of engendering trust and confidence and adept at knowledge translation. It was also recognised that most people with disabilities engaging in co-design will need opportunities to be educated about design, and designers educated about disability, for dialogue to be constructive. Concerns were acknowledged around the risk posed by the widespread integration of co-design in slowing down development project approvals and introducing additional steps into an already tight and complex process. It was suggested that the need for intensive co-design could be lessened over time if, through the process of each co-design project, new benchmarks for best practice in UD were reliably documented and consistently implemented in future similar projects. Finally, it was suggested that co-design is unlikely to succeed as a mainstream practice without significant changes to funding and policy frameworks, workforce skill levels, and an

embracing of technologies such as sophisticated online engagement tools.

5.4. Policies and Procedures

Both studies called for new policy measures to safeguard UD, including improvements to existing policies and procedures or the introduction of further measures. The Geelong study provides some specific examples of state-level policy measures that could be implemented, including a new Access and Inclusion Policy embedded within the Principal Planning Framework, a review of the Apartment Design Guidelines for Victoria, a new decision-making criterion regarding access for all abilities, and the implementation of a new Local Planning Policy. The Bunbury study looked at the City of Bunbury's Purchasing Policy and found that it did not require staff members to be accountable for UD as it did for cost, safety and durability when justifying the purchase of goods or tendering of services. A range of other policies, procedures, technical manuals and strategies (such as the City's Public Open Space Strategy) were found to be in need of review and re-alignment with the City's aspiration of becoming fully accessible, by introducing additional checks and balances for UD.

One limitation noted was that while the City of Bunbury was willing to introduce more stringent policies and procedures to impose higher measures for accessibility on its own internal development projects, it was powerless as a local government authority to place any additional requirements upon private or commercial development applications beyond the applicable Australian Building Codes or other existing state or federal regulations, because any additional requirements not in the codes could be legally challenged—and likely would be due to perceived additional costs on the part of developers. It was determined, however, that local governments could play a role in educating commercial and private developers about the benefits of UD and could potentially offer incentives, such as a density bonus or reduced setbacks or other development incentives, should they meet stipulated UD measures.

Finally, it was recommended across the two studies that additional policies and procedures be implemented at every level of government to enhance built environment regulatory standards, support best-practice benchmarking, increase technical training, introduce accreditation, and mandate co-design. To be effective, these policy measures would need to be complemented by adequate resources.

5.5. Leadership and Advocacy

Both studies called for "facilitative leadership" and increased availability of resources to implement the recommendations identified, particularly from federal, state, and local governments, and to eliminate barriers within existing community infrastructure by means of a planned approach to auditing, shortlisting, and rectifying (in collaboration with people with disabilities). The Geelong study went further to recommend the establishment of a government-supported "transition leadership council" to drive the vision for an accessible and inclusive Geelong over a 10-year period, supporting applicable authorities to schedule a plan of action based on the evaluation of the actions proposed.

It was also suggested that high-profile disability advocates could be employed to engage policymakers and increase the profile of disability access and inclusion at a political level. As part of fostering leadership from both above and below, both studies recommended that organisations work to identify and cultivate local champions for access and inclusion, including from within government and within local communities. These champions, it was noted, are often already active, but need support and recognition for their efforts in promoting access, inclusion, and collaboration towards UD. It was also suggested that supportive signals be sent from leaders about their expectations of employees with respect to co-design, in tandem with policy and procedural measures, training, mentoring, and key performance indicators.

6. Conclusion

This article compared research identifying the systemic barriers to disability access and inclusion in two regional Australian cities. Both projects used participatory processes to engage a wide range of stakeholders, including many with lived experience of disability, in an exchange of ideas that linked physical barriers in the built environment with systemic barriers in design policy and leadership. This resulted in inclusive, emancipatory research and engagement able to seed deliberative dialogue and collective impact. In Geelong, a systems-thinking approach enabled the collaborative identification of principles and strategies for addressing access and inclusion across a range of domains, including regulations, attitudes, information, housing, partnerships, and employment. At Bunbury, PAR was used to empower people with lived experience of disability to engage key informants within local government, resulting in a range of systemic recommendations for safeguarding UD, including co-design, training, technical support, benchmarks, and procedural safeguards. When overlaid, the two studies revealed a number of opportunities for systemic improvement at technical, structural, and leadership levels to embed and safeguard UD and thereby transform urban design.

Geelong and Bunbury exist as microcosms of broader Australian and international urban landscapes and present typical challenges for governments and industry from a UD point of view. This comparison of the two independent studies has highlighted the factors that impact UD and social inclusion outcomes, including leadership, design culture, and design safeguards. Lasting structural

and attitudinal change is required to overcome the current state of play, in which people with disabilities are distanced from the design of the world around them, and treated as an aberration or special interest group, rather than as part of the "norm" or "mainstream." These studies show that such change can best be informed, catalysed and implemented if people with lived experience are central to every stage of change. Moreover, such an inclusive approach can have the advantage of building more positive attitudes to disability through direct knowledge exchange between people with and without disabilities. Lastly, access and inclusion for all are fundamentally a design challenge that will involve explicit strategies on the part of governments and industry to embed co-design and strengthen UD safeguards. Stronger leadership is required from all levels of government to foster UD through policy development and collaborative knowledge exchange.

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Conflict of Interests

There is no data associated with this research beyond the referenced literature. The authors declare no conflict of interests.

References

Australian Department of Social Services. (2011). *National disability strategy (NDS) 2010–2020*. https://www.dss.gov.au/our-responsibilities/disability-and-carers/publications-articles/policy-research/national-disability-strategy-2010-2020

Australian Network on Disability. (2015). *Design for dignity guidelines*. https://designfordignity.com.au/wp-content/uploads/2016/08/Design_for_Dignity_Guidelines_Aug_2016.pdf

Baum, F., MacDougall, C., & Smith, D. (2006). Participatory action research. *Journal of Epidemiology and Community Health*, *60*(10), 854–857.

BeLue, R., Carmack, C., Myers, K. R., Weinreb-Welch, L., & Lengerich, E. J. (2012). Systems thinking tools as applied to community-based participatory research: A case study. *Health Education & Behavior*, *39*(6), 745–751.

Bickenbach, J. E., Chatterji, S., Badley, E. M., & Üstün, T. B. (1999). Models of disablement, universalism and the international classification of impairments, disabilities and handicaps. *Social Science & Medicine*, *48*(9), 1173–1187.

Carling-Jenkins, R. (2014). *Disability and social movements: Learning from Australian experiences (interdisciplinary disability studies)*. Ashgate.

City of Bunbury. (2017). *Disability access and inclusion plan 2017–2022.* https://cdn.bunbury.wa.gov.au/wp-content/uploads/2022/06/Disability-and-Access-Inclusion-Plan-2017_2022.pdf

City of Greater Geraldton. (2019). *Access and inclusion action plan 2018–2022.* https://www.geelongaustralia.com.au/common/public/documents/8d64bac244b54eb-accessandinclusionactionplan2018-22-endorsed.pdf

Cocks, E., Fox, C., Brogan, M., & Lee, M. (Eds.). (1996). *Under blue skies: The social construction of intellectual disability in Western Australia*. Centre for Disability Research and Development.

Cook, D. (2002). Consultation, for a change? Engaging users and communities in the policy process. *Social Policy & Administration*, *36*(5), 516–531.

Deakin HOME Research Hub. (2019). *Accessible and inclusive Geelong project*. https://deakinhomeresearchhub.com/aig

Gale, N. K., Heath, G., Cameron, E., Rashid, S., & Redwood, S. (2013). Using the framework method for the analysis of qualitative data in multi-disciplinary health research. *BMC Medical Research Methodology*, *13*(1), Article 117.

Gleeson, B. (2001). Disability and the open city. *Urban Studies*, *38*(2), 251–265.

Hamraie, A. (2017). *Building access: Universal design and the politics of disability*. University of Minnesota Press.

Ho, D. K., Ma, J., & Lee, Y. (2011). Empathy @ design research: A phenomenological study on young people experiencing participatory design for social inclusion. *CoDesign*, *7*(2), 95–106. https://doi.org/10.1080/15710882.2011.609893

Imrie, R. F., & Imrie, R. I. R. (1996). *Disability and the city: International perspectives*. SAGE.

Johnson, A. (2019). *Disability access and local government: Co-researching the City of Bunbury's aim to become the most accessible regional city in Australia* [Doctoral dissertation, Edith Cowan University]. ECU Research Online. https://ro.ecu.edu.au/theses/2248

Kitchin, R. (1998). "Out of place," "knowing one's place": Space, power and the exclusion of disabled people. *Disability & Society*, *13*(3), 343–356.

London, S. (2005). Thinking together: The power of deliberative dialogue. In R. J. Kingston (Ed.), *Public thought and foreign policy: Essays on public deliberations about Americans' role in the world*. Kettering Foundation Press.

Mace, R., Hardie, G., Place, J. (1991). *Accessible environments: Toward universal design*. Center for Accessible Housing. https://mn.gov/mnddc/parallels2/pdf/90s/90/90-AEN-CAH.pdf

Malhi, L., Karanfil, Ö., Merth, T., Acheson, M., Palmer, A., & Finegood, D. T. (2009). Places to intervene to make complex food systems more healthy, green, fair, and affordable. *Journal of Hunger & Environmental Nutrition*, *4*(3/4), 466–476.

Mathieson, J., Popay, J., Enoch, E., Escorel, S., Hernandez, M., Johnston, H., & Rispel, L. (2008). *Social exclusion: Meaning, measurement and experience and links to health inequalities. A review of literature* (WHO Social Exclusion Knowledge Network Background Paper No. 1). https://www.academia.edu/52017523/WHO_Social_Exclusion_Knowledge_Network_Background_Paper_1

McIntyre, J. (2008). *Participatory action research*. SAGE.

Meadows, D. H. (1999). *Leverage points: Places to intervene in a system*. Sustainability Institute.

National People with Disabilities and Carer Council. (2009). *Shut out: The experience of people with disabilities and their families in Australia*. https://www.dss.gov.au/sites/default/files/documents/03_2022/shut-out-standard.pdf

Neely-Barnes, S. L., & Elswick, S. E. (2016). Inclusion for people with developmental disabilities: Measuring an elusive construct. *Journal of Social Work in Disability & Rehabilitation*, *15*(2), 134–149.

Nirje, B. (1985). The basis and logic of the normalization principle. *Australia and New Zealand Journal of Developmental Disabilities*, *11*(2), 65–68.

Oliver, M. (1990). *Politics of disablement*. Red Globe Press.

Owens, J. (2015). Exploring the critiques of the social model of disability: The transformative possibility of Arendt's notion of power. *Sociology of Health & Illness*, *37*(3), 385–403.

Persson, H., Åhman, H., Yngling, A. A., & Gulliksen, J. (2015). Universal design, inclusive design, accessible design, design for all: Different concepts—One goal? On the concept of accessibility—Historical, methodological and philosophical aspects. *Universal Access in the Information Society*, *14*(4), 505–526.

Rappolt-Schlichtmann, G., & Daley, S. G. (2013). Providing access to engagement in learning: The potential of universal design for learning in museum design. *Curator: The Museum Journal*, *56*(3), 307–321.

Sarmiento-Pelayo, M. P. (2015). Co-design: A central approach to the inclusion of people with disabilities. *Revista de la Facultad de Medicina*, *63*, 149–154.

Steinfeld, E., & Maisel, J. (2012). *Universal design: Creating inclusive environments*. Wiley.

Taket, A., Crisp, B. R., Graham, M., Hanna, L., Goldingay, S., & Wilson, L. (2013). *Practising social inclusion*. Routledge.

United Nations. (1975). *Declaration on the rights of disabled persons*. https://www.ohchr.org/sites/default/files/res3447.pdf

United Nations. (2004). *The United Nations and disabled persons—The first fifty years*. https://www.un.org/esa/socdev/enable/dis50y00.htm

United Nations. (2007). *Convention on the Rights of Persons with Disabilities (CRPD)*. http://www.un.org/disabilities/documents/convention/convoptprote.pdf

Ward, D. J., Furber, C., Tierney, S., & Swallow, V. (2013). Using framework analysis in nursing research: A worked example. *Journal of Advanced Nursing*, *69*(11), 2423–2431.

Wolfensberger, W. P., Nirje, B., Olshansky, S., Perske, R., & Roos, P. (1972). *The principle of normalization in human services*. National Institute on Mental Retardation.

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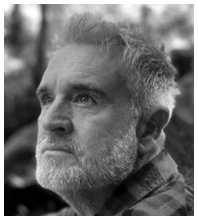

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Article

Comparative Analysis of 20-Minute Neighbourhood Policies and Practices in Melbourne and Scotland

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Abstract
Twenty-minute neighbourhoods highlight the importance of well-connected and mixed-used neighbourhoods and communities with proximate access to employment, essential services, public transport, and open spaces. Shorter distances together with re-prioritised public spaces encourage more active transport choices, resulting in public health benefits and reduced environmental pollution. Higher liveability brought about by mixed-use developments enables people to have equitable access to local facilities, amenities, and employment opportunities, promoting vibrancy, social cohesion, and intergenerational connections. The attributes of 20-minute neighbourhoods also combine to create places, that are acknowledged as friendly for all ages, address changing needs across the life course, and provide better support for the ageing population. Furthermore, there are indications that 20-minute neighbourhoods may be more resilient against many of the negative impacts of stringent public health protocols such as those implemented in periods of lockdown during the Covid-19 pandemic. In this article, we evaluate and compare planning policies and practices aimed at establishing 20-minute neighbourhoods in Melbourne (Australia) and Scotland (the UK). Using case studies, we discuss similarities and differences involved in using place-based approaches of 20-minute neighbourhoods to address 21st-century challenges in key areas of health and wellbeing, equity, environmental sustainability, and community resilience.

Keywords
20-minute neighbourhood; accessibility; active transport; age-friendly; Australia; climate change; Covid-19; liveability; Scotland; walkability

Issue
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1. Background

In the last decade, there has been a renewed interest in walkable compact places. Similar concepts emerged around the globe, from "20-minute neighbourhoods" in Portland, Oregon in the US, Melbourne in Australia, and Scotland in the UK (City of Portland, 2012; Department of Environment, Land, Water and Planning [DELWP], 2019a; Royal Town Planning Institute, 2021), "15-minute neighbourhoods" in Ottawa, Canada (City of Ottawa, 2021) to "20-minute towns" in Singapore (Land Transport Authority, 2019), and a "15-minute city" in Paris (Moreno et al., 2021). Despite different terminologies, the aim is to provide well-connected and mixed-used neighbourhoods and communities with proximate access to employment, essential services, public transport, and open spaces. This idea is not new to urban planning, with towns developed before the invention of motor vehicles tending to have good walkability. The idea of having mixed-use places with good access to parklands was reit-

erated by Ebenezer Howard in the garden city movement in 1898 (Howard, 1898/2006), whilst the importance of "neighbourhood units" was also highlighted by Clarence Perry in 1929 (Perry, 1929/1998).

The prevalence of modernist urban planning over the last century has led to car dependent cities divided into segregated mono-functional zones. This movement was heavily influenced by the 1929 *Plan Voisin*, by the Swiss-French architect, Le Corbusier (Charles-Édouard Jeanneret-Gris) who proposed to demolish a large part of central Paris and replace it with a group of office skyscrapers for urban renewal. The city was to be divided into residential, commercial, industrial, and cultural areas. Wide motorways were to be built to encourage the use of vehicles as a means of transportation (Le Corbusier, 1929). Le Corbusier's radical urban planning ideas were respected and implemented in cities all over the world, especially in the decades following the Second World War.

The modernist zoning demarcation and tower typology were criticised by Jane Jacobs in her seminal work, *The Death and Life of Great American Cities*. Jacobs (1961) advocated a low-rise-high-density approach and stressed the importance of having dense concentration of people of different ages, abilities, and ethnicities for land mix diversity and flourishing street life. Similarly, Jan Gehl, in his book, *Life Between Buildings*, criticised car dependency resulting in the loss of pedestrian-oriented environments and encouraged social life in public spaces and mixed land-use in urban areas leading to the liveliness of communities (Gehl, 2011).

2. Literature Review

After almost a century of rapid car-dependent urbanisation, policy makers are attempting to address the deficiencies of modernist urban planning. The City of Portland in the US promoted the framework of a 20-minute neighbourhood in 2012 for a prosperous, healthy, and equitable Portland. According to the *Portland Plan*, a 20-minute neighbourhood is defined as "a place with convenient, safe, and pedestrian-oriented access to the places people need to go and the services people use nearly every day: transit, shopping, healthy food, school, parks, and social activities" (City of Portland, 2012, p. 4). Walkable neighbourhoods and vibrant neighbourhoods are emphasised with respect to health and wellbeing, equity, environmental sustainability, and community resilience.

The benefits of walkability to human health and wellbeing are widely recognised. High walkability neighbourhoods have reduced numbers of overweight and obese residents (Sallis et al., 2009). They spend less time driving and are more likely to meet or exceed health recommendations for moderate-to-vigorous physical activity (Arvidsson et al., 2012; Cerin et al., 2014). The walkability of a neighbourhood depends on several factors, including land-use mix, residential density, street connectivity, and pedestrian safety (Dovey & Pafka, 2020). A variety of walkable destinations motivate people to go outdoors at different times of the day (Gauvin et al., 2008; Jamei et al., 2021). Nearby greenery spaces encourage people to engage in walking and other relaxation activities, contributing to reduced stress and increased physical fitness (Aziz et al., 2021; Song et al., 2014). The proximity to leisure centres and facilities has a close relationship with increased physical activity practices (Hobbs et al., 2021). The availability of well-connected bike tracks facilitates increased levels of cycling, which is positively associated with public health (Teschke et al., 2017; Van Holle et al., 2014).

The idea of enabling people to live locally with ease of access to essential services is considered fundamental to achieve equity (Calafiore et al., 2022). The increased use of active transport (walking and cycling) and the reduced need of long commutes for work, education, recreation, shopping, and health services are crucial in an equitable environment. There has been rising attention to transport equity and justice over the past decades (Martens, 2017; Pereira et al., 2017). Where established neighbourhoods have developed high levels of walkability, this can trigger gentrification (Markley, 2018). However, the increased prices and rents may not be affordable to people with low socio-economic status (Graells-Garrido et al., 2021). Special attention is required to be paid to vulnerable groups, such as disabled and older adults, with an aim to provide an inclusive, age-friendly built environment to enhance the quality of life of people regardless of their age or ability (Almeida, 2016; Chau & Jamei, 2021).

Mixed-use walkable neighbourhoods are beneficial for reducing air pollution but may be less successful were this is only implemented within isolated neighbourhoods. Considering that motor vehicle exhaust contributes significantly to $PM_{2.5}$ air pollution, any local reductions in motor vehicle emissions could help to reduce or prevent numerous poor health outcomes for people in the community (Chaney et al., 2017). The proximity of localised amenities and services is therefore a key factor in reducing the use of private motor vehicles and reducing the environmental pollution that they cause. However, neighbourhoods which possess many attributes of the 20-minute neighbourhood may, still, experience higher concentrations of air and noise pollution due to factors such as higher volumes of vehicular through-transit or visitors from a wider car-dependent geographic area (Higgins et al., 2019). This is one of the potential pitfalls of planning individual 20-minute neighbourhoods in isolation from each other. This is an "emblematic case of socio-ecological trade-off between benefits and costs of agglomerations" (Da Schio et al., 2019, p. 180). However, with proper widely implemented policies and well-connected networks for encouraging walking and cycling as non-motorised modes of mobility, it is possible to achieve high accessibility with lower levels of pollution. The promotion of active transport also mitigates

greenhouse gas emissions and urban heat island effects against climate change and contributes to public health co-benefits (Maizlish et al., 2017).

The emergency of the pandemic has exposed the vulnerability of the city and highlighted the resilience of walkable neighbourhoods (Moreno et al., 2021). Under lockdown measures and travel restrictions, there were fewer vehicles on roads, reduced use of public transport, more teleworking, and almost no tourists (Nieuwenhuijsen et al., 2022). The experience of Covid-19 restrictions in cities worldwide varied significantly, but broadly correlated with the extent to which residents of a neighbourhood could avail of local access to day to day goods and services. Lockdowns showed the importance of local greenery, open spaces, cycling, and walking infrastructure as a means of enabling residents to safely engage in physical activity, and maintain mental health, within the bounds of movement limitations (Kraus & Koch, 2021). Widespread lessons from this period stress the need for urban planners to ensure that high quality public realm is prioritised to restore and protect the right of pedestrians in streets, and to promote sustainable mobility of walking and cycling for a liveable and healthy community after the pandemic (Rajabifard et al., 2021; Salih & Hussein, 2021).

This article is based on a desk-top review of published literature, including comparative analyses of policies and practices from the 20-minute neighbourhood programs in Melbourne and Scotland. The selection of Melbourne and Scotland for comparative analysis was based on the geographical backgrounds of co-authors and the associated ease of obtaining first-hand accounts of case studies. Considering that the concept of 20-minute neighbourhoods has been increasingly adopted worldwide (Gower & Grodach, 2022; Thornton et al., 2022), the findings in this article are useful for the implementation of mixed-use compact places and neighbourhoods in other cities and countries.

3. Case Studies

3.1. 20-Minute Neighbourhoods in Melbourne, Australia

In Australia, there is no national policy on 20-minute neighbourhoods, but policies which employ a 20-minute neighbourhood basis can be found in different states. Examples include the *30-Year Plan for Greater Adelaide* (Government of South Australia, 2017) and the mandatory *Planning (Walkable Neighbourhoods) Amendments Regulation 2020* in Queensland (Queensland Treasury, 2020). In Melbourne, the principle of 20-minute neighbourhoods was first mentioned in *Plan Melbourne* published by the Department of Transport, Planning and Local Infrastructure in 2014 after the 2012 *Portland Plan*. Compared with the pedestrian-oriented *Portland Plan*, *Plan Melbourne* originally aimed to provide safe and convenient access to goods and services within 20 minutes of where people live, travelling by foot, bicycle, or public transport (Department of Transport, Planning and Local Infrastructure, 2014). Such understanding was refined in *Plan Melbourne Refresh: Discussion Paper* published in 2015 with a particular emphasis on meeting "daily (non-work) needs locally, primarily within a 20-minute walk" (Victoria State Government, 2015, p. 18). The metropolitan planning strategy, *Plan Melbourne 2017–2050* published by the DELWP in 2017 returned to the original aim in 2014 by meeting most of people's "everyday needs within a 20-minute walk, cycle or local public transport trip of home" (DELWP, 2017, p. 98).The discrepancy of the definition of 20-minute neighbourhoods has been clarified by the introduction of "an 800 m catchment of social infrastructure and destinations" as the "spatial accessibility measure of a walkable neighbourhood" (DELWP, 2019a, p. 25). Although cycling and local transport provide alternative active travel options to walking, they do not extend neighbourhoods because the "20-minute journey represents an 800 m walk from home to a destination and back again" (DELWP, 2019a, p. 25).

According to the Global Liveability Index, Melbourne was ranked as the most liveable location of the 140 cities surveyed worldwide for seven consecutive years, from 2011 to 2017 (The Economist Intelligence Unit, 2017). However, the population of the Greater Melbourne is projected to increase by four million people from five million in 2018 to nine million in 2056 (DELWP, 2019e). This creates pressure on local infrastructure and poses a challenge for maintaining the city's liveability and sustainable development. Urban liveability is enhanced by walkable 20-minute neighbourhoods with mixed land-uses, effective residential density, street connectivity, and safety (Arundel et al., 2017).

Melbourne has been criticised as a monocentric city with a high concentration of employment, key facilities, and services in the central business district (Gu & Saberi, 2019). The radial public transport network from the city centre with few connections on orbital routes have negative impacts, including longer travel distance and commuting time, limited access to services, and increased traffic congestion (City of Melbourne, 2019). According to International Energy Agency (2019), Australia is also one of the countries with high greenhouse gas emissions per capita in the developed world. Facing the impacts of climate change, the Victoria State Government is committed to transition pathways to achieve net-zero emissions by 2050 (DELWP, 2021e). If this results in 20-minute neighbourhoods across Melbourne, daily greenhouse gas emissions will be lowered by more than 370,000 tonnes (DELWP, 2017).

During the Covid-19 pandemic, Melbourne experienced the longest lockdown in the world (Miller, 2021). Strict health protocols and severe stay-at-home rules were enforced affecting people's daily life. Most Melbourne residents were required to work from home and access necessary services within a 5 km radius of their home. Lockdown measures highlighted the benefits

of having core facilities and amenities within walking distance to enable residents to shop, work, and exercise locally for better quality of life and greater convenience, which demonstrate the benefits of resilient communities.

Three pilot programs in the metropolitan area of Melbourne were launched in 2018 to test the practical delivery of 20-minute neighbourhoods. These pilot programs were in three suburbs: Croydon South in the east, Sunshine West in the west, and Strathmore to the north of the central business district. Since each neighbourhood varies in demographic profile and character, a place-based approach has been adopted to address different contexts and needs at a local level. On-site walkability assessments of these three pilot sites were conducted by Victoria Walks to identify pedestrian infrastructure issues, and from this safer road design for older pedestrians has been taken into consideration when implementing the pilot programs (Victoria Walks, 2016). Through community engagement in collaboration with local councils, residents' ideas were collected for better understanding of their concerns to formulate appropriate strategies. Activation plans for neighbourhood activity centres in the three pilot programs were then developed to incorporate locally led initiatives. Neighbourhood activity centres with local high streets, shops, cafes, community services, and public spaces are an integral part of a community life. Technical assessments were undertaken on walkability, housing density, land use, and transport network towards walkable, accessible, and viable neighbourhoods for people of different ages, abilities, and backgrounds (DELWP, 2019a). Considering that local shops, cafes, and small businesses have been hit hardest by the pandemic, there are some initiatives to help traders in walkable locations recover from impacts of Covid-19 and support economic recovery of the neighbourhoods (DELWP, 2021a).

The neighbourhood activity centre of Croydon South is the Eastfield shops, located at the intersection of two major arterial roads and predominately vehicle-based with local cafes and services. The major public space is a large open car park with impermeable asphalt paving. The activation plan is to convert the town centre to become more accessible and walkable by reducing vehicle speed, adding signalised pedestrian crossings, and relocating bus stops to be closer to new signalised crossings. An open car park is to be transformed into a green public space with shelters, picnic tables, and fitness and children play equipment, becoming flexible enough for local community events. Some roadside parking lots will be removed for widening footpaths, planting trees, and allowing traders to extend their businesses onto the street. Connectivity to adjacent parks and a recreation reserve will also be upgraded with improved bike tracks and widened shared paths for pedestrians and cyclists to encourage active transport (DELWP, 2019b, 2021b).

Glengala Village in Sunshine West is a local business precinct with small retail and hospitality outlets. The activation plan aims to encourage more people to walk and cycle in the local neighbourhood with inviting streetscapes and community co-working spaces. Existing angled parking spaces are to be removed and some streets will be converted for one-way traffic to provide wider footpaths, additional bike parking and more landscaping. Other upgrades include outdoor seating and dining, extra space for street trading, raised pedestrian crossings, and traffic calming road art on the main street (DELWP, 2019d, 2021d).

Woodland Street is the main thoroughfare in front of Strathmore Station. The activation plan aims to revitalise the Strathmore Station precinct to improve accessibility and liveliness by having safer station connectivity, prioritising walking, promoting cycling, and encouraging retail variety. Existing residential planning controls will be reviewed to achieve higher density and greater housing diversity. A green boulevard along Woodland Street will be created through tree planting and greening initiatives (DELWP, 2019c, 2021c).

The three pilot programs in Melbourne are mainly focused on neighbourhood activity centres of each of the three suburbs. Besides infrastructure opportunities identified for each neighbourhood, there were temporary activation initiatives in engagement with residents, such as a community workshop, street party, movie night, shop local campaign, and pop-up park. A monitoring process is in place for continuous evaluation and there is a long-term commitment from the state government for implementing 20-minute neighbourhoods according to the metropolitan planning strategy in Melbourne including the availability of public funding to support localised upgrades of road safety, side street enhancements, cycle paths, public transport, and green spaces.

3.2. 20-Minute Neighbourhoods in Scotland

The Scottish Government priority to "make Scotland more equal and socially just" is underpinned by the *National Performance Framework*, which sets out national wellbeing outcomes such as to "live in communities that are inclusive, empowered, resilient and safe" (Scottish Government, 2021a, p. 1). In 2019, the Scottish Government adopted Place Principles, a formal commitment to support a place-based approach to national development and service provision.

Accordingly, the 20-minute neighbourhood concept is a key policy directive, being embedded into several Scottish Government policy commitments, with aligned strategies and frameworks. Most notably, future decisions on development across the country are expected to be underpinned by place-based planning principles which have been embedded into the *National Planning Framework Four*. The implementation of these principles is supported by a place-based investment programme of £325 million of capital investment to support grass roots/local co-development to be undertaken through private and third sector organisations (Scottish Government, 2022).

Scotland 2045: Our Fourth National Planning Framework (NPF4) published by the Scottish Government defines a 20-minute neighbourhood as being "designed in such a way that all people can meet most of their daily needs within a reasonable walk, wheel or cycle (within approx. 800 m) of their home" (Scottish Government, 2021b, p. 73). Upon adoption, the NPF4 will see all regional spatial strategies, local development plans, and local place plans in Scotland adopt the principle of 20-minute neighbourhoods. Free public transport is provided for young persons under 22, which is likely to contribute to a generational shift in transport habits and possibly car ownership (Transport Scotland, 2022). Consideration is also given to safe walking, wheeling, and cycling networks, affordable housing, local amenities, commerce, integration of blue/green infrastructure, employment opportunities, and services. Housing diversity and the ability to "age in place" are also key considerations of this policy and subsequently root the 20-minute neighbourhood concept as a mechanism to support ageing populations to remain active within their community (Scottish Government, 2021b). Urban planning recommendations to support healthy ageing have existed for several years but recognition and integration to national policy is novel (Mitchell et al., 2004).

The Granton Waterfront Development is 5 km north of Edinburgh City Centre on the shores of the Firth of Forth. The site comprises of 200 ha of open space and parkland and 50 ha of contaminated, derelict, industrial land. The development builds on the site's ecological and cultural significance as a post-industrial area and an area of multiple deprivation. The proposal is for a new "Coastal Quarter" of Edinburgh with 20,000 m^2 of mixed-use spaces for leisure, work, learning, enterprise, health, retail, and approximately 3,000 new, affordable, homes of mixed size, typology, and tenure. A new school, cultural facilities, commerce, and parks are integrated, connected via "human scaled" streets and avenues. Public transport stops with direct and frequent services are distributed to ensure provision within a five-minute walk. Public green spaces are provided within a two-minute walk of housing, of which 75% provision will be car free. Existing infrastructure is enhanced with green-blue connections. A 10 ha flood resilient coastal park will be formed to the coastal northern edge of the development which will give the water's edge back to the community (as opposed to maximising land values for private housing). Active travel routes reconnect the waterfront back to the city, the neighbourhood, and existing communities. At the outset of the project, a sustainability strategy was developed based on seven "principles" which combine the physical, spatial, social, and cultural aspects of placemaking (Scottish Design Awards, 2020). These are rooted in connectivity/walkability, blue-green infrastructure and a low carbon approach with safe, active streets and shared parks/landscapes that enhance biodiversity and promote active travel and increase health, and well-being opportunities for all, important tenets of the 20-minute neighbourhood concept.

Stewarton is a rural town in East Ayrshire and has recently experienced significant rise in residential demand and development. Consequently, this growth has contributed to infrastructural capacity issues relating to local health, social care, and education services, as well as pressures with roads, digital connectivity, water, and sewerage, to the extent that the character of community is under threat. To address this, East Ayrshire Council along with the Scottish Government Digital Planning Team and Architecture and Design Scotland translated and shared data and mapping, to understand the location and distance of existing services, facilities, and infrastructure. Furthermore, they undertook collaborative cross departmental and agency workshops to raise awareness of what is required for Stewarton to perform as a 20-minute neighbourhood, recommending a wide range of interlinked actions from new cycle lanes to public realm improvements, in addition to addressing education and health facilities. This collaborative whole-place method is considered a sustainable and infrastructure-first approach to development, aligned with expectations noted by the local community and the policies of NPF4.

The two Scottish case studies vary in scale and response to their specific socio-economic, health, and placemaking needs but are unified in their prioritisation of health, wellbeing, and local connectivity. In both case studies, the Scottish Government's place-based directive shifts the balance of urban planning policies which have dominated for the last century to a novel focus on person-centred, relational urban design.

4. Results and Discussion

The comparative analysis has identified similarities and differences of 20-minute neighbourhood policies and practices in Melbourne and Scotland. Findings are summarised in Table 1 below.

In terms of similarities, both Melbourne and Scotland have integrated the 20-minute neighbourhood concepts in their long-term planning objectives, setting targets for 2050. Scotland has the national policy, *Scotland 2045: Our Fourth National Planning Framework*. Despite the lack of a national policy in Australia on 20-minute neighbourhoods, different states have similar policies. In Melbourne, *Plan Melbourne 2017–2050* is the metropolitan planning strategy underpinned by the key principle of living locally.

Regarding the definition of 20-minute neighbourhoods, there has been an evolution in Melbourne: from 20-minute travel by foot, bicycle, or public transport in 2014 to primarily within a 20-minute walk in 2015. Although cycling and public transport were included again in 2017, the definition has been further clarified in 2019 to an 800 m catchment of social infrastructure and destinations involving an 800 m walk from home to a destination and back again. Compared with the

Table 1. Comparison of 20-minute neighbourhoods in Melbourne and Scotland.

	Melbourne	Scotland
Long-term planning policy	*Plan Melbourne 2017–2050*—The 20-minute neighbourhood is a key objective of this plan to create accessible, safe, and attractive local areas for people to live locally	*Scotland 2045: Our Fourth National Planning Framework*—The 20-minute neighbourhood is a new policy area within this framework, to enable a place-based approach to have effect within wider development plans
	Without national policy, but similar policies in different states	With national policy (*National Performance Framework*)
Goal-oriented radius	800 m walk from home to a destination and back again	A reasonable walk, wheel, or cycle within approximately 800 m
Place-based	Reconnect planning, infrastructure, and service decision-making with the place and the needs of a community at a local level	Promote innovative place-based solutions with a focus on liveable places and solutions to localism
Co-production	Collaboration with councils and residents for community partnership and local-led initiatives	Collaboration with councils and residents with the use of Place Standard tool
Equity	Locally accessible services and affordable housing for different stakeholders, including people with low socio-economic status, as well as older and disabled people	Locally accessible services and affordable housing for different stakeholders, including people with low socio-economic status, as well as older and disabled people
	Walkability assessment of pedestrian infrastructure for people with mobility limitations	Accessibility and inclusion are embedded in the Place Standard tool
Active travel and net-zero emission target	Optimisation of active transport for pedestrians and cyclists to reduce greenhouse gas emissions towards net-zero emissions by 2050	Delivery of strategic active travel networks through community-led active travel plans towards a net-zero sustainable Scotland by 2045
	Urban greening and increase of tree cover to reduce energy consumption	Enhancement of natural (green and blue) infrastructure provision
Data-led planning approach	Technical assessments on walkability, transport network, land use, housing density, and vegetation cover to inform decision-making with the place and to cater for community needs at a local level according to a place-based planning approach	Multi-disciplinary and inter-agency relational based approach to data mapping of services, facilitates, and infrastructure for evidence-based planning; adoption of Place Principle across government departments reinforces a data-led, place-based approach
Pilot programs	Croydon South, Sunshine West, Strathmore	Granton Waterfront, Stewarton
Location and scale	Sub-urban, smaller in scale	Outer urban and rural, larger in scale

evolving definition in Melbourne, 20-minute neighbourhoods in Scotland consider a reasonable walk, wheel, or cycle from home, but the goal-oriented radius remains approximately 800 m. There is no significant difference between Melbourne and Scotland in terms of the goal-oriented radius.

Both Melbourne and Scotland have adopted a place-based approach to neighbourhood design. In Melbourne, the place-based approach aims to reconnect planning, infrastructure, and service decision-making with the place and the needs of a community at a local level. This reflects the need for more flexible, locally led solutions to neighbourhood challenges (DELWP, 2019a). Likewise, in Scotland, innovative place-based solutions are promoted to take all aspects of a place into consideration to improve the lives of people, support inclusive growth, and create more successful places (Royal Town Planning Institute, 2021).

Consistent with place-based planning, co-production with various stakeholders has been incorporated in Melbourne and Scotland. In Melbourne, the Victoria State Government works closely with local governments, developers, industry, and community stakeholders through an ongoing consultation process to create sustainable, liveable, and attractive places (DELWP, 2017). Community partnerships have been developed at local levels to enable communities to be a part of the decision-making process (DELWP, 2019a). In Scotland, the use of the Place Standard tool is embedded in the planning process to reflect the importance of public involvement and recognise the need for collaborative approaches to community engagement (Scottish Government, 2020, 2021b).

Particular attention is paid to vulnerable groups including people with low socio-economic status and disabled and older adults in both Melbourne and Scotland to achieve equity through the provision of locally accessible services and affordable housing for a variety of stakeholders, including people with low socio-economic status, as well as older and disabled people. In Melbourne, walkability assessments by Victoria Walks were carried out for the three pilot programs to ensure the quality and identify areas of improvement of pedestrian infrastructure to cater for people with mobility limitations (DELWP, 2019a). Similarly, in Scotland, accessibility and inclusion are embedded in the Place Standard tool to take into consideration the specific needs of disabled and older people (Scottish Government, 2020).

Both Melbourne and Scotland promote active transport through the provision of safe, accessible, and well-connected networks for pedestrians and cyclists as a sustainable choice for daily travel. The transition to a low-carbon living will contribute to the goal of achieving the net-zero emissions by 2050 in Melbourne (DELWP, 2017). Comparably, community-led active travel plans in Scotland provide locally driven solutions towards the net-zero emission target by 2045 (Scottish Government, 2021b). The increase of urban greening and tree cover in Melbourne reduces the energy consumption for heating and cooling (DELWP, 2019a). Besides green infrastructure, blue infrastructure is also promoted in Scotland (Royal Town Planning Institute, 2021).

A data-led approach is adopted in Melbourne and Scotland for evidence-based planning. The advancements in data-led planning approaches and adoption of evidence-based planning enable accurate mapping of existing infrastructure and apply planning mitigation strategies which advocate for 20-minute neighbourhood principles. In Melbourne, technical assessments undertaken cover walkability, transport network, land use, housing density, and vegetation cover (DELWP, 2019a). The Digital Planning Strategy of the Scottish Government aims to develop shared data resources which support Place Standard Tool and Understanding Scotland's Places databases (Royal Town Planning Institute, 2021).

The three pilot programs in Melbourne are suburban in nature and smaller in scale. Community feedback, workshops and technical assessments have contributed to future opportunities for the three activity centres in Croydon South, Sunshine West, and Strathmore to improve liveability and create 20-minute neighbourhoods (DELWP, 2019b, 2019c, 2019d). Comparatively, the two pilot sites in Scotland (Granton Waterfront and Stewarton) are outer urban and larger in scale. The land values were reported as being higher within walkable neighbourhoods in comparison to less-connected neighbourhoods and in time, the increased provision of 20-minute neighbourhoods anticipated by the adoption of government policy may help rebalance the current inequalities. The equitable approach to land use and the access to amenity demonstrated in the Granton Waterfront Development provides a useful precedent and framework for future projects.

Observing the similarities across case studies, the consensus on the principles of the 20-minute neighbourhood are to be walkable and well connected to optimise active travel, to provide services that support local living, to facilitate access to quality public transport that connect people to wider economic and life-long learning opportunities, to offer high quality public realm and open spaces which integrate natural infrastructure, and to facilitate thriving local economies. Integration of the 20-minute neighbourhood concept into long-term planning policy will deliver direct and indirect health benefits to the population. The proximity of services within a walkable distance and subsequent anticipated reduction in car use coupled with increased adoption of active travel will lower carbon emissions, improve air quality, increase physical activities, and, consequently, reduce the prevalence of some chronic conditions. The alignment of 20-minute neighbourhood policies with active travel objectives and net-zero targets goes to reinforce the environmental benefits of this urban planning approach.

The 20-minute neighbourhood is defined as an 800 m goal-oriented activity radius. This assumes a speed of 2.4 km/hour. Providing neighbourhoods which are planned and designed to be walkable are considered preconditions to support social interaction, community engagement, activeness, and independence in old age (Wennberg et al., 2018) and can enhance support for people living with cognitive decline (Gan et al., 2021). In a time of increased population ageing, there is a need to provide age-friendly urban environments. However, gait speed varies across age and declines with age. Therefore, we recommend consideration of site characteristics and varying gait speed/user ability in the development of walkable neighbourhoods.

The "stay at home" and "stay local" policies of the Covid-19 pandemic highlighted the importance of well-connected and serviced walkable neighbourhoods. Implementation of 20-minute neighbourhood concept in future planning could create resilience in our communities in the event of future pandemics and local lockdowns.

5. Limitations

This comparative analysis is mainly focused on Melbourne and Scotland. The relevant literature reviewed is limited to articles and materials written in English only. Due to international travel restrictions, it was not possible to visit each case study and, therefore, comparative analysis was undertaken through desk-top review, published literature, and the first-hand accounts of the researchers from each country. The limitations of this analysis are acknowledged, and further cross-national comparisons are recommended to evaluate policies and practices of 20-minute neighbourhoods in other countries and cultures.

6. Conclusion

Twenty-minute neighbourhoods highlight the importance of well-connected and mixed-used neighbourhoods and communities with proximate access to employment, essential services, public transport, and open spaces. Shorter distances together with re-prioritised public spaces encourage more active transport choices, resulting in public health benefits and reduced environmental pollution. Higher liveability brought about by mixed use developments that enable people to have equitable access to local facilities, amenities, and employment opportunities, promoting vibrancy, social cohesion, and intergenerational connections.

The attributes of 20-minute neighbourhoods combine to create places that are acknowledged as friendly for all ages, address changing needs across the life course, and provide better support for an ageing population. There are indications that 20-minute neighbourhoods may be more resilient against many of the negative impacts of stringent public health protocols such as those implemented in periods of lockdown during the Covid-19 pandemic.

In this article, we evaluate and compare planning policies and practices aimed at establishing 20-minute neighbourhoods in Melbourne and Scotland. Using case studies, we discuss similarities and differences involved in using place-based approaches of 20-minute neighbourhoods to address 21st-century challenges in key areas of health and wellbeing, equity, environmental sustainability, and community resilience.

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Conflict of Interests

There is no data associated with this research beyond the referenced literature. The authors declare no conflict of interests.

References

Almeida, M. F. (2016). Age-friendly walkable urban spaces: A participatory assessment tool. *Journal of Housing for the Elderly*, *30*(4), 396–411.

Arundel, J., Lowe, M., Hooper, P., Roberts, R., Rozek, J., Higgs, C., & Giles-Corti, B. (2017). *Creating liveable cities in Australia: Mapping urban policy implementation and evidence-based national liveability indicators*. Centre for Urban Research. https://cloudstor.aarnet.edu.au/plus/index.php/s/CJ4t5N3SFCOZTWP

Arvidsson, D., Kawakami, N., Ohlsson, H., & Sundquist, K. (2012). Physical activity and concordance between objective and perceived walkability. *Medicine & Science in Sports & Exercise*, *44*(2), 280–287. https://doi.org/10.1249/MSS.0b013e31822a9289

Aziz, N. A. A., Shian, L. Y., Mokhtar, M. D. M., Raman, T. L., Saikim, F. H., Chen, W., & Nordin, N. M. (2021). Effectiveness of urban green space on undergraduates' stress relief in tropical city: A field experiment in Kuala Lumpur. *Urban Forestry & Urban Greening*, *63*, Article 127236. https://doi.org/10.1016/j.ufug.2021.127236

Calafiore, A., Dunning, R., Nurse, A., & Singleton, A. (2022). The 20-minute city: An equity analysis of Liverpool City Region. *Transportation Research Part D: Transport and Environment*, *102*, Article 103111.

Cerin, E., Cain, K. L., Conway, T. L., Van Dyck, D., Hinckson, E., Schipperijn, J., De Bourdeaudhuij, I., Owen, N., Davey, R. C., Hino, A. A. F., Mitáš, J., Orzanco-Garralda, R., Salvo, D., Sarmiento, O. L., Christiansen, L. B., Macfarlane, D. J., Schofield, G., & Sallis, J. F. (2014). Neighborhood environments and objectively measured physical activity in 11 countries. *Medicine and Science in Sports and Exercise*, *46*(12), 2253–2264. https://doi.org/10.1249/MSS.0000000000000367

Chaney, R. A., Sloan, C. D., Cooper, V. C., Robinson, D. R., Hendrickson, N. R., McCord, T. A., & Johnston, J. D. (2017). Personal exposure to fine particulate air pollution while commuting: An examination of six transport modes on an urban arterial roadway. *PLoS ONE*, *12* (11), Article e0188053. https://doi.org/10.1371/journal.pone.0188053

Chau, H.-W., & Jamei, E. (2021). Age-friendly built environment. *Encyclopedia*, *1*(3), 781–791.

City of Melbourne. (2019). *Transport strategy 2030*. https://www.melbourne.vic.gov.au/SiteCollectionDocuments/transport-strategy-2030-city-of-melbourne.pdf

City of Ottawa. (2021). *15-minute neighbourhoods: Baseline report* https://engage.ottawa.ca/the-new-

official-plan/news_feed/15-minute-neighbourhoods
City of Portland. (2012). *Portland Plan—20-minute neighborhoods analysis: Background report and analysis area summaries*. https://www.portlandonline.com/portlandplan/index.cfm?c=51427&a=395048
Da Schio, N., Boussauw, K., & Sansen, J. (2019). Accessibility versus air pollution: A geography of externalities in the Brussels agglomeration. *Cities*, *84*, 178–189.
Department of Environment, Land, Water and Planning. (2017). *Metropolitan planning strategy: Plan Melbourne 2017–2050*. https://www.planmelbourne.vic.gov.au
Department of Environment, Land, Water and Planning. (2019a). *20-minute neighbourhoods: Creating a more liveable Melbourne*. https://www.planmelbourne.vic.gov.au/__data/assets/pdf_file/0018/515241/Creating-a-more-liveable-Melbourne.pdf
Department of Environment, Land, Water and Planning. (2019b). *Croydon South: Our 20-minute neighbourhood—20-minute neighbourhood pilot program*. https://www.planmelbourne.vic.gov.au/__data/assets/pdf_file/0019/515242/Croydon-South-Our-20-minute-neighbourhood.pdf
Department of Environment, Land, Water and Planning. (2019c). *Strathmore: Our 20-minute neighbourhood—20-minute neighbourhood pilot program*. https://www.planning.vic.gov.au/__data/assets/pdf_file/0024/428910/Strathmore-Our-20-minute-neighbourhood.pdf
Department of Environment, Land, Water and Planning. (2019d). *Sunshine West: Our 20-minute neighbourhood—20-minute neighbourhood pilot program*. https://www.planmelbourne.vic.gov.au/__data/assets/pdf_file/0017/515240/Sunshine-Our-20-minute-neighbourhood.pdf
Department of Environment, Land, Water and Planning. (2019e). *Victoria in future 2019: Population projections 2016 to 2056*. https://www.planning.vic.gov.au/__data/assets/pdf_file/0032/332996/Victoria_in_Future_2019.pdf
Department of Environment, Land, Water and Planning. (2021a). *2020 report on progress: Metropolitan planning strategy—Plan Melbourne 2017–2020*. https://www.planmelbourne.vic.gov.au/__data/assets/pdf_file/0005/544253/Plan-Melbourne-Report-on-Progress-2020.pdf
Department of Environment, Land, Water and Planning. (2021b). *Living locally—Activating Croydon South: 20-minute neighbourhood pilot program*. https://www.planning.vic.gov.au/__data/assets/pdf_file/0028/482527/Croydon-South-full-plans-2021.pdf
Department of Environment, Land, Water and Planning. (2021c). *Living locally—Activating Strathmore: 20-minute neighbourhood pilot program*. https://www.planning.vic.gov.au/__data/assets/pdf_file/0030/482529/Strathmore-full-plans-2021.pdf
Department of Environment, Land, Water and Planning. (2021d). *Living locally—Activating Sunshine West: 20-minute neighbourhood pilot program*. https://www.planning.vic.gov.au/__data/assets/pdf_file/0029/482528/Sunshine-West-full-plans-2021.pdf
Department of Environment, Land, Water and Planning. (2021e). *Victoria's climate change strategy*. https://www.climatechange.vic.gov.au/__data/assets/pdf_file/0026/521297/Victorian-Climate-Change-Strategy.pdf
Dovey, K., & Pafka, E. (2020). What is walkability? The urban DMA. *Urban Studies*, *57*(1), 93–108.
Department of Transport, Planning and Local Infrastructure. (2014). *Plan Melbourne: Metropolitan planning strategy*. https://www.planning.vic.gov.au/__data/assets/pdf_file/0016/104182/Plan-Melbourne-2014-PT1.pdf
Gan, D. R. Y., Chaudhury, H., Mann, J., & Wister, A. V. (2021). Dementia-friendly neighbourhood and the built environment: A scoping review. *The Gerontologist*, *62*(6), e340–e356. https://doi.org/10.1093/geront/gnab019
Gauvin, L., Riva, M., Barnett, T., Richard, L., Craig, C. L., Spivock, M., Laforest, S., Laberge, S., Fournel, M.-C., & Gagnon, H. (2008). Association between neighborhood active living potential and walking. *American Journal of Epidemiology*, *167*(8), 944–953. https://doi.org/10.1093/aje/kwm391
Gehl, J. (2011). *Life between buildings: Using public space*. Island Press.
Government of South Australia. (2017). *Walkable neighbourhoods: The 30-year plan for Greater Adelaide*. https://livingadelaide.sa.gov.au/targets/walkable_neighbourhoods
Gower, A., & Grodach, C. (2022). Planning innovation or city branding? Exploring how cities operationalise the 20-minute neighbourhood concept. *Urban Policy and Research*, *40*(1), 36–52.
Graells-Garrido, E., Serra-Burriel, F., Rowe, F., Cucchietti, F. M., & Reyes, P. (2021). A city of cities: Measuring how 15-minutes urban accessibility shapes human mobility in Barcelona. *PLoS ONE*, *16*(5), Article e0250080. https://doi.org/10.1371/journal.pone.0250080
Gu, Z., & Saberi, M. (2019). A bi-partitioning approach to congestion pattern recognition in a congested monocentric city. *Transportation Research Part C: Emerging Technologies*, *109*, 305–320. https://doi.org/10.1016/j.trc.2019.10.016
Higgins, C. D., Adams, M. D., Réquia, W. J., & Mohamed, M. (2019). Accessibility, air pollution, and congestion: Capturing spatial trade-offs from agglomeration in the property market. *Land Use Policy*, *84*, 177–191.
Hobbs, M., Moltchanova, E., Wicks, C., Pringle, A., Griffiths, C., Radley, D., & Zwolinsky, S. (2021). Investigating the environmental, behavioural, and sociodemographic determinants of attendance at a city-wide public health physical activity intervention: Longitudi-

nal evidence over one year from 185,245 visits. *Preventive Medicine*, *143*, Article 106334.

Howard, E. (2006). *To-morrow: A peaceful path to real reform*. Routledge. (Original work published 1898)

International Energy Agency. (2019). *CO_2 emissions from fuel combustion: Highlights*. https://iea.blob.core.windows.net/assets/eb3b2e8d-28e0-47fd-a8ba-160f7ed42bc3/CO2_Emissions_from_Fuel_Combustion_2019_Highlights.pdf

Jacobs, J. (1961). *The death and life of great American cities*. Vintage Books.

Jamei, E., Ahmadi, K., Chau, H. W., Seyedmahmoudian, M., Horan, B., & Stojcevski, A. (2021). Urban design and walkability: Lessons learnt from Iranian traditional cities. *Sustainability*, *13*(10), Article 5731.

Kraus, S., & Koch, N. (2021). Provisional COVID-19 infrastructure induces large, rapid increases in cycling. *Proceedings of the National Academy of Sciences*, *118*(15), Article e2024399118.

Land Transport Authority. (2019). *Land Transport Master Plan 2040*. https://www.lta.gov.sg/content/dam/ltagov/who_we_are/our_work/land_transport_master_plan_2040/pdf/LTA%20LTMP%202040%20eReport.pdf

Le Corbusier. (1929). *The city of to-morrow and its planning*. John Rodher.

Maizlish, N., Linesch, N. J., & Woodcock, J. (2017). Health and greenhouse gas mitigation benefits of ambitious expansion of cycling, walking, and transit in California. *Journal of Transport & Health*, *6*, 490–500.

Markley, S. (2018). Suburban gentrification? Examining the geographies of new urbanism in Atlanta's inner suburbs. *Urban Geography*, *39*(4), 606–630.

Martens, K. (2017). *Transport justice: Designing fair transportation systems*. Routledge.

Miller, N. (2021, October 3). Proud or mad? Melbourne's marathon lockdown becomes the world's longest. *The Age*. https://www.theage.com.au/national/victoria/proud-or-mad-melbourne-s-marathon-lockdown-becomes-the-world-s-longest-20210930-p58w9w.html

Mitchell, L., Burton, E., & Raman, S. (2004). Dementia-friendly cities: Designing intelligible neighbourhoods for life. *Journal of Urban Design*, *9*(1), 89–101.

Moreno, C., Allam, Z., Chabaud, D., Gall, C., & Pratlong, F. (2021). Introducing the "15-minute city": Sustainability, resilience and place identity in future post-pandemic cities. *Smart Cities*, *4*(1), 93–111.

Nieuwenhuijsen, M. J., Hahad, O., & Münzel, T. (2022). The COVID-19 pandemic as a starting point to accelerate improvements in health in our cities through better urban and transport planning. *Environmental Science and Pollution Research*, *29*, 16783–16785. https://doi.org/10.1007/s11356-021-18364-8

Pereira, R. H., Schwanen, T., & Banister, D. (2017). Distributive justice and equity in transportation. *Transport Reviews*, *37*(2), 170–191.

Perry, C. (1998). *The neighbourhood unit: From the Regional Survey of New York and its environs—Volume VII, neighbourhood and community planning*. Routledge. (Original work published 1929)

Queensland Treasury. (2020). *Walkable neighbourhoods: Supporting information for the walkable neighbourhoods assessment benchmarks in the Planning Regulation 2017*. https://dsdmipprd.blob.core.windows.net/general/walkable-neighbourhoods-supporting-information.pdf

Rajabifard, A., Paez, D., & Foliente, G. (2021). *COVID-19 pandemic, geospatial information, and community resilience: Global applications and lessons*. Routledge.

Royal Town Planning Institute. (2021). *20 minute neighbourhoods: Implementing 20 minute neighbourhoods in planning policy and practice*. https://www.rtpi.org.uk/research/2021/march/20-minute-neighbourhoods

Salih, N. M. M., & Hussein, S. H. (2021). Cities after pandemic: Enabling social distancing as a new design standard to achieve urban immunity. *Acta Scientiarum Polonorum Administratio Locorum*, *20*(4), 345–360.

Sallis, J. F., Saelens, B. E., Frank, L. D., Conway, T. L., Slymen, D. J., Cain, K. L., Chapman, J. E., & Kerr, J. (2009). Neighborhood built environment and income: Examining multiple health outcomes. *Social Science & Medicine*, *68*(7), 1285–1293. https://doi.org/10.1016/j.socscimed.2009.01.017

Scottish Design Awards. (2020). *Granton Waterfront*. https://2020.scottishdesignawards.com/master-planning/granton-waterfront

Scottish Government. (2020). *Place Standard tool: Strategic plan 2020–2023*. https://www.placestandard.scot/docs/Place_Standard_Strategic_Plan.pdf

Scottish Government. (2021a). *National performance framework*. https://nationalperformance.gov.scot

Scottish Government. (2021b). *Scotland 2045: Our fourth national planning framework—Draft*. https://www.gov.scot/publications/scotland-2045-fourth-national-planning-framework-draft

Scottish Government. (2022). *Place based investment and infrastructure*. Our Place. https://ourplace.wsdev.org/about-place/themes/place-based-investment/place-based-investment-infrastructure

Song, C., Ikei, H., Igarashi, M., Miwa, M., Takagaki, M., & Miyazaki, Y. (2014). Physiological and psychological responses of young males during spring-time walks in urban parks. *Journal of Physiological Anthropology*, *33*(8), Article 8. https://doi.org/10.1186/1880-6805-33-8

Teschke, K., Chinn, A., & Brauer, M. (2017). Proximity to four bikeway types and neighborhood-level cycling mode share of male and female commuters. *Journal of Transport and Land Use*, *10*(1), 695–713. https://doi.org/10.5198/jtlu.2017.943

The Economist Intelligence Unit. (2017). *The global liveability report 2017: A free overview*.

https://bluesyemre.files.wordpress.com/2017/08/liveability_free_summary_2017.pdf

Thornton, L. E., Schroers, R.-D., Lamb, K. E., Daniel, M., Ball, K., Chaix, B., Kestens, Y., Best, K., Oostenbach, L., & Coffee, N. T. (2022). Operationalising the 20-minute neighbourhood. *International Journal of Behavioral Nutrition and Physical Activity*, *19*(1), Article 15.

Transport Scotland. (2022). *Young persons' (under 22s) free bus travel*. https://www.transport.gov.scot/concessionary-travel/young-persons-free-bus-travel-scheme

Van Holle, V., Van Cauwenberg, J., Deforche, B., Goubert, L., Maes, L., Nasar, J., Van de Weghe, N., Salmon, J., & De Bourdeaudhuij, I. (2014). Environmental invitingness for transport-related cycling in middle-aged adults: A proof of concept study using photographs. *Transportation Research Part A: Policy and Practice*, *69*, 432–446. https://doi.org/10.1016/j.tra.2014.09.009

Victoria State Government. (2015). *Plan Melbourne Refresh: Discussion paper*. https://www.planmelbourne.vic.gov.au/__data/assets/pdf_file/0006/377313/Plan-Melbourne-Refresh-Discussion-Paper_WEB_FA-R2.pdf

Victoria Walks. (2016). *Safer road design for older pedestrians*. https://www.victoriawalks.org.au/Safer_Road_Design

Wennberg, H., Phillips, J., & Ståhl, A. (2018). How older people as pedestrians perceive the outdoor environment: Methodological issues derived from studies in two European countries. *Ageing & Society*, *38*(12), 2435–2467. https://doi.org/10.1017/S0144686X17000666

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Article

Integrating Health Into the Urban Master Plan of Vic, Barcelona: A Comprehensive Approach

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Abstract
Planning healthier cities is essential for public health. However, there is a gap between the insights from public health research and applications to planning practice. Based on a scoping review and in cooperation with urban planners and public health professionals, this study developed evidence-based tools and a comprehensive approach to help urban planners integrate health into the urban master plan (2017–2020) of a medium-sized city named Vic (Barcelona). The scoping review included a systematic review of the literature (PubMed, PRISMA protocol) and an advanced Google search for gray literature (2015–2017). The systematic review identified significant associations between urban planning attributes (n = 16) and health outcomes (n = 21). After critical appraisal with stakeholders, an urban and health association matrix was developed to help urban planners understand the connection between urban planning and health. The advanced Google search identified urban planning actions (n = 117) that had an impact on health outcomes. After critical appraisal with stakeholders, a healthy urban planning actions checklist (n = 68) was developed to help urban planners' decision-making on the inclusion of locally tailored health-enhancing urban planning actions into the urban master plan. From the reviewed evidence and tools, a comprehensive approach delineated a series of steps that successfully led urban planners to incorporate health-enhancing urban actions (n = 112) into the urban master plan. This translational research developed a comprehensive approach to include health in local urban planning. This might scale up to other European medium-sized cities to maximise the effectiveness of built environment interventions and monitor their health impact.

Keywords
Barcelona; health in the city; medium-sized city; tools; urban master plan; urban planning

Issue
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1. Introduction

Urban settings are key social determinants of health (Cockerham et al., 2017). Traffic exposure, noise, air pollution, social isolation, physical inactivity, sedentary behaviour, unhealthy diets, and crime (Giles-Corti et al., 2016; Glazener & Khreis, 2019; Sallis et al., 2016) are all city-related health hazards that have a causal role in fostering chronic disease (Giles-Corti et al., 2016; Kleinert & Horton, 2016). Given that the global urban population

is expected to double by 2050 (United Nations, 2016), cities have a central role in improving populations' health (United Nations, 2015, 2016).

Tackling the way cities are planned is to fundamentally promote urban health (Giles-Corti et al., 2016; Nieuwenhuijsen, 2020). Poor urban designs are associated with an increased risk of chronic disease and premature mortality burden (Khomenko et al., 2020) and are environmental stressors for the severity of Covid-19 (Barouki et al., 2021). Thus, improving the built environment of communities, creating walkable environments, or increasing exposure to urban green and blue spaces are current priorities for public health (Frank et al., 2019; Frank & Wali, 2021; Higgs et al., 2019; Koehler et al., 2018; Smith et al., 2021).

Several reviews have identified interventions, policies, or actions that make cities healthier (Nieuwenhuijsen, 2018, 2020; Salgado et al., 2020; Wolf et al., 2020). However, designing health-enhancing urban environments is a complex task that demands systems-based and interdisciplinary methods (Goenka & Andersen, 2016; Vardoulakis et al., 2016). In a context where translational research in urban health studies is scarce (Rubio et al., 2010), there is a current need to systematically and practically approach the design of healthier cities (Sallis et al., 2016). Thus, enhancing the adoption of best practices by using multidisciplinary and collaborative approaches with key stakeholders in real-life practice settings (Rubio et al., 2010) is a key issue to bridge research-practice gaps in healthy urban planning.

Effective environmental decision-making is required to guide the design of new neighbourhoods or the redevelopment of existing built environments to become health-enhancing (Frank et al., 2019; Koehler et al., 2018). This is especially relevant at the earliest stages of city (re)development when urban planners draw urban master plans, defined as the technical long-term city planning instrument that indicates the main city layout to guide future land use growth, development, and preservation. Urban planners have a fundamental role in designing healthier cities and with public health evolving from a bio-medical to a socio-anthropological approach (Azzopardi-Muscat et al., 2020), there is a scarcity of decision support tools and comprehensive approaches to help urban planners effectively integrate health-enhancing services and infrastructures into local urban master plans.

Some decision support tools for policy and investment decisions exist in green infrastructure (van Oijstaeijen et al., 2020), urban transport planning such as the health impact assessments (Nieuwenhuijsen et al., 2017; Ramirez-Rubio et al., 2019) or the overall urban built environment (Pineo et al., 2020). However, these have been developed for large urban and metropolitan areas rather than for small- to medium-sized cities (5,000–100,000 inhabitants) that characterise most European settlements (Servillo et al., 2017). Examples include the national public health assessment model (N-PHAM) in America and Canada (Schoner et al., 2018), the US Environmental Protection Agency's Eco-Health Relationship Browser (http://epa.gov/enviroatlas), the Australian Urban Observatory (https://auo.org.au), which also includes some medium-sized towns and cities in Australia, the Pedestrian First tools for a walkable city (https://pedestriansfirst.itdp.org), and the resources developed by the US American Planning Association on how to incorporate health into planning (https://cpe.rutgers.edu/public-health/health-in-all-policies). In a context where (a) little systematic research exists on small- and medium-sized cities compared to large cities and (b) few tools exist to match the different implementation phases of the design of urban master plans, there is a current need to "scale up" (Milat et al., 2015) real-life practices of small- and medium-sized cities that integrate health-enhancing urban actions into local urban master plans.

Given the current research-practice gaps, our study aimed to develop evidence-based tools and a comprehensive approach—in cooperation with public health professionals and urban planners—to guide urban planner's practice on integrating health into the urban master plan (2017–2020) of Vic, a medium-sized city with 45,000 inhabitants near Barcelona (Spain). This research practice study can contribute to maximising the effectiveness of health-enhancing urban environments in small- and medium-sized cities and monitoring their health impact.

2. Materials and Methods

A scoping review (Arksey & O'Malley, 2005) of two phases was performed throughout the development of the urban master plan of Vic. First, a systematic review of scientific evidence aimed to examine the relationships between urban planning attributes and health outcomes. Second, an advanced Google search of gray literature aimed to identify real-life local urban planning actions that influenced such health outcomes. Gray literature usually contains information that is not available in academic or scientific documents (Paez, 2017), a key issue to identify health-enhancing urban practices grounded in the "real world."

The reviewed evidence was then cooperatively shared and critically appraised with key stakeholders (urban planners and public health professionals) involved in the urban master plan of Vic. According to Milat et al. (2015), both a systematic use of the reviewed evidence and sharing the evidence with key stakeholders are fundamental issues when putting research into practice. Based on participatory action research, which embraces principles of participation, reflection, empowerment, and emancipation of people and groups interested in improving their social situation, an expert steering group was built to allow stakeholders and researchers become contributing actors in the research enterprise (Berg, 2004). The steering group (n = 9), led by two researchers from the University of Vic, included urban

planners from the Vic City Council (n = 1) and the supramunicipal entity Barcelona Provincial Council (n = 2), as well as public health professionals from the Barcelona Provincial Council (n = 2) and the Faculty of Medicine at the University of Vic (n = 2). In this group, researchers shared their knowledge of the reviewed evidence and discussed with stakeholders how the evidence could be made usable for urban planners to develop the Vic urban master plan. This participatory approach has been described elsewhere (Juncà et al., 2019).

2.1. Systematic Review of the Literature

2.1.1. Search Strategy and Selection Criteria

Following the PRISMA protocol for systematic reviews (http://www.prisma-statement.org), relevant scientific articles in the database PubMed were searched from January 2015 to 31 December 2017. Search terms described two key search areas: (a) urban planning and environment and (b) health and health-related concepts. The search strategy is described in Supplementary File 1.

Scientific articles were included if studies quantitatively investigated the associations between attributes of urban planning and health behaviours and outcomes. One author selected the scientific articles by examining titles and abstracts and excluded those focused on (a) private or indoor built environments, (b) natural or agricultural settings, and (c) specific clinical populations. Full-text data of eligible records were critically appraised before inclusion in the comprehensive synthesis of relevant literature. Any disagreement about document eligibility was resolved by other authors. Manual searching of reference lists also identified additional relevant studies and systematic reviews.

2.1.2. Data Extraction and Theoretical Integration of the Literature

Data from scientific studies were extracted according to the PRISMA 2009 checklist (Moher et al., 2009): details on source (authors, year, and location, i.e., country or city); objectives; study design (description of participants, interventions, comparisons, outcomes, and design); urban planning attributes and measurement methods; health outcomes and measurement methods; and synthesis of the existing associations between urban planning attributes and health outcomes.

Data on health-related urban planning attributes were categorised into five groups: traffic, density, land use mix, connectivity, and landscape (Nieuwenhuijsen, 2020; Salgado et al., 2020). Data on health outcomes were categorised into physical (physical and behavioural), social (psychological, emotional and social), environmental, and global health risk factors according to the WHO health indicators description of what makes cities healthy (WHO Regional Office for Europe, 2009).

2.1.3. Summary and Report of Key Findings

A comprehensive analysis of the reviewed evidence identified urban planning attributes related to health outcomes. After critical appraisal with key stakeholders, a Matrix table that visually summarised statistically significant relationships between urban planning attributes and health outcomes was developed. The matrix helped public health professionals and urban planners understand the connection between urban planning and health.

2.2. Advanced Google Search

2.2.1. Search Strategy and Selection Criteria

A gray literature search of documents of governmental organisations and public agencies in the advanced search platform of Google was performed. The search randomly permuted a combination of key terms in the following areas: document; urban planning; environment; health and health-related concepts; internet domains; search operators; and specific symbols that acted as filters following the Google search criteria (the Google search strategy is described in Supplementary File 2).

The authors reviewed Google records by titles and nomenclature links shown as relevant in the Google algorithm. Only the first 100 records were cross-checked since relevant records tend to appear in the first 10 pages according to the Google search criteria. Exclusion criteria of documents included scientific papers, documents from non-public profit organisations, individual authors, and documents with the internet domain ".com," which usually belongs to private companies. Inclusion criteria of documents included the full text of eligible records for national and international documents that illustrated urban planning actions within the health-related urban planning attributes that were analysed. Relevant documents were downloaded in PDF and included in the final comprehensive synthesis. Any disagreement about document eligibility was resolved by other authors.

2.2.2. Data Extraction and Theoretical Integration of the Literature

The following data were systematically extracted from the selected PDF documents: (a) author and year of publication; (b) general and specific aims; (c) description of the health-enhancing urban planning actions; and (d) measurement and evaluation methods for the urban actions if any.

2.2.3. Summary and Report of Key Findings

Data extracted from the reviewed evidence identified urban planning practices that fitted within each health-related urban planning attribute that was identified in the systematic review (traffic, density, land use mix, connectivity, and landscape). Results were critically

appraised by urban planners to discuss health-focused planning practices that could be better incorporated into Urban Master Plans of medium-sized cities. A checklist of health-focused urban planning practices was created to help urban planners include urban actions tailored to the local health characteristics and needs.

2.3. Comprehensive and Participatory Approach With Stakeholders

A first meeting with the expert steering group discussed and reached agreements on how to apply the evidence from the systematic review of the literature into practice. Initially, researchers presented a report on the urban planning attributes related to health indicators. Then, results were shared among stakeholders who highlighted the need to develop a matrix to make the connection between urban planning and health easier to understand. Stakeholders' feedback was collected to determine the exact features of the matrix. After the first meeting, a matrix was developed by researchers who sent a first draft to stakeholders by email. Minor changes were suggested, for example, adding colours to each group of health-related urban planning attributes for better understanding.

In a second meeting, the discussion reached agreements on how to apply evidence from the advanced Google search into practice. Initially, researchers presented the long list of health-focused urban actions that had been identified in the Google search. Then, urban planners provided feedback on the health-focused urban actions they perceived to be more feasible to be implemented within small-to-medium sized cities. An agreement was reached about including the perceived most feasible health-focused urban actions in a checklist as an easy way to guide urban planners' decisions on how to integrate health services and infrastructures into the city urban master plan.

A third meeting agreed on how to develop and apply a comprehensive approach that was perceived as useful for stakeholders to integrate health into the city's urban master plan. Initially, urban planners presented a general plan on how they were intending to apply the matrix and checklist to include health-focused urban planning actions in the local urban master plan. The general plan was agreed upon by stakeholders and was decided to be applied in real life. After implementation, minor changes were suggested to make implementation easier, for example, using the checklist of urban planning actions first rather than the matrix. This allowed urban planners to count the number of actions included in the urban master plan that related to each urban planning attribute and health outcome.

3. Results

The systematic review of scientific literature generated 623 scientific studies that were screened by abstract. After excluding those studies that did not quantitatively investigate the associations between attributes of urban planning, health behaviours and outcomes the full text of 169 studies was critically appraised for final eligibility. Eighty-five studies failed to meet the inclusion criteria, and 84 studies were included in the comprehensive synthesis (see Figure 1). The Google search strategy yielded more than three thousand records. From the first 100 records, eighty potentially relevant documents were identified, 62 of which met the exclusion criteria. A total of 18 documents were included for analysis (see Figure 2).

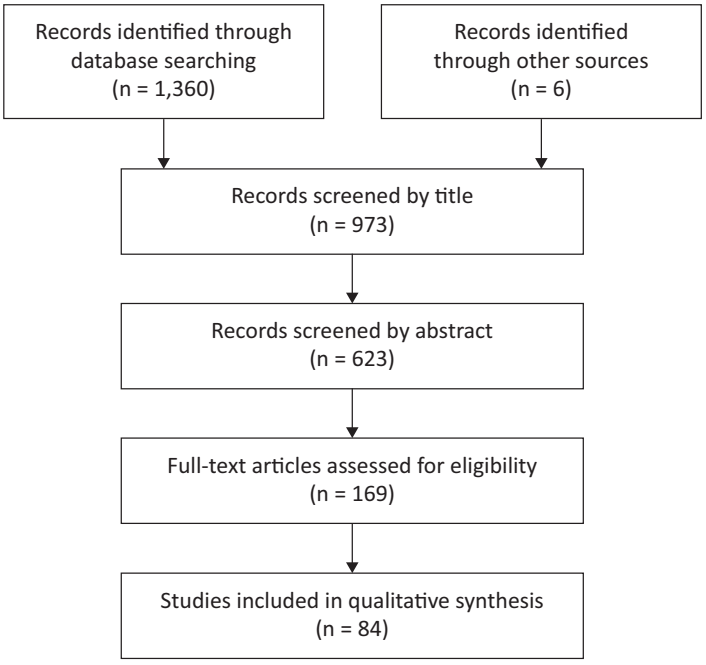

Figure 1. Flowchart diagram of the systematic review.

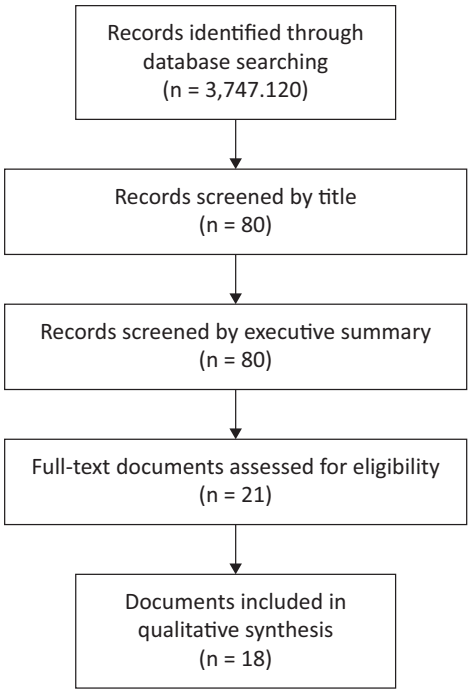

Figure 2. Flowchart diagram of the Google search.

3.1. Results From the Systematic Review

The studies were cross-sectional, systematic reviews and quantified the relationship between objective or perceived urban planning attributes and health outcomes. They were carried out in the US (n = 24), Canada (n = 12), followed by Europe (Spain, Germany, Finland, Norway, and Italy, n = 11), Asia (China and Japan, n = 7), Oceania (Australia and New Zealand, n = 5), Central and South America (Peru, Mexico, and Argentina, n = 3), South Africa (n = 1), and 21 studies were multinational including at least two different countries. The reference list is shown in Supplementary File 3.

A total of 16 urban planning attributes (see Figure 3) were significantly associated with 21 health outcomes (see Figure 4). Residential density, street connectivity, land use mix, walking and cycling infrastructures, open public spaces (i.e., green areas), aesthetic attributes, crime, traffic safety, and walkability were related to the widest range of health outcomes, especially physical activity and weight control. Significant associations between urban planning attributes and health outcomes are shown in Supplementary File 4. After critical appraisal with urban planners and public health professionals, an urban and health association matrix (UHAM) was designed to help urban planners and public health professionals understand the relationship between urban planning and health (see Figure 5).

3.2. Results From the Advanced Google Search

The selected documents (n = 18) were published by governmental organisations from Australia (n = 2), Canada (n = 2), the US (n = 1), Europe (n = 2), Hong Kong (n = 1), the UK (n = 4), Sweden (n = 1), and global public agencies (n = 5) such as the World Health Organization and Interreg Europe. They were descriptive documents that formed the basis of territorial projects and urban planning strategies that were either already developed or were future planned. The reference list is shown in Supplementary File 5.

A total of 117 urban actions fitted within the five groups of health-related urban planning attributes previously identified. Density grouped actions to promote compact cities and proximity commerce (6.84%, n = 17). Land use mix grouped actions referring to the diversity of the built-environment uses for everyone (25.90%, n = 55). Connectivity grouped actions related to urban network connectivity and pedestrian and cycling pathway designs (40.17%, n = 52). Traffic included actions related to reducing traffic volume and speed, as well as increasing road safety (23.83%, n = 28). Landscape included actions on how to improve cities' aesthetics and the greenery of public open spaces and natural areas (73.50%, n = 88). The complete list of health-enhancing urban actions is shown in Supplementary File 6.

After critical appraisal with urban planners and public health professionals, a healthy urban planning actions checklist (HUPAC) was developed to better suit small to medium-sized cities. This HUPAC was created as a menu of choices for healthy urban practices to help urban planners decide on health-focused urban planning actions that could be included in the urban master plan of the city. The HUPAC (see Table 1) consisted of 68 urban actions on density (n = 7), land use mix (n = 3), connectivity (n = 26), traffic (n = 4), and landscape (n = 28).

URBAN PLANNING ATTRIBUTES		
DENSITY	01	Population density
	02	Business density
CONNECTIVITY	03	Intersection density and street connectivity
	04	Cycling infrastructure
	05	Walkability / pedestrian infrastructure
	06	Public transport density
LAND USE MIX (DIVERSITY)	07	Health, wellness and community services
	08	Entertainment, culture and recreation services
	09	Physical and sport infrastructures
	10	Public open spaces
LANDSCAPE	11	Green and blue areas (greenness index, vegetation coverage)
	12	Aesthetic and cleanness
	13	Urban furniture
	14	Maintenance and lighting
TRAFFIC	15	Slow-moving and heavy traffic / Truck routes
	16	Traffic volume

Figure 3. Urban planning attributes (n = 16) significantly associated with health indicators.

HEALTH INDICATORS			
Physical Health	Physical	F01	Obesity and overweight
		F02	Diabetes
		F03	Cardiovascular diseases
		F04	Asthma and respiratory diseases
		F05	Functional capacity
		F06	Accidents and falls
		F07	Pain
	Behavioural	F08	Physical activity
		F09	Sedentary behavior
		F10	Food habits
Social Health	Psychological, emotional and social	S01	Support and social skills
		S02	Stress and anxiety
		S03	Depression
		S04	Cognitive function
		S05	Emotional wellbeing
		S06	Attention deficit
		S07	Mental health and psychological disorder
Environmental		A01	Noise pollution
		A02	Air pollution
Global		G01	Wellbeing and quality of life
		G02	Vitality and happiness

Figure 4. Health indicators (n = 21) significantly associated with urban planning attributes.

URBAN PLANNING ATTRIBUTES		HEALTH INDICATORS																				
		PHYSICAL HEALTH										SOCIAL HEALTH							ENVIRONMENTAL		GLOBAL	
		PHYSICAL							BEHAVIOURAL			PSYCHOLOGICAL, EMOTIONAL AND SOCIAL										
		F01	F02	F03	F04	F05	F06	F07	F08	F09	F10	S01	S02	S03	S04	S05	S06	S07	A01	A02	G01	G02
		Obesity and overweight	Diabetes	Cardiovas-cular diseases	Asthma and respiratory diseases	Functional capacity	Accidents and falls	Pain	Physical activity	Sedentary behaviour	Food habits	Support and social skills	Stress and anxiety	Depression	Cognitive function	Emotional wellbeing	Attention deficit	Mental health and phychological disorders	Noise pollution	Air pollution	Wellbeing and quality of life	Vitality and happiness
Density	Population density	1							7	1		1		1		1				1		
	Business density				1				1											1		
Connectivity	Intersection density and street connectivity	2							15	2		1								1		
	Cycling infrastructure	1	1						6													
	Walkability and pedestrian infrastructure	4	1	1		1		1	15	1										1	2	
	Public transport density	1							5	1				1								
Land use mix	All four subgroups included	3					1		10vxl	1											2	
	Health wellness and community services	2							4	2	1vxl										2	1
	Entertainment, culture and recreational services	2							6		1										2	
	Physical and sport infrastructure	2		1		1			3	1												
	Public open spaces	1		1				1	15	1			2	1				2			1	
Landscape	All four subgroups included						1		2	1												
	Green and blue areas (greeness index, vegetation coverage)	2			1	1			6	1			2	1	1	1			1	1	2	
	Aesthetic and cleanness	2	1	1			1		9	1						1	1				1	
	Urban furniture								1													
	Maintenance and lighting						1		5	1											1	
Traffic	Traffic volume	1		1					2	1							1		1	2	1	
	Truck routes	1		1	2														1	2		
	Slow-moving and heavy traffic				2		1		8	1					1							

Negative association — Number of articles found — Positive association

>5 | 2 to 5 | 1 | 1 | 2 to 5 | >5

Figure 5. The urban and health association matrix for urban planners: Understanding associations between urban planning attributes and health outcomes.

Table 1. The healthy urban planning action checklist for urban planners.

Density
Proximate Commerce
Ensure space for proximity commerce in all neighbourhoods
Plan for bicycle parking spaces and bicycle paths
Areas with fountains and shade around the trade area
Compact City
Prioritise growth within the city itself, avoiding large extensions
Reuse obsolete interior spaces of the city as a priority for growth
Improve green infrastructure in areas of high density
Ensure connectivity between the different green areas
Connectivity
Urban Network Connectivity
Maintain the continuity of sidewalks
In the new areas of growth, limit the size of the blocks
In built areas with low permeability, promote passages through buildings
Avoid overpasses or underground passes for pedestrians
In high-density pedestrian streets, avoid median-island accesses for vehicles
Ensure access to the main public buildings
Improve access to short distance parks and natural areas
Create ecological corridors along the green and blue ecosystems
Connect the bus stops with the train stations
Pedestrian Pathways Design
Separating pedestrians from vehicles using furniture, trees, etc.
Provide benches, fountains and rest areas as support for longer journeys
Outdoor lighting along the streets and pedestrian routes
Incorporate trees and other visually appealing elements along the routes
Wide pavements suitable for use
Pedestrian crossings at intersections
Ensure a network of roads in continuity with the pavements and pedestrian routes, improving the connectivity of the walking routes
Create pedestrian routes oriented towards elements or points of interest
Streets and roads accessible to users with reduced mobility: width, radius of rotation, suitable crossing time, visible access ramps, etc.
Bicycle Network Connectivity
Define a basic structure of bike lanes, with connections to the rest of the network
Provide links between different modes of transport
Bicycle Network Design
Use marks or signals to reinforce the separation between motorised areas and cyclist areas
Enlarge bicycle network if its use exceeds the capacity
Special attention to intersections to improve visibility between cyclists and cars
Reduce conflicts between cyclists and the opening of vehicle doors. Expand parking width when needed
Promote greenways with external connection
Cycling Infrastructure
Foresee spaces for parking bicycles along and at the end of the routes
Land Use Mix
Urban planning that fosters the mix of uses and activities (housing, offices, schools, trade, green areas, etc.) avoiding specialised areas in a single activity
Provide housing and work spaces in proximity to green spaces, parks, paths etc.
Promoting trade and services around housing and office areas

Table 1. (Cont.) The healthy urban planning action checklist for urban planners.

Landscape
Parks, Open Spaces, and Recreational Areas
Prioritize about open spaces as an essential part of urban development
Integrate the planning of green and blue ecosystems
Ensure access to green areas within 250m of homes
Ensure access to a large park within 10 minutes walking distance
Create or improve urban forests
Improve the access (security and visibility) of cyclists and pedestrians to large parks and green areas
Assess the different possible uses for open spaces: sports, urban gardens, children's playground, meeting point …
Create emblematic parks as key elements of the green infrastructure
Improve the equipment of the parks to facilitate their use: paths, furniture, fountains, benches, children's areas)
Planning new open spaces in proximity to public buildings and infrastructure
Designing parks considering the use and preferences of the local population and age groups
Promote partnerships with organisations and/or businesses to sponsor to maintain parks and gardens
Create a green belt around the city
Playgrounds
Include areas for sports and multi-use areas
Preserve the natural land as far as possible
Lighting to promote use during winter
Provide suitable spaces for different seasons and weather conditions
Public Space
Place green areas along the main pedestrian paths
Place squares near traffic stops
Ensure the access of cyclists to the green areas
Ensure squares and green areas have different uses
Foresee the possible uses in a variety of climatic conditions
Leisure and Sports
Improve the infrastructure to promote sport and physical activity
Provide the infrastructure to practice physical activity and sports activity in all city contexts such as public parks, trails, and recreational facilities among others.
Aesthetics
Avoid abandoned or underused spaces in the city
Green Cover and Vegetation
Use species adapted to the climatic zone
Promote green roofs and facades on buildings
Increase the number of trees in vulnerable areas
Traffic
Public Transport and Parking
Provide car parking areas to facilitate the exchange of transport mode, promoting active mobility
Provide car parking at the entrances of the city in connection with pedestrian routes
Traffic Calming
Reduce the width of the roads to promote lower speed
Incorporate speed reducers

3.3. Results From the Comprehensive Approach for Incorporating Health-Focused Urban Planning Actions Into the Urban Master Plan of Vic

As a result of the developed evidence-based support tools and in cooperation with urban planners and public health professionals, a comprehensive approach was designed to include health-focused urban planning actions in the urban master plan of Vic. The comprehensive approach delineated five specific steps (see Figure 6):

- Step 1: Urban planners identified the urban planning attributes related to health (see Figure 3).

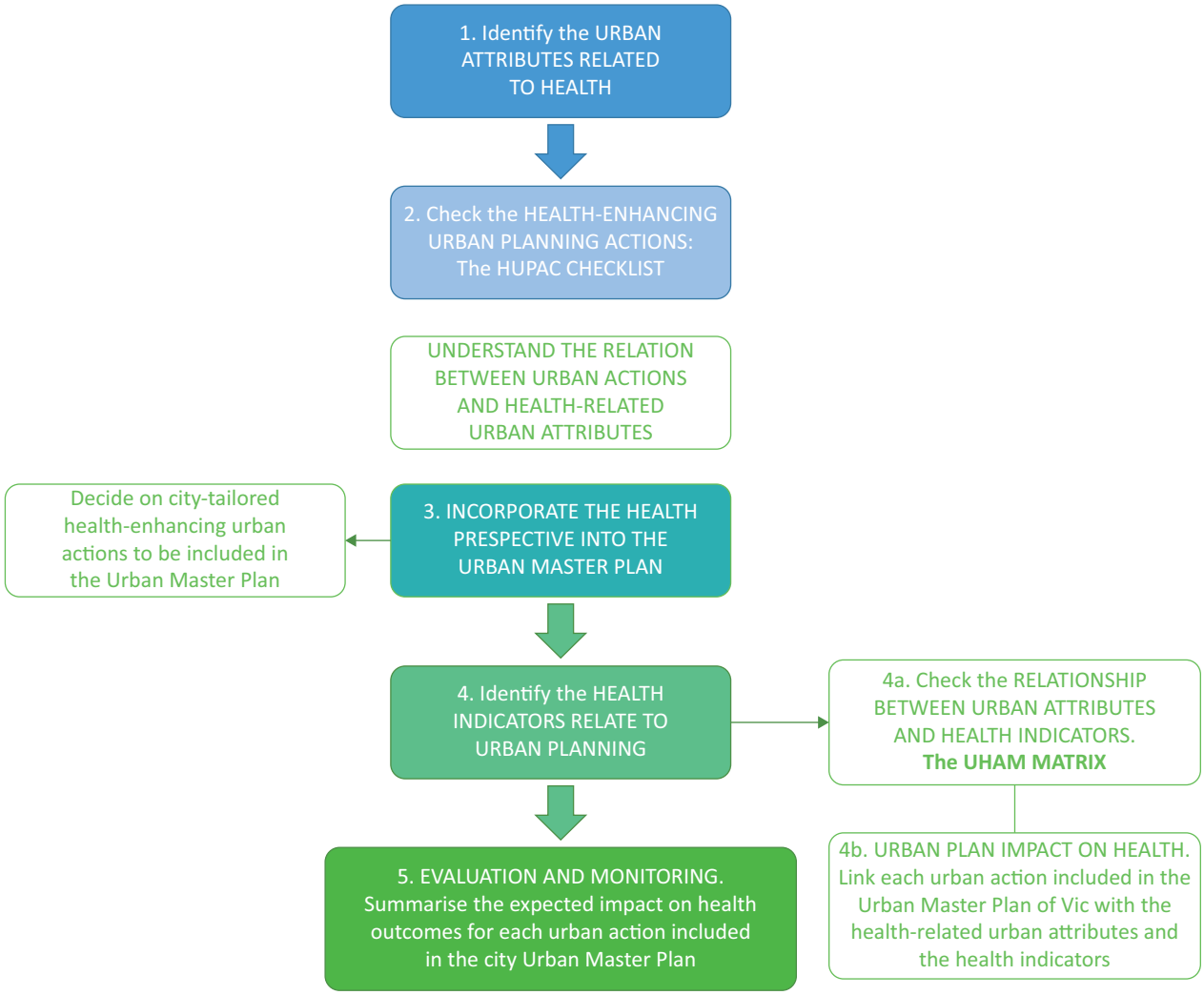

Figure 6. Comprehensive approach to connect the urban planning actions of the Vic urban master plan with the health-related urban attributes and citizens' health.

- Step 2: Urban planners checked the HUPAC as a guide to identify examples of practices for health-focused urban actions.
- Step 3: Urban planners chose and decided on city-tailored health-focused urban planning actions to be included in the Vic urban master plan.
- Step 4: Urban planners checked the UHAM to connect each urban planning action included in the Vic urban master plan with the urban planning attributes and health-related indicators identified by the reviewed evidence (Figure 7).
- Step 5: Urban planners summarised the expected impact on health for each urban planning action included in the Vic urban master plan according to the UHAM.

As a result, 112 local health-focused urban planning actions were successfully incorporated into the local urban master plan of Vic (see Supplementary File 7). Each urban planning action was related to one or several of the 16 health-related urban planning attributes. In turn, these were associated with one or several health outcomes (see Figure 6, step 4b; see also Figure 7). For example, "completing the green ring of Vic" (street connectivity and walkability) was designed to positively impact citizens' physical activity and emotional well-being. This comprehensive approach allowed urban planners to have a global overview (see Figure 6, step 5) of the expected impact the urban master plan of Vic might have on health-related urban planning attributes (see Figure 8), and the expected impact of the overall local urban planning actions included in the Vic urban master plan on health (see Figure 9).

4. Discussion

This study developed evidence-based tools and a comprehensive approach to help urban planners integrate health-focused urban planning actions into the urban master plan of a medium-sized city named Vic, Barcelona (Spain). This provided a unique opportunity to perform translational research to improve urban built

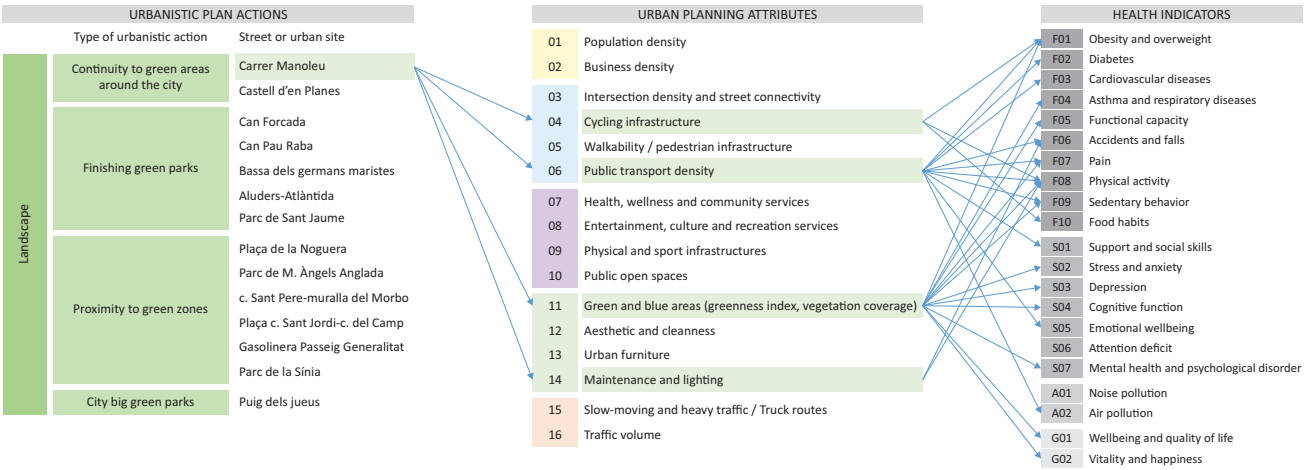

Figure 7. Example of how urban planning actions included in the Vic Urban Master Plan were linked to the health-related urban planning attributes and health indicators.

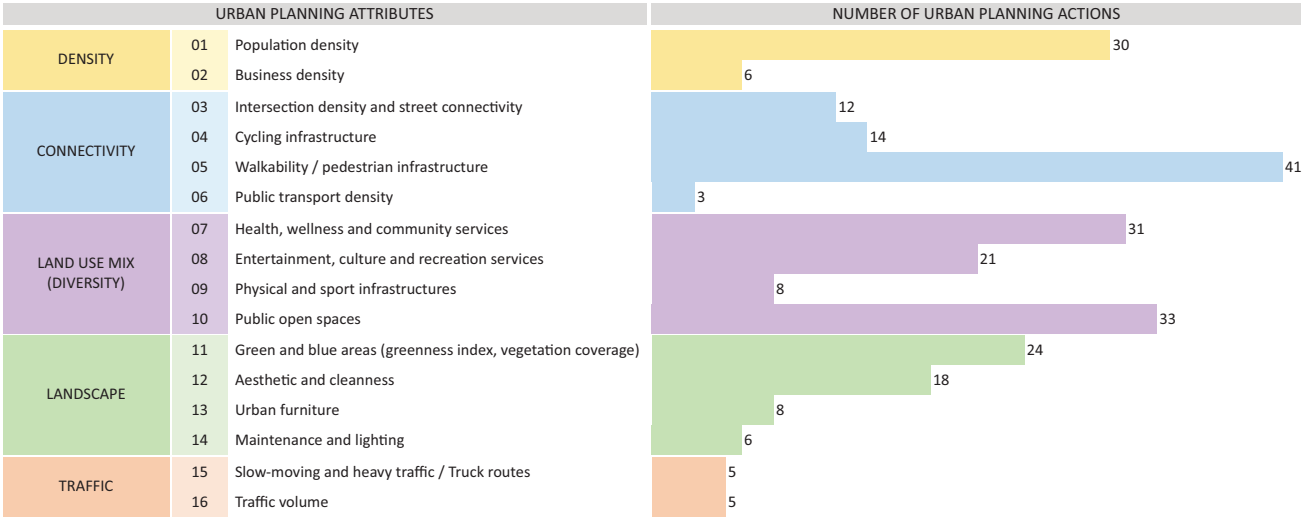

Figure 8. Overview of the number of urban planning actions included in the Vic urban master plan that relate to the health-related urban planning attributes.

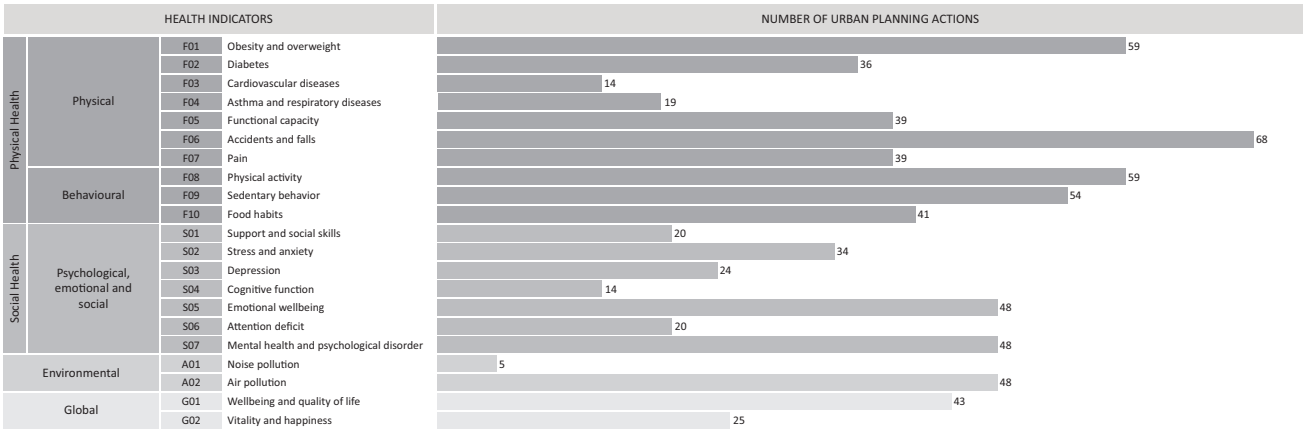

Figure 9. Overview of the number of the urban planning actions included in the Vic urban master plan that relate to the health indicators.

environments at the earliest stages of planning development in order to foster citizens' health and well-being (McKinnon et al., 2020). This study also contributes to scaling up the inclusion of health in the local urban planning of small to medium-sized cities on which the European pattern of settlements mostly depends (Servillo et al., 2017). This is a relevant public health topic that was emphasised during the pandemic when urban planning was identified as a key strategy to improve citizens' health (Frank et al., 2019).

The development process was guided by a systematic review of scientific evidence and gray literature, as well as the use of participatory approaches with stakeholders, two key factors for effective scaling up (Milat et al., 2015). The UHAM, the HUPAC, and the comprehensive approach were successfully implemented in urban planners' daily work and could be useful to help other urban planners integrate health into local urban planning. This would facilitate the much-needed multidisciplinary work across urban planning and health disciplines (McKinnon et al., 2020). The implementation of a UHAM and a HUPAC represented a low-cost translational comprehensive approach that seemed to overcome the main barriers to applying baseline research into something as practical and specific as an Urban Master Plan. The main barriers identified by stakeholders in the steering group included (a) the complexity of working multidisciplinarily with professionals that address the same issue from different perspectives and (b) applying evidence-based information in a comprehensive way so it guides professional action and decision-making. This work contributes to implementation research that is needed to enhance population health by identifying and synthesizing evidence that shifts toward greater stakeholder input (Lobb & Colditz, 2013). This shift improves the relevance of the information that is produced and guides decision-makers in their implementation of research-based interventions (Lobb & Colditz, 2013).

City planning is an essential element to fight the major global health challenges of the 21st century (Sallis et al., 2016). Therefore, facilitating the implementation of a health-oriented urban master plan is fundamental to address the existing gap between what is known in public health research and what gets implemented in urban planning practice (Milat et al., 2015). To our knowledge, research on urban health has focused on developing national urban indicators to describe what constitutes a healthy and liveable city (Alderton et al., 2019; Giles-Corti et al., 2014), exploring the capacity of urban policies to create healthy and liveable cities (Giles-Corti et al., 2020), providing quality criteria and validated instruments for evaluating municipal environmental planning in metropolitan areas (Poza-Vilches et al., 2020), understanding the influence of key actors, planning approaches and health-data characteristics to inform urban health planning (Mirzoev et al., 2019), and carrying out health impact assessments to estimate the health gains of city planning interventions like active transportation (Rojas-Rueda et al., 2012). Studies on urban health are predominantly cross-sectional and reviews (Mueller et al., 2015); therefore this study provides a systematic and practical approach to the design of health-enhancing cities (Sallis et al., 2016) with a special focus on medium-sized cities. This is especially relevant since most urban research focuses on large metropolitan areas.

Previous studies have identified similar results on the relationships between urban planning attributes and physical, behavioural, psychological, emotional, social, environmental and global health (Hankey & Marshall, 2017; Mueller et al., 2021; Sallis et al., 2016). Several systematic reviews have studied the relationships between built environments and physical activity (Smith et al., 2017), cardio-metabolic health (Chandrabose et al., 2019), mental health and wellbeing (Moore et al., 2018). However, there is a lack of comprehensive approaches—specifically tailored to urban planners—for adopting practices that enhance community health through better environmental decision-making. The development of several health-enhancing urban built environment interventions in Vic, Barcelona, could contribute to attenuating future environmental, social, and behavioural health hazards of this city.

This study has a number of limitations. First, the comprehensive approach and tools for introducing health outcomes into urban master plans were developed for a specific European, Mediterranean, medium-sized city. To be scaled up to other medium-sized cities, caution is needed and contextual differences might have to be considered. Second, it is very likely that the checklist did not include all the urban planning actions published in Google within the health-related urban planning attributes. The vast amount of existing information was a limiting factor, but many urban planning actions were listed (n = 117) and data saturation was reached. In the future, the checklist of health-focused urban planning actions should be expanded to include new urban planning actions that will be developed over time. Similarly, the UHAM should be further expanded to include any newfound relationships between urban attributes and health outcomes. Future work should also build the comprehensive approach and tools into technological platforms (i.e., web tools) to make urban planners' practice easier.

This study has a number of unique features. First, it involved applied research at the early stages of the development of urban places. Second, it involved a scoping review which is more explanatory and describes a broader field of inquiry than systematic reviews (Arksey & O'Malley, 2005). The scoping review illustrated the range and nature of real-life activity in the research practice area of urban planning and health. Third, the comprehensive approach and tools were developed by bringing together different disciplines, including public health professionals, urban planners, and researchers.

5. Conclusion

In the 21st century, addressing the social and built environment factors that influence the health of individuals and communities is a key issue for preventing disease, promoting health and well-being (Cockerham et al., 2017), and achieving the United Nations SDGs 3 and 11 for 2030. Developing evidence-based tools that help urban planners to design and build health-focused urban actions for urban master plans is a key element for the promotion of urban health. This study contributes to translational research by developing a comprehensive approach that might scale up the inclusion of health-focused urban actions in the design of other urban master plans of other small to medium-sized European cities. It represents a contribution to implementation research that is needed to enhance population health (Lobb & Colditz, 2013). This could maximize the effectiveness of creating health-enhancing urban environments from zero, allowing for a more effective evaluation and follow-up of their health impact.

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Conflict of Interests

The authors declare no conflict of interests.

Supplementary Material

Supplementary material for this article is available online in the format provided by the authors (unedited).

References

Alderton, A., Davern, M., & Nitvimol, K. (2019). What is the meaning of urban liveability for a city in a low-to-middle-income country? Contextualizing liveability for Bangkok, Thailand. *Global Health*, *15*(1). https://doi.org/10.1186/s12992-019-0484-8

Arksey, H., & O'Malley, L. (2005). Scoping studies: Towards a methodological framework. *International Journal of Social Research Methodology*, *8*(1), 19–32. https://doi.org/10.1080/1364557032000119616

Azzopardi-Muscat, N., Brambilla, A., Caracci, F., & Capolongo, S. (2020). Synergies in design and health. The role of architects and urban health planners in tackling key contemporary public health challenges. *Acta Biomedica*, *91*(3-S), 9–20. https://doi.org/10.23750/abm.v91i3-S.9414

Barouki, R., Kogevinas, M., Audouze, K., Belesova, K., Bergman, A., Birnbaum, L., Boekhold, S., Denys, S., Desseille, C., Drakvik, E., Frumkin, H., Garric, J., Destoumieux-Garzon, D., Haines, A., Huss, A., Jensen, G., Karakitsios, S., Klanova, J., Koskela, IM., . . . Vineis, P. (2021). The Covid-19 pandemic and global environmental change: Emerging research needs. *Environmental International*, *146*. https://doi.org/10.1016/j.envint.2020.106272

Berg, B. (2004). *Qualitative research methods for the social sciences* (5th ed.). Pearson.

Chandrabose, M., Rachele, J. N., & Gunn, L. (2019). Built environment and cardio-metabolic health: Systematic review and meta-analysis of longitudinal studies. *Obesity Reviews*, *20*(1), 41–54. https://doi.org/10.1111/obr.12759

Cockerham, W. C., Hamby, B. W., & Oates, G. R. (2017). The social determinants of chronic disease. *American Journal of Preventive Medicine*, *52*(1S1), S5–S12. https://doi.org/10.1016/j.amepre.2016.09.010

Frank, L. D., Iroz-Elardo, N., MacLeod, K. E., & Hong, A. (2019). Pathways from built environment to health: A conceptual framework linking behavior and exposure-based impacts. *Journal of Transport and Health*, *12*, 319–355. https://doi.org/10.1016/j.jth.2018.11.008

Frank, L. D., & Wali, B. (2021). Treating two pandemics for the price of one: Chronic and infectious disease impacts of the built and natural environment. *Sustainable Cities and Society*, *73*. https://doi.org/10.1016/j.scs.2021.103089

Giles-Corti, B., Badland, H., & Mavoa, S. (2014). Reconnecting urban planning with health: A protocol for the development and validation of national liveability indicators associated with noncommunicable disease risk behaviours and health outcomes. *Public Health Research Practice*, *25*(1). https://doi.org/10.17061/phrp2511405

Giles-Corti, B., Lowe, M., & Arundel, J. (2020). Achieving the SDGs: Evaluating indicators to be used to benchmark and monitor progress towards creating healthy and sustainable cities. *Health Policy*, *124*(6), 581–590. https://doi.org/10.1016/j.healthpol.2019.03.001

Giles-Corti, B., Vernez Moudon, A., Reis, R., Turrell, G., Dannenberg, A., Badland, H., Foster, S., Lowe, M., Sallis, J. F., Stevenson, M., & Owen, N. (2016). City planning and population health: A global challenge. *The Lancet*, *388*(10062), 2912–2924. https://doi.org/10.1016/S0140-*6736*(16)30066-6

Glazener, A., & Khreis, H. (2019). Transforming our cities: Best practices towards clean air and active transportation. *Current Environmental Health Reports*, *6*(1), 22–37. https://doi.org/10.1007/s40572-019-0228-1

Goenka, S., & Andersen, L. B. (2016). Urban design and transport to promote healthy lives. *The Lancet*, *388*(10062), 2851–2853. https://doi.org/10.1016/S0140-*6736*(16)31580-X

Hankey, S., & Marshall, J. D. (2017). Urban form, air pollution, and health. *Current Environmental Health Reports*, *4*(4), 491–503. https://doi.org/10.1007/s40572-017-0167-7

Higgs, C., Badland, H., Simons, K., Knibbs, L. D., & Giles-Corti, B. (2019). The Urban Liveability Index: Developing a policy-relevant urban liveability composite measure and evaluating associations with transport mode choice. *International Journal of Health Geography*, *18*(1). https://doi.org/10.1186/s12942-019-0178-8

Juncà, A., Bort-Roig, J., Martori, J. C., & Puig-Ribera, A. (2019). Improving walkability in Catalonia through a participatory and empowerment model. *International Journal of Sustainable Society*, *11*(2), 108–124. https://doi.org/10.1504/IJSSOC.2019.103654

Khomenko, S., Nieuwenhuijsen, M., Ambròs, A., Wegener, S., & Mueller, N. (2020). Is a liveable city a healthy city? Health impacts of urban and transport planning in Vienna, Austria. *Environmental Research, 183*. https://doi.org/10.1016/j.envres.2020.109238

Kleinert, S., & Horton, R. (2016). Urban design: An important future force for health and well-being. *The Lancet*, *388*(10062), 2848–2850. https://doi.org/10.1016/S0140-*6736*(16)31578-1

Koehler, K., Latshaw, M., Matte, T., Kass, D., Frumkin, H., Fox, M., Hobbs, B. F., Wills-Karp, M., & Burke, T. A. (2018). Building healthy community environments: A public health approach. *Public Health Reports*, *133*(Suppl. 1), 35S–43S. https://doi.org/10.1177/0033354918798809

Lobb, R., & Colditz, G. A. (2013). Implementation science and its application to population health. *Annual Review of Public Health*, *34*, 235–251. https://doi.org/10.1146/annurev-publhealth-031912-114444

McKinnon, G., Pineo, H., Chang, M., Taylor-Green, L., Strategy, A. J., & Toms, R. (2020). Strengthening the links between planning and health in England. *British Medical Journal*, *16*(369). https://doi.org/10.1136/bmj.m795

Milat, A. J., Bauman, A., & Redman, S. (2015). Narrative review of models and success factors for scaling up public health interventions. *Implementation Science*, *10*. https://doi.org/10.1186/s13012-015-0301-6

Mirzoev, T., Poudel, A. N., & Gissing, S. (2019). Is evidence-informed urban health planning a myth or reality? Lessons from a qualitative assessment in three Asian cities. *Health Policy and Planning*, *34*(10), 773–783. https://doi.org/10.1093/heapol/czz097

Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PloS Medicine*, *6*(7). https://doi.org/10.1136/bmj.b2535

Moore, T. H. M., Kesten, J. M., & López-López, J. A. (2018). The effects of changes to the built environment on the mental health and well-being of adults: Systematic review. *Health and Place*, *53*, 237–257. https://doi.org/10.1016/j.healthplace.2018.07.012

Mueller, N., Daher, C., Rojas-Rueda, D., Delgado, L., Vicioso, H., Gascon, M., Marquet, O., Vert, C., Martin, I., & Nieuwenhuijsen, M. (2021). Integrating health indicators into urban and transport planning: A narrative literature review and participatory process. *International Journal of Hygiene and Environmental Health*, *235*. https://doi.org/10.1016/j.ijheh.2021.113772

Mueller, N., Rojas-Rueda, D., & Cole-Hunter, T. (2015). Health impact assessment of active transportation: A systematic review. *Preventive Medicine*, *76*, 103–114. https://doi.org/10.1016/j.ypmed.2015.04.010

Nieuwenhuijsen, M. J. (2018). Influence of urban and transport planning and the city environment on cardiovascular disease. *Nature Reviews Cardiology*, *15*(7), 432–438. https://doi.org/10.1038/s41569-018-0003-2

Nieuwenhuijsen, M. J. (2020). Urban and transport planning pathways to carbon neutral, liveable and healthy cities: A review of the current evidence. *Environment International*, *140*. https://doi.org/10.1016/j.envint.2020.105661

Nieuwenhuijsen, M. J., Khreis, H., Verlinghieri, E., Mueller, N., & Rojas-Rueda, D. (2017). Participatory quantitative health impact assessment of urban and transport planning in cities: A review and research needs. *Environment International*, *103*, 61–72. https://doi.org/10.1016/j.envint.2017.03.022

Paez, A. (2017). Grey literature: An important resource in systematic reviews. *Journal of Evidence-Based Medicine*. https://doi.org/10.1111/jebm.12265

Pineo, H., Glonti, K., & Rutter, H. (2020). Use of urban health indicator tools by built environment policy- and decision-makers: A systematic review and narrative synthesis. *Journal of Urban Health*, *97*, 418–435. https://doi.org/10.1007/s11524-019-00378-w

Poza-Vilches, M. F., Gutiérrez-Pérez, J., & Pozo-Llorente, M. T. (2020). Quality criteria to evaluate performance and scope of 2030 agenda in metropolitan areas: Case study on strategic planning of environmental municipality management. *International Journal of Environmental Research in Public Health*, *17(*2). https://doi.org/10.3390/ijerph17020419

Ramirez-Rubio, O., Daher, C., & Fanjul, G. (2019). Urban health: An example of a "health in all policies" approach in the context of SDGs implementation. *Global Health*, *15*(1). https://doi.org/10.1186/s12992-019-0529-z

Rojas-Rueda, D., de Nazelle, A., Teixidó, O., & Nieuwenhuijsen, M. J. (2012). Replacing car trips by increasing bike and public transport in the greater Barcelona metropolitan area: A health impact assessment study. *Environment International*, *49*, 100–109. https://doi.org/10.1016/j.envint.2012.08.009

Rubio, D. M., Schoenbaum, E. E., Lee, L. S., Schteingart, D. E., Marantz, P. R., Anderson, K. E., Platt, L. D., Baez, A., & Esposito, K. (2010). Defining translational research: Implications for training. *Journal of the Association of American Medical Colleges*, *85*(3), 470–475. https://doi.org/10.1097/ACM.0b013e3181ccd618

Salgado, M., Madureira, J., Mendes, A. S., Torres, A., Teixeira, J. P., & Oliveira, M. D. (2020). Environmental determinants of population health in urban settings. A systematic review. *BMC Public Health*, *20*(1). https://doi.org/10.1186/s12889-020-08905-0

Sallis, J. F., Bull, F., & Burdett, R. (2016). Use of science to guide city planning policy and practice: How to achieve healthy and sustainable future cities. *The Lancet*, *388*(10062), 2936–2947. https://doi.org/10.1016/S0140-*6736*(16)30068-X

Schoner, J., Chapman, J., Brookes A., MacLeod, K., Fox E., Iroz-Elardo, N., & Frank, L. D. (2018). Bringing health into transportation and land use scenario planning: Creating a national public health assessment model (N-PHAM). *Journal of Transportation and Health*, *10*, 401–418. https://doi.org/10.1016/j.jth.2018.04.008

Servillo, L., Atkinson, R., & Hamdouch, A. (2017). Small and medium-sized towns in Europe: Conceptual, methodological and policy issues—Project TOWN. *Journal of Economic and Human Geography*, *108*(4), 365–379. https://doi.org/10.1111/tesg.12252

Smith, M., Hosking, J., & Woodward, A. (2017). Systematic literature review of built environment effects on physical activity and active transport—An update and new findings on health equity. *International Journal of Behavioural Nutrition and Physical Activity*, *14*(1). https://doi.org/10.1186/s12966-017-0613-9

Smith, N., Georgiou, M., King, A. C., Tieges, Z., Webb, S., & Chastin, S. (2021). Urban blue spaces and human health: A systematic review and meta-analysis of quantitative studies. *Cities*, *119*. https://doi.org/10.1016/j.cities.2021.103413

United Nations. (2015). *Resolution adopted by the General Assembly: Transforming our world; the 2030 agenda for sustainable development*.

United Nations. (2016). *Resolution adopted by the General Assembly on 23rd December 2016: New urban agenda*.

van Oijstaeijen, W., van Passel, S., Cools, J. (2020). Urban green infrastructure: A review on valuation toolkits from an urban planning perspective. *Journal of Environmental Management*, *267*. https://doi.org/10.1016/j.jenvman.2020.110603

Vardoulakis, S., Dear, K., & Wilkinson, P. (2016). Challenges and opportunities for urban environmental health and sustainability: The HEALTHY-POLIS initiative. *Environmental Health*, *15*(Suppl. 1). https://doi.org/10.1186/s12940-016-0096-1

Wolf, K. L., Lam, S. T., McKeen, J. K., Richardson, G. R. A., van den Bosch, M., & Bardekjian, A. C. (2020). Urban trees and human health: A scoping review. *International Journal of Environmental Research and Public Health*, *17*(12). https://doi.org/10.3390/ijerph17124371

WHO Regional Office for Europe. (2009). *Phase V (2009–2013) of the WHO European Healthy Cities Network: Goals and requirements*.

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Article

Putting Health at the Heart of Local Planning Through an Integrated Municipal Health Strategy

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Abstract
As a cross-sectoral issue, the promotion of health needs to be addressed across all policies. In Portugal, as more competencies are being transferred to local governments, the integration of health considerations into municipal plans remains a challenge and guidance on how to develop an integrated municipal health strategy is absent. The aim of this study is to describe the conceptual and methodological approach that informed the development of an integrated and multisectoral municipal health strategy in the City of Coimbra. Its design followed a population health approach with a geographic lens, looking at how the population's health outcomes and health determinants were geographically distributed across the municipality, as well as the extent to which policies from multiple sectors can address them. The planning cycle followed an iterative workflow of five actions: assessing, prioritizing, planning, implementing, and monitoring. Following a participatory planning approach, several participatory processes were conducted involving local stakeholders and citizens (e.g., population-based surveys, workshops, Delphi, collaborative sessions) to identify problems, establish priorities, and define measures and actions. The strategic framework for action integrates 94 actions across multisectoral domains of municipal intervention: sustainable mobility and public places, safe and adequate housing, accessible healthcare, social cohesion and participation, education and health literacy, and intersectoral and collaborative leadership. Findings shed light on important aspects that can inform other municipal strategies, such as the adoption of a place-based approach, focused on geographic inequalities, health determinants and stakeholder participation, and the application of a health in all policies framework.

Keywords
Coimbra; health determinants; health in all policies; local government; participatory governance; place-based approach; stakeholder involvement

Issue
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1. Introduction

The important link between how cities are planned and the health of the population that lives in them is convincingly and extensively recognized in the literature (Corburn, 2015; Galea et al., 2019; Giles-Corti et al., 2016; Grant et al., 2017; Pineo, Zimmerman, & Davies, 2019; Santana, 2007; Santana et al., 2009; Tsouros, 2013; Vlahov et al., 2007), and by the United Nations and the World Health Organization (WHO; UN-HABITAT & WHO, 2020; WHO, 2012; WHO & UN-Habitat, 2010). It is easy to understand how cities influence health: "Urban environments shape what we do, how we do it, what we consume, when and what we play, and generally how we behave" (Galea et al., 2019, p. 15). Many of the current main threats to public health and leading causes of

mortality and disability (e.g., non-communicable diseases such as diabetes, cancer, cardiovascular disease, chronic respiratory disease, and depression) are widely considered "preventable" by modifiable risk factors, either behavioral (e.g., unhealthy eating, sedentary lifestyle, lack of physical activity; see Giles-Corti et al., 2016) or linked to urban environmental exposures (e.g., air pollution, noise, ambient temperature, urban residential surroundings; see Rojas-Rueda et al., 2021) which, in turn, are influenced by urban planning policies and actions. An increasing amount of scientific evidence underlines the urgent need to address urban hazards such as air pollution, noise, heat, and lack of green spaces, as they are associated with adverse health effects (Khomenko et al., 2021; Mueller et al., 2017; Nieuwenhuijsen, 2016; Richardson et al., 2013). Studies conducted in the city of Barcelona estimated that 20% of premature mortality would be avoidable by changes in urban and transport planning policies, for example by the promotion of active mobility, improvements to the public transport system, establishment of limits on motorized traffic, provision of green infrastructure, increase of urban vegetation, and improvements to building insulation (Mueller et al., 2017, 2020). There are many other examples of urban planning interventions that not only mitigate the impact of hazards but can also work as public health tools for improving overall health; these include changes in different domains such as land use, transport, mobility, housing, and public spaces (Giles-Corti et al., 2022).

Urban planning and public health, despite having common historical origins and the shared goals of preventing diseases and improving the overall well-being of the population, have evolved in separate and uncoordinated ways (Corburn, 2013). Health considerations are not always integrated into urban plans, and there is a general lack of collaboration between planning and health practitioners, which can undermine the effectiveness of interventions. The importance of bringing the public health and urban planning sectors together was recently deemed crucial by UN-Habitat and WHO (2020) with the release of a sourcebook to guide practitioners in integrating evidence-based health information into urban plans (e.g., analytical frameworks, data, and tools). Both sectors benefit from a more integrated and collaborative approach, with the translation and application of respective knowledge, data, and tools into policy and practice, helping to understand the health impacts of proposed plans (Northridge & Sclar, 2003).

Considering the complexity inherent to the study of human health, there has been an increased interest in applying ecological models to health promotion which consider the broad range of factors that influence health at multiple levels and help inform our understanding of how urban environments and urban planning influence health (Galea et al., 2019; Vlahov et al., 2007). At the core of these models is the assumption that health "behavior has multiple levels of influences, often including intrapersonal (biological, psychological), interpersonal (social, cultural), organizational, community, physical environmental, and policy" (Sallis et al., 2008, p. 466) and that "behavior change is expected to be maximized when environments and policies support healthful choices" (Sallis et al., 2008, p. 466). These levels integrate factors that are broadly formulated as determinants of health and include the person's individual characteristics and behaviors, the social and economic conditions, the physical and built environment, and local resources (Barton & Grant, 2006; Dahlgren & Whitehead, 1991; Marmot, 2005). As comprehensive and multilevel frameworks, these are useful for (a) understanding the multiple and interacting factors influencing health, and thereby (b) guiding the development of more comprehensive public health interventions and more integrated and multisectoral urban plans aiming to improve conditions in health-promoting domains such as housing, employment, education, quality of urban physical environment, social support, mobility, and social services (Santana et al., 2020).

The Covid-19 pandemic has shed light on existing social and place-based health inequities between and within cities bringing health equity to the forefront of public discussion (Bambra et al., 2020). Research indicates that healthful amenities are inequitably distributed across places and this, in turn, drives disparities in short and long-term health, thus producing inequities (Santana et al., 2017a; WHO & UN-Habitat, 2010). WHO (2018, para. 4) defines health inequities as "differences in the health status or in the distribution of health resources between different population groups, arising from the social conditions in which people are born, grow, live, work and age." These are considered unjust, avoidable, and can be reduced by a broad range of policies. Urban planning plays a key role in ensuring that everyone has fair access to resources and opportunities to be healthy, by addressing the social, economic, built, and physical determinants of health (Giles-Corti et al., 2022; UN-Habitat, 2021). However, for most local governments, integrating public health evidence into urban plans remains a challenge and cooperation between health, environmental, and urban planning is often absent. There is a general lack of health-enhancing city planning policies consistent with the rhetoric of promoting healthier environments. In this context, integrated approaches to planning, which place health at their core, are considered more effective because they help to conceptualize health disparities at multiple levels and inform the development of multilevel and multisectoral interventions (Lowe et al., 2022). One example is the City of Utrecht which has been developing a health and equity in all policies approach for several years, supported and institutionalized through strong political leadership and inter-disciplinary teams at both the neighborhood- and city-level for policy development and implementation (Weber, 2019).

Governance is an important factor influencing urban health (WHO Regional Office for Europe, 2019a). There are multiple levels of government, numerous sectors,

and many stakeholders involved in the direct pursuit of health and well-being or influencing it indirectly. Cities and local governments are, therefore, in a prime position to provide leadership on public health, activating partnerships and intersectoral collaborations (Tsouros, 2013; WHO Western Pacific Regional Office, 2015). Given the complexity inherent to health being considered a contemporary societal issue and urban challenge, "experimental" governance is more needed than ever to recast the role of local governments from a hierarchical, vertical, sectorized structure with a silo orientation to a more horizontal, cross-sectoral, and collaborative structure with distributed responsibilities (Eneqvist & Karvonen, 2021; Giles-Corti et al., 2022). In a recent study, Giles-Corti et al. (2022) urged city governments to transform urban governance schemes, strengthen policy frameworks that are integrated across sectors, adopt evidence-informed policies with spatial knowledge, apply participatory planning, and make decision-making accountable, by conducting partnerships with universities and involving all concerned parties, from stakeholders to citizens.

Since its creation in 1985, when the WHO proposed a health promotion scheme to be known as the Healthy Cities Project, the European Healthy Cities Network has been working directly with municipal governments to develop and implement intersectoral strategies for health development at the local level. At its core, is the intention to apply the principles of "health-for-all" through local action and by putting health on the agenda of local government (Ashton et al., 1986; de Leeuw & Simos, 2017). This intention goes hand in hand with the health in all policies (HiAP) framework for public policy, a collaborative approach that integrates and articulates health considerations into policymaking across sectors to improve health (WHO, 2014; WHO & Government of South Australia, 2010). However, a recent review on the utilization of the HiAP approach in local government revealed a gap in evidence regarding the implementation, adoption, and evaluation in municipal settings (Van Vliet-Brown et al., 2018). One potential mechanism to overcome these challenges is through the implementation of a municipal coordinating body for HiAP that would be responsible for working horizontally across city departments, including traditionally non-health departments (e.g., transportation) and across levels of government (i.e., regional, national; Amri, 2022). A city health development plan has been a requirement for member cities of the WHO European Healthy Cities Network since 1998 (Phase III). Following WHO guidelines, it should (a) contain the city's vision, values, and strategy, translated into action through operational planning and (b) be based on the contribution of the different sectors and stakeholders whose policies have an influence on health. One key aspect of this type of city health development plan is the increased emphasis on the social, economic, and environmental determinants of health, going beyond traditional health plans dealing mainly with the control of risk factors and the promotion of healthy lifestyles (WHO Centre for Urban Health, 2001).

1.1. The Portuguese Context of Municipal Health Planning

According to Simões et al. (2017), in the latest health system review, the role of Portuguese local governments in health is ill-defined and, in statutory terms, rather marginal. Despite some partnerships in health promotion and disease prevention (e.g., child oral health, environmental health, and healthy behaviors), where municipalities are involved with local/regional health administrations, there is still a lot of room for improvement. One barrier highlighted is that decisions in domains such as urban planning or transport are not carried out in collaboration with the health sector. This is due to a lack of intersectoral structures or bodies. Also, health impact assessments have not been institutionalized in Portugal, nor have specific guidelines (Loureiro, 2022; Simões et al., 2017). At the municipal level, despite stated policy ambitions to create healthy and sustainable cities, the integration of health considerations into urban plans is lacking, and few municipalities have explicit strategies or city health plans to achieve such aspirations. In a study conducted with local stakeholders in Lisbon exploring the challenges and opportunities posed to more effective intersectoral action for health at the local level, the following reasons were identified: (a) the policymaker's narrowed understanding of health and its place-based determinants, (b) the limited nature of the formal competencies and statutory responsibilities of municipalities for health promotion, (c) limitations in financing and competing priorities regarding the allocation of resources, (d) lack of formal structures and mechanisms for local health planning, and (e) the siloed nature of municipal governance (Freitas et al., 2021).

The Portuguese Network of Healthy Municipalities, formally established in 1997 and part of the WHO's Healthy Cities Network, has endeavored to create a strong network among participating municipalities to help overcome the main challenges mentioned above. Currently (2022), it is formed of 64 municipalities and is expanding further. One of its flagship initiatives is the development of a Health Atlas platform displaying data on health indicators and best practices addressing health determinants at the municipal level. This project aims to support associate municipalities in advancing knowledge and practice for more integrated city health development plans.

The recent decentralization process and transfer of competencies in the health area (Law 23/2019, January 30) has been a "hot" topic of discussion within Portugal, mainly due to questions regarding financial allocation and management. Yet, this legal framework endowed local governments with a more formal health mandate and offers space to develop a higher political

commitment to local health promotion. Within the scope of new competencies, city councils are required to prepare a municipal health strategy and establish a municipal health council. While still early in the implementation process and in the absence of any guidance on how to develop the strategy (e.g., common frameworks to follow, indicators to include, health action plan templates), some municipalities started to develop their own municipal health strategies. In this context, academic partnerships are considered key to filling the evidence gap and translating knowledge and methods into policy and practice. Early success is found in the Municipality of Coimbra (associate municipality of the Portuguese Network of Healthy Municipalities), where the city council embarked on a partnership with academia (University of Coimbra) to develop an evidence-based strategy to improve health.

The aim of this article is to present the conceptual and methodological framework that oriented the development of an integrated and multisectoral municipal health strategy in the city of Coimbra, Portugal.

2. The Municipal Health Strategy of Coimbra 2021–2025: An Example of an Integrated Approach to Health

The Municipal Health Strategy of Coimbra (MHS of Coimbra) is defined as a planning tool for health promotion in the municipality. It sets out a five-year plan which guides activities and investments for the development of healthier environments and healthier populations, aimed at reducing the avoidable and unjust health inequalities between social groups and geographical areas. In this tool, the strategic goals and strategies to reach them are defined and broken down into specific actions, measures, and interventions (action plan). Its elaboration is based on an evidence-based, thorough, and comprehensive analysis of the current health situation (where the municipality stands) and of the expected available resources and chosen priorities (where the municipality is heading).

2.1. Conceptual Framework

The MHS of Coimbra is anchored in the broad health promotion scheme of the Healthy Cities Project, building on the WHO's (1948, para. 2) definition of health as "a state of complete physical, mental and social well-being not merely the absence of disease or infirmity," and on the recognition of the role that local governments, through territorial planning activities, can have in preventing disease and promoting health by addressing the place-based determinants of health (Ashton et al., 1986; Barton & Tsourou, 2000; Duhl & Sanchez, 1999; UN-Habitat & WHO, 2020; WHO, 2012).

The design of the conceptual and methodological framework follows previous studies of population health evaluation (Freitas et al., 2020; Santana, 2007, 2015; Santana et al., 2017b, 2020) and is built upon the well-known "population health approach" with a geographic lens. This looks at how the population's health outcomes and health determinants are geographically distributed, as well as the extent to which policies and interventions from multiple sectors can address them (Kindig & Stoddart, 2003). Complementing this approach, the health map developed by Barton and Grant (2006) was used as a model for local analysis of the relationship between health and place. This conceptual framework is informed by the main determinants of the health model (Dahlgren & Whitehead, 1991, 2006), showing how various spheres of living conditions—the social, economic, built, and physical environmental determinants of health—are interconnected, thus providing a glimpse of the pathways through which policy and planning decisions may affect health (Figure 1).

2.2. Methodological Framework

The development of the MHS of Coimbra followed an iterative seven-stage process based on a workflow of five key actions: assess, prioritize, plan, implement, and monitor (see Figure 2).

2.2.1. Stage 1: Health Profile

According to the definition provided by the WHO Regional Office for Europe (1995, p. 11), "a city's health profile is a quantitative and qualitative description of the health of the citizens and the factors which influence their health. It identifies problems, proposes areas for improvement and stimulates action." Following this definition, the municipal health profile of Coimbra was elaborated considering not only the information on health outcomes but also on health determinants with respect to their impact on health. The selection of health indicators and the factors affecting them were based on scientific evidence gathered namely in the GeoHealthS (Santana, 2015; Santana et al., 2015) and EURO-HEALTHY projects (Freitas et al., 2018, 2020; Santana et al., 2020). These projects applied a geographical and multidimensional framework to analyze health at a regional and municipal level, looking at a broad range of indicators across dimensions of (a) health outcomes (mortality and morbidity), (b) lifestyles (health behaviors), and (c) health determinants (e.g., socioeconomic factors, built and physical environments, health care, safety) starting with the assumption that there is no single factor explaining health inequities and, thus, no single solution or policy response (WHO Regional Office for Europe, 2019b).

Figure 3 depicts the multidimensional framework used in Stage 1—Health Profile. It is inspired by the main determinants of the health model (Dahlgren & Whitehead, 1991, 2006) and by the Utrecht health profile model (City of Utrecht, 2018). In each dimension, quantitative and qualitative data were collected using various kinds of data sources (e.g., death and disease

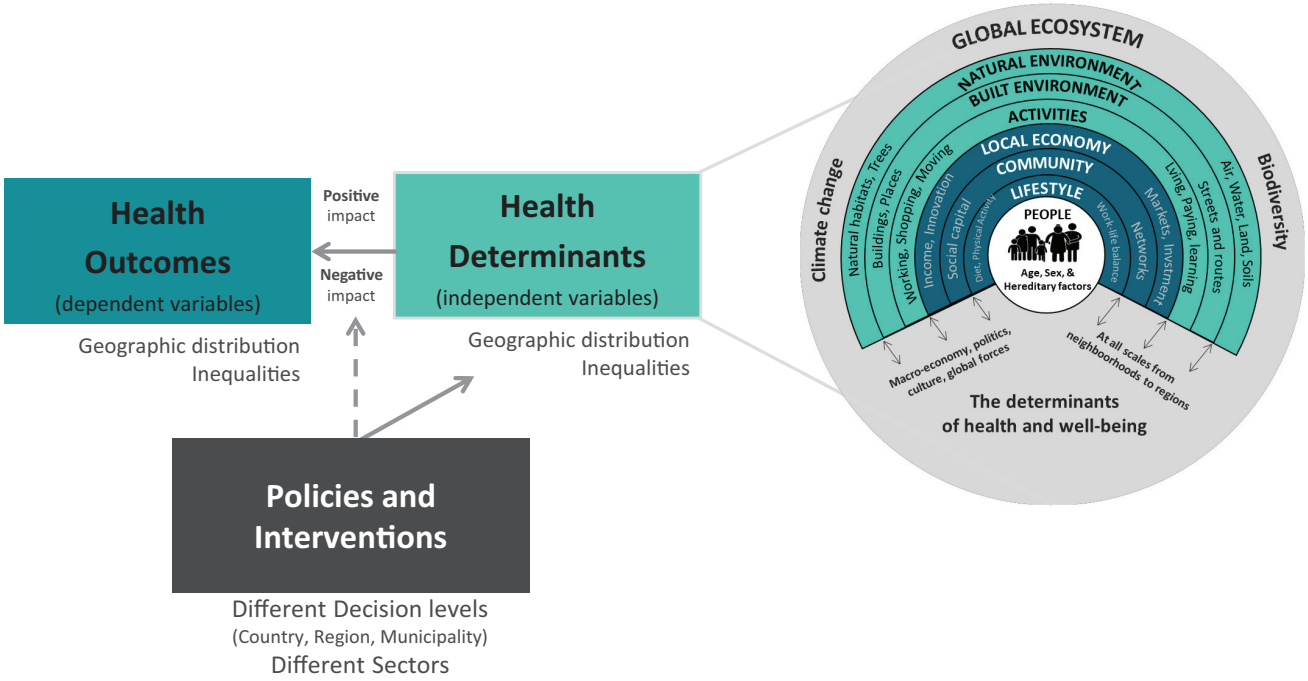

Figure 1. The population health approach considering the model of the main determinants of health. Source: Authors' work adapted from Barton and Grant (2006), Dahlgren and Whitehead (1991, 2006), and Kindig and Stoddart (2003).

registries, health care information, questionnaire-based surveys), and in-depth analysis was made wherever possible at the neighborhood level, using disaggregated data for the 18 civil parishes of the Municipality of Coimbra. In this regard and following the WHO guidelines for including a community-based assessment of health (WHO Centre for Urban Health, 2001), a population-based survey on health and well-being was applied to a representative sample of residents (representative for each civil parish, sex, and age) yielding a final sample of 1,117 participants. This provided data on health behaviors (e.g., physical activity levels, diet, alcohol and tobacco consumption), sociodemographic and economic characteristics (e.g., age, sex, educational level, income),

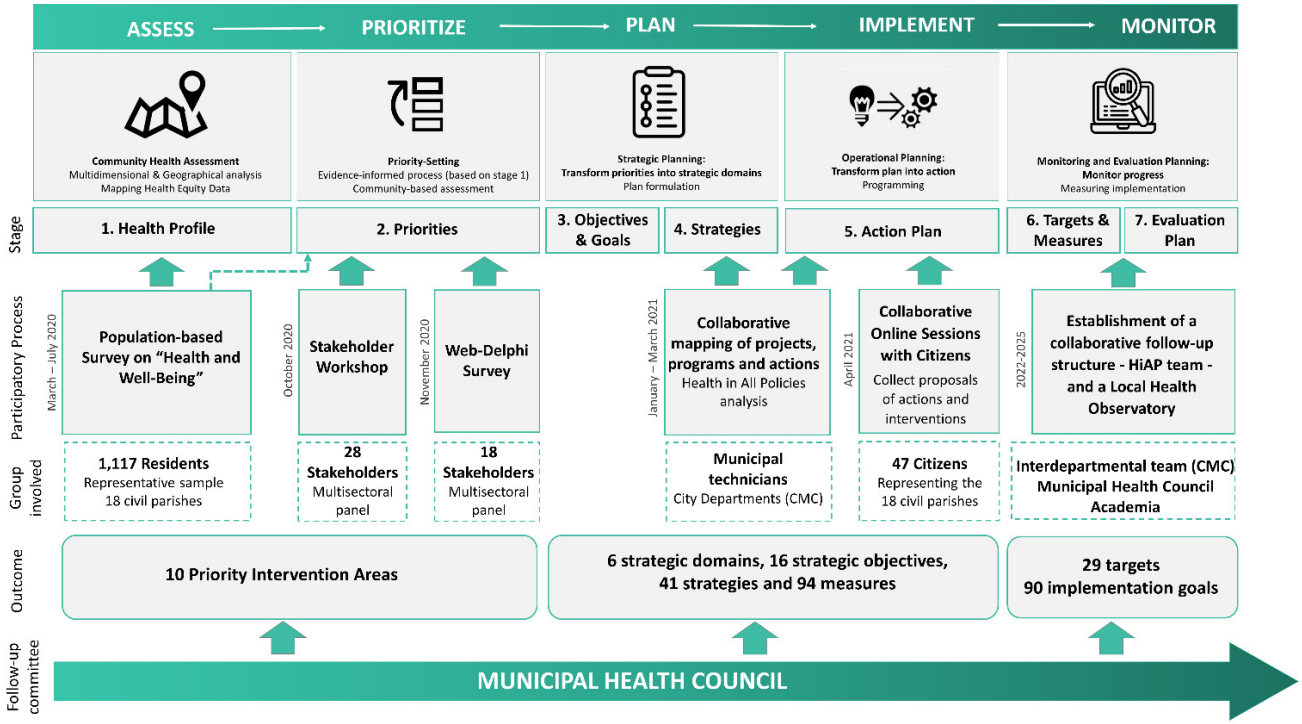

Figure 2. The planning cycle and applied participatory processes in the MHS of Coimbra.

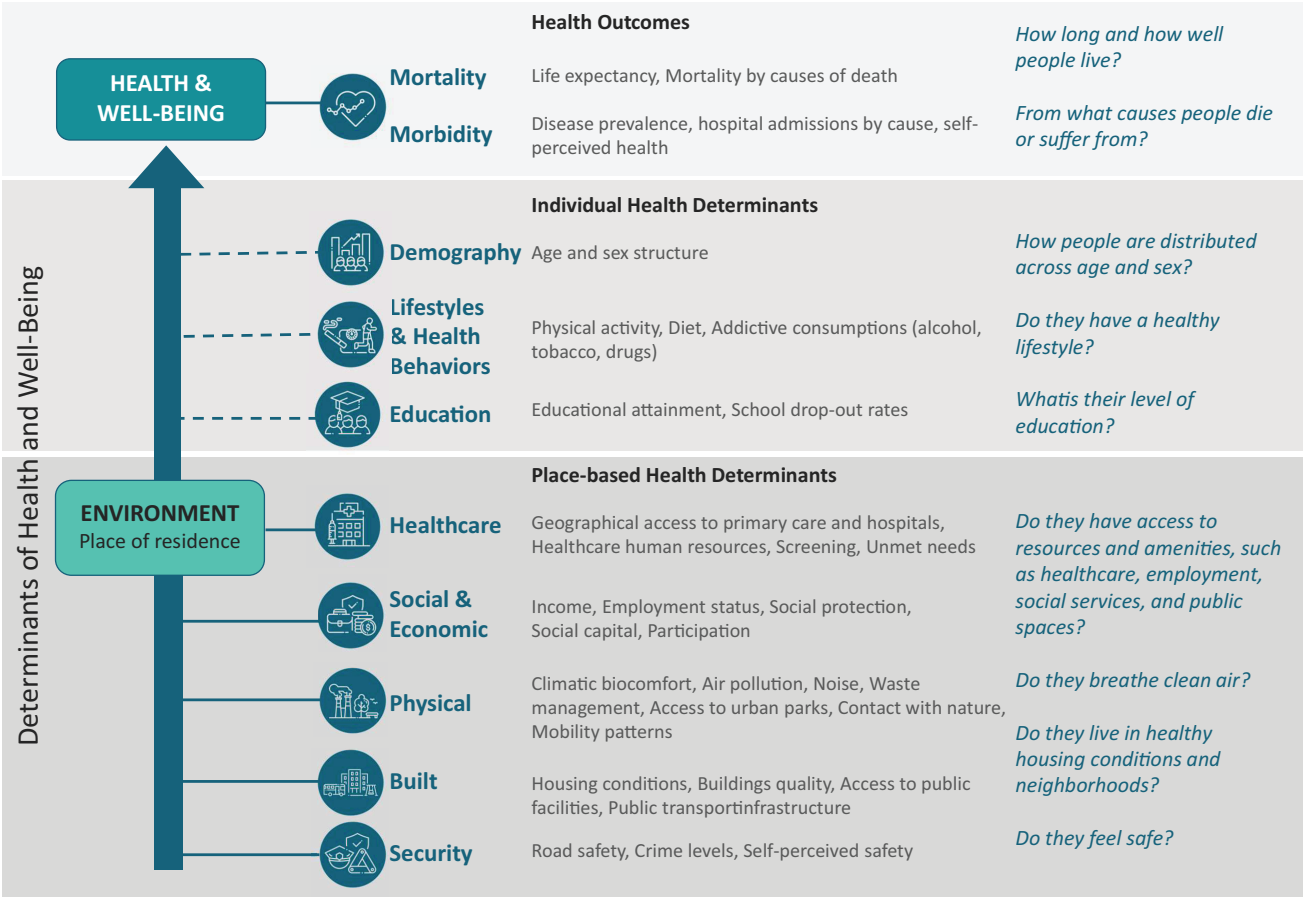

Figure 3. The multidimensional framework of health assessment applied in the MHS of Coimbra. Note: the list of indicators is provided in Supplementary File 2. Source: Authors' work adapted from Câmara Municipal de Coimbra and Universidade de Coimbra (2020).

self-perceived health as well as perceptions of the quality of the respective local environment, namely the social, physical, and built environment conditions (e.g., social activities, neighborhood amenities, housing conditions, public spaces, mobility, transportation, access to health and social care, public safety). The list of indicators integrating the health profile and respective data sources can be consulted in Supplementary File 2.

2.2.2. Stage 2: Priorities

After the health assessment, it was considered essential to determine what and where priorities should be placed. The prioritization process is a key stage in health planning, enabling the identification of priority problems in which to intervene. Under Stage 2—Priorities, two participatory processes were held, a one-day workshop and a two-round web-Delphi survey, with the aim to engage a local panel of stakeholders, first in the identification of health issues and locally critical situations across multiple dimensions of health determinants, and second, to prioritize them. A total of 28 individuals, from regional and local institutions from different sectors, were invited to participate. Overall, the panel represented different points of view considered valuable to inform the municipal health strategy, e.g., local government departments, academia, healthcare, social care, and public security sectors (the list of stakeholders is provided in Supplementary File 1).

The one-day workshop was held in October 2020. The methodology and workshop protocol were based on previous research (Freitas et al., 2020). The nominal group technique was conducted to identify problems and involved 28 participants. The experts were divided into discussion groups according to the stakeholders' area of expertise and covered the main dimensions of health determinants (see Figure 3). Each group was assigned a specific set of indicators. To support the analysis, indicator matrices with data disaggregated at the civil parish level were constructed and complemented with maps. In total, the performances of each civil parish on 67 indicators across seven dimensions of health determinants were displayed: Lifestyles and Health Behaviors (eight indicators), Healthcare (22), Education (three), Social and Economic Environment (15), Physical Environment (11), Built Environment (14), and Safety (four). The data was organized in a way that allowed participants to easily visualize how well or badly each civil parish was performing against given benchmarks: the municipality average and the worst and the best performances. Participants

were asked to identify critical situations by marking in red the cells corresponding to critical performances (civil parishes in columns) in one or more indicators (indicator data in rows). In summary, a critical situation depicted a civil parish where, considering the evidence provided, its performance in one or more indicators would potentially have a negative effect on health equity and should consequently be considered a priority for intervention (Figure 4). The assessment was conducted individually and then discussed within each group. To support the analysis, participants were provided with a consultation dossier with each indicator identity cards (i.e., metadata, information on how it affects health) and a map showing its geographical distribution in the municipality. The panel also had the opportunity to analyze a series of maps showing the geographical variation of 27 indicators of health outcomes, namely mortality by causes of death, disease prevalence, and hospital admissions (Figures 4 and 5).

The assessment conducted in the stakeholder workshop resulted in a preliminary list of critical situations in 45 indicators of health determinants. This list was then clustered into 16 problematic topics to be submitted to the prioritization process. Each topic corresponded to one or more indicators characterizing that topic and where civil parishes' performances were identified as critical situations. For example, the problematic topic "housing conditions" integrated the following five indicators where worse performances were found: (a) percentage of overcrowded houses, (b) percentage of houses with damp problems, (c) percentage of houses without central heating, (d) percentage of houses needing major repair, and (e) percentage of buildings without wheelchair accessibility.

The next activity developed consensus among stakeholders about the top priority problems to be addressed by the municipal health strategy. The priority-setting was conducted through the application of a web-Delphi questionnaire in two rounds, involving 18 experts, 14 from the initial local panel (see Supplementary File 1) and four representatives of professional public associations belonging to the Municipal Health Council (pharmacists,

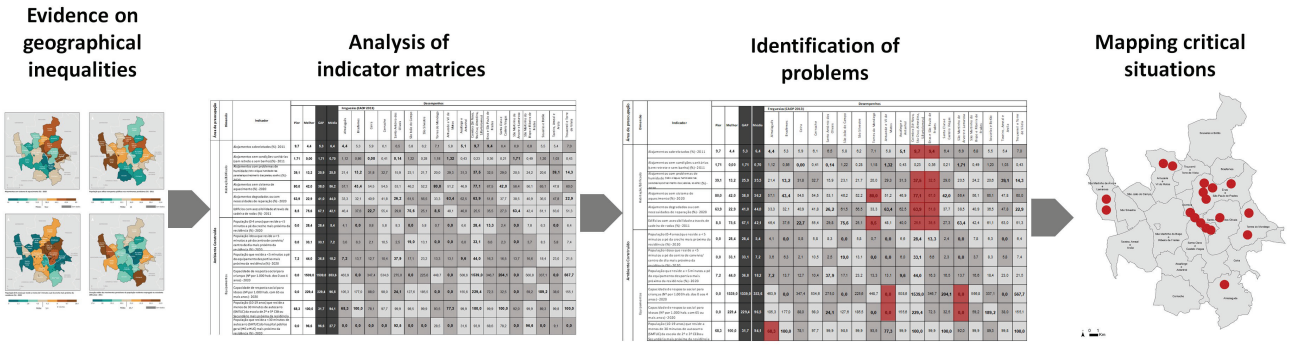

Figure 4. The evidence-based matrix methodology to assess problems during the stakeholder workshop. Note: Illustrative example for the Built Environment dimension.

Figure 5. Photos illustrating the consultation process held in the stakeholder workshop.

physicians, nurses, and architects). This process was held in November 2020 through the platform Welphi, which is an online survey platform that implements the Delphi method. The Delphi method is a structured consultation process that uses a series of repeated rounds to gather information from an anonymous group of experts with the final goal of achieving "agreement among experts on a certain issue where none previously existed" (Keeney et al., 2010, p. 4).

Two criteria were determined to guide the prioritization process: (a) *equity*, considering the existent gaps between civil parishes in the health determinants considered as problematic topics to be addressed, and (b) *municipal capacity*, the municipality's level of operational capacity to address the identified problems, considering its formal competences, available resources, as well as ability to promote intersectoral collaborations. Specifically, as a first step, participants were asked to assign the relative importance (weight) to each criterion (on a scale from 0 to 10) and then to rank the list of 16 problematic topics against each criterion. Participants were provided with consultation material, including indicator matrices with critical situations, respective maps, and indicator metadata. After the second round, where experts had the opportunity to reconsider their answers in the light of the group consensus, weighted averages for each criterion were calculated, resulting in an aggregate score for each problem and respective ranking (a problem with a higher score would be considered a higher priority, lower scores equating to lower priorities).

The population-based survey, conducted previously, provided additional information on the citizen's priority areas for intervention in each civil parish. The joint analysis of stakeholders' and citizens' priorities informed the subsequent stages of transforming priorities into plans (Stage 3—Objectives and Goals and Stage 4—Strategies).

2.2.3. Stage 3: Objectives and Goals

To each priority defined in the previous stage, one or more strategic objectives were assigned. These were outlined as the "big-picture goals" for health promotion, describing the overall outcomes and targets to be achieved. Each objective was also framed considering its contribution to the 2030 Agenda for Sustainable Development, as this framework also became an integral part of current local action, and many of the issues and priorities identified were in line with several sustainable development goals (SDGs). For example, to address priority issues regarding "housing conditions," the strategic objective was assigned as "improving housing quality and safety" and respective targets defined in relation to the indicators considered critical in the municipality—"decrease the percentage of houses in need of major repair" and "decrease the percentage of people living in thermal discomfort in housing." These targets are indirectly linked to some of the targets defined within the SDG 11 "sustainable cities and communities" (e.g., Target 11.1—"By 2030, ensure access for all to adequate, safe, and affordable housing and basic services and upgrade slums") and SDG 3 "good health and well-being'' (e.g., Target 3.4—"By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being"), considering that poor housing and poor heating have been associated with a range of non-communicable diseases, such as heart and chronic respiratory diseases.

2.2.4. Stage 4: Strategies

The aim of this stage was to group the priorities and objectives, defined previously, into domains of intervention representing the strategic domains that were to guide the plan formulation. First, all projects, programs, and actions, being planned or implemented, were identified and mapped to address each strategic objective. This systematization of policies was collaborative, involving not only the research team but technicians from all city departments directly or indirectly linked to strategic domains (e.g., the Departments of Social Development, Health and Environment, Education, Public Spaces and Mobility, Transport, and Urban Planning). Following a HiAP approach, the aim was to capitalize on all municipal measures and interventions with the potential to address each objective. This analysis provided an integrated view of the existent gaps in policy measures that were needed to address some of the priorities and objectives defined. This led to a search for evidence-based practices and strategies in the literature and in other cities worldwide to complete the plan formulation. For example, all the priorities and objectives associated with housing issues were grouped in the domain "affordable and adequate housing." Considering the mapping of existent policies and the collection of best practices, five strategies were defined to address this domain (e.g., the provision of housing at affordable prices, the improvement of thermal comfort and energy efficiency, and the improvement of accessibility to buildings). This process of selecting policies and strategies informed the following stage of programming, that is, defining specific and place-based actions within each strategy (Stage 5—Action Plan).

2.2.5. Stage 5: Action Plan

This stage corresponded to the development of a five-year plan outlining concrete and context-specific actions needed to reach the strategic objectives and implement the strategies defined in the previous stages. At this stage, public consultation was considered fundamental since the first assumption of the municipal health strategy was to address health issues considering a place-based approach, looking at the existent geographical inequalities and specific local needs (that is, a priority in

one civil parish was not necessarily identified in another civil parish, so the definition of actions should reflect this geography). To collect the views and opinions from the community on what were the priority interventions and actions in each civil parish, a series of citizen sessions were held in April 2021. Due to the restrictions determined by the Covid-19 pandemic these sessions were conducted online using the Zoom platform (discussion groups were formed through breakout rooms) and the Miro tool, an online collaborative platform that helps to manage group discussion and enables a visual representation of the brainstorming with digital sticky notes and diagrams. Sessions were organized considering the typology of territory: (a) urban (two civil parishes), (b) peri-urban (nine civil parishes), and (c) rural (seven civil parishes). In each session, citizens pointed out the main problems of their residential area and presented proposed actions. A total of 59 individuals (47 citizens and 12 municipal technicians) participated in these sessions forming a discussion panel that contributed with more than 100 proposed actions. Figure 6 presents an illustrative example of the collaborative diagram of contributions in the session dedicated to rural civil parishes.

2.2.6. Stages 6 and 7: Monitoring and Evaluation Planning

The last activity of the planning cycle corresponded to the design of a monitoring and evaluation strategy where targets and respective indicators were defined to (a) measure progress in the attainment of strategic objectives (Stage 6—Targets & Measures) and (b) to monitor and evaluate the implementation strategy (Stage 7—Evaluation Plan). For each strategic objective, one or more targets (measurable objectives) were defined to be accomplished in the specified period (five years). Each target corresponds to the expected outcome, and it was defined considering the actual municipal performance (status quo) from baseline data, that is, from indicators used in the health profile and aligned with the identified priorities. Finally, implementation goals and milestones were established for each action or measure defined in the action plan to enable the evaluation of progress in its execution. To support evaluation activities and the follow-up of the strategy implementation, it was considered critical to create a collaborative and integrated structure involving an interdepartmental team from the city council (HiAP project team), the Municipal Health Council (intersectoral committee), and academia (to provide consultancy and technical support).

3. Results and Discussion

The combination of evidence on geographical inequalities, health outcomes, and health determinants across the municipality, with the points of view of stakeholders and citizens, resulted in the definition of 10 priorities to promote health in the Municipality of Coimbra. These priorities oriented the definition of six strategic domains, corresponding to multisectoral areas of municipal intervention.

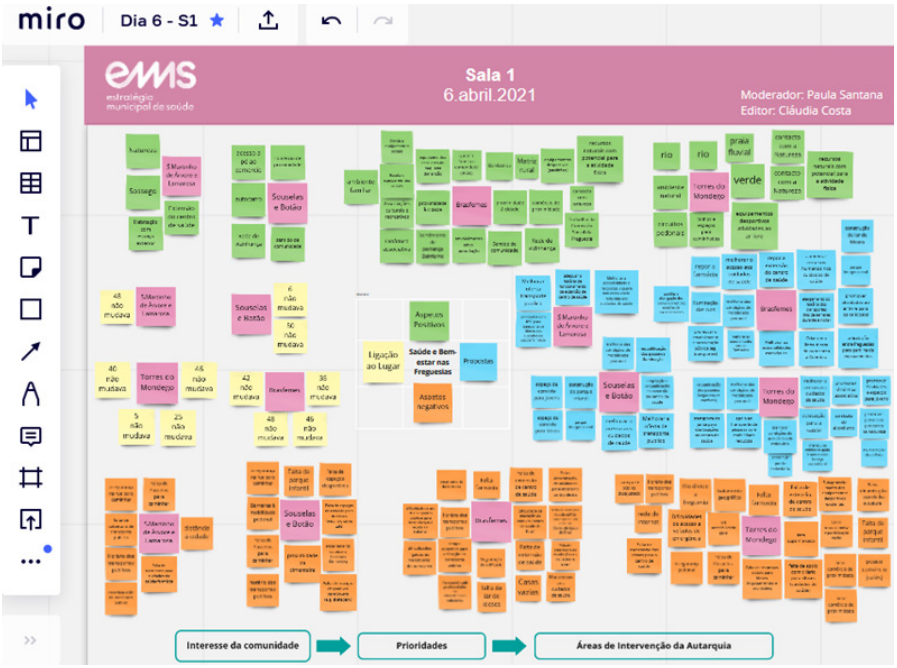

Figure 6. Lotus diagram representing the proposals of citizens in the collaborative session dedicated to rural civil parishes (illustrative example). Note: In the center of the diagram is the central theme (health and well-being in the civil parish), and then the digital sticky notes are expanded outwards in an iterative manner with the proposed solution areas. Source: Câmara Municipal de Coimbra and University of Coimbra (2021).

Although different methods were used to develop priorities, adapting the process to suit respective contexts and audiences (a workshop and a web-Delphi survey with stakeholders and a population-based survey with citizens) resulted in an overall ranking of issues reflecting a shared understanding of the problems affecting municipal health. This was particularly evident for issues related to public transport, mobility, housing, and social support for older people, which were prioritized by both groups. Worthy of mention is the fact that built environment features related to urban planning, such as public spaces, contact with nature, traffic and parking, and urban maintenance, were considered top priorities by citizens (Figure 7). Another innovative aspect is the geographical nature of the priority-setting process, considering the specific problems of each civil parish. Stakeholders were provided with evidence on the geographical inequalities in health determinants across the municipality and had the opportunity to prioritize issues considering "equity" criteria, here understood from the point of view that the geographic location and place of residence (in this case, the civil parish where population live) has an impact on health outcomes (e.g., reduction of pollution) and/or on the ability to access health-promoting resources and services (e.g., access to healthcare, access to public transport), thus producing place-based health equity or inequity. This geographical approach to defining priorities was considered key to guiding the definition of a locally delivered action plan aiming to address specific local needs. For example, issues related to public transport and access to primary health care were defined as priorities for intervention in the peripheral areas of the municipality (rural civil parishes) whereas active mobility and public space were ranked high in the peri-urban areas. The support for the vulnerable older population was a priority mainly allocated to urban areas given the high number of older people living alone and/or living in buildings with no elevator. Figure 8 presents the geographical incidence of the 10 priorities for intervention in the municipality.

Figure 9 shows the strategic policy framework defined for municipal health planning grounded in five key pillars for effective health promotion: Healthy People, Healthy Place, Healthy Community, Healthy Behavior, and Healthy Governance. Healthy People is linked to health outcomes, Healthy Place to the physical and built environment, Healthy Community to the social environment, Healthy Behavior to individual lifestyles, and Healthy Governance to decision-making practices and processes. The policy framework of action operationalizes a strategic vision that puts health and well-being at the center and gives emphasis to conditions, resources, and opportunities, enabling everyone to be healthy, regardless of their age, sex, socioeconomic status, physical condition, or place of residence.

The Municipal Health Plan of Coimbra outlines a total of 16 objectives and 94 proposed actions across six strategic multisectoral domains to enable people living in the municipality to achieve optimum health and well-being: (a) Sustainable Mobility and Public Space, (b) Affordable and Adequate Housing, (c) Proximity to Primary Health Care, (d) Social Cohesion and Public Participation, (e) Education and Health Literacy, and (f) Collaborative and Intersectoral Leadership (Figures 9 and 10). The higher number of proposed actions are within the domain of Sustainable Mobility and Public Space (31), addressing urban planning aspects (e.g., transport, mobility, land use, public space, and safety),

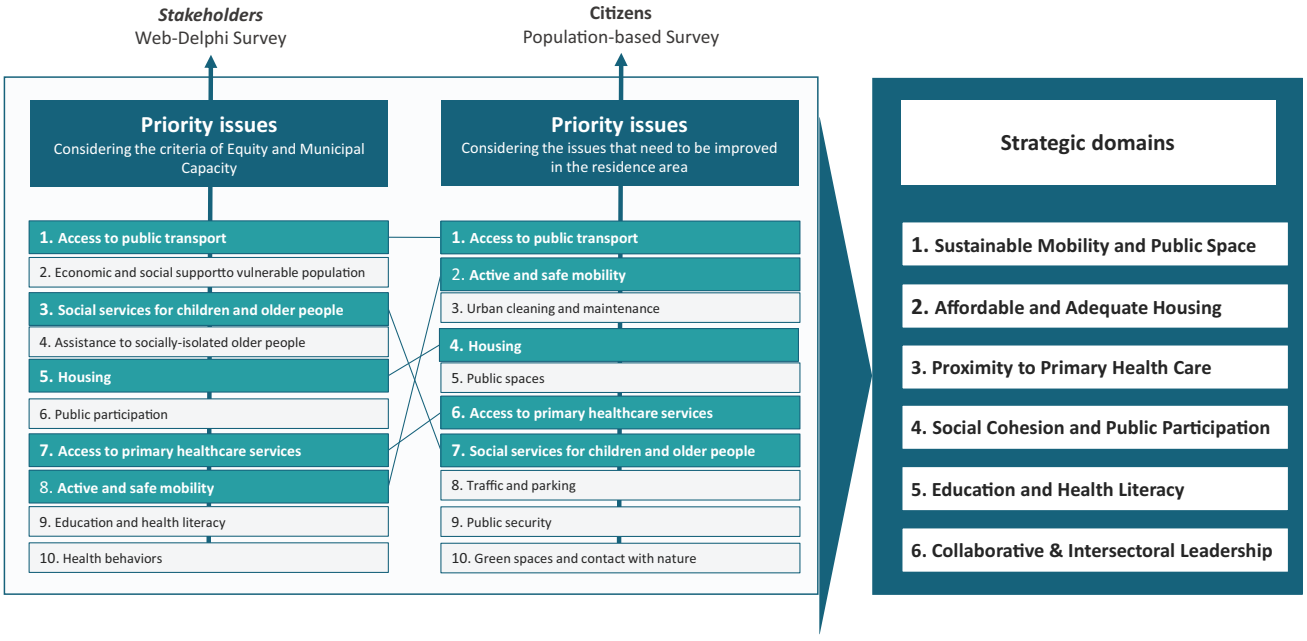

Figure 7. Comparison between priorities identified by local stakeholders and by citizens and their alignment with the strategic domains. Source: Câmara Municipal de Coimbra and University of Coimbra (2021).

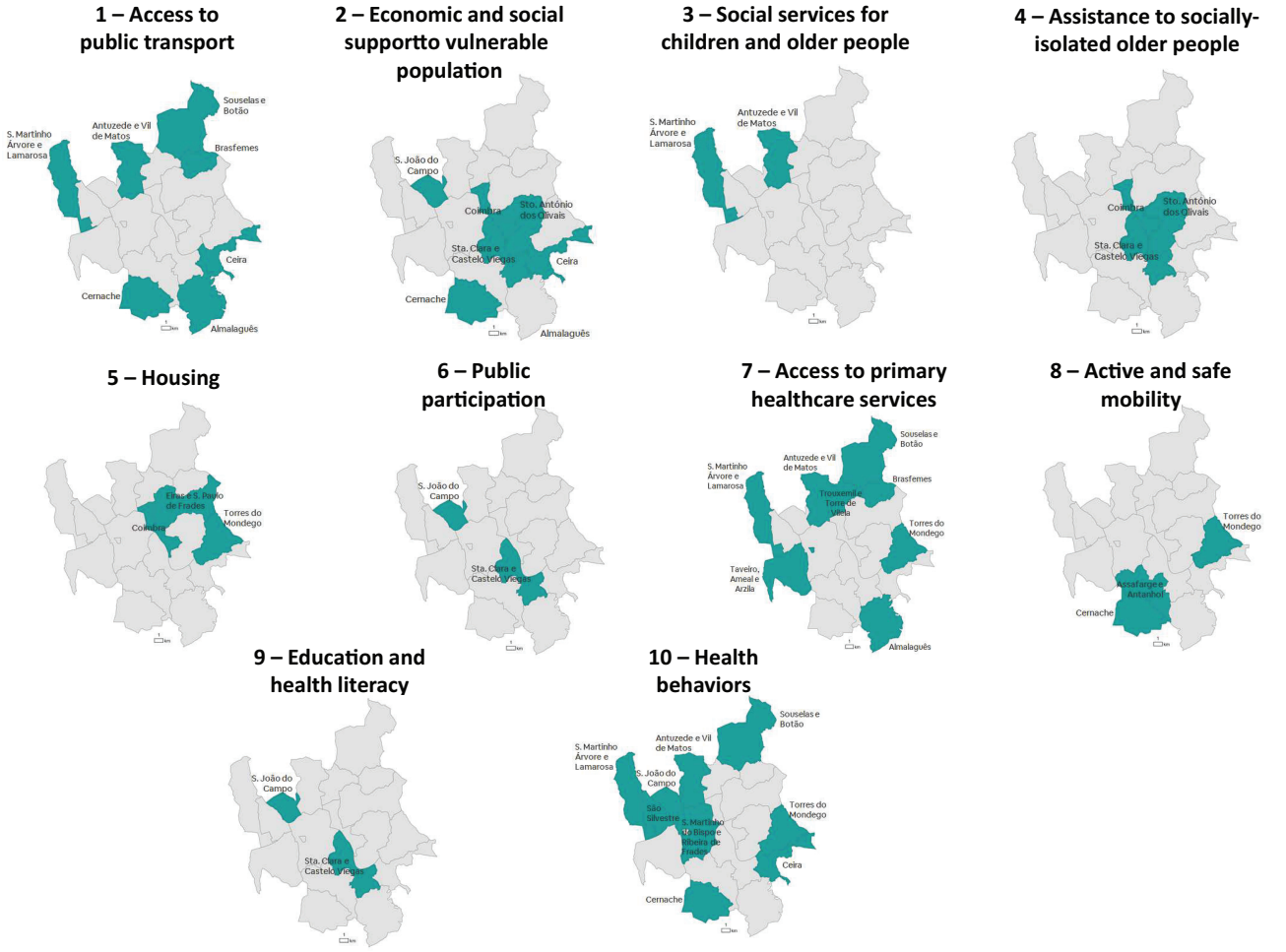

Figure 8. Geographical incidence of the 10 priorities of intervention. Source: Câmara Municipal de Coimbra and University of Coimbra (2021).

followed by Education and Health Literacy (16), focused at promoting opportunities and resources for the adoption of healthier lifestyles considering different settings (e.g., schools, institutions) and target populations (e.g., older people, poor families). The domain dedicated to Housing gathered a reduced number of proposed new actions (nine) because the municipality has an ongoing Municipal Housing Strategy, whose measures and interventions considered relevant for health promotion were already taken into account in the stage of selecting policies (Stage 4—Strategies). The same applies to Social Cohesion since the municipality already devotes significant attention to social issues and has an ongoing Social Development Plan. New proposed actions in these two domains complement and fill some equity gaps identified as critical situations in specific civil parishes. Regarding Primary Health Care, actions address the need to improve geographical access in peripheral areas and to develop a more integrated health service, as well as improve the collaboration between the City Council and local and regional health administrations. In this domain, it is worth mentioning that the City Council has limited competencies with regards to healthcare provision.

A particularly innovative aspect of the MHS of Coimbra is the inclusion of a strategic domain corresponding to Governance. The proposed actions (13) aim to change the actual siloed policy-making model and to break down the barriers between city departments as well as between the City Council and health institutions. This domain also reflects the HiAP approach, embedding actions dedicated to boosting collaboration and integrated practices and processes within the municipal governance structure. Intersectoral collaboration is considered fundamental in the context of municipal health planning.

The implementation of the MHS of Coimbra is currently underway as its action plan was established for the period between January 2022 and December 2025. Since it is the first city health plan to be developed and implemented in the City of Coimbra, the first year is dedicated to establishing the necessary governance structure changes and practices. Furthermore, local government is now provided with a monitoring tool and evaluation plan useful to monitor progress towards the achievement of integrated policies that prioritize local health needs. Not only was each target defined

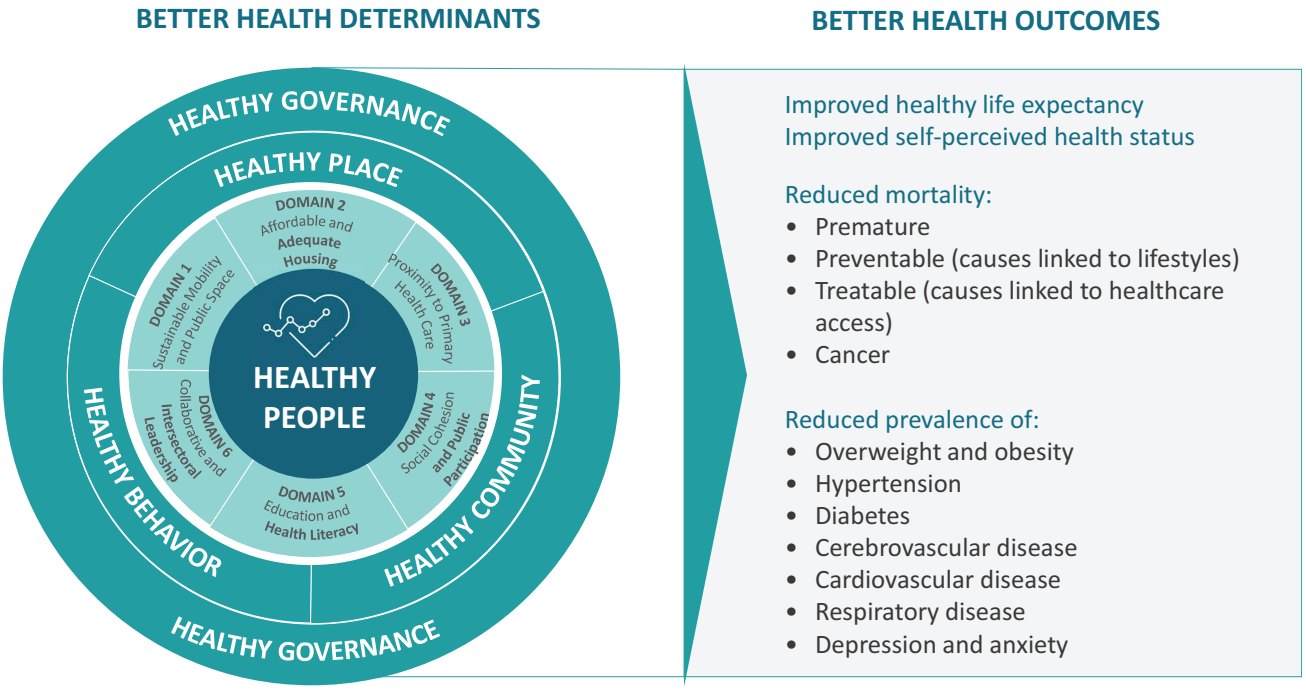

Figure 9. Strategic policy framework of the Coimbra Municipal Health Strategy. Source: Source: Câmara Municipal de Coimbra and University of Coimbra (2021).

	DOMAIN	STRATEGIC OBJECTIVE	ACTIONS (Number)	
HEALTHY PLACE	DOMAIN 1. Sustainable Mobility and Public Space	1. To encourage the use of public transportation	7	31
		2. To increase active travel and soft mobility (walking, cycling)	12	
		3. To promote accessible, inclusive, clean and safe public spaces	12	
	DOMAIN 2. Affordable and Adequate Housing	4. To increase the offer of affordable housing	2	9
		5. To improve housing quality and safety	7	
HEALTHY COMMUNITY	DOMAIN 3. Proximity to Primary Health Care	6. To reinforce and qualify the proximity offer of primary health care	7	12
		7. To enhance accessibility to primary health care services	2	
		8. To strengthen collaboration between City Council and healthcare services	3	
	DOMAIN 4. Social Cohesion and Public Participation	9. To reduce poverty and social exclusion	2	13
		10. To promote social inclusion and social activities for the older people	5	
		11. To reinforce the offer of social services for family and community	3	
		12. To promote citizen engagement and community development	3	
HEALTHY BEHAVIOR	DOMAIN 5. Education and Health Literacy	13. To promote conditions for healthy lifestyles and prevent risk behaviors	10	16
		14. To enhance communication, capacity and health literacy	6	
HEALTHY GOVERNANCE	DOMAIN 6. Collaborative and Intersectoral Leadership	15. To promote the adoption of Health in All Municipal Policies	8	13
		16. To reinforce the intersectoral action for health	5	
			94	

Figure 10. Strategic objectives and number of actions by policy domain. Source: Source: Câmara Municipal de Coimbra and University of Coimbra (2021).

considering available indicator data to measure progress but also each concrete action proposed in the action plan has a specific "roadmap of implementation." This roadmap provides information on (a) geographical incidence (i.e., in which civil parishes a specific action is a priority), (b) target population, (c) municipal departments involved, (d) stakeholders to involve as partners, (e) milestones and implementation goals, and (f) final and mid-term evaluation indicators, the latter to support potential adjustments. The guidance on implementation and monitoring is expected to be supported by a follow-up committee involving the Municipal Health Council in close collaboration with the University of Coimbra as a way of benefiting from research translation in terms of evidence, methods, and approaches.

3.1. Summary of Main Findings

This study described the conceptual and methodological approach used to develop an integrated and multisectoral health municipal plan, taking as a case the MHS of Coimbra. Overall, the methodologies applied, as well as the planning cycle activities, could serve as an example for adopting a place-based health plan and guide other municipalities in developing such an instrument. Yet, it should not be seen as a "blind" prescription of a list of indicators, priorities, and strategies. Each municipality should start from its specific context to set priorities, involving local stakeholders and citizens.

Below are four key takeaway messages that should inform integrated health planning approaches and may contribute to establishing the local government's capacity to promote health.

3.1.1. Geographic and Multidimensional Approach to Health: Focused on Health Determinants

To effectively influence population health and improve health outcomes it is critical to adopt a broad view of health and conduct an in-depth community health assessment which considers multiple determinants of health—not only lifestyles and healthcare but also the social, economic, physical, and built environment conditions. This assessment must be geographically oriented since health outcomes are not evenly distributed across a municipality and differences in health reflect the differing social, environmental, and economic conditions of local communities. The mapping of those equity gaps through disaggregated data at local scales is crucial to identifying appropriate and place-based policy responses.

3.1.2. Evidence-Informed Health Assessment and Priority Setting: Focused on Geographical Data and Local Knowledge

As recognized in the literature, the priority-setting process is highly dependent on the goal, the context, and the points of view of stakeholders (Tan et al., 2022). The issues requiring priority intervention in a specific period should be contextually defined and involve all concerned parties. The place-based approach used for assessing health problems and developing priorities included two critical aspects of effective planning. First, it gathered geographically disaggregated data on health indicators at the sub-municipal level. The use of area-level indicators invariably reveals inequities stemming from a locational or place-based disadvantage, therefore having quality data available is essential for accurate health assessment and priority-setting. Second, it involved local stakeholders and citizens from the beginning of the planning cycle, recognizing that local knowledge is vital, alongside data, when it comes to both identifying and analyzing context-specific health inequities.

3.1.3. Health in All Policies Approach to Municipal Policymaking: Focused on Multi and Intersectoral Action

Following the Healthy Cities principles that health can be improved by modifying the physical and built environment and the social and economic determinants of health (Ashton et al., 1986), the adoption of a HiAP analytic framework is a fundamental component of effective municipal health planning. Drawing up a municipal health strategy that puts emphasis on the leadership role that local government play in acting upon different health domains and on the involvement of stakeholders from multiple sectors can be a catalyst for a formal change in the local governance structure, shifting from siloed city planning (departments operating as silos) to a more integrated, and collaborative approach. The action plan defined under the MHS of Coimbra set the direction for more healthy and participatory governance, integrating health considerations in all municipal policies and applying a participatory approach not only to planning but also to implementation through the mobilization of different city partners to implement multisectoral solutions. In this respect, it is worth highlighting that the defined strategic goals were framed and aligned with the SDGs framework, providing an even more compelling imperative of action in the context of whole-of-government approaches.

3.1.4. Strengthening and Monitoring Local Government Policy: Focused on Place-Based Inequities and Co-Creation

The conceptual and methodological approach applied to the MHS of Coimbra has at its core indicators and methods relevant to monitoring progress towards the achievement of different municipal policies that impact health, thus reinforcing the understanding and awareness of the role local government plays and highlighting multisectoral co-benefits (e.g., access to public transport, provision of services, adequate housing, environmental quality). The use of area-level indicators is an efficient means

of analyzing existing variations in health determinants and identifying those neighborhoods that need to be prioritized (Freitas et al., 2020; Pineo, Glonti, et al., 2019). The methods used to identify and select place-based inequities affecting health across the different neighborhoods of the municipality are aligned with established decision-support tools to assess urban health equity, such as the well-known WHO urban health equity assessment and response tool (Urban HEART), successfully applied in several cities around the world (Prasad et al., 2015; WHO, 2010). Another aspect that helps strengthen the local government's role is the political commitment, collaboration, and follow-up from the beginning of the planning cycle. Worth mentioning is the active involvement of the City of Coimbra in the following activities: (a) application of the population-based survey across all civil parishes, (b) collection of all data needed to build indicators used in the health profile (e.g., social action, public transport system, accessibility data, noise and pollution, services and facilities), (c) facilitation and mediation with local stakeholders involved in the participatory processes, (d) involvement of all city departments in the collaborative mapping of policies and in the discussion of the action plan, and (e) discussion and approval within the municipal assembly involving local political leaders.

The implementation of an integrated municipal health strategy requires strong governance and political commitment and, most of all, should be guided by principles of co-creation, involving local stakeholders and citizens from the beginning of the planning cycle and then in its implementation and evaluation. The application of participatory processes is considered paramount given the assumption that when people are actively involved in decision-making processes, they feel more committed, avoiding future conflicts and thereby guaranteeing better implementation. For example, stakeholders participating in the process provided proposed actions where they could be involved in the implementation, and a number of projects were specifically defined to be developed in co-creation with citizens (with special attention to vulnerable groups), namely in the strategic domains Social Cohesion and Public Participation and Sustainable Mobility and Public Space (e.g., placemaking activities, citizen labs, community-based social and culture events).

3.2. Limitations and Further Research

As with most research, this study is subject to limitations that could be addressed in the future. The first is related to the development of a comprehensive indicator framework to assess and monitor health and health equity issues through a place-based lens. A good municipal health strategy is based on the analysis and assessment of health needs in different dimensions and looking at geographical inequalities to inform a place-oriented intervention. Although we developed an extensive database built with measurable spatially disaggregated variables reflecting the status quo of the different neighborhoods (civil parishes) in multiple health determinants, there were some barriers regarding the availability of data in some indicators. Criteria related to having valid and available data from official statistics, disaggregated at the sub-municipal level, created some barriers. A specific limitation was not having indicator data disaggregated by sex and age, which could represent a flaw when monitoring health equity. However, we were able to overcome other barriers related to the availability of area-level data, namely in health behaviors and housing conditions, through the application of a population-based survey (with a representative sample of the population), and in the physical and built environment, where the research team built spatial indicators that were not available in the municipality (e.g., distance to healthcare and green spaces, access to public transport, exposure to air pollution and noise). The type of indicators used and data availability may hinder the potential replicability of the presented framework to other settings. Nevertheless, the indicator framework should be meaningful for the context and city, using locally available data, to effectively address the needs of each neighborhood.

The second limitation concerns public participation in the participatory processes, namely in the collaborative online sessions with citizens to collect proposed actions and interventions in each civil parish. These sessions were held in April 2021, a time when face-to-face meetings and gatherings were restricted due to the Covid-19 pandemic. The fact that sessions had to be conducted online through Zoom may have limited the participation of some population groups, namely older people with low digital skills or knowledge barriers, marginalized groups, and migrants, among others. Although the City of Coimbra conducted an extensive communication campaign using social media and email, we can report that the number of citizens participating was below our expectations. Another aspect that the team could not control was the representativeness in terms of e.g., age, gender, or educational level because the sessions were open to everyone who wanted to participate; the only criterion being residency in the municipality. Yet, people that participated were actively engaged in local advocacy and were knowledgeable on the main issues affecting health and well-being in their place of residence, which contributed to a fruitful discussion, resulting in a high number of proposals for interventions.

Finally, the implementation of this policy framework and whether and how local government will track performance against targets defined in the action plan depends, always and ultimately, on political will and the commitment of the current city council (the municipal elections were held in September 2021 resulting in a change of the elected councilors). Often, policy implementation is limited by the short electoral cycles (four years) and dominant political interests. Baum et al. (2020) state that political will can be created through framing policy options in a way that makes

them more likely to be adopted. One way to do this could be to include implementation costs and to provide the "value for money" of each intervention in terms of its health impact. Another further research area is to explore alternative methodologies to assess the health equity impacts of proposed strategies. One example is the PROGRESS framework, a tool designed to assess the impact interventions can have on the following factors contributing to health inequity: place of residence, race/ethnicity/culture/language, occupation, gender/sex, religion, education, socioeconomic status, and social capital (O'Neill et al., 2014). A useful framework that could benefit further evaluation of the MHS of Coimbra is the application and adaptation of the availability, accessibility, acceptability, and quality framework, originally developed for the healthcare sector (UN Committee on Economic, Social and Cultural Rights, 2000), to assess if municipal policies and services are contributing to the right to health in those four standards, in line with the health determinants approach.

4. Conclusions

The aim of this article was to present the MHS of Coimbra as a case of an integrated, multi-sectoral, and evidence-informed policy framework with the potential to make a significant difference in the context of Portuguese municipal health planning and the current transfer of competencies since, at this time, there are no guidelines provided to develop such a tool. We began by describing the analytic approaches used to understand health in urban settings, the role of cities and local governments (health determinants, healthy cities, and HiAP frameworks), and providing insight into the current Portuguese context. We then described the planning cycle of the health strategy developed for the City of Coimbra focusing on the participatory planning aspects that oriented priorities, objectives, strategies, and concrete actions to promote health in cross-sectoral domains. At the heart of this strategy is the recognition that healthy places, healthy communities and healthy governance lead to healthy behaviors and healthy people.

There is no question that local policies have a major influence on health and that promoting health equity is a place-based issue. At the local level, interventions that create more walkable, cleaner, and safer urban environments will lead to more people engaging in physical activity and using the car less, with known positive impacts on health and environmental quality as well. The development of an integrated and multisectoral municipal health strategy can stimulate local governments to act as engines of public health and provide political leadership for health, equity, and sustainable urban development.

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Conflict of Interests

The authors declare no conflict of interests.

Supplementary Material

Supplementary material for this article is available online in the format provided by the authors (unedited).

References

Amri, M. (2022). Healthy governance for cities: Synergizing health in all policies (HiAP) and healthy cities approaches. *Journal of Urban Health*, *99*, 231–234. https://doi.org/10.1007/s11524-022-00618-6

Ashton, J., Grey, P., & Barnard, K. (1986). Healthy cities—WHO's new public health initiative. *Health Promotion International*, *1*(3), 319–324. https://doi.org/10.1093/heapro/1.3.319

Bambra, C., Riordan, R., Ford, J., & Matthews, F. (2020). The Covid-19 pandemic and health inequalities. *Journal of Epidemiology and Community Health*, *74*(11), 964–968. https://doi.org/10.1136/jech-2020-214401

Barton, H., & Grant, M. (2006). A health map for the local human habitat. *The Journal of the Royal Society for the Promotion of Health*, *126*(6), 252–253. http://www.ncbi.nlm.nih.gov/pubmed/17152313

Barton, H., & Tsourou, C. (2000). *Healthy urban planning: A WHO guide to planning for people*. WHO Regional Office for Europe. https://books.google.pt/books/about/Healthy_Urban_Planning.html?id=waJTeLApScC&redir_esc=y

Baum, F., Townsend, B., Fisher, M., Browne-Yung, K., Freeman, T., Ziersch, A., Harris, P., & Friel, S. (2020). Creating political will for action on health equity: Practical lessons for public health policy actors.

International Journal of Health Policy and Management, *11*(7), 947–960. https://doi.org/10.34172/ijhpm.2020.233

Câmara Municipal de Coimbra, & University of Coimbra. (2020). *Perfil municipal de saúde de Coimbra 2020: Estratégia municipal de saúde de Coimbra 2021–2025—Volume I* [Municipal health profile of Coimbra 2020: Municipal health strategy of Coimbra 2021–2025—Volume I].

Câmara Municipal de Coimbra, & University of Coimbra. (2021). *Plano municipal de saúde de Coimbra 2022–2025: Estratégia municipal de saúde de Coimbra 2021–2025—Volume II* [Municipal health plan of Coimbra 2022–2025: Municipal health strategy of Coimbra 2021–2025—Volume II].

City of Utrecht. (2018). *Utrecht health profile 2018*. https://www.volksgezondheidsmonitor.nl/upload/publicaties_pdf/210_VMU_Utrecht_Health_Profile_2018_(English).pdf

Corburn, J. (2013). *Healthy city planning: From neighbourhood to national health equity*. Routledge. https://doi.org/10.4324/9780203772249

Corburn, J. (2015). City planning as preventive medicine. *Preventive Medicine*, *77*, 48–51. https://doi.org/10.1016/j.ypmed.2015.04.022

Dahlgren, G., & Whitehead, M. (1991). *Policies and strategies to promote social equity in health: Background document to WHO—Strategy paper for Europe*. Institute for Futures Studies. https://doi.org/978-91-85619-18-4

Dahlgren, G., & Whitehead, M. (2006). *Levelling up (part 2): A discussion paper on European strategies for tackling social inequities in health*. WHO Regional Office for Europe. https://apps.who.int/iris/handle/10665/107791

de Leeuw, E., & Simos, J. (Eds.). (2017). *Healthy cities: The theory, policy, and practice of value-based urban planning*. Springer. https://doi.org/10.1007/978-1-4939-6694-3

Duhl, L., & Sanchez, A. (1999). *Healthy cities and the city planning process: A background document on links between health and urban planning*. World Health Organization. https://apps.who.int/iris/handle/10665/108252

Eneqvist, E., & Karvonen, A. (2021). Experimental governance and urban planning futures: Five strategic functions for municipalities in local innovation. *Urban Planning*, *6*(1), 183–194. https://doi.org/10.17645/up.v6i1.3396

Freitas, A., Loureiro, A., Costa, C., Almendra, R., Padeiro, M., & Santana, P. (2021, July 6–8). *Participatory governance in the context of Portuguese municipal health planning: Exploring stakeholders and citizens perspectives on place-based health priorities* [Paper presentation]. 17th International Conference on Urban Health (Virtual).

Freitas, A., Rodrigues, T. C., & Santana, P. (2020). Assessing urban health inequities through a multidimensional and participatory framework: Evidence from the EURO-HEALTHY project. *Journal of Urban Health*, *97*, 857–875. https://doi.org/10.1007/s11524-020-00471-5

Freitas, A., Santana, P., Oliveira, M. D., Almendra, R., Bana e Costa, J. C., & Bana e Costa, C. A. (2018). Indicators for evaluating European population health: A Delphi selection process. *BMC Public Health*, *18*(1), Article 557. https://doi.org/10.1186/s12889-018-5463-0

Galea, S., Ettman, C. K., & Vlahov, D. (Eds.). (2019). *Urban health*. Oxford University Press.

Giles-Corti, B., Moudon, A. V., Melanie Lowe, E. C., Boeing, G., Frumkin, H., Salvo, D., Foster, S., Kleeman, A., Bekessy, S., de Sá, T. H., Nieuwenhuijsen, M., Higgs, C., Hinckson, E., Adlakha, D., Arundel, J., Liu, S., Oyeyemi, Adewale L Nitvimol, K., & Sallis, J. F. (2022). What next? Expanding our view of city planning and global health, and implementing and monitoring evidence-informed policy. *The Lancet Global Health*, *10*, E919–E926. https://doi.org/10.1016/S2214-109X(22)00066-3

Giles-Corti, B., Vernez-Moudon, A., Reis, R., Turrell, G., Dannenberg, A. L., Badland, H., Foster, S., Lowe, M., Sallis, J. F., Stevenson, M., & Owen, N. (2016). City planning and population health: a global challenge. *The Lancet*, *388*(10062), 2912–2924. https://doi.org/10.1016/S0140-*6736*(16)30066-6

Grant, M., Brown, C., Caiaffa, W. T., Capon, A., Corburn, J., Coutts, C., Crespo, C. J., Ellis, G., Ferguson, G., Fudge, C., Hancock, T., Lawrence, R. J., Nieuwenhuijsen, M. J., Oni, T., Thompson, S., Wagenaar, C., & Ward Thompson, C. (2017). Cities and health: An evolving global conversation. *Cities & Health*, *1*(1), 1–9. https://doi.org/10.1080/23748834.2017.1316025

Keeney, S., Hasson, F., & McKenna, H. (2010). *The Delphi technique in nursing and health research*. Wiley. https://doi.org/10.1002/9781444392029

Khomenko, S., Cirach, M., Pereira-Barboza, E., Mueller, N., Barrera-Gómez, J., Rojas-Rueda, D., de Hoogh, K., Hoek, G., & Nieuwenhuijsen, M. (2021). Premature mortality due to air pollution in European cities: A health impact assessment. *The Lancet Planetary Health*, *5*(3), E121–E134. https://doi.org/10.1016/s2542-5196(20)30272-2

Kindig, D., & Stoddart, G. (2003). What is population health? *American Journal of Public Health*, *93*(3), 380–383.

Loureiro, A. (2022). *Avaliação de impactos do território na saúde mental* [Assessment of the territory impacts on mental health] [Doctoral dissertation, University of Coimbra]. Estudo Geral. http://hdl.handle.net/10316/100355

Lowe, M., Adlakha, D., Sallis, J. F., Salvo, D., Cerin, E., Moudon, A. V., Higgs, C., Hinckson, E., Arundel, J., Boeing, G., Liu, S., Mansour, P., Gebel, K., Puig-Ribera, A., Mishra, P. B., Bozovic, T., Carson, J., Dygrýn, J., Florindo, A. A., . . . Giles-Corti, B. (2022). City plan-

ning policies to support health and sustainability: An international comparison of policy indicators for 25 cities. *The Lancet*, *10*(6), E882–E894. https://doi.org/10.1016/S2214-109X(22)00069-9

Marmot, M. (2005). Social determinants of health inequalities. *The Lancet*, *365*(9464), 1099–1104. https://doi.org/10.1016/S0140-*6736*(05)71146-6

Mueller, N., Rojas-Rueda, D., Basagaña, X., Cirach, M., Cole-Hunter, T., Dadvand, P., Donaire-Gonzalez, D., Foraster, M., Gascon, M., Martinez, D., Tonne, C., Triguero-Mas, M., Valentín, A., & Nieuwenhuijsen, M. (2017). Urban and transport planning related exposures and mortality: A health impact assessment for cities. *Environmental Health Perspectives*, *125*(1), 89–96. https://doi.org/https://doi.org/10.1289/EHP220

Mueller, N., Rojas-Rueda, D., Khreis, H., Cirach, M., Andrés, D., Ballester, J., Bartoll, X., Daher, C., Deluca, A., Echave, C., Milà, C., Márquez, S., Palou, J., Pérez, K., Tonne, C., Stevenson, M., Rueda, S., & Nieuwenhuijsen, M. (2020). Changing the urban design of cities for health: The superblock model. *Environment International*, *134*, Article 105132. https://doi.org/10.1016/j.envint.2019.105132

Nieuwenhuijsen, M. J. (2016). Urban and transport planning, environmental exposures and health-new concepts, methods and tools to improve health in cities. *Environmental Health*, *15*(Suppl. 1), 161–171. https://doi.org/10.1186/s12940-016-0108-1

Northridge, M. E., & Sclar, E. (2003). A joint urban planning and public health framework: Contributions to health impact assessment. *American Journal of Public Health*, *93*, 118–121. https://doi.org/https://doi.org/10.2105/AJPH.93.1.118

O'Neill, J., Tabish, H., Welch, V., Petticrew, M., Pottie, K., Clarke, M., Evans, T., Pardo Pardo, J., Waters, E., White, H., & Tugwell, P. (2014). Applying an equity lens to interventions: Using PROGRESS ensures consideration of socially stratifying factors to illuminate inequities in health. *Journal of Clinical Epidemiology*, *67*(1), 56–64. https://doi.org/10.1016/j.jclinepi.2013.08.005

Pineo, H., Glonti, K., Rutter, H., Zimmermann, N., Wilkinson, P., & Davies, M. (2019). Use of urban health indicator tools by built environment policy- and decision-makers: A systematic review and narrative synthesis. *Journal of Urban Health*, *97*, 418–435. https://doi.org/10.1007/s11524-019-00378-w

Pineo, H., Zimmerman, N., & Davies, M. (2019). Urban planning: Leveraging the urban planning system to shape healthy cities. In S. Galea, C. Ettman, & D. Vlahov (Eds.), *Urban health* (pp. 198–206). Oxford University Press.

Prasad, A., Kano, M., Dagg, K. A.-M., Mori, H., Senkoro, H. H., Ardakani, M. A., Elfeky, S., Good, S., Engelhardt, K., Ross, A., & Armada, F. (2015). Prioritizing action on health inequities in cities: An evaluation of urban health equity assessment and response tool (Urban HEART) in 15 cities from Asia and Africa. *Social Science & Medicine*, *145*, 237–242. https://doi.org/10.1016/j.socscimed.2015.09.031

Richardson, E., Pearce, J., Mitchell, R., & Kinghamc, S. (2013). Role of physical activity in the relationship between urban green space and health. *Public Health*, *127*(4), 318–324. https://doi.org/https://doi.org/10.1016/j.puhe.2013.01.004

Rojas-Rueda, D., Morales-Zamora, E., Alsufyani, W. A., Herbst, C. H., AlBalawi, S. M., Alsukait, R., & Alomran, M. (2021). Environmental risk factors and health: An umbrella review of meta-analyses. *International Journal of Environmental Research and Public Health*, *18*(2), Article 704. https://doi.org/10.3390/ijerph18020704

Sallis, J. F., Owen, N., & Fisher, E. B. (2008). Ecological models of health behavior. In K. Glanz, B. K. Rimer, & K. viswanath (Eds.), *Health behavior and health education:Theory, research, and practice* (4th ed., pp. 465–486). Wiley.

Santana, P. (Ed.). (2007). *A Cidade e a saúde* [City and health]. Edições Almedina.

Santana, P. (Ed.). (2015). *A Geografia da saúde da população: Evolução nos últimos 20 anos em Portugal Continental* [The geography of population health: Evolution in the last 20 years in Portugal]. Centro de Estudos em Geografia e Ordenamento do Território. https://doi.org/10.17127/cegot/2015.GS

Santana, P. (Ed.). (2017a). *Promoting population health and equity in Europe: From evidence to policy*. Imprensa da Universidade de Coimbra. https://ucdigitalis.uc.pt/pombalina/item/56854

Santana, P. (Ed.). (2017b). *Atlas of population health in European Union regions*. Imprensa da Universidade de Coimbra. https://digitalis-dsp.uc.pt/handle/10316.2/43220

Santana, P., Freitas, A., Costa, C., & Vaz, A. (2015). Evaluating population health: The selection of main dimensions and indicators through a participatory approach. *European Journal of Geography*, *6*(1), 51–63.

Santana, P., Freitas, A., Stefanik, I., Costa, C., Oliveira, M., Rodrigues, T. C., Vieira, A., Ferreira, P. L., Borrell, C., Dimitroulopoulou, S., Rican, S., Mitsakou, C., Marí-Dell'Olmo, M., Schweikart, J., Corman, D., & Bana e Costa, C. A. (2020). Advancing tools to promote health equity across European Union regions: The EURO-HEALTHY project. *Health Research Policy and Systems*, *18*(1), Article 18. https://doi.org/10.1186/s12961-020-0526-y

Santana, P., Santos, R., & Nogueira, H. (2009). The link between local environment and obesity: A multilevel analysis in the Lisbon Metropolitan Area, Portugal. *Social Science and Medicine*, *68*(4), 601–609. https://doi.org/10.1016/j.socscimed.2008.11.033

Simões, J., Augusto, G., Fronteira, I., & Hernández-Quevedo, C. (2017). Portugal: Health system review. *Health Systems in Transition*, *19*(2), 1–184. https://

www.euro.who.int/__data/assets/pdf_file/0007/337471/HiT-Portugal.pdf

Tan, A., Nagraj, S. K., Nasser, M., Sharma, T., & Kuchenmüller, T. (2022). What do we know about evidence-informed priority setting processes to set population-level health-research agendas: An overview of reviews. *Bulletin of the National Research Centre*, *46*(1), Article 6. https://doi.org/10.1186/s42269-021-00687-8

Tsouros, A. (2013). City leadership for health and well-being: Back to the future. *Journal of Urban Health: Bulletin of the New York Academy of Medicine*, *90*(Suppl. 1), 4–13. https://doi.org/10.1007/s11524-013-9825-8

UN Committee on Economic, Social and Cultural Rights. (2000). *CESCR General Comment No. 14: The right to the highest attainable standard of health (Art. 12)*. https://www.refworld.org/docid/4538838d0.html

UN-Habitat. (2021). *Cities and pandemics: Towards a more just, green and healthy future*. https://unhabitat.org/cities-and-pandemics-towards-a-more-just-green-and-healthy-future-0

UN-Habitat, & World Health Organization. (2020). *Integrating health in urban and territorial planning: A sourcebook*. https://apps.who.int/iris/handle/10665/331678

Van Vliet-Brown, C. E., Shahram, S., & Oelke, N. D. (2018). Health in all policies utilization by municipal governments: Scoping review. *Health Promotion International*, *33*(4), 713–722. https://doi.org/10.1093/heapro/dax008

Vlahov, D., Freudenberg, N., Proietti, F., Ompad, D., Quinn, A., Nandi, V., & Galea, S. (2007). Urban as a determinant of health. *Journal of Urban Health: Bulletin of the New York Academy of Medicine*, *84*(Suppl. 3), i16–i26. https://doi.org/10.1007/s11524-007-9169-3

Weber, M. (2019). How the city of Utrecht develops a health and equity in all policies approach. *European Journal of Public Health*, *29*(Suppl. 4). https://doi.org/10.1093/eurpub/ckz185.733

World Health Organization. (1948). *Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York, 19–22 June, 1946*.

World Health Organization. (2010). *Urban health equity assessment and response tool (Urban HEART)*. http://www.who.int/kobe_centre/measuring/urbanheart/en

World Health Organization. (2012). *Addressing the social determinants of health: The urban dimension and the role of local government*. http://www.euro.who.int/en/publications/abstracts/addressing-the-social-determinants-of-health-the-urban-dimension-and-the-role-of-local-government

World Health Organization. (2014). Health in all policies (HiAP) framework for country action. *Health Promotion International*, *29*(Suppl. 1), i19–i28. https://doi.org/10.1093/heapro/dau035

World Health Organization. (2018). *Health inequities and their causes*. https://www.who.int/news-room/facts-in-pictures/detail/health-inequities-and-their-causes

World Health Organization, & Government of South Australia. (2010). *Adelaide statement on health in all policies: Moving towards a shared governance for health and well-being*. https://www.sahealth.sa.gov.au/wps/wcm/connect/d4f9bd0043aee08bb586fded1a914d95/omseet-sahealth-100610.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-d4f9bd0043aee08bb586fded1a914d95-nKKhqBX

World Health Organization, & UN-Habitat. (2010). *Hidden cities: Unmasking and overcoming health inequities in urban settings*. http://www.who.int/kobe_centre/%0Apublications/hidden_cities2010/en

World Health Organization Centre for Urban Health. (2001). *A working tool on city health development planning: Concept, process, structure and content*. https://www.euro.who.int/__data/assets/pdf_file/0017/101069/E85866.pdf

World Health Organization Regional Office for Europe. (1995). *City health profiles—How to report on health in your city*. https://www.euro.who.int/__data/assets/pdf_file/0009/101061/wa38094ci.pdf

World Health Organization Regional Office for Europe. (2019a). *A multilevel governance approach to preventing and managing noncommunicable diseases: The role of cities and urban settings*.

World Health Organization Regional Office for Europe. (2019b). *Healthy, prosperous lives for all: The European Health Equity Status Report*. https://apps.who.int/iris/handle/10665/326879

World Health Organization Western Pacific Regional Office. (2015). *Healthy cities: Good health is good politics—Toolkit for local governments to support healthy urban development*.

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Article

Co-Benefits of Transdisciplinary Planning for Healthy Cities

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Abstract
Synergies between urban planning and public health were synthesized a decade ago by the Lancet Commission's article "Shaping Cities for Health: Complexity and the Planning of Urban Environments in the 21st Century." Since then, innovative research projects, urban planning projects, and accumulated experience from the World Health Organization Healthy Cities project confirm that transdisciplinary contributions enable the achievement of core principles of healthy cities. This article clarifies important differences between the content, scope, and outcomes of interdisciplinary and transdisciplinary projects about public health and urban planning. It explains why transdisciplinary contributions are more likely to bridge the applicability gap between knowledge and practice in response to persistent urban health challenges; notably, they transgress the boundaries of public health and medical science; they prioritize political action in both the formal and informal construction sectors; and they include citizens, community associations, and private enterprises as partners in consortia for concerted action. This article proposes a radical shift from incremental, reactive, and corrective approaches in planning for urban health to proactive and anticipative contributions using backcasting and alternative scenarios that prioritize health. The article uses the case of public green spaces in planning for urban health. It identifies the shortcomings of many empirical studies that are meant to promote and sustain health before describing and illustrating an alternative way forward.

Keywords
applicability gap; co-benefits; healthy cities; transdisciplinary projects; urban planning for health

Issue
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1. Introduction

> The lay customers are complaining because planners and other professionals have not succeeded in solving the problems they claimed they could solve. (Rittel & Webber, 1973, p. 160)

During the 20th century, academic researchers, elected officials, and practicing architects and planners claimed that standardized and rationalized projects for the construction of large-scale housing projects, whole new cities, and the reconstruction of inner-city neighborhoods would meet the needs of rapidly growing populations (Labbé & Sorensen, 2020; Parker & Doak, 2012). These claims were based on common interpretations of urbanization borrowed from traditional development agendas that focused narrowly on economic growth and industrialization (Kresl, 2007). Urban development processes have changed and continue to change natural ecosystems by modifying the biological, ecological, and geological components and processes of natural and human-made ecosystems in all regions of the world (Elmqvist et al., 2013). Indeed, they have created unintended consequences for current and future generations: Although the health of urban populations has improved according to statistics on life expectancy at birth, other data and information record increasing levels of housing, employment, and socio-economic inequalities in cities (UN-Habitat, 2016; World Health Organization & UN-Habitat, 2010). These inequalities are reflected in the

health inequalities of urban populations across their lifespan (Galea et al., 2019; Giles-Corti et al., 2016).

Persistent problems in cities are often attributed to shortcomings in public policies or planning practice, but rarely attributed to housing, land, or property markets (Schröder et al., 2022). Researchers often suggest that shortcomings can be corrected by access to additional data and information, or new tools and methods (Sarkar et al., 2014). This article challenges this kind of thinking which has dominated architectural and urban research (Lawrence, 2015). The article reconsiders the cultural and political reasons for the gap between "what is known" and "what is implemented." It concludes that this "applicability gap" is not only the result of lack of data or procedural shortcomings. In addition, conceptual frameworks, human intentionality, fundamental values, political structures, and power relations should be identified and understood in specific cities.

This article explains why researchers, practitioners, and policymakers should rethink conventional gaps between scientific knowledge, public policies, and urban projects. It explains that interdisciplinary research and intersectoral collaboration are necessary but not sufficient to bridge these gaps because they are strongly influenced by other drivers (Goldstein, 2009). The article explains why transdisciplinary concepts and methods can and should provide epistemological and methodological frameworks that creatively facilitate human agency during collective decision-making about urban habitats. Indeed, they enable articulations of intentions, meanings, norms, and values of individuals and institutions in precise situations; these are influential drivers for promoting health through public policies for urban planning.

This article uses the Lancet Commission work "Shaping Cities for Health: Complexity and the Planning of Urban Environments in the 21st Century" (Rydin et al., 2012) as a benchmark. A decade after it was published, its propositions are reconsidered critically to reduce the gap between what is known about urban health and how this knowledge is included or ignored in public policies about planning for urban health (Bambra, 2013; Lawrence & Gatzweiler, 2017). This article requests a more radical shift from reactive to proactive approaches than the proposals of the Lancet Commission. The first step in this shift means that the health impact assessment of urban projects should be preceded by including health criteria in proactive decision-making from the outset of planning processes rather than applying criteria to monitor and assess projects only after they are formulated (Black et al., 2019). This requires political commitment and leadership as well as co-action of investors and decision-makers in the construction and planning sectors. The second step can be achieved if piecemeal and corrective measures are replaced by anticipative planning approaches that have a strategic vision of planning for urban health. These approaches include backcasting and scenarios, both still rarely used in urban planning.

1.1. Method

This article was written after analyzing scientific publications, official reports, and information about innovative projects that record the development of urban health challenges. These sources have been analyzed; since the 1990s they indicate diverse impacts of urban living conditions and lifestyles on the health of urban populations, and growing inequalities stemming from intra-urban differences (UN-Habitat, 2016; World Health Organization & UN-Habitat, 2010). These global trends indicate ineffective societal responses at national levels despite concordant empirical data and increasing scientific knowledge about them. In addition, the author has been a project partner in the European Commission's 4th, 5th, and 7th Framework Programs about housing and planning for health and well-being. These multi-stakeholder partnerships confirmed the need to question both the empirical content and the results of large interdisciplinary research projects that did not consider the pertinence of scientific research to influence societal change that promotes and sustains health (Bambra, 2013).

2. Taking Stock: Planning for Urban Health

The 2012 Lancet Commission report (Rydin et al., 2012) was based on their synthesis of a large volume of expert reviews and desk-top research about the health of urban populations. The Commission formulated five recommendations: (a) Local authorities should collaborate with a wide range of stakeholders including professional practitioners in urban planning and public health, (b) health inequalities in cities should be a focus of urban planning and policymaking, (c) "the urban advantage" of population health in cities should be maintained using public policies for urban planning, (d) systems analysis is needed to better understand the complexity of planning for urban health, and (e) local experimentation can provide progress for action to promote urban health, and these projects should include practitioners and representatives of local communities. However, the role and responsibility of property owners and enterprises in the housing, building, and planning sectors were not discussed.

The Lancet Commission used case studies to show how health can be improved by modifying buildings, infrastructure, and outdoor public spaces in cities. Then it argued for a new approach to planning for urban health having three key components. First is the need for experimentation, including trial and error, without any reference to the checkered history of experimentation in housing, building, and city planning (Goodman, 1972; Jacobs, 1961). Second, specific urban projects are cases for learning based on assessment and feedback of these projects, without mentioning that post-occupancy evaluation of housing, building, and urban planning projects is anathema to architecture, urban design, and city planning professions (Preiser et al., 1988). Third is accounting for the value-laden nature of urban policies,

including ethical and moral dimensions of planning for urban health, without acknowledging the role and responsibility of elected officials, professional practitioners and investors in housing, land, and property markets (Dunleavy, 1981). Each of these shortcomings will be discussed in later sections using the example of published research on the health benefits of access to public green spaces. The article concludes by endorsing the need for transdisciplinary concerted action to address urban health challenges.

A key message of this article is that transdisciplinary planning (a term not used by the Lancet Commission) should replace common intersectoral contributions grounded only on expert knowledge applied in "planning for society." Instead, concerted action known as "planning with and for society" uses core principles of transdisciplinarity briefly summarized in the next section. Then, the complex political character of both health and urban planning are discussed to highlight their complex value-laden character and the interrelations between them. The case of providing public green space for health promotion is summarized and enlarged by including other biological, economic, environmental, and social co-benefits. This example shows that if the shift from reactive to proactive planning for health is to be effective, then backcasting and alternative scenarios can apply transdisciplinary principles to prioritize health and well-being from the outset of planning processes.

3. What is Transdisciplinarity?

In this article, multidisciplinary contributions refer to projects involving at least two disciplines without intentional collaboration, or synthesis of each specific and specialised contribution (see Box 1). Interdisciplinarity refers to intentional convergence and cooperation between people in different disciplines that enable concerted action between them about a common subject. Both multidisciplinary and interdisciplinarity contributions are founded on discipline-based expertise including specialised concepts, theories, methods, and research protocols. In contrast, transdisciplinary contributions involve rethinking and using combinations of disciplinary and other types of knowledge, know-how, and "other ways of knowing" involving intentions, meanings, values, and worldviews (Lawrence, 2021).

Transdisciplinary contributions extend beyond interdisciplinary ones defined by scientific knowledge because they include multiple types of knowledge, professional know-how, and ways of knowing (Lawrence, 2021). Transdisciplinary contributions include and benefit from the plurality of knowing in a heterogenous world of facts and multiple values that transgress scientific domains. Complexity, diversity, and dialogue are addressed by applying complementary methods and tools that account for different meanings, perceptions, values, and worldviews. Transdisciplinary projects can

Box 1. Terminology: What are we discussing?

Key terms used for diverse disciplinary approaches are defined because there is no consensus about their definitions:

Disciplinarity refers to the definition and specialization of academic disciplines such that each discipline has its own concepts, definitions, and methodological protocols for the study of its precisely defined domain of competence. For example, in the domain of environmental sciences, different definitions, concepts, and methods coexist in biology, chemistry, geology, and physics. This means that collaboration across disciplinary boundaries requires a shared working definition before collaboration is possible.

Multidisciplinary refers to an additive approach including multiple contributions that remain within disciplinary conceptual and methodological boundaries. Each contributor applies disciplinary concepts and methods without intending to collaborate with others. This approach is frequently applied in environmental impact assessments of large-scale housing developments and urban infrastructure projects.

Interdisciplinary contributions involve intentional, collaborative actions that are applied by researchers in at least two different disciplines to achieve a shared research goal about a common subject. This kind of collaboration has created new disciplines, including architectural psychology and environmental sociology. Sharing of a combination of concepts and methods is intended between different disciplines, but the whole process does not extend beyond scientific knowledge, protocols, and know-how.

Transdisciplinary contributions extend beyond scientific knowledge by including non-academic researchers and institutions, such as representatives of the private sector, public administrations, community associations, and citizens. Transdisciplinary contributions enable the cross-fertilisation of knowledge and the experiences of people educated in disciplines, trained in professions, and experienced in policymaking. Collaborative planning and participatory design are tangible ways of co-producing new built environments with the involvement of representatives from industry, researchers, practitioners, policymakers, and citizens.

Source: Lawrence (2019).

enable agreements and shared understanding of complex situations and the resources needed to change them. They are not always piloted by researchers or public administrators: Many community-led projects have been successful in providing affordable housing through communal and cooperative initiatives; producing local food has increased in many cities north and south of the Equator; and environmental, energy, and health consequences of intensive road traffic have been counteracted by local communities (Lawrence, 2021).

Seven core characteristics of transdisciplinary planning contributions are listed in Box 2: a shared conceptual framework, complexity, context, agency, change, multiple methods, and creativity. Collectively, these core characteristics highlight the need to communicate data, information, and different (sometimes conflicting) interpretations of them, so that all participants can understand the complex, systemic nature of a situation or problem they wish to address collectively (Kirst et al., 2011). This shared concern is situated in a specific societal context, including cultural and political dimensions, which change over time and should be understood by systemic analysis. Both qualitative and quantitative research methods are necessary; they should be combined to develop a comprehensive understanding and continual monitoring. The commitment and participation of individuals and institutions affected by the situation or problem are needed if social adherence to projects is to be assured. Finally, the synthesis of different types of knowledge and ways of knowing can create effective responses to problematic situations, or persistent problems, including urban health challenges (Lawrence & Gatzweiler, 2017). In such cases, citizens, elected officials, property owners, and representatives of the construction sector should be invited to contribute their knowledge and experience. This article posits that if transdisciplinary contributions do not involve these key individuals and institutions in projects meant to promote and sustain urban health, then they are unlikely to achieve their objective of bridging the persistent "applicability gap."

Transdisciplinary planning incorporates three fundamental principles described by Després et al. (2011). First, there is no pre-established definition of criteria used to delineate what a design project or planning proposal should include in precise situations and who should participate (Knapp et al., 2019). This inclusive principle acknowledges the contribution of elected officials, design and planning practitioners, property investors and owners, and citizens; they all have personal and cultural preferences and values that should be addressed. Hence the second principle recognizes that cultural norms, and social norms and values should be addressed during design and planning processes. This approach replaces the dogma of those architects and planners who claim that professionals have liberal choices about what can be proposed, and they are often concerned with design only for design's sake (Goodman, 1972). The third principle accepts that the provision of carefully designed built environments for designated groups in cities (e.g., housing for migrants or older people) can be extended across numerous population groups and geopolitical levels (e.g., residential buildings, neighborhoods, and cities) to promote their health and quality of life (Shaw et al., 2020). However, this is not simply a technical task.

4. Complexity of Planning for Health

Rittel and Webber (1973) summarized fundamental limitations of scientific analyses of social policy problems,

Box 2. Core characteristics of transdisciplinary contributions.

Conceptual framework: Sharing information and knowledge between two or more disciplines and other types of non-scientific knowledge, professional know-how, and ways of knowing to develop a shared conceptual framework by relational and systemic thinking.

Complexity: Differences, emergence and conflicting values are acknowledged and addressed.

Context: Contextual contingencies of research and practice are taken into account.

Agency: Participation between researchers, practitioners, policymakers, and other representatives of society occurs using diverse communication tools and methods.

Change: Understanding real-world situations and persistent problems in order to reach agreements about changing them.

Multiple methods: Diverse sources of data and information as well as mixed research methods are applied in both analytical and synthetic thinking.

Creativity: Synergies between knowledge cultures, public policies, project implementation, and human behavior are encouraged to implement change.

Source: Lawrence (2019).

including urban planning and public health challenges during a meeting of the American Association for the Advancement of Science in December 1969:

> The search for scientific bases for confronting problems of social policy is bound to fail, because of the nature of these problems. They are "wicked problems," whereas science has developed to deal with "tame" problems. (Rittel & Webber, 1973, p. 155)

This distinction between tame and wicked problems is pertinent for considering the limitations of science to effectively respond to complex ecological and societal challenges including planning for urban health. In sum, scientific problems are usually isolated from their real-world situations before they are studied; then a definitive solution is proposed using rational knowledge derived from scientific research protocols. In contrast to this custom, Rittel and Webber (1973) explained that public policies for planning should not be isolated from their societal context, especially their political and temporal context, because they are dynamic and systemic and have no definite resolution; Lawrence and Gatzweiler (2017) explain why researchers should interpret urban health challenges accordingly.

Health is not just a condition of individual humans. It is a right influenced by politics and public policies (Corburn, 2009; Freudenberg et al., 2009). This axiom is illustrated by urban health, and especially the convergence and collaboration of politicians, medical and welfare practitioners, and professionals in the field of built environments to reduce the contagion of infectious diseases, including coronavirus SARS-CoV-2. The Covid-19 pandemic confirms that health is an emergent, complex, contextual, and systemic societal challenge bypassing boundaries of disciplines and professions. It also highlights the crucial role of human behavior and built environments in influencing health and quality of life.

Health is a changeable condition of human beings resulting from multiple interrelations between them and their biological, chemical, economic, physical, and social environment (Galea & Vlahov, 2005). Hence, health is place-based and locality-specific, not just population-specific; the geography of intra-urban health inequalities confirms this approach (UN-Habitat, 2016; World Health Organization & UN-Habitat, 2010). All the components of human habitats should be compatible with basic human needs and full functional activity including biological reproduction over a long period. Health is the outcome of direct pathological effects of chemicals, biological agents and radiation, as well as the cumulative influence of cultural, physical, psychological, and social dimensions of daily life including housing, transport, and other characteristics of urban habitats which Hartig and Lawrence (2003) nominated "the residential context of health."

Urban planning, like health, is complex because it is dynamic, systemic, and political. It is dependent on cultural, ethical, financial, and political variables that are defined contextually and temporally (Kresl, 2007). Alone, no single discipline or profession can tackle the challenges of rapid urban development, nor effectively intervene to reduce unintended consequences of built environments and infrastructure on health (Kirst et al., 2011; Lawrence, 2015, 2021). Urban ecosystems are societal conditions that require shared understanding and concerted action by consortia who can contribute to the formulation and implementation of strategic visions and innovative projects about healthy living in a world of global change. These consortia should include elected officials, public administrations, private enterprises in the construction sector, property investors and owners, and residents.

4.1. Planning Healthy Cities

> A healthy city is one that is continually creating and improving those physical and social environments and expanding those community resources which enable people to support each other in performing all the functions of life and in developing themselves to their maximum potential. (Hancock & Duhl, 1988, p. 1)

This definition implies that health is influenced by both short- and long-term processes led by public authorities. The WHO Healthy Cities project intends to integrate health into the agenda of all policy decision-makers, facilitate partnerships for health promotion between actors and institutions in the public and private sectors, and adopt a communal approach when implementing projects (de Leeuw & Simos, 2017). A core requirement of the World Health Organization is a political commitment by mayors and allocation of public resources for health promotion at the city rather than the national level. This requirement for adhesion to the Healthy Cities project is rarely prescribed for membership in other large city networks, including Local Agenda 21 initiatives for sustainable development.

The WHO European Health Cities Network has accumulated 35 years of experience showing the benefits of thinking about housing, building, and urban planning using "a health lens." The network introduced policies and planning processes that adopt a multi-dimensional and well-balanced approach to health promotion and care needs of all in designated cities. Moreover, there have been cases of transferability of tools and methods to other cities. A core theme of the project has been accessing public green space to enable health-promoting behaviors, including physical activity and social interaction of citizens.

5. Co-Benefits of Public Green Space and Health

The volume of empirical research about public health, urban design, and planning has grown considerably since 2000. Published studies have assessed the impacts of

the built and natural environments on human health and well-being (Barton et al., 2015; Galea & Vlahov, 2005; Sarkar et al., 2014; Vojnovic et al., 2019). Although these contributions have accumulated data and statistics, the robustness of many contributions is questionable (Hartig et al., 2014; Nieuwenhuijsen et al., 2014; World Health Organization, 2022). This section specifically considers the case of research on the health benefits of public green spaces synthesized by the World Health Organization (World Health Organization Regional Office for Europe, 2016) and others.

Research on the health effects of time spent in green public spaces is limited in scope (e.g., breadth and depth of study), scale (e.g., usually limited to one level of analysis), and there is a lack of validation of previous findings. An extensive review of publications concluded that there is still little strong empirical evidence that has been validated by repeated studies. That is especially true for an approach founded on principles of evidence-based medicine: "Very few studies so far have reached a standard that can constitute a basis for evidence-based medicine" (Nilsson et al., 2011, p. 9). This finding is supported by other reviews of the findings of numerous publications between 2003 and 2011 (Hartig et al., 2014; Nieuwenhuijsen et al., 2014; World Health Organization Regional Office for Europe, 2016). These publications confirm that a narrow disciplinary interpretation of health has not facilitated a global understanding of the multiple relations between human behavior, environmental conditions, and positive health outcomes.

Notably, the World Health Organization Regional Office for Europe (2016, p. 14) stated "there is comparatively little evidence demonstrating differential health benefits associated with specific characteristics of green space." The lack of accumulated and validated evidence can be attributed to the complexity of the subject, the diversity of research methods, and the lack of coordination and synthesis. However, earlier sections of this article indicate that this explanation only partly explains the current gap between knowledge about public health and applications in landscape architecture, urban design, and land use planning. Moreover, many contributions rarely refer to theories or conceptual frameworks (Lawrence et al., 2019). These frameworks can be derived from literature reviews, observational studies, or other kinds of empirical research.

Figure 1 includes two diagrams that represent contrasting conceptual frameworks. On the left-hand side, the relations between human activity, green public space, and health are positioned such that the connections between any two components are paired. Hence this diagram represents linear causality between any two but not all three components. Much research on the impacts of natural environments on health implicitly or explicitly adopts this simplistic mechanistic approach (Lawrence et al., 2019); for example, numerous studies assume that the proximity of public green space to place of residence is a "determinant" for health-promoting activities in that space despite numerous other behavioral, cultural and social variables that can influence whether citizens spend time there (World Health Organization Regional Office for Europe, 2016). In contrast, the right-hand side represents the mutual interrelations between the three components as a dynamic tripartite system that incorporates human agency. This conceptual framework reflects key principles of systems thinking applied to public health by Pineo et al. (2020). In essence, although the two diagrams have the same components, the interrelations between these components are fundamentally different.

In principle, a conceptual framework like that shown on the right of Figure 1 can generate a conceptual model like that presented by Hoehner et al. (2003). Their model represents multiple processes and pathways between key variables that should be considered to better understand the multiple relations between health-promoting behaviors in natural settings and positive health outcomes. This approach is transdisciplinary and involves the convergence of specialized knowledge from different disciplines (including epidemiology, human ecology,

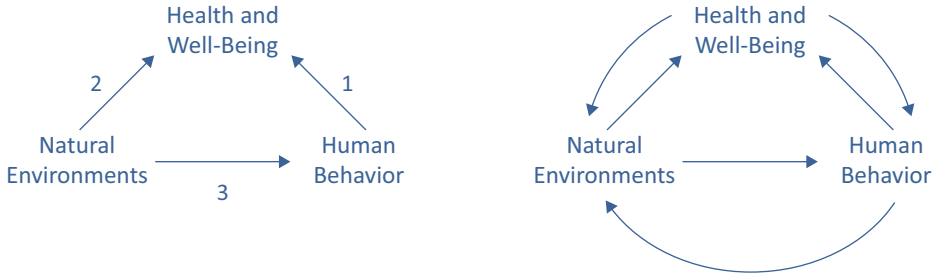

Figure 1. From linear causality to systems thinking. Notes: The relations between positive health effects of some human behaviors (physical activity, social interaction, leisure) on health (shown as 1) have been reported by empirical research. The positive impact of natural environments on human health (shown as 2) has been assumed and studied by many uncoordinated studies in the social and psychological sciences, but the accumulated evidence remains unclear. There is very little coordinated empirical research (shown as 3) that concludes that natural environments are the enablers of health-promoting human behaviors that promote positive health outcomes. A systemic conceptual framework (shown on the right) should replace the linear causality (shown on the left) that has dominated contributions to date.

landscape architecture, medical sciences, psychology, and sociology) for policy definition and implementation. It facilitates the formulation of a modified driving force, pressure, state, exposure, effect, and action (sDPSEEA) model shown in Figure 2.

This model has been formulated and presented to civil servants, policy decision-makers, and professional practitioners in health promotion, landscape architecture, and green space management to show them how their decisions can promote public health in precise localities. It challenges the narrow vision of discipline-based studies that seek simple answers to complex real-world situations as if "one size fits all" regarding the norm for the surface area of public green space per capita, or the optimal distance that people should travel to access green space for health-promoting activities. This normalized and rationalized approach repeats the erroneous thinking of architects, urban designers, landscape architects, and land use planners before the construction of new residential neighborhoods last century in many cities north and south of the Equator.

Given the repeated shortcomings of academic research about the relations between health and natural environments, a different approach was applied before, during and after the EU FP7 PHENOTYPE Project (Centre de Recerca en Epidemiologia Ambiental, n.d.). This approach, founded on core principles of human ecology, showed that alone, neither the size nor the proximity of public green spaces determines whether specific groups of the population use these spaces for health-promoting behaviors. Although both these characteristics are pertinent, their importance should not be dissociated from human agency and contextual conditions in specific localities. These conditions include seven other sets of characteristics identified and validated with groups of stakeholders in the public and private sectors; participants included landscape architects and urban planners at national and city levels, management staff of public green spaces, and elected officials in four cities. Hence, the set of nine characteristics, shown in Figure 3, should be used to explain why specific groups of people may or may not consider public green spaces as sites for health-promoting behaviors. Collectively, this multidimensional set of characteristics produced by dialogue with stakeholders defines the attractiveness of public green spaces in specific cities. These dialogue processes

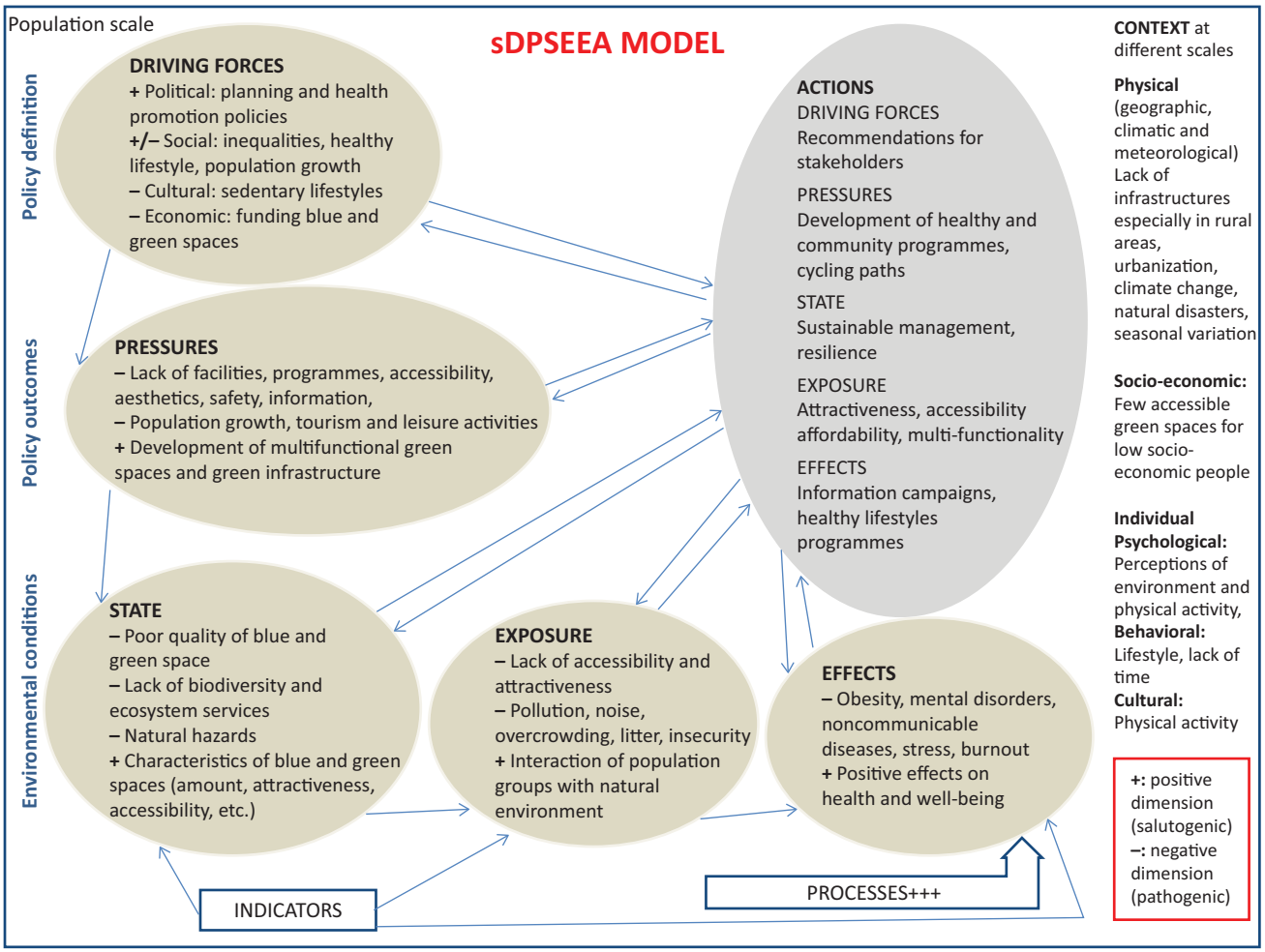

Figure 2. The sDPSEEA model proposed to incorporate systemic thinking for policymakers and practitioners concerned with identifying and monitoring the impacts of interventions on public health such as the provision of public green space.

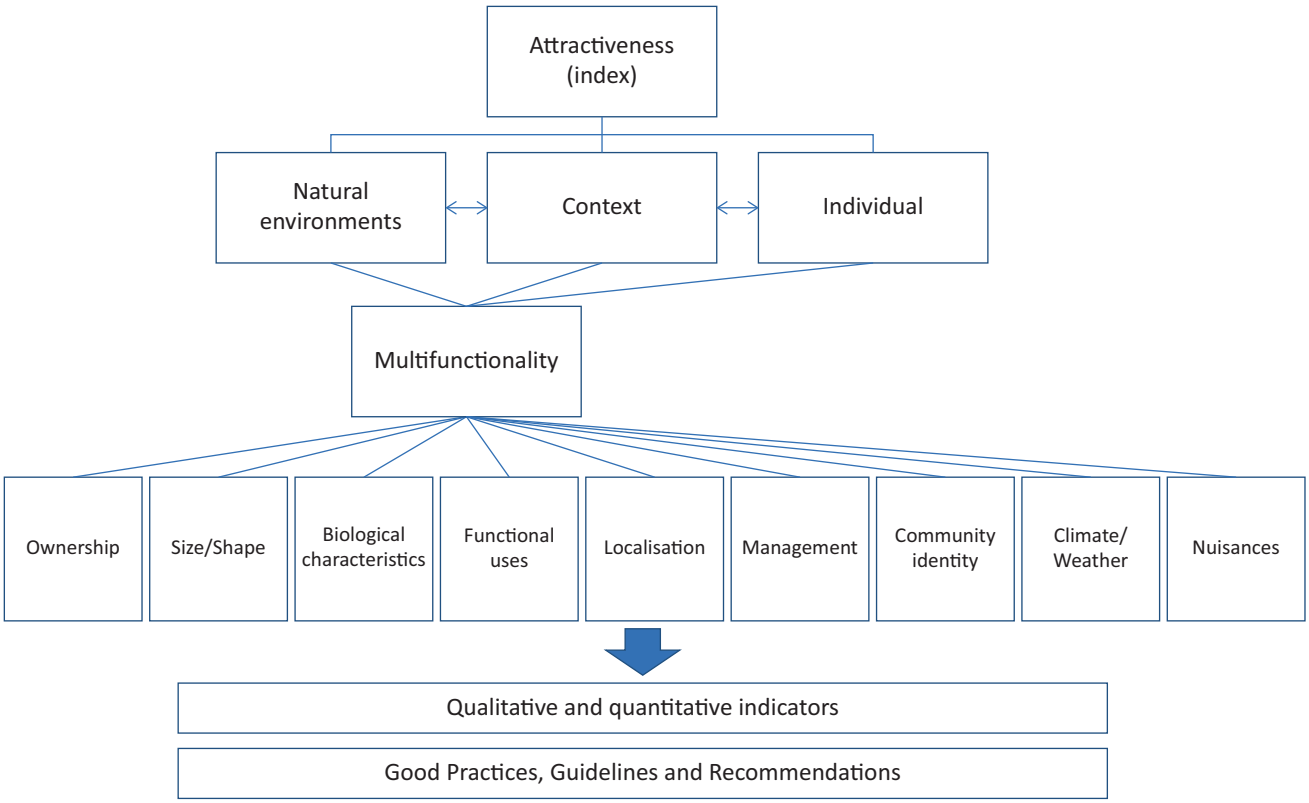

Figure 3. Nine core characteristics that contribute to the attractiveness of public green spaces are shown as ownership, size/shape, biological characteristics, functional uses, localisation, management, community identity, climate/weather, and nuisances.

should discuss co-benefits to assist mutual understanding of this complex subject.

5.1. Planning With and for Co-Benefits

Co-benefits denote additional benefits gained when a specific action in one sector (e.g., provision of public green space) has direct benefits in other sectors (e.g., exposure to lower levels of ambient air pollution and reduced incidence of respiratory illness). Co-benefits refer to co-lateral advantage and multiple benefits. The World Health Organization (2011) endorsed this concept to enable intersectoral collaboration between public health and other sectors including the "green economy." This is precisely how access to public green space has been interpreted by a large volume of research using the framework of ecosystem services (Elmqvist et al., 2013). It enables decision-makers in the public and private sectors to discuss how investments in the provision and maintenance of public parks in cities produce a public good involving biological, health, economic, and environmental benefits while reducing expenditure on health and medical care (see Figure 4). The EU FP7 PHENOTYPE project found that many civil servants did not know co-benefits; they were more concerned about the cost of providing public green spaces and expenditure for maintenance over the long-term than collateral benefits. This approach has been applied to assess the outcomes of large urban projects, including the restoration of the Cheonggyecheon Stream project in Seoul, South Korea, after its completion in 2015 (Lawrence, 2021).

Planning with and for co-benefits enables replacing simplistic interpretations of real-world issues by addressing their complexity, diversity, political, and value-laden nature. Transdisciplinary contributions recognize the importance of human agency. They can re-politicize both health and urban planning by including the voices of elected officials, civil servants, professional practitioners, property owners, and citizens. This fundamental shift is applicable to anticipative and proactive approaches to urban planning. These approaches will be summarized in the next section.

5.2. Anticipative and Proactive Approaches

Conventional planning and urban design methods rely heavily on predictions that are extrapolated from recent and past trends (Black et al., 2019). These approaches often ignore uncertainty and unpredictability in a rapidly changing world, and they have been challenged from the 1960s by three main currents of critical thinking: advocacy movements that defended the rights of underprivileged populations who suffered from urban renewal and upgrading projects in cities in all continents (Goodman, 1972), anthropological studies of the

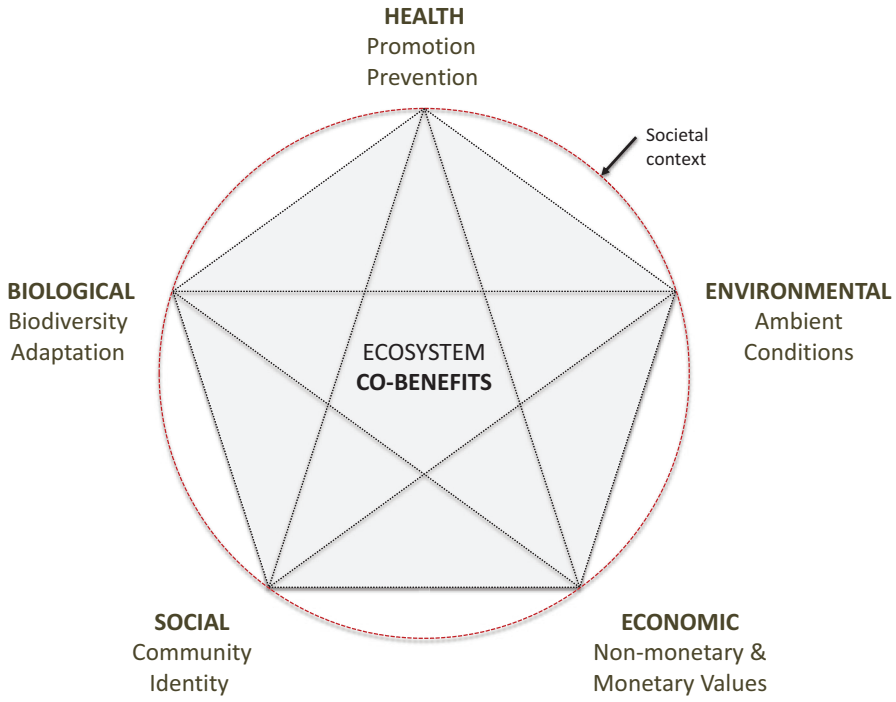

Figure 4. Co-benefits of public green space are much larger than health and support the provision of green space in cities. Notes: (a) Biological—biodiversity supports adaptability and resilience; (b) economic—increased market values for private properties; (c) environmental—trees absorb carbonic gases, filter fine particulates, and influence ambient temperatures; (d) health—contact time of more than four hours per week is beneficial for children and pregnant women; (d) social—low cost of recreation/physical activity in public green spaces.

knowledge of indigenous populations whose knowledge and values were ignored by experts (Kahane, 2012), and criticisms of the unintended consequences of economic and urban development projects in many cities north and south of the Equator (UN-Habitat, 2016; World Health Organization & UN-Habitat, 2010).

Kresl (2007) explained that anticipative approaches to future built environments, cities, and large urban agglomerations require a shift from speculative claims of experts to political leadership and strategic thinking. These approaches incorporate different temporal perspectives—the past, the present, and the future—to account for change and dynamic processes of urban development and population health. They can prioritize health at the outset of urban planning processes to ensure that health is included "upstream" rather than "downstream" (Black et al., 2019). For example, the provision of public green space in cities requires a strategic vision and agreed targets regarding land cover and tree canopy. Then the next task is to agree on how, where, and when this can be achieved.

5.3. Backcasting for Prioritizing Health

Urban projects that promote health and well-being require strategic thinking and visioning of what healthy habitats and livelihoods should become (Neuman & Hull, 2009). Forecasting involves looking at the future from the perspective of the past, whereas backcasting methods are grounded in formulating alternative scenarios of desired futures. Carlsson-Kanyama et al. (2008) explained that backcasting means that the present situation is considered from the perspective of the desired future. For example, a 50% increase in land surface area for public green space in the next 30 years is laudable but how will it be achieved? Backcasting comprises the definition of steps or phases going back from the desired state or condition to the present situation. This approach has been applied to define transitions in energy supply and consumption patterns that require long-term investments in infrastructure and incentives to change human behavior (Neuvonen & Ache, 2017).

Backcasting is pertinent in those situations when forecasting suggests that projections of current trends lead to undesirable outcomes. Hence, backcasting is relevant for concerns about implementing ecological, economic, health, and social objectives that will counteract unsustainable, inequitable, and unhealthy trends stemming from the planning, construction, and uses of built environments and infrastructure (Bibri, 2018; Carlsson-Kanyama et al., 2008). Backcasting has the advantage of identifying alternative options not confined to recent trends. It comprises the definition of the desired future condition or situation: a healthy city, or a large residential area with accessible public green space; analysis and formulation of alternative proposals that will result in the desired future condition; assess the amount of change required and where and when it

should occur; and estimating the resources and time necessary to achieve all desired changes (Dreborg, 1996).

Backcasting can enlarge public discussion about *what* can or should change by addressing *how* change can occur. Hence it can include planning measures, such as modified land-use planning policies and regulations requiring the provision of public green space in new urban areas, new incentives or sanctions using fiscal and financial measures to facilitate planting trees, and norms and rules that are meant to change human behavior about uses of public green spaces. All the actors and institutions of desired change should be identified, as Neuvonen and Ache (2017) explained.

Backcasting is a transdisciplinary method that collectively defines what are desirable and achievable futures (Bibri, 2018). One example is the initiative by 14 municipalities in the Helsinki Metropolitan Region to create a vision of sustainable development for 2050 (Ache, 2011). These local authorities organized an international competition in 2006 and 2007 called "Greater Helsinki Vision 2050" in collaboration with the Finnish Ministry of Environment and the Finnish Association of Architects. After the competition, several participants were asked to form a working group to create a joint vision of land use, housing and transport in the region based on an estimated population of 1.8 million residents in 2050 (Helsingin Kaupunki, 2010).

5.4. Planning for Change with Scenarios

Scenarios assist people to think about alternative futures by incorporating uncertainty into their analysis of extant situations or problems. Scenarios are a way of presenting a range of plausible yet different futures about a known situation, such as the effects of tree canopy and public green spaces on the urban heat island effect. Scenarios should be created from an understanding of the situation and the reasons that enabled it to exist. Scenarios present what could or should be changed in that situation, how the changes can be implemented, and by whom. Alternative scenarios are considered in terms of different driving forces and the potential outcomes of the changes they produce at prescribed periods of time.

Kahane (2012) defined "adaptive scenarios" that are formulated to anticipate and modify extant situations by adaption to plausible futures that are not challenged. He distinguished these from "transformative scenarios" which are alternatives that are explicitly influenced by human agency in order to transform current trends or a problematic situation. He argued that both types of scenarios are legitimate, but the latter are more aspiring and broader in scope and ambition.

Kahane (2012) explained how the scenario planning method he elaborated on using a "learning by doing" approach over 20 years has changed problematic situations in South Africa. He noted there are several preconditions for transforming problematic situations in cities that may exist at the local, regional, or national levels. These preconditions include:

- The scenario participants agree that the situation is unacceptable;
- They understand that alone they cannot change the situation themselves (or by working with a few others);
- They also agree that collaboration with representatives of the societal economic and political system in which they live is necessary during the scenario planning;
- The participants also should understand that problematic situations usually cannot be changed directly until there is a shared understanding that can be co-constructed by collaboration between the participants.

Kahane (2012) proposed five phases for the formulation of scenarios including conveying the pertinent team members, observing, and diagnosing the problematic situation, co-discovering common ground and different interpretations of that situation, and co-creating the transformative scenarios; these are then implemented by the team as well as other actors and institutions in society. He proposed four ways to effectively formulate transformative scenario planning processes that depend on each participant's openness to changing themselves and their viewpoint about a problematic situation:

- The transformation of personal understandings by a creative and collective sharing of perceptions and viewpoints so that the problematic situation is interpreted collectively in a different way from the sum of the participant's viewpoints;
- The construction of interpersonal relationships between the participants founded on team spirit, respect, and trust that provide adhesion to the collaborative venture to transform a problematic situation;
- The transformation of intentions regarding what can and should be changed regarding the problematic situation;
- The transformation of the participant's actions or what they need to do is based on the outcomes of the three preceding achievements.

Kahane (2012) explained that these four ways of implementing transformative change require a combination of existing skills and capabilities to organize the team of participants that represent all the stakeholders concerned by the problematic situation. He also noted the requirement for a convergence space in which the participants can transform their understandings, interpersonal relationships, and intentions.

In Europe, scenarios have improved joint decision-making about land use planning by representatives of private companies, public administrations, and non-government associations. They use communication

methods that rely on narrative rather than technical or professional language. The European Environment Agency has applied the story-and-simulation approach to document these narratives. One example of scenario formulation for land-use planning and built environments has been coordinated and documented by the European Environment Agency (2007). The project called PRELUDE considers the prospective environmental analysis of land use developments in Europe. The project partners formulated five contrasting scenarios for alternative land use planning in the European region envisaged 30 years forward. Then they formulated scenarios for Estonia, Northern Italy, and the Netherlands.

6. Synthesis

This article is the result of studying many scientific publications, official reports, and innovative projects about planning for urban health. The key messages are summarized in this section before concluding this contribution to this thematic issue on healthy cities.

First, there is a large volume of empirical studies that confirm correlations between environmental, housing, socio-economic, and health inequalities that have become persistent problems in cities north and south of the Equator. However, there is also a small yet growing number of cities that have prioritized planning for urban health, and innovative projects have been implemented to achieve that goal. Political commitment and leadership by mayors and public administrators have been instrumental in bypassing the inertia of national authorities.

Second, despite these innovative cases, there is a persistent applicability gap between what is known and what is implemented by planning for urban health in most cities. This gap is often supported by claims by researchers about the need for more data, information, methods, and tools, which this article has challenged. Linking scientific knowledge, public policies, and professional practice in the fields of public health and urban planning is much more than a scientific challenge as Rittel and Webber (1973) explained. Both public health and urban planning are influenced by ethical, moral, and political values of elected officials, public administrators, professional practitioners, and property owners. However, ethical and moral values are frequently discounted by academic researchers. Moreover, the political authority and power relations of property investors and owners are often ignored even though they are active decision-makers in housing, building, and urban planning projects.

Third, the shift from interdisciplinary research to transdisciplinary projects raised the question of *who* should be included in planning for urban health. While many publications, including the Lancet Commission (Rydin et al., 2012) and the World Health Organization Reports (World Health Organization, 2022; World Health Organization Regional Office for Europe, 2016) refer to stakeholders, this denomination should include more than policymakers and planners who are usually mentioned. The nature of urban development in global housing, land, and property markets underscores that policymaking without political leadership and long-term commitment is not sufficient to bridge the applicability gap between what is known and how it is used in specific planning projects. This situation is exacerbated in many countries by the deregulation of land and property markets, the privatization of public housing stock, and reduced investments and expenditure by public authorities. Research on planning for urban health should be re-politicized so that these societal conditions can be addressed more effectively.

Fourth, transdisciplinarity challenges common assumptions and conceptual frameworks commonly used in planning for urban health, including claims about the causal relations between access to public green space and health outcomes. In contrast, systemic thinking about the multiple interrelations between health and natural and human-made ecosystems, and all their interrelated components, should be applied because they influence directly or indirectly both urban and planetary health (Pineo et al., 2020). This has rarely been achieved in large-scale interdisciplinary research projects, whereas it is a core component of transdisciplinary projects.

7. Conclusion

This article has challenged the low impact of research and official reports that could influence planning for urban health. The large volume of scientific research, including studies on the health benefits of access to public green space, has not been effective in accumulating, validating, and using knowledge about urban health in cities in all regions. Today, there still is a schism between the results of scientific research and the content of public policies in public health and urban planning.

The advocates of more scientific knowledge to improve planning for urban health, whether policy-relevant or not, cannot guarantee that this knowledge will be used in policy definition, or by professional practitioners in urban planning, or by property investors and owners during decision making. This naïve claim ignores the societal context of planning for urban health. It also ignores the history of research on the health impacts of exposure to asbestos, lead, and tobacco smoking, which highlighted the root cause of political inaction about what was known following much scientific research (Brownell & Warner, 2009). Likewise, scientific knowledge about housing, building, and urban planning may or may not be used to support urban health. The WHO Healthy Cities project has highlighted the crucial role of political commitment and leadership of local authorities, and especially mayors, in the field of public health.

This article underscores the cultural, institutional, and political reasons behind the gap between what is

known and what is done to promote and sustain public health by urban planning. The crucial influence of political authority and power relations has often been overlooked in much academic research about planning for urban health. However, when transdisciplinary projects involve stakeholders from the private construction sector, as well as public administrators and elected officials in local and national authorities, then this omission can be addressed in precise situations. Hopefully, the examples presented in this article can serve as beacons for change.

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Conflict of Interests

The author declares no conflict of interests.

References

Ache, P. (2011). 'Creating futures that would otherwise not be': Reflections on the Greater Helsinki vision process and the making of metropolitan regions. *Progress in Planning*, *75*(4), 155–192. https://doi.org/10.1016/j.progress.2011.05.002

Bambra, C. (2013). The primacy of politics: The rise and fall of evidence-based public health policy? *Journal of Public Health*, *35*(4), 486–487. https://doi.org/10.1093/pubmed/fdt113

Barton, H., Thompson, S., Burgess, S., & Grant, M. (Eds.). (2015). *The Routledge handbook of planning for health and well-being*. Routledge.

Bibri, S. (2018). Backcasting in future studies: A synthesized scholarly and planning approach to strategic smart sustainable city development. *European Journal of Futures Research*, *6*, Article 13. https://doi.org/10.1186/s40309-018-0142-z

Black, D., Scally, G., Orme, J., Hunt, A., Pilkington, P., Lawrence, R., & Ebi, K. (2019). Moving health upstream in urban development: Reflections on the operationalisation of a trans-disciplinary case study. *Global Challenges*, *3*(4), Article 1700103. https://doi.org/10.1002/gch2.201700103

Brownell, K. D., & Warner, K. E. (2009). The perils of ignoring history: Big tobacco played dirty and millions died—How similar is big food? *Milbank Quarterly*, *87*(1), 259–294.

Carlsson-Kanyama, A., Dreborg, K. H., Moll, H. C., & Padovan, D. (2008). Participative backcasting: A tool for involving stakeholders in local sustainability planning. *Futures*, *40*(1), 34–46. https://doi.org/10.1016/j.futures.2007.06.001

Centre de Recerca en Epidemiologia Ambiental. (n.d.). *Phenotype: Health from the outside in*. https://www.phenotype.eu/en

Corburn, J. (2009). *Toward the healthy city: People, places, and the politics of urban planning*. The MIT Press.

de Leeuw, E., & Simos, J. (2017). *Healthy cities: The theory, policy, and practice of value-based urban planning*. Springer.

Després, C., Vachon, G., & Fortin, A. (2011). Implementing transdisciplinarity: Architecture and urban planning at work. In I. Doucet & N. Janssens (Eds.), *Transdisciplinary knowledge production in architecture and urbanism: Urban and landscape perspectives* (Vol. 11, pp. 33–49). Springer. https://doi.org/10.1007/978-94-007-0104-5_3

Dreborg, K. (1996). Essence of backcasting. *Futures*, *28*(9), 813–828. https://doi.org/10.1016/S0016-3287(96)00044-4

Dunleavy, P. (1981). *The politics of mass housing in Britain 1945–1975: A study of corporate power, and professional influence in the welfare state*. Clarendon Press.

Elmqvist, T., Fragkias, M., Goodness, J., Güneralp, B., Marcotullio, P., McDonald, R., Parnell, S., Schewenius, M., Sendstad, M., Seto, K., & Wilkinson, C. (Eds.). (2013). *Urbanization, biodiversity and ecosystem services: Challenges and opportunities*. Springer.

European Environment Agency. (2007). *PRELUDE: Prospective environmental analysis of land-use development in Europe*.

Freudenberg, N., Klitzman, S., & Saegert, S. (Eds.). (2009). *Urban health and society: Interdisciplinary approaches to research and practice*. Jossey-Bass.

Galea, S., Ettman, C., & Vlahov, D. (Eds.). (2019). *Urban health*. Oxford University Press.

Galea, S., & Vlahov, D. (Eds.). (2005). *Handbook of urban health: Populations, methods and practice*. Springer.

Giles-Corti, B., Vernez-Moudon, A., Reis, R., Turrell, G., Dannenberg, A. L., Badland, H., Foster, S., Lowe, M., Sallis, J., Stevenson, M., & Owen, N. (2016). City planning and population health: A global challenge. *The Lancet*, *388*(10062), 2912–2924. https://doi.org/10.1016/S0140-6736(16)30066-6

Goldstein, H. (2009). Commentary: Translating research into public policy. *Journal of Public Health Policy*, *30*(Suppl. 1), S16–S20. https://www.jstor.org/stable/40207248

Goodman, R. (1972). *After the planners*. Penguin Books.

Hancock, T., & Duhl, L. (1988). *Promoting health in the urban context*. FADL Publishers.

Hartig, T., & Lawrence, R. (2003). Introduction: The residential context of health. *Journal of Social Issues*, *59*, 455–676.

Hartig, T., Mitchell, R., de Vries, S., & Frumkin, H. (2014). Nature and health. *Annual Review of Public Health*, *35*(1), 207–228. https://doi.org/10.1146/annurev-publhealth-032013-182443

Helsingin Kaupunki. (2010). *Greater Helsinki Vision 2050*. https://www.hel.fi/hel2/helsinginseutu/FINAL_

GreaterHelsinki_200x200mm_english_03-09-2010_LOW.pdf

Hoehner, C. M., Brennan, L. K., Brownson, R. C., Handy, S. L., & Killingsworth, R. (2003). Opportunities for integrating public health and urban planning approaches to promote active community environments. *American Journal of Health Promotion*, *18*(1), 14–20. https://doi.org/10.4278/0890-1171-18.1.14

Jacobs, J. (1961). *The death and life of great American cities: The failure of town planning*. Random House.

Kahane, A. (2012). *Transformative scenario planning: Working together to change the future*. Berrett-Koehler.

Kirst, M., Schaefer-McDaniel, N., Hwang, S., & O'Campo, P. (2011). (Eds.). *Converging disciplines: A transdisciplinary research approach to urban health problems*. Springer.

Knapp, C., Reid, R., Fernández-Giménez, M., Klein, J., & Galvin, K. (2019). Placing transdisciplinarity in context: A review of approaches to connect scholars, society and action. *Sustainability*, *11*(18), Article 4899. https://doi.org/10.3390/su11184899

Kresl, P. (2007). *Planning cities for the future: The successes and failures of urban economic strategies in Europe*. Edward Elgar.

Labbé, D., & Sorensen, A. (Eds.). (2020). *Handbook of megacities and mega-city regions*. Edward Elgar.

Lawrence, R. J. (2015). Mind the gap: Bridging the divide between knowledge, policy and practice. In H. Barton, S. Thompson, S. Burgess, & M. Grant (Eds.), *The Routledge handbook of planning for health and well-being* (pp. 74–84). Routledge.

Lawrence, R. J. (2019). Transdisciplinary responses to children's health challenges in the context of rapid urbanization. *Sustainability*, *11*(15), 4097. https://doi.org/10.3390/su11154097

Lawrence, R. J. (2021). *Creating built environments: Bridging knowledge and practice divides*. Routledge. https://www.routledge.com/Creating-Built-Environments-Bridging-Knowledge-and-Practice Divides/Lawrence/p/book/9780815385394

Lawrence, R. J., Forbat, J., & Zufferey, J. (2019). Rethinking conceptual frameworks and models of health and natural environments. *Health*, *26*(2), 158–179. https://doi.org/10.1177/1363459318785717

Lawrence, R. J., & Gatzweiler, F. (2017). Wanted: A transdisciplinary knowledge domain for urban health. *Journal of Urban Health*, *94*(4), 592–596. https://doi.org/10.1007/s11524-017-0182-x

Neuman, M., & Hull, A. (2009). The futures of the city region. *Regional Studies*, *43*(6), 777–787. https://doi.org/10.1080/00343400903037511

Neuvonen, A., & Ache, P. (2017). Metropolitan vision making—Using backcasting as a strategic learning process to shape metropolitan futures. *Futures*, *86*, 73–83. https://doi.org/10.1016/j.futures.2016.10.003

Nieuwenhuijsen, M. J., Kruize, H., Gidlow, C., Andrusaityte, S., Antó, J. M., Basagaña, X., Cirach, M., Dadvand, P., Danileviciute, A., Donaire-Gonzalez, D., Garcia, J., Jerrett, M., Jones, M., Julvez, J., van Kempen, E., van Kamp, I., Maas, J., Seto, E., Smith, G., . . . Grazuleviciene, R. (2014). Positive health effects of the natural outdoor environment in typical populations in different regions in Europe (PHENOTYPE): A study programme protocol. *BMJ Open*, *4*(4), Article e004951. https://doi.org/10.1136/bmjopen-2014-004951

Nilsson, K., Sangster, M., Gallis, C., Hartig, T., de Vries, S., Seeland, K., & Schipperijn, J. (Eds.). (2011). *Forests, trees and human health*. Springer.

Parker, G., & Doak, J. (2012). *Key concepts in planning*. SAGE.

Pineo, H., Zimmermann, N., & Davies, M. (2020). Integrating health into the complex urban planning policy and decision-making context: A systems thinking analysis. *Palgrave Communications*, *6*(1), Article 21. https://doi.org/10.1057/s41599-020-0398-3

Preiser, W., Rabinowitz, H., & White, E. (1988). *Post-occupancy evaluation*. Van Nostrand Reinhold.

Rittel, H. W. J., & Webber, M. M. (1973). Dilemmas in a general theory of planning. *Policy Sciences*, *4*(2), 155–169. https://doi.org/10.1007/bf01405730

Rydin, Y., Bleahu, A., Davies, M., Dávila, J. D., Friel, S., De Grandis, G., Groce, N., Hallal, P. C., Hamilton, I., Howden-Chapman, P., Lai, K.-M., Lim, C., Martins, J., Osrin, D., Ridley, I., Scott, I., Taylor, M., Wilkinson, P., & Wilson, J. (2012). Shaping cities for health: Complexity and the planning of urban environments in the 21st century. *The Lancet*, *379*(9831), 2079–2108. https://doi.org/10.1016/s0140-6736(12)60435-8

Sarkar, C., Webster, C., & Gallacher, J. (2014). *Healthy cities: Public health through urban planning*. Edward Elgar.

Schröder, J., Moebus, S., & Skodra, J. (2022). Selected research issues of urban public health. *International Journal of Environmental Research and Public Health*, *19*(9), Article 5553. https://doi.org/10.3390/ijerph19095553

Shaw, R. M., Howe, J., Beazer, J., & Carr, T. (2020). Ethics and positionality in qualitative research with vulnerable and marginal groups. *Qualitative Research*, *20*(3), 277–293. https://doi.org/10.1177/1468794119841839

UN-Habitat. (2016). *World cities report 2016: Urbanization and development—Emerging futures*.

Vojnovic, B., Pearson, A., Asiki, G., Geoffrey DeVerteuil, G., & Allen, A. (Eds.). (2019). *Handbook of global urban health*. Routledge. https://doi.org/10.4324/9781315465456

World Health Organization. (2011). *Health in the green economy: Health co-benefits of climate change mitigation—Transport sector*.

World Health Organization. (2022). *Technical expert meeting on urban health, June 2021: Meeting report*.

World Health Organization, & UN-Habitat. (2010). *Hid-*

den cities: Unmasking and overcoming inequalities in health in urban areas.
World Health Organization Regional Office for Europe. (2016). *Urban green spaces and health: A review of evidence*.

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Article

Public Space Usage and Well-Being: Participatory Action Research With Vulnerable Groups in Hyper-Dense Environments

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Abstract
The importance of neighbourhood-level public space and its benefits have been discussed at large during the Covid-19 pandemic. While demands for public space increase, restrictions imposed by the containment policies such as social distancing and public space use have made profound health impacts on the general public. Such impact may further widen the gaps of existing health and social inequalities and engender well-being issues in vulnerable populations living in dense urban environments. To better understand vulnerable groups' perception and experience of access to public spaces and its association with well-being, we conducted participatory action research during the pandemic (October 2020 to April 2021) via surveys, focus group discussions, mapping, and co-creation workshops in Sham Shui Po, a hyper-dense and poverty-stricken district in Hong Kong. Participants reported demands for public space use and its significance to well-being and pointed to several environmental and social factors that hindered their usage, including perceived safety, hygiene concerns, and issues between different genders and ethnic groups in the neighbourhood. Pandemic-containment measures and the fear of infections may contribute to heightened anxiety and stress to some degree among the participants. Directions for local interventions of spatial improvement were identified. Our study further highlights the strength of participatory action research for the development of more user-oriented planning solutions and the potential of community mapping and co-creation activities to empower vulnerable groups and enhance their spatial competence.

Keywords
Covid-19; high-density environment; Hong Kong; participatory action research; public space; urban planning; vulnerable groups; well-being

Issue
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1. Introduction

The impacts of the Covid-19 pandemic are devastating worldwide, with vulnerable populations (e.g., urban poor, unemployed, homeless) bearing the brunt of health, social, and economic inequalities to a great extent (World Health Organization, 2020). Such impact can be observed notably in Hong Kong with its rising socio-spatial inequalities (CUHK Institute of Health Equity, 2021). While restricting social contact prevents the spread of infections, containment measures have subsequently led to the closure of or limited access to public amenities, welfare and recreational facilities, and schools. Such closure disproportionately impacts the vulnerable groups who heavily rely on these public spaces and their services. Furthermore, there is a rising concern over the impact of the pandemic on people's well-being as the prevalence and burden of mental

disorders appear to be ongoing and sustained since early lockdown (Ettman et al., 2022; Holttum, 2020).

Public space, ranging from parks to alleys, has widely proven to be vital for both individual and social well-being (Maas et al., 2006; Mehaffy, 2021; Thompson et al., 2016; UN-Habitat, 2020). Recent studies consistently indicate a great need for public space access among urban dwellers during the pandemic, especially for those residing in economically deprived neighbourhoods or those without private garden access (Hubbard et al., 2021; Larson et al., 2021; Poortinga et al., 2021). For many urban poor, public space is an essential living environment for everyday life, with economic, social, and well-being importance. Overall, the emergence of prior evidence highlights the significance of having nearby public spaces to mitigate stress, promote health and well-being, and maintain spatial and social connections in times of crisis.

While the importance of public space has gained increasing recognition during the pandemic, free outdoor public space is a limited resource in dense urban areas, and the situation is even worse in underprivileged districts. Hong Kong, characterised by its compact, high-density urban form, has long faced a dearth of urban public space, with an average of 29 sq. ft. of open space per person (Civic Exchange, 2018). Moreover, its urban public space is unequally distributed, designed, and managed, with a large proportion located closer to upmarket housing areas rather than densely populated low-income neighbourhoods (CABE Space, 2005; Tang, 2017). Previous studies have investigated arrays of socio-demographics, environmental-spatial attributes, and individual factors concerning public space usage, e.g., population density, neighbourhood affluence, proximity, accessibility, spatial equity of provision, and individual perceived quality, safety, and attitudes towards public space (Liu et al., 2017; Tan & Samsudin, 2017; Wan et al., 2020; Wang et al., 2021; Zanon et al., 2013). Socio-demographic factors of income and gender (Liu et al., 2017; Wang et al., 2021; Zanon et al., 2013) are shown to be associated with the frequency of park visits, in which women tended to report more barriers such as time constraints and fear of crime. Yet, significant knowledge gaps remain in the context of small neighbourhood public spaces in dense underprivileged urban areas and additionally, engaging socially disadvantaged groups in the study of public space and the planning process is rather limited.

There is an emerging trend of applying participatory action research (PAR) to the design field to enhance transferable knowledge, such as participants' experience of physical or perceived barriers to public space use, and to better address specific practical problems through bottom-up local interventions for improvements. In this study, the PAR approach was adopted to provide opportunities for empowerment, collective inquiry, and collaborations in practice where participants actively engaged as partners in the research process and benefited from participation. The validity and effectiveness of this approach were documented in prior research (Ku & Kwok, 2008; Qi & Gu, 2020).

This study is a swift response to observations and concerns of a local charity (Caritas Hong Kong), which has long engaged in frontline mental health support to grassroots residents in Sham Shui Po (SSP), one of the poorest and densest districts in Hong Kong. Caritas' social workers observed their clients triggered mental health problems during Hong Kong's pandemic containment policies and suspected the relationship between clients' well-being issues and the difficulties in accessing public spaces and public resources. With such first-hand observation and the aforementioned research gaps, this study aims to understand the overlooked vulnerable groups' perception and experience of public space in a hyper-dense environment and to examine the degree to which its association with well-being during the Covid-19 pandemic using the PAR approach. Surveys, focus group interviews and community mapping activities were conducted to explore (a) participants' public space usage patterns, (b) encouraging and hindering factors from accessing or using public spaces, and (c) impacts of Covid-19 and containment measures on daily life and well-being.

2. Study Site: Sham Shui Po

The selected study site, SSP, characterised by a predominantly working-class population, a diverse mix of ethnicities, and hyper-dense urban habitation, represents a typical underprivileged area in Hong Kong. SSP has the second-highest poverty rate in Hong Kong; of 431,090 SSP residents, 96,800 (22.5%) were classified as "poor population" below the poverty line (Office of the Government Economist, 2020). The population density of SSP is 46,067/km2, with increasing groups of ethnic minorities coming from South Asia and mainland China (Census and Statistics Department, 2021). The district's urban form is characterised by two main patterns: a dense urban street grid, and large urban blocks with public and private housing estates (Figure 1). Private permanent housing, mostly tenement buildings, is the dominant housing type in the district (59.0%), followed by public rental housing (35%; Kan et al., 2022). SSP has the second-highest concentration of subdivided units, mostly in dilapidated tenement buildings, with a median area of 107.6 sq. ft. per unit, which, on average, accommodates a median household size of 2.3 persons (Census and Statistics Department, 2018). Poverty, heavy workloads, and cramped living environments potentially arouse mental health concerns in the district, especially among middle-aged females (Hong Kong Young Women's Christian Association, 2021). Furthermore, the accessibility to public spaces and the social discomfort of using public spaces in SSP are widely reported as unsatisfying as compared to other districts in Hong Kong (Civic Exchange, 2018).

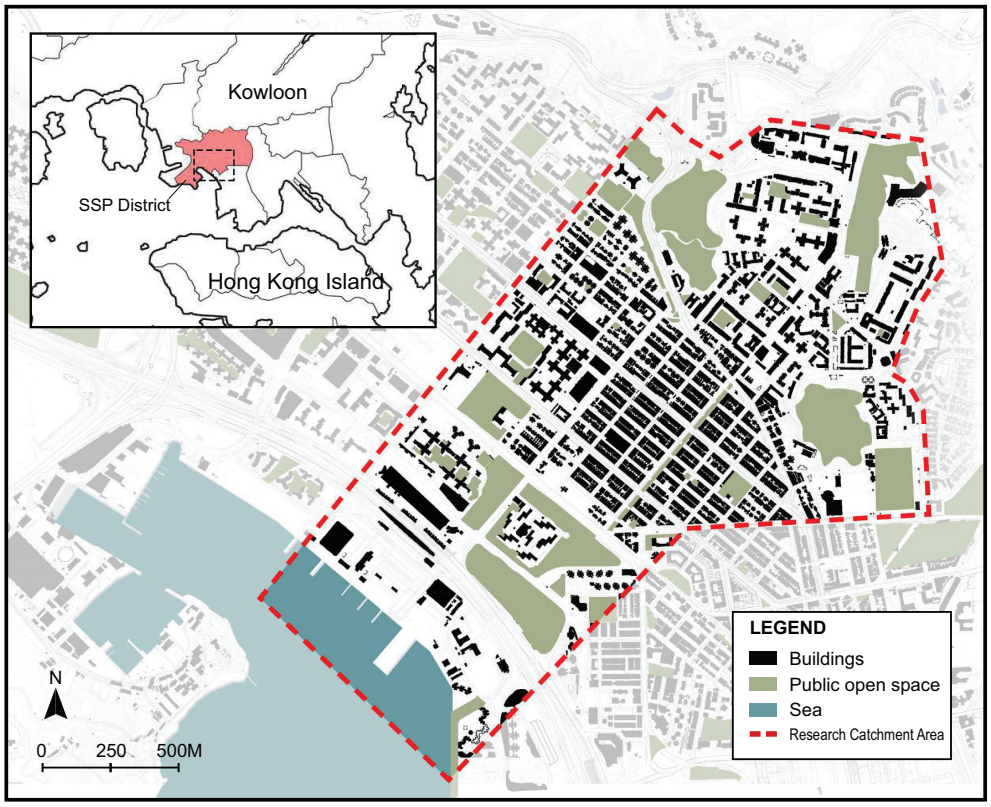

Figure 1. The geographical scope of the study. Note: Research catchment area is defined by participants' residential neighbourhoods and locals' correlation between neighbourhood boundaries.

3. Methodology and Research Design

3.1. Research Design

The research team was composed purposefully of members working in social work, public and mental health, architecture, and urban design to address the complex issues affecting the residents in the district. All members worked together to contribute to the research design using their expertise and related experiences in their fields.

The team adopted a PAR approach, which is "an iterative process in which researchers and practitioners act together in the context of an identified problem to discover and effect positive change within a mutually acceptable ethical framework" (Lingard et al., 2008, p. 461). The benefits of PAR include generating transferable knowledge to create effective local solutions, consciousness-raising, and community empowerment (Park, 1999), which the team deemed important for the here-involved vulnerable groups in the moment of pandemic crisis. It also permits the team to review and adjust the study to accommodate participants' feedback at different stages (Stringer, 2007).

The PAR approach in this study includes quantitative (questionnaire survey) and qualitative methods (focus group discussion with mapping exercise and co-creation workshops; Figure 2). With a strategic relationship among the methods, this mixed method approach can create greater insights than a single method could (Lingard et al., 2008) and is conducive to our interdisciplinary research. The questionnaire survey was designed for an overview of the participants' self-rated psychological distress, daily routines, and patterns of public space usage during the pandemic and the degree to which the pandemic may impact participants' livelihood and daily life. The development of the study survey and focus group was informed by related scientific literature and theory, the authors' prior field study observation and spatial knowledge of the district, and the frontline working experience with the charity during the pandemic.

Focus group discussions were conducted to add more depth to the quantitative findings to enhance a comprehensive understanding of space meaning, facilitators and barriers to access and its relationship with well-being. Mapping is a common method used in delineating spatial relationships with open space (Qi & Gu, 2020). Mapping enhances the dialogue by encouraging the participants to "think aloud" about spatial factors and helps researchers efficiently identify the spatial aspects and boundaries in the discussion (Rohrbach et al., 2018). In this study, the focus group discussion, together with the mapping exercise, allowed further understanding of participants' public space experiences, use patterns, rationales behind everyday usage, and the impacts of the pandemic on usage and well-being.

Due to the swift set-up of the project in response to the frontline social workers' observations during the

pandemic, the research team used convenience sampling from Caritas' client database of its community-based project on mental wellness. Fifty participants were recruited, and each signed a written consent form. Participants were informed about their right to withdraw from the research at any time, and all agreed to participate in the survey and focus group session. Upon completion of the focus group discussion, participants were each paid a cash voucher of HK$250 (equivalent to US$31.85). Among them, 23 participants further took part in the co-creation workshops. The study was approved by the university's Survey and Behavioural Research Ethics Committee.

The project was set up by the research team and the social workers from Caritas. In the first stage, the social workers acted as coordinators in facilitating participant recruitment, survey conduction, focus group discussion, and finding consolidation. After the research team decided to launch the second stage, the co-creation workshops, the social workers again helped to facilitate workshop activities with the research team. The long-standing relationships between the research team and Caritas, and Caritas' trustful relationship with vulnerable groups in SSP, effectively facilitated the implementation of the PAR approach.

3.1.1. First Stage: Survey and Focus Group Interviews

After identifying the research questions collaboratively, the first stage took place in October 2020 with 10 sessions conducted, each including survey-filling, semi-structured focus group discussion and mapping exercises. Each session hosted five participants. The small group size responded to the tight pandemic regulations at that time. After filling out the surveys, participants joined the focus group discussion, accompanied by a mapping exercise where study participants mapped out their daily routes and identified their frequently used public spaces. This led to a discussion about their motivations for visiting these spaces and their experiences.

3.1.2. Research Design Iterations

The first stage revealed three unforeseen issues. First, many participants did not pay attention to their daily routes or did not have any regular routes. Second, participants found it difficult to comprehend the maps, so facilitators had to take the role of mapping instead. Third, many participants discovered new places during the focus group discussion and learnt new information from other participants about their neighbourhoods. Such observations led to corresponding iterations and adjustments to the research design. The unfamiliarity and the interest in learning about public spaces among study participants motivated the decision to iterate and adjust the study to accommodate participants' feedback, which has subsequently enriched both research methods and outputs. Regarding output, the team decided to co-create a map of local public spaces with the study participants to build up their spatial competence and relationship to the neighbourhood.

3.1.3. Second Stage: Co-Creation Workshops

Three engagement co-creation workshops were organised in April 2021 to collect feedback from study participants regarding (a) key public spaces which were not represented on the map, (b) suggestions for useful additional map content, and (c) the recommended distribution of the map after its completion. The participants also discussed the map layout design and size. Finally, a co-created community map was produced in the format of a double-sided, foldable 50 cm × 70 cm leaflet with a PDF version (Figure 7).

3.1.4. Finding Analysis

Upon completion of the first stage, the focus group discussions were transcribed, and the mapping outputs were digitalised. The transcriptions were analysed according to general and place-specific concerns. Recurring themes were uncovered, and, within each of them, further content analyses were performed. The result was categorised into encouraging and hindering factors of public space usage, while specific influences related to the pandemic were identified as well. Such qualitative outcomes were mapped onto digitised spatial results of the mapping exercise to corroborate findings and present an understanding of neighbourhood-level public spaces. They were also cross-checked with the findings of the quantitative survey to deduce further relationships between usage patterns and demographic details. The co-creation workshops' facilitated discussions were recorded as researchers' notes, with findings

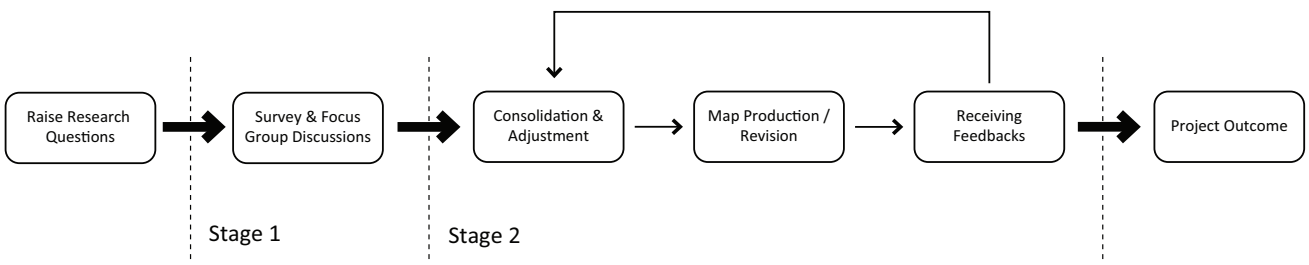

Figure 2. The two-stage approach.

directly integrated into the map production process, and other insights regarding participants' preferred information channels and spatial knowledge learning collected.

3.2. Demographics of Study Participants

Study participants were predominantly females (86%), with a higher concentration (32%) of age 35–44 years old (Table 1). Participants were all ethnically Chinese. A majority (60%) of the participants reside in subdivided units. Approximately, two-thirds (62%) live in a flat smaller than 200 sq. ft., and the average household size is 2.6 members. More than half (58%) were not employed at the time of the survey, being either unemployed (28%) or housewives (30%). Furthermore, many participants did not grow up in the district. The survey included the Kessler Psychological Distress Scale (K10; Kessler et al., 2002) to assess participants' self-rated psychological distress. The scale has 10 screening questions to measure emotional state using a five-point scale from one (*none of the time*) to five (*all of the time*). The summary score ranges from 10 to 50, with higher scores indicating greater levels of psychological distress. A cut-off of the summary score is used to identify the likelihood of having a mental disorder: 10–19 likely to be well, 20–24 likely to have a mild disorder, 25–29 likely to have a moderate disorder, and 30–50 likely to have a severe disorder. In this study, of 50 participants, 33 (66%) endorsed experiencing a substantial likelihood of psychological distress, with 12 (24%) likely to have a mild disorder, three (6%) likely to have a moderate disorder, and 18 (36%) likely to have a severe disorder (Table 1).

Table 1. Demographics of study participants (n = 50).

Gender	No. of participants n (%)
Male	7 (14%)
Female	43 (86%)
Age	**No. of participants n (%)**
18–24	1 (2%)
23–34	4 (8%)
35–44	16 (32%)
45–54	9 (18%)
55–64	11 (22%)
65–74	9 (18%)
Property Type*	**No. of participants n (%)**
Private Property (Individual Unit)	9 (18%)
Private Property (Subdivided Unit)	30 (60%)
Public Housing	7 (14%)
Subsidised Housing	1 (2%)
Transitional Housing	2 (4%)
Living Area*	**No. of participants n (%)**
Below 100 sq. ft.	14 (28%)
100–199 sq. ft.	17 (34%)
200–299 sq. ft.	8 (16%)
300–399 sq. ft.	5 (10%)
400–499 sq. ft.	3 (6%)
500 sq. ft. or above	2 (4%)
Occupation Status	**No. of participants n (%)**
Housekeeper	15 (30%)
Unemployed	14 (28%)
Salaried	20 (40%)
Retired	1 (2%)
Results of Kessler Psychological Distress Scale (K10)	**No. of participants n (%)**
Under 20 (likely to be well)	17 (34%)
20–24 (likely to have a mild mental disorder)	12 (24%)
25–29 (likely to have moderate mental disorder)	3 (6%)
30 and over (likely to have a severe mental disorder)	18 (36%)

Note: * One participant did not answer the question.

4. Results

4.1. Usage Patterns of Public Spaces

Seventeen frequently used public spaces were mapped by the participants during the mapping exercise (Figure 3). Large parks (five out of 17), indoor public spaces (five out of 17), and playgrounds or sitting-out areas (four out of 17) rank the top three among all the categories of public spaces. Nearly all of the district's large parks and indoor public spaces (e.g., municipal services buildings and shopping malls) were identified as popular public spaces by the participants, indicating a preference for spaciousness, greenery, and diverse facilities. Moreover, the frequently used public spaces are mostly concentrated in the district's centre. Many participants emphasised convenience as a key factor influencing daily routes and the use of space amid their heavy workload and long working hours. Findings further illustrate clear point-to-point travel patterns between necessary destinations, such as home and market (see Figure 4 for a travel route example extracted from the mapping analysis). Few participants would go beyond their utilitarian daily routines to visit new places. There is a general negative sentiment regarding the serious lack of public space in crowded SSP. Meanwhile, several spaces were seldom mentioned by the participants, such as the waterfront promenade and small sitting-out areas (see Figure 5, for example).

4.2. Encouraging Factors of Public Space Usage

4.2.1. Space and Nature

The mere presence of space is an attraction for most participants who live in a very small unit. Their desire to use public spaces is driven by depressing indoor personal space conditions. In some cases, participants only have a bed space where it is difficult for them to turn around or stretch their legs properly while seated. Going out is necessary and sometimes regarded as an emotional refuge. With space also comes the possibility to exercise and play. For children, open spaces are important for them to release energy. For adults, parks give them a space to pursue both active and passive activities, e.g., tai chi and dance.

Some public spaces allow access to nature, such as hills and larger recreation areas away from the urban centre. Participants enjoy better air quality, sunshine, and greenery in these open areas and express that such areas provide a place to breathe and rest, help calm their minds, and release stress amidst the "concrete jungle" (hyper-dense urban environment). Many participants mention that public spaces make them "feel better" and "happier":

> You feel different when you are outside, you can at least calm your mind, not only the birds, you can also hear the wind. I spend more time on the hill than at

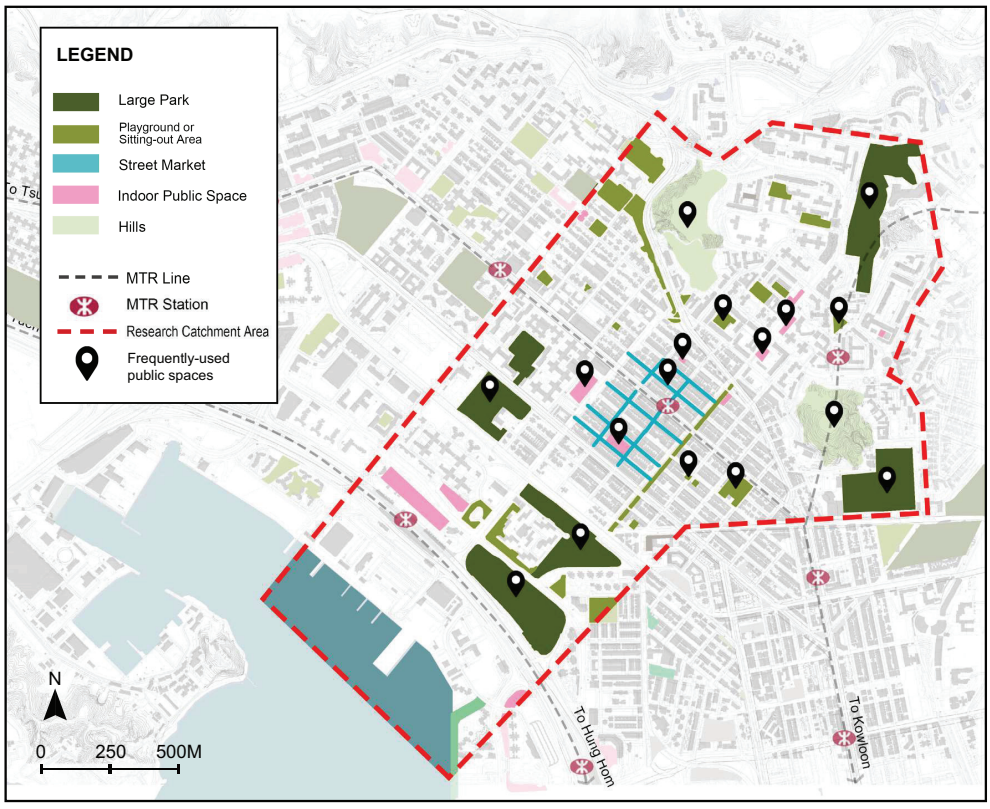

Figure 3. Map of public spaces in the research catchment area. Note: Black pins indicate 17 frequently used public spaces mapped by study participants during the mapping exercises.

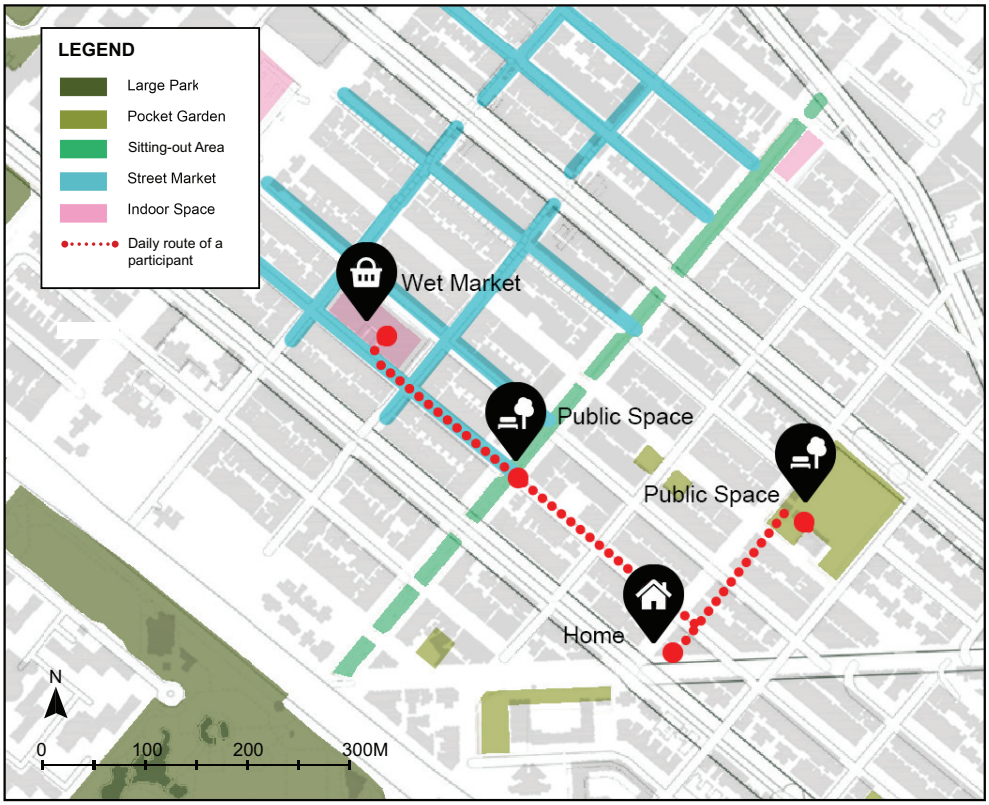

Figure 4. An example of a daily routine.

Figure 5. Example of an underutilised small sitting-out area.

> home. The air is better and it's spacious. My mood is better if I take a walk there. I feel bad when I stay home because my legs can't stretch….It's 60–70 sq. ft.

4.2.2. Caretaking and Socialising

For many participants, usage and choice of public spaces are driven by the needs and preferences of their children and senior family members. For instance, spaces with ball game facilities are preferred for children, while the availability of shaded seating and fitness equipment is important for the elderly. As for companionship matters, participants express the need and hope to enjoy public spaces with others, such as friends and grandchildren; it is unlikely for some to visit places alone, especially further ones. Public spaces facilitate socialising and meeting new friends, who potentially become part of participants' support networks.

4.3. Hindering Factors of Public Space Usage

4.3.1. Sense of Insecurity

Many participants feel insecure in the district and recall sightings of smoking, fights, illegal gambling, cigarettes and drugs trade, and sex businesses. Many female participants raise issues of male-dominated spaces, which they generally avoid. Middle-aged and senior local men often gather in groups and occupy huge parts of public spaces for a prolonged period of time to play chess, gamble, or smoke, leaving the impression of being unhygienic, sexually intimidating, ignoring rules, and engaging in illegal activities. A few participants recall accounts of being approached, intimidated, or harassed:

> My hands would turn cold; I'm so scared….I don't look at the pavilions where they play chess and smoke. I look at the exit in front of me….One day I went in by mistake. You must dash all the way to the end, so we kept running even though we were carrying a lot.

Participants (all ethnically Chinese) show strong concerns about the South Asian community. They observe that public spaces and streets in the study neighbourhoods are often occupied by big groups of South Asians and therefore feel scared and uncomfortable getting close to them. Some are particularly uncomfortable at night as the number of South Asian groups would increase, and many shops would be closed. Additionally, drug users and the homeless community also arouse mixed feelings. Some feel a sense of insecurity and try to avoid places where the drug users gather, but others are not intimidated.

4.3.2. Poor Hygiene and Management

The issues of rats, littering, dirty facilities, stinks, fleas, and bugs bother many participants. Public toilets are generally seen as unhygienic, and participants would rather rush home when needed. Insufficient cleaning in the parks, lack of management over users' behaviours, and the difficulty of seeking help are mentioned too. The high density of the district population and spaces amplify these issues, particularly during weekends with the influx of visitors.

4.3.3. Insufficient Accessibility

In addition to access to space, access to relevant information about the public spaces and facilities in the neighbourhood is an important issue. Many participants did not grow up in SSP, but they moved here for lower rents. Many are not aware of the available places and facilities in the area and have no idea where to find such information despite their need for space. Affordability also poses a concern for some participants who prefer free facilities and services.

4.4. The Impacts of Covid-19 and Related Containment Measures on Participants' Daily Life and Well-being

4.4.1. Livelihood

Thirty participants encountered a salary reduction during the pandemic, and of them, 19 shared that they faced economic pressure due to the loss of jobs (Table 2). The decrease in salary was mainly due to the reduction of part-time job opportunities, insufficient working hours, and the higher priority and time needed for childcare as schools were closed. Participants who worked as janitors reported a strong increase in workload due to a cut in the overall labour force and a heightened need to sanitise during the pandemic.

4.4.2. Reduced Outdoor Activities

As shown in Table 2, 80% of the participants' daily routine was affected by Covid-19; most of them reduced outings and frequency of grocery buying; instead, they preferred takeaways, avoided crowded spaces, and stayed home. About two-thirds (62%) of the participants reflect that the closure of public spaces affected the daily routines of themselves and their family members, with a great proportion agreeing that it led to the lack of recreational and personal space. Very few attempted to go to alternate public spaces. Participants are very concerned about hygiene and infection. Parents in this study generally did not allow their children to go out or would otherwise bring their own toys to avoid touching public facilities. Most public play equipment in parks and playgrounds was cordoned off anyway.

4.4.3. Personal Mood and Social Relationship

As mentioned previously, a substantial proportion (66%) of study participants endorsed psychological distress

Table 2. Impact of Covid-19 on participants' livelihood and daily life (n = 50).

Questions	Answers	Sub-Questions	Answers
Was your salary reduced?	Yes (n = 30, 60%)	Did you lose your original job during Covid-19?	Yes (n = 19, 63%) No (n = 11, 37%)
		Did you encounter the issue of inadequate working hours during Covid-19?	Yes (n = 19, 63%) No (n = 11, 37%)
	No (n = 20, 40%)		
Was your daily routine affected by Covid-19?	Yes (n = 40, 80%)	Reduce outings Avoid crowded public spaces Go to an alternate type of public space Stay at home mostly	Yes (n = 36, 90%) Yes (n = 30, 75%) Yes (n = 9, 23%) Yes (n = 31,78%)
	No (n = 10, 20%)		
Did the closing of public spaces affect your family and personal routines?	Yes (n = 31, 62%)	Lack of play space and recreational space Lack of space for leaning Lack of assistance to take care of children Lack of personal space	Yes (n = 24, 77%) Yes (n = 17, 55%) Yes (n = 4, 13%) Yes (n = 20, 65%)
	No (n = 19, 38%)		

during the pandemic. In particular, 62% experienced negative impacts on "relationships with family and friends," and 54% felt "loneliness" during the pandemic (Table 3). Many participants experienced huge fear of infection, the main reason why they reduced outings. Particularly, as schools and playgrounds were shut down, parents lost their only time to rest. They accumulated great stress concerning their children's learning progress, increased workload, and lack of rest. Moreover, participants expressed that the prolonged stay at home led to other problems, including boredom, uncontrolled eating, weight increase, dizziness, and lack of rest space.

4.5. Findings and Knowledge Production of the Co-Creation Workshops

During the co-creation workshops, group discussions revolving around the draft of the community map encouraged study participants to share information regarding where and how to access valuable public spaces and facilities. This experience-sharing helped establish participants' awareness of the relationship between the environment and well-being and enabled them to recognise, describe, and evaluate public spaces in their neighbourhood. The research team also planned to organise walking tours guided by the study participants to further empower them and spread spatial knowledge. Due to Hong Kong's ongoing restrictions on group gatherings in public spaces, this idea could not yet be realised.

In addition, feedback collected during the workshops provides insights related to information deemed useful and important by the participants and their preferred information distribution methods. Information regarding available facilities such as public toilets, Wi-Fi, charging stations, and charities were added to the map. Details of each public space (e.g., opening hours, facilities), descriptions of special streets, and historical assets were also added to the back side of the map. Participants mentioned that digital communication channels (e.g., WhatsApp), community centres, municipal buildings, and district councils are suitable places to distribute such information.

5. Discussion

5.1. Discussion of Results

5.1.1. Significance of Neighbourhood-Level Public Spaces

Study findings reveal that neighbourhood-level spaces play an important role as a living environment for the

Table 3. Overall impacts of Covid-19 on participants (n = 50).

Effects/number of participants N (%)	Exercising self-isolation/ social distancing	Loneliness	Buying daily necessities	Relationship with family and friends	Exercise
Positive	12 (24%)	2 (4%)	5 (10%)	3 (6%)	8 (16%)
Neutral	15 (30%)	13 (26%)	25 (50%)	13 (26%)	9 (18%)
Negative	18 (36%)	27 (54%)	18 (36%)	31 (62%)	23 (46%)
Not applicable	5 (10%)	8 (16%)	2 (4%)	3 (6%)	10 (20%)

studied vulnerable groups. Many participants mentioned that public spaces helped with stress relief and provided a place to breathe, rest, socialise, and pursue both active and passive activities as they generally cannot afford economically and timewise to venture further. Specifically, part of the improved mental well-being was a result of the different roles public spaces played in participants' daily life. However, during the pandemic, stringent social distancing rules meant that study participants had fewer options and thus more often stayed at home. Many participants reported that staying in cramped home living conditions all the time had led to detrimental effects on health, caused loneliness, and negatively affected the relationships with family and friends. While no direct and quantifiable relationship can be drawn, given the vulnerable group's undesirable living conditions and hence heavy reliance on public spaces for well-being purposes, the containment measures placing public space and facility access under strain might partially contribute to participants' heightened stress and anxiety during Covid-19. There is a need to factor in the significance of public spaces and their impacts on the mental health of vulnerable groups in future pandemic closure policies.

5.1.2. Gender and Ethnicity-Related Safety Perception of Space Use

While concurring with previous studies' emphasis on safety concerns (Liu et al., 2017; Zanon et al., 2013), our research further highlights gender and ethnicity-related safety perceptions of public space use. Apart from the quantity and quality of public space, the social fabric and environment, influenced by the intricate interaction and negotiation between different user groups, is a significant attribute to public space usage in an underprivileged area. This situation is even more salient in SSP as it is home to many disadvantaged people, mainland Chinese immigrants and ethnic minorities. There is also little sense of belonging as the district has a large transient community; many come for lower rents while waiting for public housing. Some participants felt inferior to others in the city and perceived they did not belong in nice parks and facilities. Gender concerns revealed in this study attest to how females are more often inhibited by safety concerns than males when using public spaces. This pushes them to a more vulnerable position regarding mental and physical health as they are less willing to spend time outdoors. Overall, our study findings indicate that, in addition to the spatial dimension, there appear underlying social norms affecting gender and ethnic groups' dynamics concerning study participants' public space use and experience.

5.1.3. Street Design

Overcrowding is another reason for the uncomfortable public space experience, a common problem in dense environments worldwide. With high density, city streets play a critical role in providing public open spaces and easing the crowdedness through strategies like traffic calming (Wen et al., 2020). Participants in this research often use public spaces along their utilitarian route. Enhancing street space, such as sidewalk widening, street greening, and micro-parks, might satisfy the need for a better sense of spaciousness and access to nature. Street space improvement has been applied as an affordable way to alleviate open space shortage (Do et al., 2018). Despite the long-lasting impacts of the pandemic, effective street design can limit the exacerbation of existing inequalities and challenges magnified by the pandemic (National Association of City Transportation Officials, 2020).

5.2. Discussion of the Participatory Action Research Process

PAR's ongoing nature facilitates communication, obtains an in-depth understanding of participants' thoughts, and enables trust-building among researchers, partner organisations, and study participants. This, in turn, leads to effective feedback on the research. The actual adoption of comments and iteration further enhances trust among the parties and improves coordination. Upon consolidation of information collected from the focus groups, a community map of public space was created to spread useful but often inaccessible and overlooked information about available open spaces and facilities in the district (Figures 6 and 7). It provided added values to foster explorations of co-created vision across a diverse group of participants using their different experiences and increasing their awareness of public space and services usage. A similar approach has been applied in other studies (Carpenter et al., 2021; Falco et al., 2019). In this project, the co-creation workshops were designed to share useful information about the local public space and empower the participants in mastering their surroundings through knowledge sharing and awareness building. Collaboration with Caritas was essential in conducting this study. Social workers' day-to-day contact with the clients and their frontline work led to unique observations, which set a foundation for research questions and design formation, enabled the recruitment of suitable participants, enhanced trust establishment with study participants, and facilitated focus group meetings and co-creation workshops.

Places undergoing remodelling and renewal often face state-led gentrification, displacement of vulnerable groups (La Grange & Pretorius, 2016), and elimination of the sense of community (Sullivan, 2007). Amid large-scale government-led renewal projects in SSP, the adoption of the PAR approach is of particular importance to engage overlooked vulnerable groups throughout the study to help cultivate a sense of community and collective action. Additionally, unlike case study research, PAR allows significant participation, in turn, raising awareness of public space, provoking participants to think

Figure 6. The co-creation workshop. Note: All participants provided consent for publishing their photos during the research activities.

about this seemingly unfamiliar issue, recalling experiences in urban environments, and envisioning their ideal public spaces. Empowerment also comes in the form of new knowledge and relationships, as participants become more familiar with their residential neighbourhoods and their spatial resources. We also observed information exchanges and bonding among the study participants during focus group discussions. This may encourage them to explore more of their neighbourhood surroundings and strengthen their sense of belonging and social capital.

Additionally, sharing in groups has led to confidence enhancement. Some participants expressed their joy of being listened to and felt surprised that their opinions were valued. Active participation in map co-creation offered an opportunity for participants to shape the output and enhance spatial competence and knowledge sharing. Participatory approaches play a crucial role in developing a sense of transformative agency among disadvantaged groups (Cameron & Grant-Smith, 2005). We believe that this study contributes to such agency formation of the participants. Overall, the concrete space-specific inputs build a solid foundation which may transfer as a cornerstone for further bottom-up spatial intervention in the neighbourhoods.

5.3. Study Limitations and Recommendations

Several limitations of this research should be noted. Primarily, all participants are Caritas' service clients prone to or affected by mental health conditions, and thus the results might not represent the general vulnerable population in SSP. Additionally, females comprise a predominant proportion of the sample and study participants were all ethnically Chinese. Opinions from male residents and other ethnicities would be of great importance for future research.

Our preliminary finding unveils insights that point to future research directions. First, study findings reveal the impact of inter-group tension in public space usage, raising questions about gender, ethnicity, and the competing interest and territoriality in space. Further investigation is suggested to gain a more thorough understanding of these groups' dynamics and their effects. Secondly, while our study demonstrates the application of using the PAR approach, its long-term impacts on disadvantaged urban dwellers with regard to implementing improvements and enhancing well-being are of great interest for future research. After discovering hindering and encouraging factors of public space usage in the study, we plan to continue building the relationship with study participants and Caritas to further co-design and implement improvements for SSP's neighbourhood-scale public spaces and enhance participants' spatial competence and knowledge sharing. Thirdly, although our research scope did not specifically focus on the challenges faced by families with underage children amidst the pandemic impact, with childcare being one of the main activities and concerns reported by the participants, future studies utilising the information of families with children would be very important as it influences participants' frequency and experience of public space

Figure 7. Community map.

usage. Lastly, insights in this study are mostly drawn from individual experiences in some public spaces. There is a need to further examine neighbourhood public space networks in their entirety, particularly the street spaces.

6. Conclusions

This participatory action research explores vulnerable groups' experience of public spaces and the impacts of Covid-19 in Hong Kong's dense grassroots district SSP. Public spaces prove to be essential for vulnerable groups from a well-being perspective. This is particularly true for those suffering from cramped and undesirable living conditions. However, factors like perceived safety related to gender and ethnicity, and the lack of information about available public spaces and facilities hinder the usage of public spaces, all overlooked issues in the neighbourhood. The adoption of PAR fosters awareness-building, confidence enhancement, and empowerment of vulnerable groups, which is fundamental for creating transformative agency and ownership. The production of a tangible outcome and the community public place map in this research significantly enhanced study participants' understanding of the research and its relevance, and facilitated their engagement in the group discussions. This study provides implications for public space and street planning in an Asian dense urban environment and points to future research directions in the dynamics of gender, ethnicity, and self-esteem, and the possible synergies within public space networks.

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Conflict of Interests

The authors declare no conflict of interests.

References

CABE Space. (2005). *Decent parks? Decent behaviour? The link between the quality of parks and user behaviour*. https://forestry.gov.scot/images/corporate/pdf/CABEDecentparksDecentBehaviour.pdf

Cameron, J., & Grant-Smith, D. (2005). Building citizens: Participatory planning practice and a transformative politics of difference. *Urban Policy and Research*, *23*(1), 21–36.

Carpenter, J., Horvath, C., & Spencer, B. (2021). Co-creation as an agonistic practice in the favela of Santa Marta, Rio de Janeiro. *Urban Studies*, *58*(9), 1906–1923.

Census and Statistics Department. (2018). *2016 population by-census—Thematic report: Persons living in subdivided units*. https://www.bycensus2016.gov.hk/data/16BC_SDU_report.pdf

Census and Statistics Department. (2021). *Table E2021A: 2021 population census—Main tables (demographic)*. https://www.censtatd.gov.hk/en/EIndexbySubject.html?scode=600&pcode=D5212101

Civic Exchange. (2018). *Open space opinion survey*. https://civic-exchange.org/wp-content/uploads/2019/01/Open-Space-Opinion-Survey-District-Info-Kit-EN.pdf

CUHK Institute of Health Equity. (2021). *Build back fairer: Reducing socioeconomic inequalities in health in Hong Kong*. https://www.ihe.cuhk.edu.hk/wp-content/uploads/Health-Equity-Report-01-1-1.pdf

Do, T. D., Mori, S., & Nomura, R. (2018). Passenger's attention behaviors along street space: A case study of Da Nang City. *Journal of Civil Engineering and Architecture*, *12*, 245–261.

Ettman, C. K., Cohen, G. H., Abdalla, S. M., Sampson, L., Trinquart, L., Castrucci, B. C., Bork, R. H., Clark, M. A., Wilson, I., Vivier, P. M., & Galea, S. (2022). Persistent depressive symptoms during Covid-19: A national, population-representative, longitudinal study of U.S. adults. *The Lancet Regional Health—Americas*, *5*, Article 100091. https://doi.org/10.1016/j.lana.2021.100091

Falco, E., Zambrano-Verratti, J., & Kleinhans, R. (2019). Web-based participatory mapping in informal settlements: The slums of Caracas, Venezuela. *Habitat International*, *94*, Article 102038. https://doi.org/10.1016/j.habitatint.2019.102038

Holttum, S. (2020). Research watch: Coronavirus (Covid-19), mental health and social inclusion in the UK and Ireland. *Mental Health and Social Inclusion*, *24*(3), 117–123. https://doi.org/https://doi.org/10.1108/MHSI-05-2020-0032

Hong Kong Young Women's Christian Association. (2021, October 17). *Survey reveals health as the major worry of underprivileged families in Sham Shui Po, and sounds warning bell on middle aged women's mental health* [Press release]. https://www.ywca.org.hk/Press/Survey-reveals-health-as-the-major-worry-of-underprivileged-families-in-Sham-Shui-Po-and-sounds-warning-bell-on-middle-aged-womens-mental-health

Hubbard, G., den Daas, C., Johnston, M., Murchie, P., Thompson, C. W., & Dixon, D. (2021). Are rurality, area deprivation, access to outside space, and green space associated with mental health during the Covid-19 pandemic? A cross sectional study (CHARIS-E). *International Journal of Environmental Research and Public Health*, *18*(8), Article 3869. https://doi.org/10.3390/ijerph18083869

Kan, Z., Kwan, M. P., Ng, M. K., & Tieben, H. (2022). The impacts of housing characteristics and built-environment features on mental health. *Interna-*

tional Journal of Environmental Research and Public Health, *19*(9), Article 5143. https://doi.org/10.3390/ijerph19095143

Kessler, R. C., Andrews, G., Colpe, L. J., Hiripi, E., Mroczek, D. K., Normand, S.-L., Walters, E. E., & Zaslavsky, A. M. (2002). Short screening scales to monitor population prevalences and trends in non-specific psychological distress. *Psychological Medicine*, *32*(6), 959–976. https://doi.org/10.1017/S0033291702006074

Ku, H. B., & Kwok, J. Y. C. (2008). Making habitable space together with female Chinese immigrants to Hong Kong: An interdisciplinary participatory action research project. *Action Research*, *6*(3), 261–283. https://doi.org/10.1177/1476750308094131

La Grange, A., & Pretorius, F. (2016). State-led gentrification in Hong Kong. *Urban Studies*, *53*(3), 506–523.

Larson, L. R., Zhang, Z., Oh, J. I., Beam, W., Ogletree, S. S., Bocarro, J. N., Lee, K. J., Casper, J., Stevenson, K. T., Hipp, J. A., Mullenbach, L. E., Carusona, M., & Wells, M. (2021). Urban park use during the Covid-19 pandemic: Are socially vulnerable communities disproportionately impacted? *Frontiers in Sustainable Cities*, *3*, Article 710243. https://doi.org/10.3389/frsc.2021.710243

Lingard, L., Albert, M., & Levinson, W. (2008). Qualitative research: Grounded theory, mixed methods, and action research. *BMJ*, *337*(7667), 459–461. https://doi.org/10.1136/bmj.39602.690162.47

Liu, H., Li, F., Xu, L., & Han, B. (2017). The impact of socio-demographic, environmental, and individual factors on urban park visitation in Beijing, China. *Journal of Cleaner Production*, *163*, S181–S188. https://doi.org/10.1016/j.jclepro.2015.09.012

Maas, J., Verheij, R. A., Groenewegen, P. P., De Vries, S., & Spreeuwenberg, P. (2006). Green space, urbanity, and health: How strong is the relation? *Journal of Epidemiology & Community Health*, *60*(7), 587–592.

Mehaffy, M. W. (2021). Health and happiness in the new urban agenda: The central role of public space. *Sustainability*, *13*(11), Article 5891. https://doi.org/10.3390/su13115891

National Association of City Transportation Officials. (2020). *Streets for pandemic response & recovery*. https://nacto.org/wp-content/uploads/2020/09/Streets_for_Pandemic_Response_Recovery_Full_20-09-24.pdf

Office of the Government Economist. (2020). *Hong Kong poverty situation report 2019*. https://www.povertyrelief.gov.hk/eng/pdf/Hong_Kong_Poverty_Situation_Report_2019.pdf

Park, P. (1999). People, knowledge, and change in participatory research. *Management Learning*, *30*(2), 141–157.

Poortinga, W., Bird, N., Hallingberg, B., Phillips, R., & Williams, D. (2021). The role of perceived public and private green space in subjective health and well-being during and after the first peak of the Covid-19 outbreak. *Landscape and Urban Planning*, *211*, Article 104092. https://doi.org/10.1016/j.landurbplan.2021.104092

Qi, H. D., & Gu, X. (2020). Older people and place-making in post-disaster community rebuilding: An interdisciplinary action research in Sichuan, China. *Action Research*, *18*(1), 48–68. https://doi.org/10.1177/1476750319884105

Rohrbach, B., Laube, P., & Weibel, R. (2018). Comparing multi-criteria evaluation and participatory mapping to projecting land use. *Landscape and Urban Planning*, *176*, 38–50.

Stringer, E. T. (2007). *Action research* (3rd ed.). SAGE.

Sullivan, D. M. (2007). Reassessing gentrification: Measuring residents' opinions using survey data. *Urban Affairs Review*, *42*(4), 583–592.

Tan, P. Y., & Samsudin, R. (2017). Effects of spatial scale on assessment of spatial equity of urban park provision. *Landscape and Urban Planning*, *158*, 139–154.

Tang, B. (2017). Explaining the inequitable spatial distribution of public open space in Hong Kong. *Landscape and Urban Planning*, *161*, 80–89. https://doi.org/10.1016/j.landurbplan.2017.01.004

Thompson, C. W., Aspinall, P., Roe, J., Robertson, L., & Miller, D. (2016). Mitigating stress and supporting health in deprived urban communities: The importance of green space and the social environment. *International Journal of Environmental Research and Public Health*, *13*(4), Article 440. https://doi.org/10.3390/ijerph13040440

UN-Habitat. (2020). *City-wide public space strategies: A guidebook for city leaders*. https://unhabitat.org/sites/default/files/2020/03/cwpss_guidebook_20200116.pdf

Wan, C., Shen, G. Q., & Choi, S. (2020). Effects of physical and psychological factors on users' attitudes, use patterns, and perceived benefits toward urban parks. *Urban Forestry & Urban Greening*, *51*, Article 126691.

Wang, P., Zhou, B., Han, L., & Mei, R. (2021). The motivation and factors influencing visits to small urban parks in Shanghai, China. *Urban Forestry & Urban Greening*, *60*, Article 127086.

Wen, L., Kenworthy, J., & Marinova, D. (2020). Higher density environments and the critical role of city streets as public open spaces. *Sustainability*, *12*(21), Article 8896. https://doi.org/10.3390/su12218896

World Health Organization. (2020). *Health inequity and the effects of COVID-19*. https://apps.who.int/iris/bitstream/handle/10665/338199/WHO-EURO-2020-1744-41495-56594-eng.pdf?sequence=1&isAllowed=y

Zanon, D., Doucouliagos, C., Hall, J., & Lockstone-Binney, L. (2013). Constraints to park visitation: A meta-analysis of North American studies. *Leisure Sciences*, *35*(5), 475–493.

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Article

City Models and Preventive Planning Strategies for Resilient Cities in Germany

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Abstract
In the face of the Covid-19 crisis, the city model of the new Leipzig Charter of the EU was re-evaluated. The existing urban development model of a mixed and compact city is to be mainly maintained because the urban density or building typology does not influence the spread of Covid-19. But the pandemic has made it clear how important green space and recreation areas are for inner city residential areas. This green space also becomes more important regarding climate adaptation measures to provide cooler air and ventilation. In the framework of the Leipzig Charter of the EU, the German ministry for building adopted the memorandum on Urban Resilience in May 2021. Resilience in this context means that we should not only repair the damage of disasters but also adapt to future crises and make our cities more resilient and sustainable. For this, we need to strengthen preventive strategies in urban development planning connected with urban renewal approaches and ask for extended city models. Planning shapes the future, including counteracting undesirable scenarios with preventive planning. In this sense, future planning and disaster control have common objectives—they take an interdisciplinary approach to prepare for future change, they want to anticipate and prevent danger, protect and expand the infrastructure, and serve the common good. In this article, I will point out how integrated urban development concepts should be extended with aspects of urban resilience, and which city models are important for the future.

Keywords
climate change; pandemic; planning models; urban planning; urban resilience

Issue
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1. Introduction

Cities are increasingly confronted with severe challenges simultaneously: extreme weather, migration, cyberattacks, disease pandemics, and attacks on critical infrastructure. Cities need to face acute short-term catastrophes, such as the Covid-19 pandemic, but also long-term chronic crises, such as climate change or demographic change. Climate change will have a major impact on cities with increasing temperature and water shortages; demographic development will change the social situation in the cities with aging and a shortage of skilled workers. Cities should not react to such different crises with single measures but with integrated urban development strategies and combined measures.

The unjustified war of Russia against the independent state of Ukraine since February 2022 shows how important it is to protect critical infrastructure, care for supply lines and maintain military services, and protect the idea of freedom and pluralism in the European city. To respond to all these challenges, we need an understanding of further risks and new planning instruments and governance models. Urban resilience means the capacity of a city to rebound, adapt, and transform itself into an improved rebuild structure. Urban planning has to respond to these challenges with preventive strategies to increase resilience and further develop mission statements and planning tools (Resilient Cities Network, 2022; UN Habitat, 2022).

Resilience is already a common strategy in many countries in Asia, Africa, and America, which are often hit

by natural disasters such as flooding, heavy rain, drought, or hurricanes. So far, Germany has been considered less vulnerable in the last decades because of its comfortable climate and lack of natural disasters. But the Covid-19 pandemic, as an unexpected natural disaster in 2020, has made it clear how German society can also be vulnerable, despite all its wealth and technical and medical progress. The urban planning system in Germany was not prepared to deal with such a disaster, and it should focus on preventive strategies.

2. Urban Planning Models and Challenges

2.1. Historical Development of Urban Planning Models

The often-criticized Charter of Athens from 1933 about modern urban development with green spaces and single-story buildings is to be understood in the context of its time. It contains statements on city hygiene and healthy cities—as a response to the Spanish flu, cholera, and other pandemics and diseases in the densely populated cities of the late 19th century. The change of the city model to a less dense and greener city is also to be understood against this background: health and urban space should be considered together, with larger building distances, improved infrastructure, and more open spaces. "Hygiene" is still an urban development deficit in the German planning regulation act ("Baugesetzbuch"), even if it is no longer used as a reason for urban renewal measures—it could now experience a renaissance (Baugesetzbuch, 2022).

Since the 1980s, the concept of a compact, socially, and functionally mixed city has been continuously pursued, with severe implementation deficits. The Leipzig Charter of 2007 of the EU emphasizes the concept of sustainable and integrated urban development and the support of deprived neighborhoods. Since 2020, the New Leipzig Charter has been supplemented by the model of the transformative power of cities as the common-good-oriented, green, productive, and just city. An important question is whether our current urban planning model is still up to the challenges of the future, facing climate change and natural disasters (Bundesministerium des Innern, für Bau und Heimat [BMI], 2020).

2.2. Challenges for Urban Development

The pandemic has revealed "new" challenges, e.g., in the prevention of danger, in health care, and in digitization. In many areas, however, it acts more like a magnifying glass, e.g., stationary retail, mobility change, or social inequality. Urban development policy must respond to this. Digitization, in particular, creates many opportunities and risks. Due to digitization and the pandemic, the increase in homeworking will change our urban structures significantly; there will be less demand for office buildings but more demand for working spaces in residential neighborhoods. At the same time, however, care must be taken not to neglect other fundamental challenges in view of the pandemic, e.g., in climate change, but also in mobility change, demographic change, and orientation toward the common good (Kunzmann, 2021; Kurth, 2020).

3. Urban Resilience As Part of the National Urban Development Policy

3.1. Memorandum Urban Resilience

In Germany, the objectives of the Leipzig Charter are implemented with the National Urban Development Policy ("Nationale Stadtentwicklungspolitik"). This policy includes expert groups, pilot studies and implementation with urban renewal projects, and also round tables about new developments.

As early as Spring 2020, the first expert workshops were held in this context to discuss the consequences of the pandemic on urban development from the ministry for housing. An independent expert advisory board was founded in the autumn of 2020, the recommendations of which were published in the memorandum urban resilience ("Memorandum Urbane Resilienz") in May 2021 (BMI, 2021). The author was the chairman of the advisory board. The memorandum is only based on this expert group; there was no attendant research about these topics.

3.2. Meaning of Urban Resilience

In the narrower sense of the word, "resilience" means springing back to the original state. For a long time, the concept of resilience was rarely associated with urban planning; it was considered too closely linked to passive reactions or to rebounding to the original condition. Resilience has also been linked to climate change, in the sense of climate adaptation: how to deal with extreme weather conditions and analyze vulnerability (Fekkak et al., 2016).

With the memorandum, the concept of "urban resilience" was newly introduced into the urban development policy of Germany. The term "resilient city" was deliberately not used to avoid a one-sided urban mission statement. The resilience strategy should be integrated into the overall objective of sustainable urban development. For this reason, the narrower concept of resilience as a rebound was expanded with two more dimensions: preventive adaptation to prevent or reduce the risk of future crises, and transforming urban spaces to build better after the crises. This understanding of urban resilience follows the UN Habitat (2022) definition.

In the face of natural disasters, politicians first switch to crisis mode to avert danger. Pragmatic solutions and accelerated planning processes are often called for to force reconstruction. But commonly, it is a lack of prevention and planning that leads to greater damage during disasters and makes reconstruction more difficult.

The response to crises such as pandemics or climate events should therefore be to include resilience aspects in planning instruments and to use them strategically across the board.

4. Elements of Urban Resilience

There are three main elements of urban resilience: the importance of preventive approaches, the meaning of neighborhoods, and building reserves at municipalities.

4.1. Increase in Importance of Preventive Approaches

The memorandum on urban resilience calls for an integrated, forward-looking urban development policy, consolidated at all spatial levels of nation, region, and municipality. This includes comprehensive analyses of the urban structure, especially regarding critical infrastructure, risk factors, and vulnerabilities, but also continuous socio-spatial monitoring of the social and climatic situation. By overlapping spatial risk assessments with social and demographic risks, focal points of action can be defined.

Preventive measures are required which mitigate or even avoid the consequences of the hazardous event, with a robust and crisis-proof design. For example, a retirement home located at a hot spot with a risk of overheating must be protected or relocated. This method of overlaying risk maps is already well-developed in climate adaptation concepts, with risk prevention measures for the green, blue, gray, and white cities.

4.2. Strengthening of Neighborhoods and Public Spaces

Since future damage events are usually not precisely predictable in space and time, redundant, robust, and flexible settlement structures and infrastructure are becoming increasingly important. Open spaces close to homes are becoming more important, as places of relaxation and health in the event of a crisis, as well as for improving the microclimate. With increasing levels of homeworking, improving the local supply and infrastructure in the residential areas is also necessary. The neighborhood level could become a "winner" of the pandemic, following the objectives of the compact city and short distances.

All in all, public space, in particular, is gaining in importance for multiple usage claims—it has no longer to be dominantly claimed by car traffic. In any case, major changes are expected in the mobility sector: electric mobility makes cars quieter and emission-free, and autonomous driving could lead to environmentally-friendly urban mobility. The citizens could reclaim the public space as a free space, a place for movement, meetings, gastronomy, and political demonstration.

4.3. Resilience Reserves in the Municipalities

To implement urban resilience strategies, the municipalities must first carry out their basic financial and personnel tasks, provide multiple usable infrastructures, and reserve space for crisis events. If several municipalities in Germany have been under budget plight for decades and cannot even have the sidewalk repaired, they will hardly be able to undertake comprehensive crisis prevention. However, sufficient municipal equipment is a prerequisite for being able to react to crises at all. The memorandum proposes a "competence center" for urban resilience and a "task force" to support affected regions in a crisis. The flood disasters in the summer of 2021 in Ahrtal in Western Germany showed how important such "backup units" would be: a task force of urban development with mobile homes and planning capacities.

5. Aspects of Resilience in Planning Tools and Planning Models

5.1. Planning Tools and Urban Redevelopment

The German planning system is mainly based on formal planning tools at the level of the municipality, such as land use plans and zoning plans following the planning regulation act ("Flaechennutzungsplan" and "Bebauungsplan" in Baugesetzbuch). These formal planning tools are combined with informal tools such as urban development plans or urban development funding programs. Aspects such as resilience, risk prevention, climate adaptation, and health must be linked much more closely with all planning tools in the future. They should become integral to the informal, integrated urban development concepts ("Stadtentwicklungskonzept"). In addition, they must be anchored in the formal urban land use plan—although numerous options for fixing them have long existed and only have to be implemented.

An important planning tool is the redevelopment law and urban redevelopment funding ("Sanierungsrecht" and "Staedtebaufoerderung"). Aspects such as climate adaptation, health, and hygiene are already explicitly mentioned in §§ 136ff Baugesetzbuch. However, unlike in the 1970s, this should not lead to extensive demolitions, even if this would be preventively and partially possible in particular areas with high risks (flood areas). Based on extensive urban analysis, specific redevelopment goals can be set in the redevelopment area. Supplemented by urban development funds, targeted measures can be implemented to strengthen resilience in the affected districts. With this set of tools, it would be possible to implement measures such as qualifying public space, realizing more green and blue infrastructure, and also demolishing selected buildings. The aspects of resilience have to be mandatory for all funding programs of urban development and urban planning tools—but they have not been implemented by the Federal government until now.

5.2. Extension of the Urban Planning Model

The Covid-19 pandemic affects all settlement structures equally, regardless of their density. Extreme weather

events can also affect all regions due to climate change. Studies on the impact of climate change on urban structures show that the planning model of the compact city serves both climate protection and climate adaptation—because it is efficient, robust, compact, and concentrated (Bundesinstitut fuer Bau-, Stadt- und Raumforschung, 2009; Knieling et al., 2012). So, it is not necessary to fundamentally question the objectives of the Leipzig Charter. However, it is therefore important to further develop the compact city model in the face of climate change and resilience to provide more greenery close to the home, greater risk management, and a qualified public space. This includes the multiple use of public spaces and the reduction of car parking facilities (Koeksalan, 2021; Rettich, 2021).

In the face of more home offices, overheating neighborhoods, and greater health awareness, it can be assumed that some city residents will move to rural areas. Because of the tense housing markets in the major cities in Germany, this could have a partial relieving function—but it could also be the starting point of a new wave of suburbanization. In the future, it will be important to focus on strong regional planning institutions to balance spatial inequalities.

6. International Case Studies of Urban Resilience

Germany has so far been less affected by natural disasters, so risk studies were considered less important than in other parts of the world. However, the pandemic has shown that it can affect all countries equally, and climate change also has global effects. The discussion about the memorandum on urban resilience made it clear that Germany needs a stronger international exchange of expertise on this topic. In the context of the Leipzig Charter and the National Urban Development Policy, appropriate international exchange formats should be established between the cities to learn from each other. Cities, especially in Asia, but also in the USA or the Netherlands, already have experience with resilience concepts that are integrated into urban development policy. A lot of them are connected in the resilient cities network (Resilient Cities Network, 2022). In the following, the two cities of Vienna and Rotterdam will be focused on as case studies (BMI, 2021).

6.1. Case Study: Vienna

Vienna has had a strong integrated urban development policy for decades. The "Smart City Vienna" framework strategy is about transforming the city to sustainability, combined with new challenges of digitization and climate change. The objective is to balance maximum resource conservation with a high quality of life for everyone in Vienna. Any form of innovation shall be supported to enable this transformation, including technical and digital innovations and social innovations. The strategy is accompanied by a large participation process.

There are 12 different target areas combined with the three target dimensions of climate protection and climate adaptation, gender and diversity, and social innovation. The strategy focuses on cross-cutting issues across all target areas. The concept relates to the 17 Sustainable Development Goals of the UN. Currently, the strategy is under development to integrate aspects of pandemic and resilience. Examples of implementation are mobility hubs to combine car traffic, public transport, and bike traffic to decrease car traffic and parking facilities in the inner city (Figure 1). Another example is the "Biotope city" (Figure 2), which combines a dense urban structure, energy efficiency, green facades, green roofs, and walkable public space (City of Vienna, 2022).

6.2. Case Study: Rotterdam

Because of the special location of Rotterdam in the delta of the Rhine and Meuse, and because it is an urban area that is almost 80% under the sea level, water

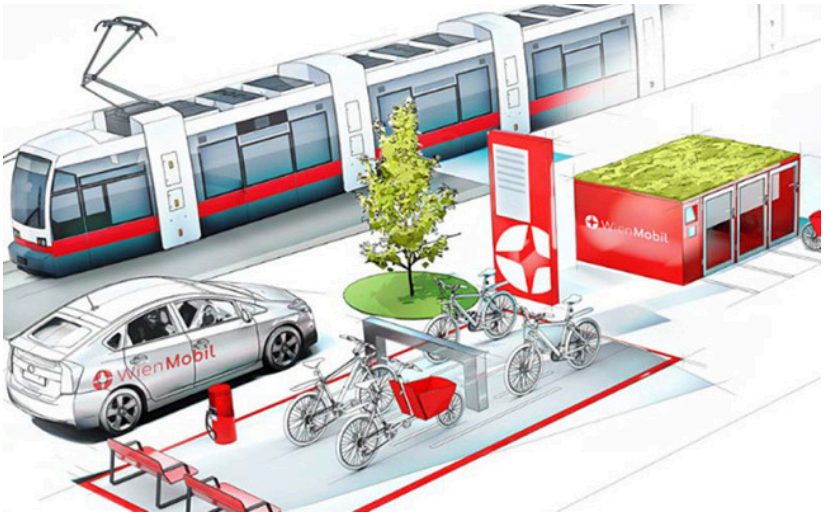

Figure 1. Mobility hub in Vienna. Source: City of Vienna (2022).

Figure 2. Biotope city in Vienna. Source: City of Vienna (2022).

management and climate adaptation play important roles in urban development. Rotterdam has an excellent resilience strategy that includes all aspects, from climate change to coastal protection and social consequences. Resilience is to become part of all city plans and all areas of everyday life. Especially in the field of urban planning, resilience must be constantly kept in mind. Rotterdam also announced its goal to become 100% climate-proof by 2025, when the city should be able to survive any extreme weather situation almost without any economic or social impact.

The main general objectives of the "action plan" are: a balanced society, a port with clean and reliable energy, a cyber port city, a climate adaptation strategy, retrofitting of infrastructure, a new social network, and anchors for resilience in the city. These goals are to be implemented by so-called actions. Examples are floating offices (Figure 3) or cyber protection for the harbor. Rotterdam's resilience strategy stands out in particular through its focus on water management and climate adaptation strategies. Because of its geographical situation, the city dealt with the consequences and possibilities of climate change at an early stage. But not just the adaptation strategies of urban development are in focus, but also the further development of society (Resilient Rotterdam, 2022).

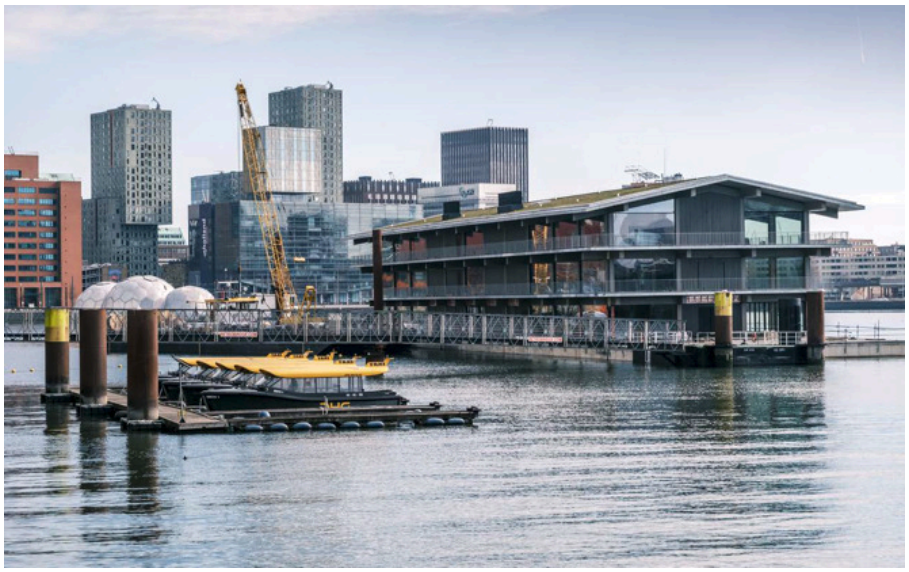

Figure 3. Floating offices in Rotterdam. Source: BMI (2021).

7. Conclusions

Especially in times of crisis, it is important to develop visions, and positive images of the future, based on current experiences. Only if there is an idea of a better city in the future can we have objectives for urban development concepts. In terms of sustainable urban development, future generations' interests must be considered in particular. Sustainability also means shaping future challenges in a socially balanced and economically viable manner. In terms of participatory urban development concepts, there is a need for visions of the future that are developed together and are reversible and flexible. The objectives of sustainable urban development and of the Leipzig Charter have to be extended with aspects of urban resilience, especially concerning pandemics and climate change.

The memorandum for urban resilience of the Federal Ministry of Housing defines resilience not only as a rebound but also as adaption and transformation, in the context of integrated urban development. But the memorandum has not been implemented until now: there have been no detailed criteria for measuring risks and vulnerability, and as yet, no change in planning tools and funding. The war between Russia against Ukraine makes it clear that there is an urgent need to implement the memorandum for urban resilience as fast as possible on all planning levels in Germany, but especially at the municipality level—as opposed to project-related incrementalism that ignores precautionary measures.

Conflict of Interests

The author declares no conflict of interests.

References

Baugesetzbuch. (2022). *Bekanntmachung vom 26.04.2022* [Announcement of April 26, 2022].

Bundesinstitut fuer Bau-, Stadt- und Raumforschung. (2009). *Klimawandelgerechte Stadtentwicklung* [Climate justice urban development].

Bundesministerium des Innern, für Bau und Heimat. (2020). *Neue Leipzig Charta* [The New Leipzig Charter].

Bundesministerium des Innern, für Bau und Heimat. (2021). *Memorandum Urbane Resilienz* [Memorandum Urban Resilience].

City of Vienna. (2022). *Smart Climate City Strategy Vienna*. www.smartcity.wien.gv.at/en/strategy

Fekkak, M., Fleischhauer, M., Greiving, S., Lucas, R., Schinkel, J., & von Winterfeld, U. (2016). *Resiliente stadt—Zukunftsstadt* [Resilient city—Future city]. Wuppertal Institut für Klima, Umwelt, Energie.

Knieling, J., Kretschmann, N., Kunert, L., & Zimmermann, T. (2012). *Klimawandel und Siedlungsstruktur* [Climate change and urban structure] (Neopolis Working Paper No. 12). Hafen-City Universität Hamburg.

Koeksalan, N. (2021). *Urbane Resilienz. Perspektive des Risiko—und Krisenmanagements* [Urban resilience. Perspectives of risk—and crisis management]. In Bundesministerium des Innern, für Bau und Heimat (Ed.), *Memorandum Urbane Resilienz* [Memorandum Urban Resilience] (pp. 16–17). Bundesministerium des Innern, für Bau und Heimat.

Kunzmann, K. (2021). *Was bleibt nach Corona?* [What remains after Corona?]. *PlanerIn*, *2021*(1), 9–11.

Kurth, D. (2020). Urban development strategies for resilient and sustainable european cities: Concluding remarks to the special issue. *disP-The Planning Review*, *56*(4), 122-124.

Resilient Cities Network. (2022). *Home*. https://resilientcitiesnetwork.org

Resilient Rotterdam. (2022). *About us*. www.resilientrotterdam.nl/en/rotterdam-resilient-city

Rettich, S. (2021). Space matters. In Bundesministerium des Innern, für Bau und Heimat (Ed.), *Memorandum Urbane Resilienz* [Memorandum Urban Resilience] (pp. 18–23). Bundesministerium des Innern, für Bau und Heimat.

UN Habitat. (2022). *Resilience and risk reduction*. https://unhabitat.org/topic/resilience-and-risk-reduction

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Detlef Kurth has served as a professor at the Technical University of Kaiserslautern, Chair for Urban Planning since 2017, and has previously been a professor at the University of Applied Sciences in Stuttgart. He has also been a visiting professor at the Universities of Cardiff in the UK, Krakow in Poland, and Hong Kong in China. His main research activities include sustainable urban development, energy-efficient cities, urban regeneration, social cities, self-driving cars, and new forms of mobility.

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Article

Greenery and Urban Form vs. Health of Residents: Evaluation of Modernist Housing in Lodz and Gdansk

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Abstract
Urban forms can have numerous direct and indirect effects on the health of residents. This article focuses on the relationship between health and urban form, in particular the role of green open spaces. The goal is to identify criteria for evaluating the impact of physical forms such as streets and open spaces, green infrastructure, and built structures on urban health. These criteria are then used to identify paths for the redevelopment of modernist housing estates with the aim of improving living conditions. This challenge remains particularly significant in Poland and Eastern Europe, where a large share of the urban population lives in modernist blocks of flats. First, we examine the modernist housing concept in Europe and Poland and the guiding principles for their development, including the role of green, open spaces. Then, we refer to several studies on urban health to identify normative factors that define the open space design conditions in modernist housing estates. We apply the typo-morphological approach with qualitative and quantitative assessment of building forms and forms of green open spaces to examine the structures of two modernist housing estates in Poland: Lodz and Gdansk. We evaluate their living conditions, especially the organisation of outdoor space, in terms of their impact on the health of residents. A comparison of the two housing estates reveals common factors defining the relationship between urban form and health.

Keywords
Gdansk; healthy cities; Lodz; modernist housing; Poland; urban form; urban morphology

Issue
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1. Introduction

The global discourse on the design of healthy cities emphasises the need to focus on both the health and well-being of citizens (World Health Organization, 2014, 2020). Recommendations for how to proceed can be found in numerous research articles, books, and documents published by international organisations (e.g., World Health Organization, 2020). Some of these works provide comprehensive guidelines based on research (Forsyth et al., 2017; Sarkar et al., 2014) and address a broad range of topics at neighbourhood, city, and regional scales. Some of the recommendations focus on urban form, others on the strategic process of adjusting the urban fabric to improve human well-being. One of the concepts that has attracted significant attention is the integration of green infrastructure in urban space, which is considered to play a principal role in improving living conditions (Forsyth et al., 2017; Marselle et al., 2019).

The founders of the modern movement also emphasised greenery and open space as elements contributing to urban health (Le Corbusier, 1943). This type of residential development became widespread in Eastern

Europe after the Second World War. It offered decent housing conditions to large numbers of urban residents. Modernist estates still satisfy the housing needs of a wide range of inhabitants in Eastern Europe. For instance, around 300,000 of the 664,000 inhabitants of Lodz (Poland) live in modernist blocks of flats (Statistics Poland, 2021). Polish housing estates support a diverse social structure and are not subject to the stigmatisation associated with similar developments in Western Europe (Szafrańska, 2013). However, due to their gradual deterioration, they are now in need of refurbishment and adjustment to changing societal requirements.

In this article, we apply a framework for evaluating a healthy environment informed by contemporary research and overlap this approach with the original modernist ideas. We look closely at the original ideas behind modernism. We then analyse their implementation and evolution over time in two Polish housing estates: Zgierska-Stefana in Bałuty (Lodz), and Przymorze (Gdansk). Both housing estates were built after 1971, during the period of industrialised, large-scale housing production. The analysed residential typologies followed some of the original concepts of Le Corbusier and Walter Gropius, in terms of scale, open space provision, and segregation of transportation. Since then, societal, political, and economic conditions have altered some of the original concepts. We trace these factors while examining the organisation of open space and look at their consequences on citizens' health. Our analysis enables us to verify how the original theoretical concepts were implemented in real life, and how they have been adapted to the housing market since the political changes of 1989–1990. Our purpose is to fill a gap in the existing research, by proposing a new approach to evaluating modernist housing estates in terms of whether and to what extent they provide healthy living conditions. Our primary research question is how modernist design assumptions overlap with healthy living conditions and, as a consequence, what recommendations might be made for the examined estates to improve the health of residents.

2. Research Background

The topic defined in this article fills a gap in the current subject literature. A literature search in Scopus using the keywords [(TITLE-ABS-KEY (housing AND estates) AND TITLE-ABS-KEY (health) AND TITLE-ABS-KEY (greenery)] returns a limited number of entries (eight). From this group, we excluded studies using IT-based methods and those focused on locations outside Europe. In the remaining five studies, one by Battisti et al. (2019) examined the health-related ecosystem services and disservices in Berlin, and another, by the same authors, considered ways of managing urban greening to improve the well-being of other European cities (Battisti et al., 2020). Kłopotowski (2017) looked at the evolution of green areas in housing estates. Schmid and Säumel (2021) examined perceptions of residential greenery in Berlin. Finally, He et al. (2020) used pedestrian-centred photographs to learn about the relationships between street greenery and the physical activities of elderly residents. The Polish studies that address issues related to the organisation of outdoor space in modernist housing estates deal with urban greenery (Skibniewska et al., 1979; Szulczewska, 2015) and forms of recreation areas (Lis, 2011). To the best knowledge of the authors, there are no previous studies focused on the overlap between the design principles of modernist housing estates and the concept of urban health.

2.1. Modernist Housing Estates: Design Principles and History

The aim of improving sanitary and living conditions in cities has been a focus for over a century. The idea of the role of access to green space was at the core of modern planning discourse from the very beginning (Le Corbusier, 1943; Mumford, 2018) and planning debates among the hygienist movement, as a reaction to progressive industrialisation, and resulted in the adoption of new building laws at the beginning of the 20th century. For example, in Berlin (Germany), a new construction law was adopted in 1925 which imposed the requirement of integrating more open spaces in courtyards. Another major goal was the building of residential estates to improve living conditions. This was also taken as an opportunity to look for ways to integrate greenery into urban areas. We can trace these objectives in the works of modernist forerunners, such as Tony Garnier's *Une Cité Industrielle*, drafted in 1901 and finally published in 1917. A synthesis of contemporary social and technical trends, the project proposed explicit functional zoning. In order to create appropriate living conditions, a continuous green space, open for everybody and containing all the necessary facilities, was to surround residential structures (Mumford, 2018, pp. 70–71). We find a similar discourse in American debates from the beginning of the 20th century, where ideas on how to deal with the decay of central cities proposed decentralisation of industrial development, improvements of traffic systems, and the introduction of greenery to the centres (Mumford, 2018, p. 122). The possibility of safe pedestrian circulation along with the provision of greenery was central to the design by Clarence Stein and Henry Wright for Radburn residential superblocks (Mumford, 2018, p. 130). Both concepts were adopted by modernist urbanism.

All these ideas influenced the important series of projects by Le Corbusier, starting from the "Contemporary City for Three Million" (*Ville Contemporaine*), his vision of future urban development published in 1922 in the avant-garde journal *L'Esprit Nouveau* (founded by Le Corbusier together with the artist Amédée Ozenfant). The concern to improve living conditions is visible especially in the form of the planned residential development, which included linear apartment blocks placed in park-like green settings as well as massive skyscrapers

containing offices, all served by various transportation modes: a system of roads, underground railway, and an airport (Mumford, 2018, pp. 148–149). Other architects belonging to the "modern movement" (the name used by Eric Mendelsohn in 1931), such as Jacobus Oud in the Netherlands and Bruno Taut in Berlin, designed large residential estates for workers applying the garden cities and Bauhaus ideas. However, unlike Le Corbusier's massive skyscrapers, these low-rise ensembles featured carefully organised green spaces. We find a continuation of the garden city emphasis on public access to green open spaces for recreation and social interactions in the works of Erst May.

All these ideas became key for the Congrès International d' Architecture Moderne (CIAM) and found full expression in its activities, especially in the Fourth Congress on the Functional City in 1933, which took place on board of the ship Patrice travelling from Marseille to Athens. The post-congress publication of the Athens Charter contained a clear message, which significantly affected the development of post-war cities (Le Corbusier, 1943). Its postulates emphasise the use of greenery to separate functional zones and as a tool to reduce the negative impacts of various adjacent activities. The introduction of vegetated areas aimed to loosen the structure of urban cores and satisfy citizens' needs for recreation (Solarek, 2015, p. 31). The founders of Modernism advanced these concepts, by looking for a balance between maintaining the proper density and open space provision. Walter Gropius promoted the construction of communal apartment buildings in the form of massive, multi-storey buildings set in large green open spaces, such as his proposal for an 11-floor slab high-rise for the Spandau district in Berlin (1928, unbuilt) or his famous diagrams published in 1929 presenting the relationships between the building heights, distribution, and the amounts of light and greenery between (Mumford, 2018, pp. 159–160).

Another concept modelled after the Plan for Helsinki of 1918 by Eliel Saarinen and Erich Gloeden was the introduction of green park strips, which divided districts while forming a continuous system and serving to reduce densities. Each semi-autonomous district would have its own centre, with a range of necessary services. The plan became influential; it found its reflection in the plan for Moscow accepted in 1935. This plan featured new housing estates with six- or seven-floor blocks of reduced densities compared to other Moscow districts (200 people per acre) and a full range of communal facilities, including mass transportation (Mumford, 2018, p. 168).

The post-war structures built in Europe tended to follow the path indicated by CIAM architects. Estates such as Churchill Gardens, Westminster, London, or Hansaviertel in West Berlin, replaced war-torn districts. They featured extensive green spaces and massive, widely spaced residential structures. During the 1960s and 1970s, large-scale housing complexes built with industrialised technologies spread out across Europe. Many of these structures were modelled after the Unité d'Habitation de Marseilles (1946) designed by Le Corbusier. In Poland, like everywhere in Eastern Europe, the modernist tradition also prevailed after the initial phase of post-war construction of neo-classical or socio-realistic residential complexes. Early projects, including Warsaw estates such as Rakowiec or Żoliborz, some of which were started before the Second World War, or Młynów, Muranów and Wierzbno (started in the 1950s), applied the concept of the so-called "social neighbourhood" developed by the Warsaw Housing Cooperative and Social Construction Company. These works, conducted during the Nazi occupation of Poland, continued earlier activities by the Polish Housing Reform Society, which from 1928 worked on the development of social housing.

In later years, Polish cities largely implemented the modernist approach, gradually introducing large-scale prefabricated concrete construction systems (Chomątowska, 2018). Eastern European cities continued a functionalist approach until the political transformation of the 1990s. High-rise buildings allowed the possibility of leaving vast open spaces, which were conceived as green areas compensating for the lack of nature in cities (Nyka, 2017). Greenery became widely recognised as an element serving to isolate functional zones, in the form of large open spaces or stripes accompanying streets and parking lots, protecting against the negative impacts of transportation. The share and dimensions of green isolating elements were defined in subsequent norms (1964, 1974, after Skibniewska et al., 1979, p. 13). For example, according to the regulation of 1974 defining the net size of green areas in multifamily housing, two conditions had to be fulfilled: Green areas should be 50% of the total net area or larger, and the amount of green area per resident should be more than 8 m^2 (Korzeniewski, 1989, p. 192). As a result, modernist housing estates often offer ample greenery but not necessarily spaces on a human scale (Solarek, 2015). The open space lacks organisation and definition into private, neighbourhood, semi-public, and public zones and facilities for pedestrians. There was also little consideration of human activity and the creation of spaces that could foster such activity (Skibniewska et al., 1979, p. 12), both in the physical dimension (environmental conditions), and through the shaping of an appropriate information sphere (the meanings of permanent and temporary elements of equipment). Another guiding principle was the location of recreational areas in direct proximity to the residences. As a result, the greenery accompanying housing structures was combined with green areas surrounding schools and recreational facilities. These conditions are the same as the requirements defined for walkable space.

2.2. Healthy Cities

Health benefits that stem from the provision of green spaces include urban cooling, physical fitness

opportunities, ecological education, improvement of water and air quality, and protection from traffic pollution (Hartig et al., 2014; Heerwagen, 2009; Schäfer et al., 2017; Wells & Rollings, 2012) and noise (Koprowska et al., 2018; Peris & Fenech, 2020). The presence of greenery also contributes to mental health, providing relaxation, reducing stress, and enabling mindfulness and various recreational activities (Alcock et al., 2014; Coon et al., 2011; Davis, 2004; Grahn & Stigsdotter, 2010; Gruebner et al., 2017; Hartig et al., 2003; Marselle et al., 2019). Greenery has beneficial effects on longevity and lowers mortality (Kühn et al., 2017). A variety of green spaces can form a system that creates opportunities for various users (Forsyth & Musacchio, 2005, pp. 3–5; Harnick, 2006; Maller et al., 2009). Moreover, overlapping and connecting variegated activities multiplies their benefits for specific users. Both parks and neighbourhood green spaces should be easily available for people with mobility problems and the socially excluded (Harnick, 2006, p. 57). Forsyth et al. (2017) defines normative guidelines for designs, which should consider the following features:

1. Access, both physical and visual. The optimum distance to green spaces should range from 400 to 800 m from all the premises in the residential estate. The proximity of public transportation can further increase access options.
2. Connections between green open spaces and recreational facilities should contribute to the system. These might include tree-lined streets, greenways, boulevards, and separate green trails or paths.
3. A variety of forms of both green and recreational areas should expand the range of available activities. Vegetated spaces may also provide other environmental benefits, such as water retention or community gardening. They can serve different users throughout the day, with various activities catering to the needs of multiple differentiated users.

The ways we use the environment are both the outcome of human evolution and the effects of socioeconomic, environmental, and cultural processes and factors (Appleton, 1975; Forsyth & Musacchio, 2005; Orians, 1986; Orians & Heerwagen, 1992; Wilson, 1984; Tveit et al., 2018; Zube & Pitt, 1981). As little as five minutes of outdoor activities per day is sufficient to improve our mental health, especially self-esteem and mood (Barton & Pretty, 2010). Research confirms that physical activities such as walking or running are considered more valuable when performed in natural conditions (Bowler et al., 2010, pp. 1–9). They provide more benefits in terms of stress reduction, raising mood, and energy levels (Coon et al., 2011), and improving some psychological disorders (Forsyth et al., 2017; Thompson, 2019). Environments that are safe from traffic and provide public spaces, recreational facilities, and greenery are especially suitable for young children (0–7 years old). This is confirmed by parental perceptions of the general physical health, emotional maturity, social competence, and cognitive and language skills of children (Christian et al., 2015, pp. 30, 33). In case of limited provision of open space, small pocket parks, rows of trees lining streets, and even views of greenery from windows can improve the well-being of residents (Brown et al., 2013; Forsyth et al., 2017; Tennessen & Cimprich, 1995; Ulrich, 1984). Table 1 presents selected forms of urban greenery using the millennium ecosystem assessment, a commonly recognised framework for evaluating the benefits of green infrastructure (Millennium Ecosystem Assessment, 2005).

Sarkar et al. (2014) examined the multi-scale associations between individual-level health outcomes and features of the built environment. They proposed a set of indicators that covers the neighbourhood-level

Table 1. Forms of urban greenery in residential estates versus their role and ecosystem services.

ES	Green infrastructure role/type	Urban parks, including pocket parks	Recreational facilities	Trails, paths, greenways	Tree rows, tree canopy	Greenery near buildings
P	Access resources	X		X		
R	Water retention, stormwater infiltration, cleaning	X			X	X
	Protection from heat	X			X	X
	Buffers from traffic/noise	X			X	X
	Climate mitigation	X			X	X
C	Physical activity	X	X	X		
	Socialising	X	X			
	Psychological wellbeing	X	X		X	X
	Safety from traffic			X		

Notes: ES—ecosystem services; P—provisioning services; R—regulating services; C—cultural services. Source: Authors' own work using the evaluation by Forsyth et al. (2017).

determinants of health, such as density and intensity, diversity, destination accessibility, street network morphology and connectivity, and access to public transit stops and stations, as well as active transport and pedestrian-oriented design. For the purposes of the present study, we initially narrowed the original rich methodology defined in their study to factors that refer directly to the physical environment:

- Factor N1—Density/intensity: Studies examining the associations between attributes of the built environment, health behaviour, and health outcomes employ diverse measures of density and intensity. Population density and residential density are the most common measures that correlate features of the built environment with active behaviour and, therefore, health. As the land use density increases, trip origins are brought closer to one another, resulting in greater accessibility to the service destination. High-density compact neighbourhoods shorten trip lengths and increase the number of trips.
- Factor N2—Diversity: Diversity or land use mix reflects the number of different land uses as well as their spatial arrangements for a given area, floor area, or employment unit. The more diverse the urban form, the more indirectly beneficial it is for active travel and physical activity, because of the reduced distances between facilities (Sarkar et al., 2014, p. 95).
- Factor N3—Destination accessibility (accessibility to green spaces, retail and recreational facilities, as well as local food environments): A healthy neighbourhood should strive towards optimised clustering of health-promoting community services at the local level (Sarkar et al., 2014, p. 102).
- Factor N4—Street network morphology and connectivity: The street network influences street level accessibility and shapes individual travel behaviour and physical activity. Dense urban grids comprising highly interconnected straight streets crisscrossing and at right angles are manifestations of archetypal highly connected networks.
- Factor N5—Access to public transit stops and stations and active transport: The use of public transportation options reduces reliance on private vehicles and has been associated with enhanced levels of physical activity, in the form of exercise through walking and subsequent health benefits.
- Factor N6—Pedestrian-oriented design: Several studies on physical activity have introduced measures of the pedestrian infrastructure and degree of road safety. Neighbourhoods with pedestrian-friendly design promote activity with potential benefits to physical and mental health.

In research on the availability of green areas, their proximity is an important indicator. When investigating the role of green in housing areas, Alexander et al. (1977) indicates that for a park to fulfil the intended recreational functions, its area should not be less than 0.55 ha. The availability of green spaces is expressed in terms of the distance people want to travel to them. Gajda (2015), using the method of pedestrian access isochrones, observes that the green area should be easily accessible on a daily basis, within 500 m from the place of residence. The several-minute time frame for reaching a park has been confirmed by Alexander et al. (1977), among others. Based on his research, Alexander et al. (1977, pp. 308–309) recommend to:

> Build one open public green within three minutes' walk – about 750 feet-of every house and workplace. This means that the greens need to be uniformly scattered at the 1500-foot intervals, throughout the city. Make the greens at least 150 feet across, and at least 60,000 square feet in area.

The methodology for the current study is based on the literature presented above.

3. Methodology: Quantitative and Qualitative Features of the Urban Environment Affecting Urban Health

In the present study, we started by defining a typology of built structures in the analysed neighbourhoods. This typology looks at the delimitation of morphological regions (Oliveira, 2016) characterised by specific parc, forms of architecture, and land use. Next, to define the method for the analysis in terms of ensuring health in the urban environment, we analysed the spatial determinants of health proposed by Sarkar et al. (2014, pp. 84–124) and other authors discussed above (Alexander et al., 1977; Forsyth et al., 2017). We overlapped these factors with the characteristics of modernist housing estates. Based on this analysis, we defined a collection of elements to examine more closely. Addressing the typology of open spaces, we distinguished three main classes:

1. Parking spaces with isolating greenery;
2. Recreational spaces;
3. Traditional urban streets.

In order to provide further categorisation, we overlapped these initial classes with the forms of open green spaces developed by Forsyth et al. (2017). We used the classification defined in Table 1 to understand and evaluate the forms of urban greenery present in the analysed case studies. However, the evaluation presented in the table is broader than the range of forms we can find in the analysed estates. We looked at the central angle values and dimensions of spaces between buildings, using the method for evaluation of outdoor spaces and enclosures defined in a classic Polish study by Wejchert (1984). We do not show the exact quantitative results here, but

they helped us to classify spatial types. We examined the activities taking place in the spaces following the above-defined typology. We looked at the relationships between forms of spaces and their usage, examined the behaviours of people using outdoor spaces, and assessed the availability of spaces for pedestrians. The results of these analyses are presented in a descriptive way.

The origins of the analysed structures can be found in the normative that functioned in Poland at the time when they were built (Skibniewska et al., 1979), as discussed in the previous section. To examine the densities (Factor N1; Sarkar et al., 2014,), we complemented the quantitative assessment by giving the values for the floor area ratio (FAR), building coverage ratio (BCR), and green area ratio (GAR) for spaces of the assessed estates. The GAR parameter was calculated based on a simplified equation dividing the green areas by the total size of the area. We also looked at distances to parks greater than 0.55 ha and at distances to bus/tram stops. In both cases, we verified the largest distance to the entrance of the farthest building. All the above observations provided the basis for transforming the outdoor facilities.

When preparing the graphical analyses, we used ArcGIS 10.3 for the Lodz case study and QuantumGIS for the Gdansk case study. The software and data availability affected the final form of the graphical analyses. Some discrepancies in the presented graphics might also stem from the usage of different data sets. In the case of the Lodz case study, we used data on the property structure, buildings, and land coverage from datasets provided by the Municipal Survey and Cartographic Documentation Centre in Lodz. In the case of the Gdansk housing estate, we used data provided by the Geodesy Department of Gdansk City Hall. Spatial data covering the network of park paths and pedestrian roads were downloaded from the OpenStreetMap website.

4. Case Studies: Housing Estates in Lodz and Gdansk

Large housing estates from the modernist era are an essential part of the structure of Polish cities. The selection of the housing estates in Gdansk and Lodz was based on the fact that they are similar in terms of size and urban structure (typology of buildings and open spaces). Modernist housing is the dominant type of structure in both estates, and they are both representative fragments of a larger and more complex district. Based on the analysis of the typology of the built structures, we distinguish various forms of modernist blocks. In addition, in the Lodz housing estate, we notice the presence of several remnants of traditional structures: historic 19th-century buildings which were left behind from the pre-war period. After defining the boundaries of the areas, we analysed selected case studies looking at the conditions identified as pertaining to urban health. All the observations and photographs were taken in May 2022. We repeated the observations five times for each of the housing estates, on both weekdays and weekends, in the morning and in the afternoon. The results generalise the collected observations.

4.1. Case Study in Lodz: Zgierska-Stefana Housing Estate in Bałuty

The post-war transformation of the Bałuty district in Lodz started immediately after the Second World War, in the period of socio-realism. The district, which initially developed as a suburb of Lodz, accommodated mostly poor inhabitants in quickly built, low-quality houses, with no sewage or water systems. The imposition of the Litzmannstadt Ghetto, which Nazi occupiers established during the Second World War, further contributed to the depletion of the local development. For these reasons, the communist government wanted to reuse the territory of Bałuty and create a new socialist district. The initial concept was created in the Warsaw Office of Workers Settlements (Zakład Osiedli Robotniczych) with Ryszard Karłowicz as the main designer. The whole territory was initially divided into six estates (Ciarkowski, 2018, p. 142). These initial units of the development followed socio-realistic rules, with buildings adjusted to the earlier street network. This was not the end of the redevelopment of the district. Further estates using modernist principles and prefabricated large-scale concrete building structures were erected until the end of the transformation period, and some development continues to the present day.

The housing estate Zgierska-Stefana (Figure 1) was designed in 1971–1972, and construction started in 1973. It was one of two large-scale housing estates built in the area at this time (Krystkowski, 2019). The building work lasted for over a decade. The design team representing Inwestprojekt included Leszek Paperz, Ryszard Daczkowski, and Andrzej Bohdanowicz. The prefabricated reinforced concrete systems Dąbrowa 70 and W-70 were used. The initial number of residents planned was close to 9,000 (“Osiedle Zgierska-Stefana,” 1971).

The Zgierska-Stefana estate is served by three arterial roads: Zgierska, Julianowska, and Łagiewnicka. On Zgierska and Łagiewnicka, there are tramway lines providing efficient communication to the centre of Lodz. Numerous buses travel along all three streets. The typology of buildings directly stems from the site’s history. Located in previously urbanised areas and built during a housing shortage, the blocks of flats with adjusting open spaces were located on available land between the already existing streets. The specificity of the local development led to the fragmentation of the urban structure. The site features both traditional, historical parcellations of the pre-war Bałuty and modernist organisation of space, with blocks of flats freely distributed in open space. Figure 1 and Figure 2 show the distribution of historical structures and modernist residential buildings. There are two main types: 11–12 storey buildings in a wave form isolating the development from surrounding arterial roads, and lower 4–5 storey structures located

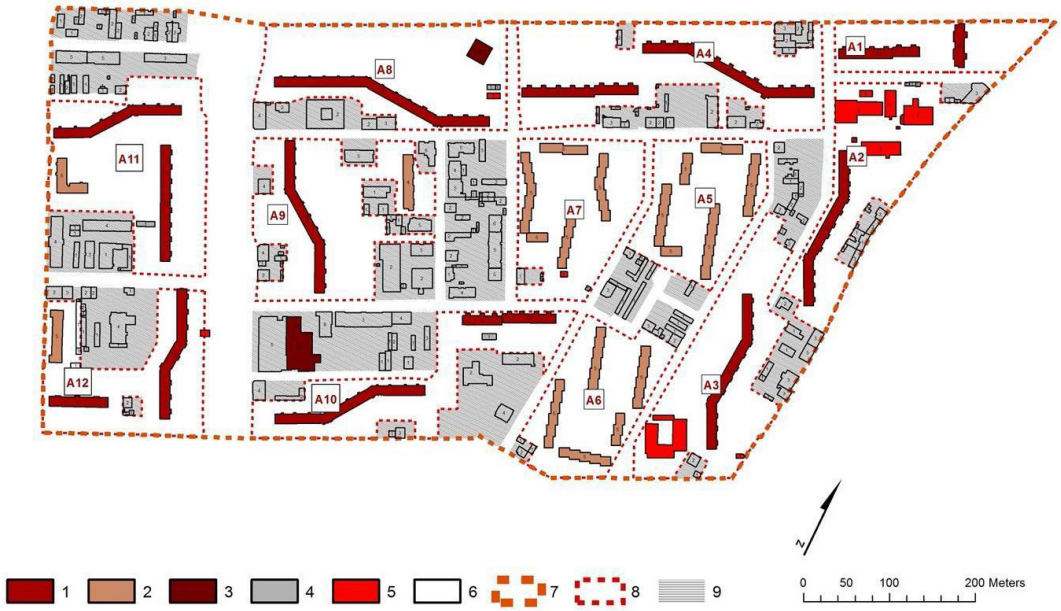


Figure 1. Typology of built structures of the Zgierska-Stefana estate, Bałuty, Lodz. Notes: (1) Twelve-floor wave blocks; (2) four- or-five-floor blocks of flats; (3) tower buildings; (4) auxiliary structures; (5) services, (6) buildings in the historical parts; (7) site limits; (8) historical development; A1–A12 are unit IDs.

inside. The configuration of historical streets strongly affected the layout of the buildings. Figure 1 also shows the units of development used in the quantitative analysis that follows. Figure 2 shows the analysis of open green spaces.

4.2. Case Study in Gdansk: Fragment of the Przymorze Wielkie Housing Estate

In the 1960s and 1970s, many areas located on the outskirts of Polish cities experienced intense urbanisation.

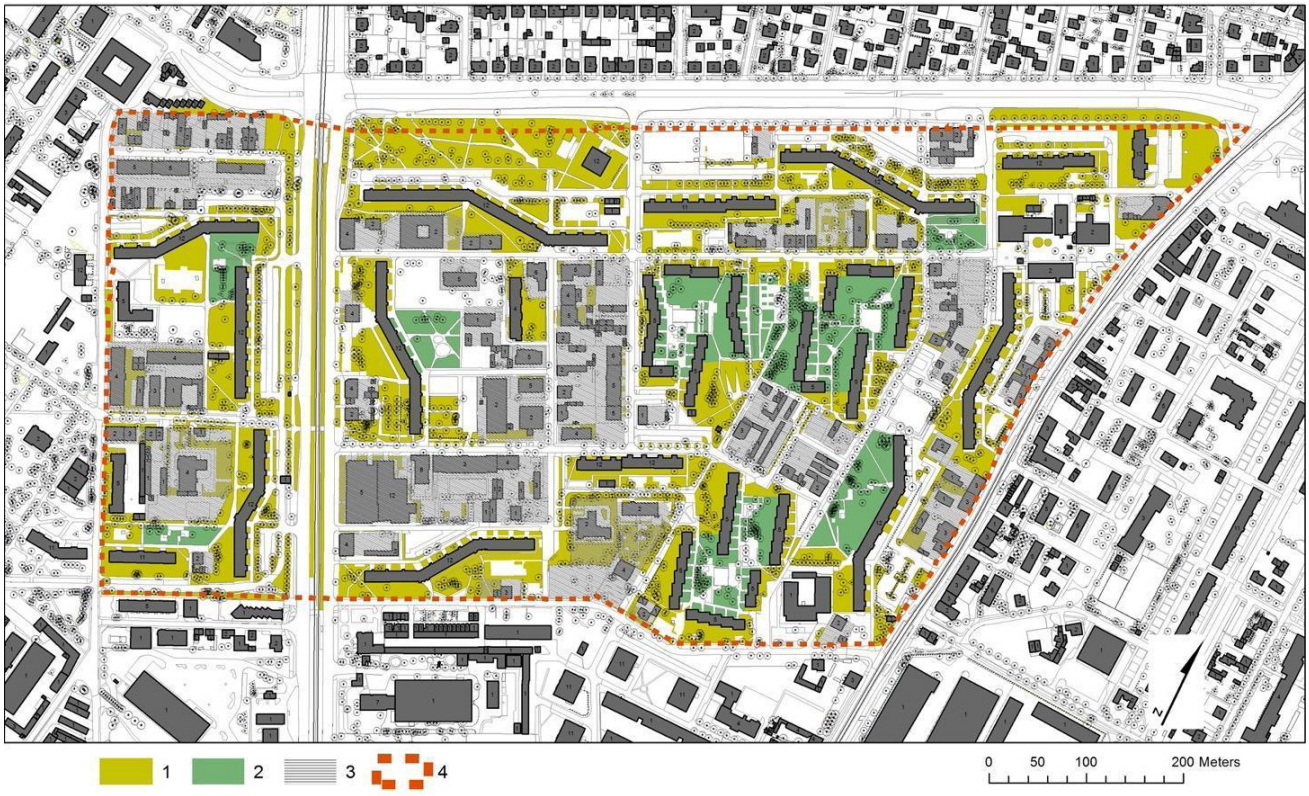


Figure 2. General layout of the Zgierska-Stefana housing estate with an analysis of the types of open green spaces. Notes: (1) Greenery isolating and accompanying buildings; (2) recreational spaces; (3) historical parcellation; (4) site delimitation.

Today, there is "an investment renaissance" in the modernist districts of Przymorze, Zaspa, Żabianka, and Morena (Rembarz, 2009). The Przymorze estate in Gdansk is 200 ha large and was designed for 50,000 inhabitants. In 1959, the SARP (Polish Republic Architects' Association) competition was held for the estate and the chosen design was created by Tadeusz Poznański, Józef Chmiel, Tadeusz Różański, Janusz Morek, and Danuta Olędzka. The final urban design of the estate was developed by Józef Chmiel and Tadeusz Różański.

The housing estate is divided into two parts: Przymorze Małe and Przymorze Wielkie. In Przymorze Małe, the development is dominated by low and medium-sized blocks of flats, with some single-family houses. Przymorze Wielkie consists of blocks of flats and Ronald Reagan's Park. The longest building in Poland, the so-called "wave building" (860 m long), is located on Obrońców Wybrzeża street. The whole district is called Przymorze.

The analysed area (limited by Rzeczpospolitej street, Kołobrzeska street, and Olsztyńska street) is characterised by diversified developments, mainly with a multi-family residential or service function. The housing development can be divided into 11-storey high gallery buildings (the so-called "wave buildings") and five-storey high multi-family sectional housing. There are also various services in the area: retail, religious, and educational. A characteristic element of the analysed area is the presence of green areas of various functions and forms: isolation and buffer greenery, recreational greenery, greenery accompanying multi-family housing (so-called "home gardens"), playgrounds, as well as sport and recreational areas. In addition, there is poorly maintained greenery in the area: large spaces of low greenery (e.g., lawns, in poor condition). Greenery is also an important compositional and functional element of the district. Green areas in Gdansk are valuable elements of green infrastructure. The analysed area has close access to a park (more than 0.6 ha in size) on the north side of the plot, a one-minute walk from the northern border. However, 24 out of Gdansk's 34 districts do not have a park of more than 0.6 ha in size within their borders (Korwel-Lejkowska & Topa, 2017).

Despite the fact that the analysed area is relatively rich in green areas (Figure 3), it is also filled with neglected green spaces, which lack a clear function (recreational, sports, or other). These areas are of different sizes, but, usually, they are relatively large in relation to the whole area. The analysed neighbourhood is very well connected by public transport. Bus and tram lines and the use of public transportation options reduce reliance on private vehicles. Destination accessibility (accessibility

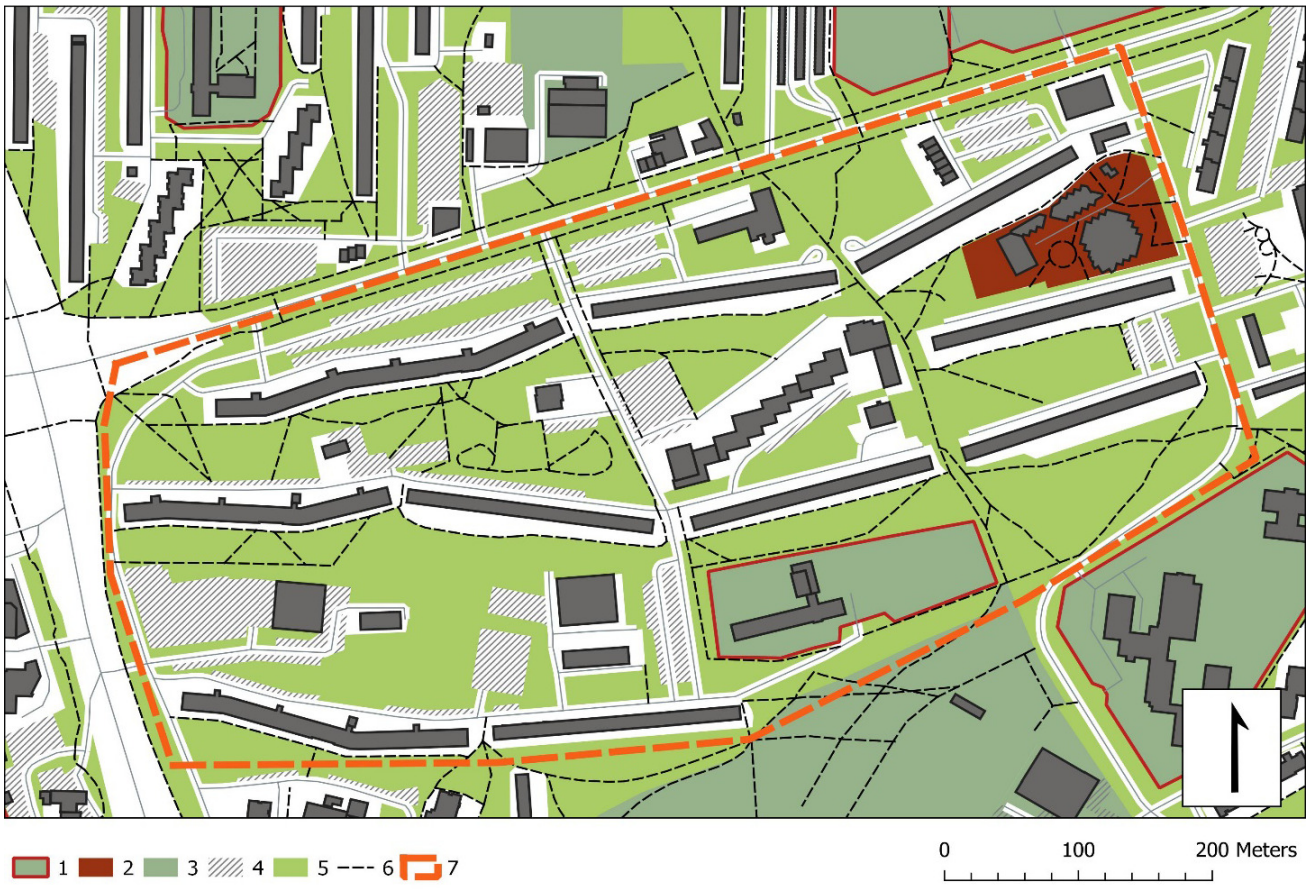


Figure 3. Analysed area of the Przymorze Wielkie housing estate in Gdansk with a schematic representation of green areas. Notes: (1) greenery isolating and accompanying buildings; (2) retail and recreational spaces; (3) fenced public facilities with greenery, (4) parking places; (5) greenery; (6) paths; (7) site delimitation.

to green spaces, retail, recreational facilities, and local food environments) is very good and encourages walking rather than driving.

5. Results and Discussion

In this section, we present the results of the analysis using the methodology defined in Section 3. We start from calculations of the FAR and BCR followed by analysis of the GAR. In the case of the Lodz site, we performed the calculations in sections (Figure 1 and Figure 4), which made it possible to differentiate between modernist and earlier traditional developments. In the case of the Przymorze estate, due to its homogeneity, we calculated values for the whole site and examined it as one entity. Because of this difference in approach, we excluded streets as a separate entity in the analysis of the Zgierska-Stefana estate in Lodz.

The results of the analysis of FAR, BCR, and GAR for the Zgierska-Stefana estate in Bałuty, Lodz, are presented in Table 2 and Figure 4. They show moderate values (from 0.7 to 1.9), which are typical for urban areas. In the case of the modernist development, the FAR results are accompanied by relatively low values for BCR, ranging from 12% to 23%. Whereas FAR is at similar levels for the traditional development, the BCR values are much higher (32.5%). The share of open green spaces reflects this. In the case of modernist development, the share of open green spaces ranges from 26% to 60%, whereas in the case of the historical development, the share is as low as 10%. In the studied area of Gdansk, the FAR is 0.5, BCR is 13%, and the GAR is relatively high at 38%.

A comparison of the two estates in Lodz and Gdansk shows that the one located in the historical district features higher overall BCR values, with relatively similar FAR values. The share of green spaces is higher for the

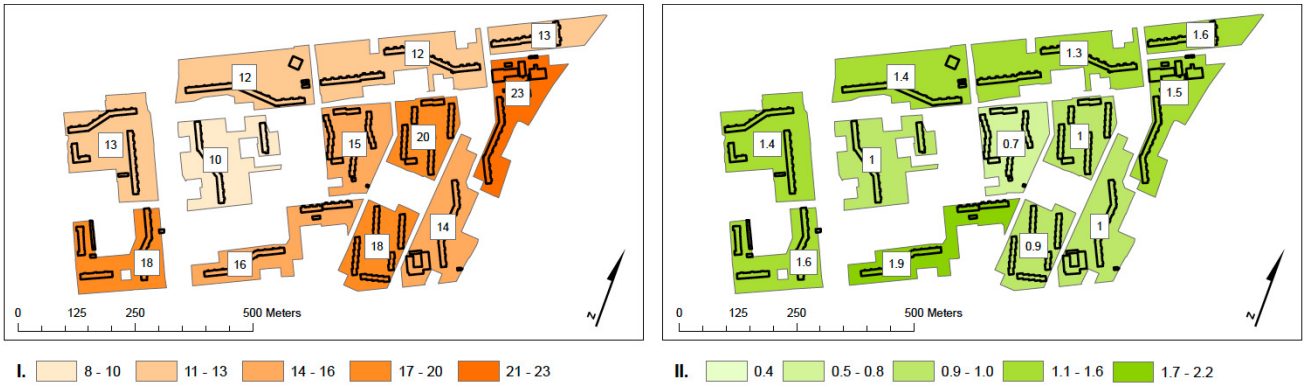


Figure 4. Results of analysis of (I) BCR and (II) FAR.

Table 2. Results of calculations of FAR, BCR, and GAR for both estates.

Zgierska-Stefana Estate in Bałuty, Lodz				
Field ID	Total area (m^2)	FAR	BCR	GAR
Streets	77,718	0	0	20
Historical development	117,067	0.9	32.5	10
A1	13,561	1.6	13	47
A2	23,710	1.5	23	26
A3	27,319	1	14	33
A4	34,836	1.3	12	36
A5	19,557	1	20	60
A6	20,049	0.9	18	54
A7	22,915	0.7	15	52
A8	30,258	1.4	12	55
A9	27,565	1	10	41
A10	21,314	1.9	16	44
A11	32,028	1.4	13	36
A12	22,448	1.6	18	43
Przymorze Wielkie in Gdańsk				
Field	Total area (m^2)	FAR	BCR	GAR
Area (including streets, buildings, and open spaces)	272,942	0.5	13	38

estate built on a greenfield site. These observations are consistent with those reported by Berghauser Pont and Haupt (2009). Whereas in both housing estates the green spaces contribute to the system, fulfilling the requirement defined by Forsyth et al. (2017) and Harnick (2006), the fragmentation of the Zgierska-Stefana estate in Lodz lessens the availability of a diverse recreational offer. On the other hand, in the case of the Przymorze Wielkie estate in Gdansk, the recreational options are limited by the spatial configuration and lack of sufficient equipment. A detailed analysis of the forms of green spaces and the activities available is provided in Table 3 and Figures 2 and 4.

In the case of the Zgierska-Stefana housing estate in Lodz, we distinguish the following types of open green spaces: recreational spaces with playgrounds; spaces of isolation and neighbouring greenery; and streets, usually historical, with rows of trees (Table 3). There is also a larger green area nearby (Table 4), which fulfils the condition defined by Alexander et al. (1977). The first type of open green space (recreational space with a playground) is usually located in the central part of the estate,

Table 3. Forms of open spaces.

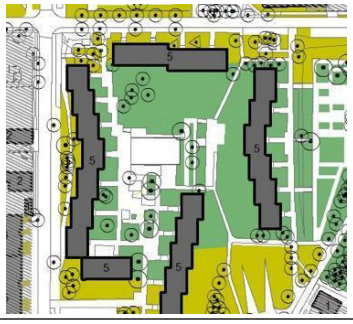
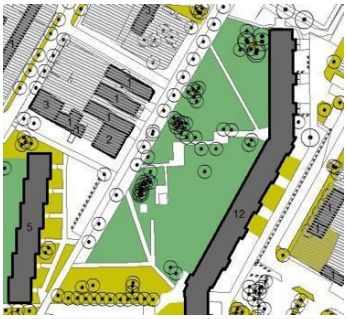
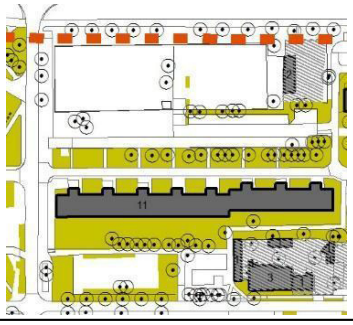
Zgierska-Stefana Estate in Bałuty, Lodz		
Type of open space	Plan	Photographs
Recreation: Playground and open space		
Recreation: Playground and open space		
Recreation: Playground and open space		
Isolation and parking		

Table 3. (Cont.) Forms of open spaces.

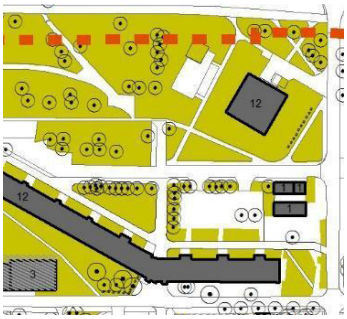
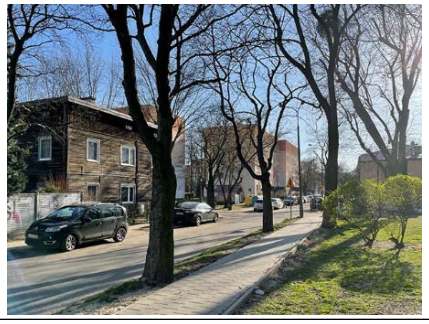
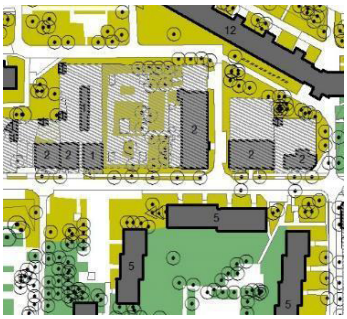
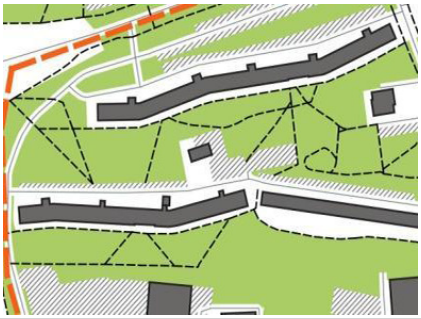
Zgierska-Stefana Estate in Bałuty, Lodz		
Type of open space	Plan	Photographs
Isolation and parking		
Isolation and parking		
Historical streets		
Historical streets		
Przymorze Wielkie in Gdańsk		
Type of open space	Plant	Photographs
Recreation: Playgrounds		

Table 3. (Cont.) Forms of open spaces.

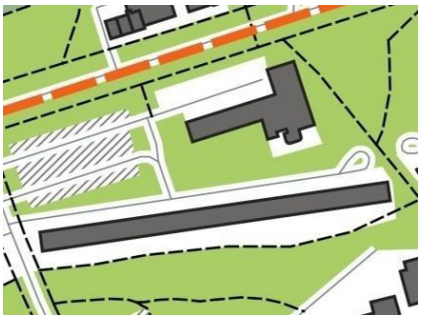
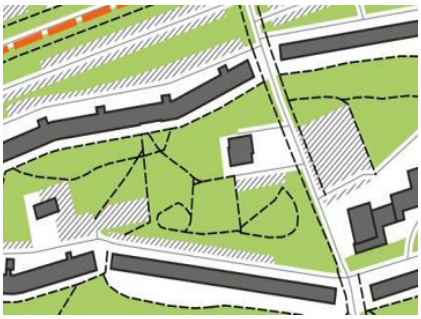
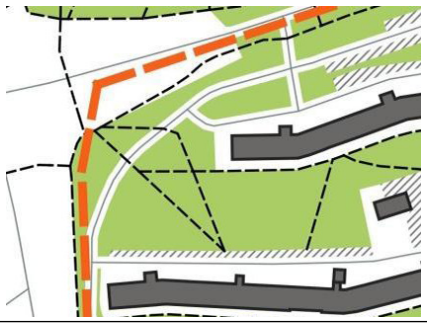
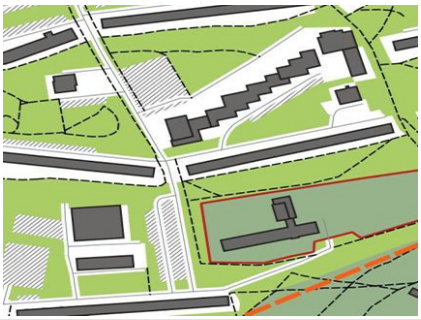
Przymorze Wielkie in Gdańsk		
Type of open space	Plant	Photographs
Recreation: Private gardens in multi-family housing		
Open spaces as semi-public spaces		
Open spaces as semi-public spaces		
Isolation and parking		
Parking and semi-green isolation spaces		

Table 3. (Cont.) Forms of open spaces.

Przymorze Wielkie in Gdańsk		
Type of open space	Plant	Photographs
Streets and pedestrian roads		
Streets and pedestrian roads		

isolated from traffic by surrounding blocks. Green spaces located more in the outskirts due to their parking function serve more for isolation from noise and pollution from surrounding streets. We noticed that people who use these spaces only rarely sit there or stop to spend time, contrary to how the more recreational sites in the centre are used. The recreational locations accommodate all age groups. Children and young adults often exercise there, and older people meet there to chat. The condition which is fulfilled in this case is linked to safety from traffic. Historical streets provide access and connectivity between other locations; they also offer a diverse range of services. Similarly to the rows of trees planted along many blocks, they provide pleasant views from windows and thus increase the psychological well-being of residents (Brown et al., 2013). Overall, we notice that while the provision of green open spaces in the modernist development is higher than elsewhere, its proximity to arterial roads and parking hinders the use of the green spaces for recreation. Locations in the outskirts tend to be overwhelmed by parking for cars, which increases the danger of accidents. In all, greenery in the modernist development could provide more positive outcomes for health if the parking issues are solved. This is feasible since public transportation is well organised and available in direct proximity to all the buildings (Table 4).

In the case of the Przymorze Wielkie estate in Gdansk, the forms of available recreation are more diverse, including playgrounds, sport facilities, and private gardens (Table 3). There are also enclosed spaces with private gardens, sports facilities (school areas), and playgrounds (fenced and unfenced). The John Paul II Park is in very close proximity (within a minute from the northern border), while bus and tram stops are within walking distance and well-connected to the area (Table 4). Unfortunately, the majority of green spaces lack a clearly defined function. The activities that take place in these spaces are congruent with the observations of Lis (2011)

Table 4. Distances to the closest facilities:Park and stops for public transportation.

Facility	Distance of the closest block	Distance to the most remote block
Zgierska-Stefana Estate in Bałuty, Lodz		
Julianowski Park	482 m	About 1 km
Tram/bus stop	36 m	360 m
Przymorze Wielkie in Gdansk		
Park of John Paul II	Approximately 50 m	950 m
Tram stop	350 m	900 m
Bus stop	94 m	650 m

for the larger housing estates in Wroclaw (for example, Polanka). However, due to the lack of specific context and necessary facilities, they are not used as frequently. Another feature of the space which diminishes its use for recreation is its vastness and a lack of a clear purpose. There are also extensive urban interiors, with many parking lots with or without green isolation. Diversity of functions is preserved, and we can define the area as a pedestrian-friendly environment (according to the factors defined by Sarkar et al., 2014).

6. Conclusions

In this study, we have compared two housing estates that fulfil many assumptions included in the CIAM Athens Charter, assessing their effectiveness in terms of residents' health. While similar in terms of the typology of buildings and scale, they differ significantly with regard to context. Following a methodology based on the current research on urban health, we looked first at the available green spaces, in terms of physical access, visual appearance, and system properties. Our primary focus was on recreational uses of green open spaces. We noticed that the scale, presence of necessary equipment, organisation of traffic and parking, and safety level affect the recreational potential of these spaces. Moreover, the placement of the Zgierska-Stefana estate in historical Bałuty in Lodz, without altering the previous development, has resulted in fragmentation of the space and, consequently, smaller sites for recreation and a reduced variety of available facilities and forms of greenery. Preserving the layout of historical streets enables cars to enter the estate, further reducing the availability of space for recreation. Green spaces located on the edges serve as isolation and complement the development. Nonetheless, the share of green space is higher than in the historic structures. Several studies have suggested that multi-unit dwellings and multi-storey housing have adverse implications on mental health (Sarkar et al., 2014). Green spaces have multiple benefits for promoting community health: providing pollution-free environments and providing spaces where individuals can relax with potentially positive effects on mental and physical health (Sarkar et al., 2014). The high values for GAR open up a whole range of psychological benefits and improve the well-being of residents. They also contribute to a range of ecosystem services, following the assessments given in Table 1 (Forsyth et al., 2017) and by Battisti et al. (2019).

Despite the high percentage of green areas in the analysed fragment of the Przymorze Wielkie estate in Gdansk, some of them are dedicated to a specific group of recipients (e.g., fenced playgrounds or school sports facilities), while others are large, poorly maintained green areas. Moreover, multi-family dwellings tend to be closer to busy streets and are exposed to higher levels of traffic and pollution, which also affect mental and physical health. However, accessibility to green spaces is high, which can potentially have a positive impact on mental and physical health. It should be emphasised that it is not only the quantity but the quality of green areas that largely determine their use, and, more importantly, their impact on health.

An important conclusion from our research is that the study of urban forms and the quality of open, green public spaces in terms of their impact on health should be approached holistically and in a wider context. This means that not only the amount of public space but, most importantly, all its form and multiple functionalities should be taken into account when designing urban spaces. Neighbourhood-level determinants of health, such as density and intensity, diversity, destination accessibility, street and passage network morphology and connectivity, access to public transit stops, and pedestrian-oriented design should be taken into account in order to create a healthy city. Together, these physical and socio-economic characteristics of the neighbourhood combine to play a significant role in defining the health of residents (Sarkar et al., 2014).

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Conflict of Interests

The authors declare no conflict of interests.

References

Alcock, I., White, M. P., Wheeler, B. W., Fleming, L. E., & Depledge, M. H. (2014). Longitudinal effects on mental health of moving to greener and less green urban areas. *Environmental Science & Technology*, *48*(2), 1247–1255. https://doi.org/10.1021/es403688w

Alexander, C., Ishikawa, S., & Silverstein, M. (1977). *Pattern language*. Oxford University Press.

Appleton, J. (1975). *The experience of landscape*. Wiley.

Barton, J., & Pretty, J. (2010). What is the best dose of nature and green exercise for improving mental health? A multi-study analysis. *Environmental Science & Technology*, *44*(10), 3947–3955. https://doi.org/10.1021/es903183r

Battisti, L., Pille, L., Larcher, F., Butenschön, S., & Säumel, I. (2020). Managing urban greening for improving well-being in European cities. *Acta Horticulturae*, *1279*, 59–66. https://doi.org/10.17660/ActaHortic.2020.1279.9

Battisti, L., Pille, L., Wachtel, T., Larcher, F., & Säumel, I. (2019). Residential greenery: State of the art and health-related ecosystem services and disservices in the city of Berlin. *Sustainability*, *11*(6), Article 1815. https://doi.org/10.3390/su11061815

Berghauser Pont, M., & Haupt, P. A. (2009). *Space, den-*

sity and urban form. TU Delft.

Bowler, D. E., Buyung-Ali, L. M., Knight, T. M., & Pullin, A. S. (2010). A systematic review of evidence for the added benefits to health of exposure to natural environments. *BMC Public Health*, *10*(1), Article 456. https://doi.org/10.1186/1471-2458-10-456

Brown, D. K., Barton, J. L., & Gladwell, V. F. (2013). Viewing nature scenes positively affects recovery of autonomic function following acute-mental stress. *Environmental Science & Technology*, *47*(11), 5562–5569. https://doi.org/10.1021/es305019p

Chomątowska, B. (2018). *Betonia: Dom dla każdego* [Concrete: A home for everyone]. Wydawnictwo Czarne.

Christian, H., Zubrick, S. R., Foster, S., Giles-Corti, B., Bull, F., Wood, L., Knuiman, M., Brinkman, S., Houghton, S., & Boruff, B. (2015). The influence of the neighborhood physical environment on early child health and development: A review and call for research. *Health & Place*, *33*, 25–36. https://doi.org/10.1016/j.healthplace.2015.01.005

Ciarkowski, B. (2018). Modernizm po drugiej wojnie światowej: Lata 1945–1989 [Modernism after the Second World War: 1945–1989]. In B. Ciarkowski & K. Stefański (Eds.), *Modernizm w architekturze Łodzi XX wieku* [Modernism in the architecture of Lodz in the 20th century] (pp. 125–200). Księży Młyn Dom Wydawniczy.

Coon, J. T., Boddy, K., Stein, K., Whear, R., Barton, J., & Depledge, M. H. (2011). Does participating in physical activity in outdoor natural environments have a greater effect on physical and mental wellbeing than physical activity indoors? A systematic review. *Environmental Science & Technology*, *45*(5), 1761–1772. https://doi.org/10.1021/es102947t

Davis, J. V. (2004). *Psychological benefits of nature experiences: An outline of research and theory with special reference to transpersonal psychology*. Unpublished manuscript. http://psichenatura.it/fileadmin/img/J._Davis_Psychological_benefits_of_Nature_experiences.pdf

Forsyth, A., & Musacchio, L. (2005). *Designing small parks: A manual for addressing social and ecological concerns*. Wiley.

Forsyth, A., Salomon, E., & Smead, L. (2017). *Creating healthy neighborhoods: Evidence-based planning and design strategies*. Routledge.

Gajda, M. (2015). *Strategia rozwoju terenów zieleni na obszarze podwarszawskiego trójmiasta ogrodów – etap II*. [Strategy for the development of green areas in the area of tricity gardens near Warsaw – Stage II]. GAJDA. http://bip.podkowalesna.pl/wp-content/uploads/2014/12/etap-ii-koncepcja-programowo-przestrzenna.pdf

Grahn, P., & Stigsdotter, U. K. (2010). The relation between perceived sensory dimensions of urban green space and stress restoration. *Landscape and Urban Planning*, *94*(3/4), 264–275. https://doi.org/10.1016/j.landurbplan.2009.10.012

Gruebner, O., Rapp, M. A., Adli, M., Kluge, U., Galea, S., & Heinz, A. (2017). Cities and mental health. *Deutsches Aerzteblatt Online*, *114*(8), 121–127. https://doi.org/10.3238/arztebl.2017.0121

Harnick, P. (2006). The excellent city park system: What makes it great and how to get there. In H. P. Rutherford (Ed.), *The humane metropolis: People and nature in the twenty-first century city* (pp. 47–60). University of Massachusetts Press.

Hartig, T., Evans, G. W., Jamner, L. D., Davis, D. S., & Gärling, T. (2003). Tracking restoration in natural and urban field settings. *Journal of Environmental Psychology*, *23*(2), 109–123. https://doi.org/10.1016/S0272-*4944*(02)00109-3

Hartig, T., Mitchell, R., de Vries, S., & Frumkin, H. (2014). Nature and health. *Annual Review of Public Health*, *35*(1), 207–228. https://doi.org/10.1146/annurev-publhealth-032013-182443

He, H., Lin, X., Yang, Y., & Lu, Y. (2020). Association of street greenery and physical activity in older adults: A novel study using pedestrian-centered photographs. *Urban Forestry & Urban Greening*, *55*, Article 126789. https://doi.org/10.1016/j.ufug.2020.126789

Heerwagen, J. (2009). Biophilia, health and well-being. In L. Campbell & A. Wiesen (Eds.), *Restorative commons: Creating health and well-being through urban landscapes* (pp. 39–57). U.S. Forest Service.

Kłopotowski, M. (2017). Evolution of greenery in housing estates. *IOP Conference Series: Materials Science and Engineering*, *245*(6), Article 062045. https://doi.org/10.1088/1757-899X/245/6/062045

Koprowska, K., Łaszkiewicz, E., Kronenberg, J., & Marcińczak, S. (2018). Subjective perception of noise exposure in relation to urban green space availability. *Urban Forestry & Urban Greening*, *31*, 93–102.

Korwel-Lejkowska, B., & Topa, E. (2017). Dostępność parków miejskich jako elementów zielonej infrastruktury w Gdańsku [Accessibility of city parks as green infrastructure elements in Gdansk]. *Rozwój Regionalnyi Polityka Regionalna*, *37*, 63–75.

Korzeniewski, W. (1989). *Budownictwo mieszkaniowe: Poradnik projektanta* [Housing construction: Design guide]. Arkady.

Krystkowski, T. (2019). Osiedla i zespoły mieszkaniowe z lat siedemdziesiątych i osiemdziesiątych XX w. Łódź w okresie PRL 09.04 [Housing estates and housing complexes from the 1970s and 1980s Łódź in the communist period 09.04]. In M. Koter & M. Dankowska (Eds.), *Atlas historyczny Miasta Łodzi* [Historical atlas of the City of Lodz]. Łódzkie Towarzystwo Naukowe.

Kühn, S., Düzel, S., Eibich, P., Krekel, C., Wüstemann, H., Kolbe, J., Martensson, J., Goebel, J., Gallinat, J., Wagner, G. G., & Lindenberger, U. (2017). In search of features that constitute an "enriched environment" in humans: Associations between geographical properties and brain structure. *Scientific Reports*, *7*(1),

Article 11920. https://doi.org/10.1038/s41598-017-12046-7

Le Corbusier. (1943). *La charte d'Athènes* [Athens charter]. La Librairie Plon.

Lis, A. (2011). *Struktura przestrzenna i społeczna terenów rekreacyjnych w osiedlach mieszkaniowych Wrocławia z lat 70–80. ubiegłego stulecia* [Spatial and social structure of recreational areas in the housing estates of Wroclaw in the 1970s–1980s]. Wydawnictwo Uniwersytetu Przyrodniczego we Wrocławiu.

Maller, C., Townsend, M., St. Leger, L., Henderson-Wilson, C., Pryor, A., Prosser, L., & Moore, M. (2009). Healthy parks, healthy people: The health benefits of contact with nature in a park context. *The George Wright Forum*, *26*(2), 51–83.

Marselle, M. R., Stadler, J., Korn, H., Irvine, K. N., & Bonn, A. (Eds.). (2019). *Biodiversity and health in the face of climate change*. Springer. https://doi.org/10.1007/978-3-030-02318-8

Millennium Ecosystem Assessment. (2005). *Ecosystems and human well-being: Biodiversity synthesis*. World Resources Institute.

Mumford, E. (2018). *Designing the modern city: Urbanism since 1850.* Yale University Press.

Nyka, L. (2017). From structures to landscapes: Towards re-conceptualization of the urban condition. In M. J. R. C. da Costa, F. Roseta, S. C. da Costa, & J. P. Lages (Eds.), *Architectural research addressing societal challenges* (Vol. 2, pp. 509–515). Routledge.

Oliveira, V. (2016). *Urban morphology: An introduction to the study of the physical form of cities*. Springer.

Orians, G. H. (1986). An ecological and evolutionary approach to landscape aesthetics. In E. C. Penning-Rowsell & D. Lwenthal (Eds.), *Meanings and values in landscape* (pp. 3–25). Allen and Unwin.

Orians, G. H., & Heerwagen, J. H. (1992). Evolved responses to landscapes. In J. H. Barkow, L. Cosmides, & J. Tooby (Eds.), *The adapted mind: Evolutionary psychology and the generation of culture* (pp. 555–579). Oxford University Press.

Osiedle Zgierska-Stefana [Zgierska-Stefana housing estate]. (1971, July 20). *Dziennik Łódzki*, *6*.

Peris, E., & Fenech, B. (2020). Associations and effect modification between transportation noise, self-reported response to noise and the wider determinants of health: A narrative synthesis of the literature. *Science of The Total Environment*, *748*, Article 141040. https://doi.org/10.1016/j.scitotenv.2020.141040

Rembarz, G. M. (2009). Gdańskie wielkie osiedla mieszkaniowe doby powojennego modernizmu i ich losy po 1989 roku [Gdansk'sgreat housing estates of the post-war modernism era and their fate after 1989]. In M. Postawka & P. Lorens (Eds.), *100-lecie nowoczesnej urbanistyki w Gdańsku* [100 years of modern town planning in Gdansk] (pp. 137–148). Oficyna Wydawnicza Adam.

Sarkar, C., Webster, C., & Gallacher, J. (2014). *Healthy cities: Public health through urban planning*. Edward Elgar.

Schäfer, K., Emeis, S., Budde, M., Beigl, M., Cyrys, J., Schnelle-Kreis, J., Philipp, A., Ziegler, V., Riedel, T., Grimm, H., & Gratza, T. (2017). SmartAQnet: Remote and in-situ sensing of urban air quality. In A. Comerón, E. I. Kassianov, & K. Schäfer (Eds.), *Remote sensing of clouds and the atmosphere XXII* (pp. 19-26). SPIE. https://doi.org/10.1117/12.2282698

Schmid, H.-L., & Säumel, I. (2021). Outlook and insights: Perception of residential greenery in multistorey housing estates in Berlin, Germany. *Urban Forestry & Urban Greening*, *63*, 127–231. https://doi.org/10.1016/j.ufug.2021.127231

Skibniewska, H., Bożekowska, D., & Goryński, A. (1979). *Tereny otwarte w miejskim środowisku mieszkalnym* [Open spaces in an urban residential environment]. Arkady.

Solarek, K. (2015). *Kształtowanie struktury przyrodniczej na tle koncepcji rozwoju I przekształceń współczesnego miasta* [Shaping the natural structure against the background of the concept of development and transformation of the modern city]. In B. Szulczewska (Ed.), *Osiedla mieszkaniowe w strukturze przyrodniczej miasta* [Housing estates in the natural structure of the city] (pp. 24–45). Wydawnictwo SGGW.

Statistics Poland. (2021). *Wyniki badań bieżących* [The results of current research]. https://demografia.stat.gov.pl/BazaDemografia/Tables.aspx

Szafrańska, E. (2013). Możliwości przekształceń wielkich osiedli mieszkaniowych w mieście postsocjalistycznym w Polsce [Opportunities for the transformation of large housing estates in a post-socialistcity in Poland]. *Studia Miejskie*, *11*, 39–53. http://cejsh.icm.edu.pl/cejsh/element/bwmeta1.element.ojs-issn-2543-5302-year-2013-volume-11-article-2611

Szulczewska, B. (Ed.). (2015). *Osiedle mieszkaniowe w strukturze przyrodniczej miasta* [Residential estate in the natural structure of the city]. Wydawnictwo SGGW.

Tennessen, C. M., & Cimprich, B. (1995). Views to nature: Effects on attention. *Journal of Environmental Psychology*, *15*(1), 77–85. https://doi.org/10.1016/0272-*4944*(95)90016-0

Thompson, R. (2019). The use of gardening and green space therapy in mental health is increasingly important. *Journal of Mental Health and Clinical Psychology*, *3*(1). https://doi.org/10.29245/2578-2959/2019/1.1173

Tveit, M. S., Ode Sang, Å., & Hagerhall, C. M. (2018). Scenic beauty: Visual landscape assessment and human landscape perception. In L. Steg & J. I. M. de Groot (Eds.), *Environmental psychology: An introduction* (pp. 45–54). Wiley. https://doi.org/10.1002/9781119241072.ch5

Ulrich, R. S. (1984). View through a window may influence recovery from surgery. *Science*, *224*(4647),

420–421. https://doi.org/10.1126/science.6143402
Wejchert, K. (1984). *Elementy kompozycji urbanistycznej* [Elements of urban composition]. Wydawnictwo Arkady.
Wells, N., & Rollings, K. (2012). The natural environment: Influences on human health and function. In S. Clayton (Ed.), *The handbook on environmental and conservation psychology* (pp. 509–523). Oxford University Press.
Wilson, E. O. (1984). *Biophilia: The human bond with other species*. Harvard University Press.
World Health Organization. (2014). *The urban health index: A handbook for its calculation and use*. https://apps.who.int/iris/handle/10665/136839
World Health Organization. (2020). *Healthy cities: Effective approach to a rapidly changing world*. https://apps.who.int/iris/handle/10665/331946
Zube, E. H., & Pitt, D. G. (1981). Cross-cultural perceptions of scenic and heritage landscapes. *Landscape Planning*, *8*(1), 69–87. https://doi.org/10.1016/0304-3924(81)90041-1

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Article

A Healthy City for All? Social Services' Roles in Collaborative Urban Development

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Abstract
There is broad consensus among policymakers about the urgency of developing healthy, inclusive, and socially sustainable cities. In the Swedish context, social services are considered to have knowledge that needs to be integrated into the broader urban development processes in order to accomplish such ends. This article aims to better understand the ways in which social service officials collaborate in urban development processes for developing the social dimensions of healthy cities. We draw from neo-institutional theories, which set out actors (e.g., social service officials) as acting according to *a logic of appropriateness*, which means that actors do what they see as appropriate for themselves in a specific type of situation. Based on semi-structured interviews with social services officials in 10 Swedish municipalities on their experiences of collaboration in the development of housing and living environments for people with psychiatric disabilities, we identified that they act based on (a) a pragmatic rule of conduct through the role of the problem solver, (b) a bureaucratic rule of conduct through the role of the knowledge provider, and (c) activist rule of conduct through the role of the advocator. In these roles, they have little authority in the development processes, and are unable to set the agenda for the social dimensions of healthy cities but act as the moral consciousness by looking out for everyone's right to equal living conditions in urban development.

Keywords
collaboration; healthy cities; psychiatric disabilities; social services; Sweden

Issue
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1. Introduction

Global as well as national policy objectives highlight the urgency to create healthy, inclusive, and socially sustainable cities (e.g., The Public Health Agency of Sweden, 2022; United Nations, 2015; World Health Organization, 2006) as well as to promote the development of healthy lifestyles and good quality educational, health, and care facilities. As health in urban areas has both a social and spatial dimension, it not determined by health policies per se but by other sectoral policies such as land use and social policies (cf. Barthel et al., 2021; Cristiano & Zilio, 2021). We believe that understanding the ways in which the social dimensions of health (e.g., equal access to adequate services and housing, as well as a sense of belonging and social connectedness), are addressed in urban development processes are important for achieving equal opportunity to live healthy lives.

Several researchers have emphasized the necessity of integrating health in planning at the local level across sectors and service providers for accomplishing such health objectives (cf. Barton & Grant, 2013; Cristiano & Zilio, 2021; D'Onofrio & Trusiani, 2018; Lowe et al., 2018; Sones et al., 2021). Such integrated planning situates health as a fundamental purpose of planning and relies upon local government sectors working together rather than alongside each other (Barton & Grant, 2013; Stead & Meijers, 2009). This represents a widespread shift from urban planning as a land-use-focused and regulatory activity towards more holistic planning that integrates and coordinates a number of policy concerns around a place (Vigar, 2009). The call for collaboration is aligned with requests for local governments to join up in coordinated efforts to solve societal challenges (Healey, 1997; Lowe et al., 2018; Nadin et al., 2021). Here the organizational culture of the public sector is portrayed as silo-mentality suffering from organizational inertia hindering local government's capacity to change and address complex societal challenges in new ways (Agger & Sørensen, 2018). Cross-sector collaboration, defined as "the linking or sharing of information, resources, and capabilities by organizations in two or more sectors to achieve jointly an outcome that could not be achieved by organizations in one sector separately" (Bryson et al., 2006, p. 44), does not come easy. Its success is dependent on the "soft institutional infrastructure of everyday practices, informal rules and cultures" (Vigar, 2009, p. 1573)—for example, differences in professional priorities, knowledge, and methods but also political goals between the sectors of urban planning and welfare (Berglund-Snodgrass et al., 2021; Larsen et al., 2014; Mourits et al., 2021). According to current Swedish legislation governing the social services formal assignments, social services are called upon to engage in broader urban planning questions to "foster good living environments in the municipality" (Ministry of Health and Social Affairs, 2001, Chapter 3, Section 1). The legislative remit is very broad and all-encompassing and also affected by austerity measures (cf. Kiely & Warnock, 2022), which, taken together, require social services to prioritize tasks and forms of work. During the last two decades, what is perceived as urgent individual cases (such as out-of-home care for maltreated children, individual placement, and support to people with severe mental illness), are set center stage at the expense of working strategically with structural and preventive issues such as field-based youth work, community work, and social planning (Meeuwisse et al., 2016; Sjöberg & Turunen, 2018). In the present time in Sweden and against the background of segregation and urban inequalities, as well as in the context of the Covid 19-pandemic, there is vivid public debate and discussions concerning the social services duties and potential roles for ensuring fair urban (re)development (cf. Sjöberg & Turunen, 2022). Swedish government investigations suggest that social services should participate to a greater extent in urban planning decision-making so as to allow for the development of socially sustainable living environments (Government Offices of Sweden, 2018, 2020).

The aim of this article is to examine if, and if so, the ways in which social service officials collaborate in urban development processes. We explore this by examining social service officials' experiences of collaborating in the development of housing and living environments for people with psychiatric disabilities (PD), i.e., people with serious and long-term consequences of mental health problems. People with PD are an often-neglected group of citizens but who equally need to be given spatial and social opportunities to live healthy lives and opportunities to recover (Friesinger et al., 2019; Högström et al., 2021). This group is quite small in numbers, but the group serves as a good example of society's priorities and abilities to care for all its citizens' health and prosperity (cf. World Health Organization, 2016), due to the many changes in institutional and community care as well as the stigmatizing processes this group has endured over time. The following research question organizes the study: What roles do social services officials adopt when collaborating in urban development processes? We approach this question by analyzing semi-structured interviews with social services officials in 10 Swedish municipalities.

2. A Neo-Institutional Theoretical Approach

This study draws from neo-institutional theory, which focuses on organizations not only as formal structures (e.g., administrations, hierarchical structures, offices) but as informal organizational structures, i.e., what officials actually do in an organization, including norms and identities (March & Olsen, 2009). Since we are interested in what social service officials do when collaborating in the development of housing and living environments for people with PD, we employ the term "role" to analytically capture their informal rules of conduct. Such rules of conduct are in this article understood to concern what is considered appropriate based on shared values and norms, including their professional identities (Currie & Spyridonidis, 2016; March & Olsen, 2009). To act according to *a logic of appropriateness* means that actors do "what they see as appropriate for themselves in a specific type of situation" (March & Olsen, 2009, p. 689). The logics operate as "frames of reference that condition actors' choices for sense making, the vocabulary they use to motivate action, and their sense of self and identity" (Thornton et al., 2012, p. 2). This means that social service officials identify situations based on their understanding of what is the correct and legitimate course of action (Eriksson-Zetterqvist, 2009). What they see as appropriate differs from situation to situation, where the individual civil servant can act according to different logics of appropriateness (Currie & Spyridonidis, 2016). Some situations may be experienced as difficult to know what is appropriate, and they can be full of ambiguous or

conflicting logics of appropriateness (cf. Mason & Evans, 2020). This includes assessing a situation to not act, or that others should act, or being faced with *situational constraints*, such as the status of the social service civil servant within the municipal organization, or political priorities (cf. Currie & Spyridonidis, 2016). Since a social service official can act according to multiple logics of appropriateness, the concept is a useful analytical device for examining rules of conduct in a collaborative setting (Mason & Evans, 2020).

2.1. Social Services and Rules of Conduct

Social work is a practice characterized by different forms of work, ranging from individual casework, community work, and societal work, which all can be preventive, reactive, or strategic in nature. Individual casework can, for example, consist of social workers reactively helping individuals in solving problems or difficulties individuals experience with, for example, their partners or children, or acting so as to prevent such problems occurring in the first place through family counselling (Fjellfeldt & Rokka, 2022). In community work, social workers are concentrating on interventions (reactive as well as preventive) linked to communities rather than individuals (e.g., fieldwork in socially disadvantaged areas; cf. Hansson et al., 2018). On the societal level, social workers are focusing on structural aspects, such as environmental, economic, and socio-political factors that may affect the social vulnerability of certain groups or individuals (Macassa, 2022). Providing politicians with homelessness registrations as an instrument to govern homelessness is one example of such societal social work on a macro level (Dyb et al., 2021). How civil servants are expected to act in these different types of work (individual, community, and societal work) may differ, but they are in many ways framed by professional rules of conduct (as taught in higher education, as well as developed in national associations of social workers), which includes both legislative and moral aspects (Hasenfeld, 2010). In terms of legislation, Swedish social workers are called in their work to promote three broad objectives, consisting of individuals' financial and social security, equality in living conditions, and active participation in community life (Ministry of Health and Social Affairs, 2001). Concerning people living with disabilities, social services should ensure people with PD are enabled to have the opportunity to live "like anyone else" (Ministry of Health and Social Affairs, 2001). This means social workers are guided by rather broad legislative objectives, making individual civil servants possess a high degree of organizational and professional discretion (Börjesson et al., 2021; Lipsky, 2010). In addition, social workers are subject to detailed national regulations in their executive functions, such as the national standard for income support (The National Board of Social Affairs and Health, 2020), which states the exact amount of money possible for social service officials to approve for a citizen who is applying for financial support. In terms of moral aspects, social workers are active interpreters and promoters of values such as "equality" and "justice," although sometimes these values may stand in conflict with personal convictions. For example, the moral obligation to help sex workers may stand in conflict with a social worker's own convictions that this type of work is immoral (Grönvall, 2022). There are, as such, overarching values pertinent to the social services profession at large, but moral rules (e.g., acting on behalf of specific user groups) may also develop among peers in a working group (Hasenfeld, 2010).

Taken together, Swedish social officials are expected to simultaneously act on various levels and on the basis of different rationales (such as preventive, reactive, and strategic). In these situations, social workers are faced with dilemmas concerning who and what type of work should get priority. During the last decades, urgent individual casework has at large been given priority at the expense of community work (Meeuwisse et al., 2016; Sjöberg & Turunen, 2018).

3. Research Approach, Method, and Material

The research approach is a qualitative interview study (Brinkmann & Kvale, 2018). We recruited key social service officials in 10 Swedish municipalities (labelled Municipality A–J) that, in various ways and in different positions, are working with everyday social services operations concerning the development of housing and living environments for people with PD. Altogether we carried out 25 semi-structured face-to-face interviews with 33 participants (cf. Brinkmann & Kvale, 2018) between February 2019 and February 2020. The selection of interviewees was exclusively from the social services and comprised eight heads of social service departments, eleven unit managers (e.g., disability, social psychiatry, elder care, economic support, housing), seven coordinators and strategists (e.g., within disability, supported accommodation, social psychiatry, housing support), and seven officials working in direct contacts with clients (e.g., housing supporters, case managers). This rather large material allowed us to identify a variety of situations and consequent roles that these officials experience, but it also provided a sense of empirical saturation, i.e., similar depictions of situations and actions repeatedly come up in the material.

Each interview was 30 to 60 minutes long, recorded, and transcribed verbatim. We applied the principles of informed consent, voluntary participation, and confidentiality. The interviews concerned themes such as the social services civil servants' experience of the extent and content of collaboration relevant to urban development concerning the target group (i.e., people with PD). This includes how they perceive their professional role and what they do and why in different situations. To substantiate our claims about the different roles we have identified, we refer to the empirical material in the analytical section of the article by selective illustrative

quotations as well as by direct reference to the municipal cases in the main body of text (A–J).

The analytical procedure is characterized by an empirical bottom-up inductive process, a so-called "pattern inducing interpretivist analysis" (Reay & Jones, 2016). This means that the social services officials' own experiences constituted the point of departure for analyzing social services' roles. The research group collaboratively read interview transcriptions several times, coded and delineated patterns, and identified roles by analyzing (a) the situations the civil servants working in the social services describe when collaborating in the development of housing and living environments for people with PD (*situations*), and further (b) how they reason around and legitimize their actions (*logic of appropriateness*), and (c) what perceived situational constraints they experience (*situational constraints*).

3.1. Empirical Context of People With Psychiatric Disabilities

People with PD, who are experiencing serious and long-term consequences of mental health problems, are an often-neglected group of citizens but who equally need to be given spatial and social opportunities to live healthy lives and, possibly, have opportunities to recover (Fjellfeldt et al., 2021; Friesinger et al., 2019). Historically, mental health care and support provision in the Western context is characterized by treatment, care, and management in particular institutional, spatial arrangements, often characterized by relatively sizable asylums isolated from the rest of the community (Högström, 2012). As these mental health care arrangements became subject to heavy criticism, a paradigm of deinstitutionalization in psychiatry began in the later part of the 20th century (Kritsotaki et al., 2016). Instead of providing isolated asylum-based care, the new paradigm of mental health care advocates care and support in community-based settings (Fakhoury & Priebe, 2007). In the Swedish context, one objective of the mental health care reform was to create preconditions for people with PD to have the ability to "participate in society and live like everyone else" (Ministry of Health and Social Affairs, 2001, Chapter 5, Section 7), and create opportunities for recovery (Government Offices of Sweden, 2012).

After having explicated the method and empirical material and procedure for analysis, we will now turn to the analysis.

4. Social Services' Roles in Developing Housing and Living Environments for People With Psychiatric Disabilities

In our empirical material, it is evident that providing housing (supported and ordinary) for people with PD is the main subject and reason for collaborating. This is perhaps not so surprising given that housing shortage is a major issue in Sweden, specifically the lack of affordable housing (Boverket, 2022). To all the social service officials in our interviews, this issue is one important question for enabling people with PD to have the possibility to recover. The importance of a dwelling of one's own (e.g., an apartment in the ordinary housing stock or in supported housing) is raised as a major point for the recovery process and equal health to take place. Housing thus stands out as a foundational dimension of people's ability to live independently, and to "live like everybody else," as the Social Service Act depicts (Ministry of Health and Social Affairs, 2001), and as such, housing comprises the backbone in the vision of a healthy city. But with little agency with regards to influencing these matters, advocating the need for affordable housing in urban development comprises the main activity of what social service officials do in these situations.

In addition to affordable housing at large, other subjects that social service officials engage in concern the location of new supported accommodations in urban developments. Here they have clear ideas of what their user groups need and make demands of proximity to public transport, meeting places, and other public services. In these situations, they experience that they are listened to, and their demands are taken into consideration in decision-making. Furthermore, social services officials describe that they, in these situations, also work to change attitudes and stigma of the user group, and promote acceptance and tolerance of diversity. Such work is reactive when it comes to dealing with individual cases, but they also work proactively in urban development processes by creating arenas for future neighbors to meet.

In these processes, the social service officials highlight that they experience many dilemmas in how they should act. For example, they explain that they have important and unique knowledge of the everyday life of people that can make a difference in decision-making in urban development processes, but they struggle to get attention, be invited, but also to know how to convey their specific knowledge to urban planners in these processes. The opposite kind of experience is also conveyed when social service officials express that they do get invited but are too stuck in the daily nitty-gritty work, and, therefore, experience that they cannot prioritize this work and thus miss the opportunity to influence the long-term development of healthy cities.

In the remainder of this section, we present the different roles that the social service officials adopt in urban development processes, which are entitled the problem solver, the knowledge provider, and the advocator (see Table 1 below for a summary of results).

4.1. The Problem Solver

A dominant part of the tasks that social service officials bring up in our interviews concerns acute problem-solving. Here, they emphasize every day as well as urgent situations that require them to work together with other municipal departments and actors in a speedy

Table 1. Summary of results.

Roles	Situations	Logics of appropriateness	Situational constraints
Problem solver	Urgent problem that needs to be dealt with that negatively affects people with PD	Pragmatism strategically	Unable to deal with problem
Knowledge provider	Knowledge is requested for decision-making in new developments	Bureaucracy Unable to prioritize	Differences in epistemologies
Advocator	Vulnerable groups have difficulties raising their voices in new developments	Activism	Lack of authority

and reactive manner, i.e., problems and tasks that need to be dealt with more or less instantly (Municipalities A, B, D, G, H, I, and J). The officials describe these situations as common to the social services and typical as well as at the heart of their formal remit of work. When solving problems, they are, for example, finding acute housing for a homeless family (Municipality H), coming to an agreement with landlords on how to manage a disturbing tenant in supported housing (Municipality I), or managing malfunctions in housing that negatively affects the wellbeing of the residents (Municipality G). In these situations, the individual citizen is the focus (e.g., a homeless person). The problem solver is seldom engaged in more long-term urban development issues, or broader strategic work, but rather recurrent "tinkering" activities in the everyday life setting centered on the individual, which can both take the form of reactive and proactive approaches.

When acting in these situations, the officials adopt the role of a pragmatic problem solver. This means that they are guided by an ethos of solving the issue at hand with the means available. In these situations, they are constrained by having to deal with the matter instantly (finding an apartment acutely), rather than having the opportunity to elevate and solve the problems strategically (e.g., developing affordable housing). In several of our interviews, the officials emphasize that they work in small and tight groups consisting of the different municipal sectors as well as landlords, with the objective of sorting things out and making sure that the individual will not be affected negatively (Municipalities A, B, D, G, and H). This is especially the case in smaller municipalities, where the distance between the organizations is small, and everyone knows each other. One interviewee states:

> We have meetings regularly where we meet the Technical Services Department, the political committee, the politicians, social services, and [the municipal housing company]. [They are partly about] if there is a need for different kinds of premises or if any problem comes up. [For example], an outbreak of fire where it was pointed out, simple but anyway, what shall we do so it won't happen [again], timers, and [things] like that. It is somehow everything from big to small in those meetings, right? On the whole, when one has a dialogue with each other, it is like this. (Head of social service, Municipality G)

The problem solver is engaged in confirming or negotiating types of action, as well as discussing various ideas with the objective of coming to mutual agreements or compromises. These actions include considering the individual's needs whilst not compromising the neighbors or landlords' interests. For example, in Municipality I, the interviewee describes how they managed a property owner's complaints on one of their clients' behavior by working to find a remotely located cottage as a new dwelling for the client instead of the existing flat in a neighborhood. This allowed the individual to avoid being involved in social situations with neighbors. Or, as in Municipality G, the interviewee states how the social service, in tandem with the housing company, managed to soundproof an individual's apartment to counteract complaints from neighbors. As one respondent states:

> We are collaborating a lot with the municipal housing company. When things happen, we get to know it immediately….We have regular meetings once a month….If we need an apartment, or if a service user disturbs [anyone], we discuss what we can do about it. (Head of social services, Municipality D)

Next to these situations where the social service officials negotiate points of action in a reactive manner are situations characterized by opportunities to proactively deal with emerging issues, e.g., to avoid complaints and rejection from neighbors in the first place. One such example is dealing with the potential stigma connected to locating a new supported accommodation for people with PD in an existing neighborhood (Municipality A). In this example, the officials dealt with the potential stigma pragmatically and organized an arena for the service user group and the existing residents to meet and understand each other's perspectives and thereby reduce the risk of future complaints. When acting proactively, the social

service officials aim to facilitate mutual respect between the existing residents and the new residents.

4.2. The Knowledge Provider

Another role, quite different to the problem-solver, is the knowledge-provider. This role is adopted in situations when officials working with urban development matters request in-depth knowledge and perspectives from the social services (Municipalities A, E, J, and H). Their knowledge is requested in instances of developing housing provisions programs, comprehensive plans, and prognosis of future needs of supported accommodation in urban (re)developments. The situations in which their knowledge is requested differ. For example, the social services are invited to share their specific experiences and perspectives when it comes to the need for a recovery process to take place, or the localization and spatial organization matters regarding supported accommodation in urban (re)developments. One respondent states:

> I used to be invited when we have a ready plot that will be planned, to meet together, depending on who is going to build…talk about the kind of accommodation, kind of people, what the plot looks like, how we think you should get there and from there. If there is something special that should be considered. (Social services facility planner, Municipality A)

In other situations when the social service officials engage in urban development processes on a strategic level (e.g., comprehensive plans and housing provision programs), the knowledge requested mostly concerns providing the urban development officials with demographic statistics, the prognosis of supported housing in the future, and specialized information of future needs of the target group (Municipalities F and J). Sometimes there are initiatives to establish spaces for collaboration, where perspective and knowledge can be shared reciprocally, for example, cross-sectoral groups with the task of planning and organizing housing for people with PD and other people with disabilities (Municipalities A, E, and H).

In several examples, the social service officials bring up that they do not share the same understanding of knowledge in urban development processes with that of other sectors (Municipalities A, F, H, and J). For example, what is considered appropriate for social services to address is not congruent with the focus of the urban development officials:

> My role has been to shed light on the social dimension in the city, like if the region should look like this, what do we need to think about? I think it has been really difficult because it's so related to everyday support. To me, it is about having confident and trained personnel on site, which is really difficult to raise in those contexts. (Head of social service unit, Municipality J)

The quotation above suggests that acting as a knowledge provider in urban development processes includes expectations to shed light on broader social questions on behalf of their organization's perspectives and values, which is deemed difficult for the social services to provide. When urban development officials want to talk about the spatial structures and their potential social implications, the social service officials want to talk about services and the possibility of having qualified personnel in everyday support. Social service officials do not appear to be used to considering the spatial dimensions of social matters at the level of the city or the region, as they have little training in thinking of such (Municipalities A, C, G, and J). Instead, the knowledge they do share is, to a great extent, about the needs of different groups (e.g., type of housing, the number of people needing housing in five to 10 years' time). However, what many interviewees underline, for example in the quotation below, is that they believe that they have unique knowledge of people's living conditions: "Again, we should be part of the planning of some areas, what we need here and now. I am not only thinking about our needs of housing generally, [but about] our knowledge of how life is for people" (Head of social services, Municipality J).

Although they believe that they have unique knowledge, they feel constrained in that there is no demand from the urban development officials for this type of knowledge nor opportunities to share such knowledge, unless it concerns the development of supported accommodation. In Municipality J, one social services unit manager expresses that she/he is invited to share knowledge with urban development officials but lacks confidence in such issues and chooses not to participate. At the same time, the head of social services in the same municipality expresses resignation about not even being invited to urban development discussions knowing they could contribute with important knowledge: "And there we have a job to do, to try to prioritize and take part. We get invitations and so, but there are not so often we actually can prioritize. Most often, other things go first" (Head of social service, Municipality I).

A substantial part of our informants wants to be invited to take part in the development of new housing areas (Municipalities A, C, E, F, H, I, and J), but they experience a heavy workload which makes it difficult to prioritize as the quotation above indicates. Taking part is perceived as a way to engage in their broader legislative remit of developing equal living conditions and a *healthy* living environment.

4.3. The Advocator

Next to the problem solver and knowledge provider is the advocator. In this role, the civil servants highlight their perceived moral obligations to speak and act on behalf of society's vulnerable groups, such as people with PD, in urban development situations in which these

group's interests and needs are unaccounted for. Several respondents highlighted the lack of resourceful representatives for people with PD, and that there are no influential service users or parent associations speaking on behalf of them. This makes the social service officials experience a moral obligation to act as a spokesperson for this group and to advocate their needs and interests, both internally within the social service administration and with other sectors such as the urban planning department (Municipalities A, C, E, H, I, and J). This is not because other municipal sectors specifically or deliberately neglect the group, rather they describe it as an effect of internal struggles within the social services where other vulnerable groups (e.g., people with neuropsychiatric disorders) have strong family members advocating for their kin: "As you notice, I am very engaged…[people with PD] are not that visible…their network is most often very, very small, so there is nobody [speaking for them], their voices are totally unheard" (Head of social service, Municipality E).

The call to act as a spokesperson for vulnerable groups is connected to a perceived professional duty to stand up for alternative values in urban development processes (i.e., affordability, inclusion, work opportunity, activities, and fairness; Municipalities A–J). The social service officials justify their advocacy by claiming what is good for the vulnerable groups is also good for society at large: "I am thinking what is good for [people with PD] is good for all" (Head of social service, Municipality I).

The specific urban development situation the social service officials repeatedly return to in the interviews when acting as an advocator is the precarious housing situation that the user group experiences. A situation they want to make planners and other decision-makers involved in urban development processes aware of. Two interviewees claim:

> We are struggling, of course, to keep rents down. And we try to remind them [urban planners] that we have to provide cheap accommodations….It is difficult because we are not building areas with only cheap apartments, but just to talk about it….When you plan, take into consideration that a new development is for all citizens. (Facility strategist, Municipality A)

> From social services, we tend to bring up that for us, it is important that there are accommodations that have lower rent, because it is difficult many times if you only have a pension and so forth, to cope with the rent. (Head of social services, Municipality C)

In the quotations above, the officials highlight their role in bringing up the question of a general need for affordable apartments in general urban development discussions, almost to remind the planners that the city is for everyone. Also, other interviews in other municipalities emphasize that they take on such a role (Municipalities A, C, and J). In these situations, the social service officials are constrained with no executive power, or the authority to prescribe actions that would remedy this unfairness, so they rather tirelessly act on the basis of their professional moral code and remind decision-makers and their collaborators of this general need.

In other instances, the social service officials experience that they are able to make demands when collaborating in urban development processes. These are situations characterized by formal collaborations between different municipal facility strategists, and social service officials experience that they have a stake and are able to influence the decisions. Also in these situations, they take on the role of a spokesperson for the group's specific needs. One example is to make demands for suitable plots for new supported accommodations that allow people with PD to access public transport and other services:

> Our goal has been to stay within a radius of 5 km from the city center, and it has worked quite well. The city is growing, so it gets harder and harder….They [development units] have really searched everywhere to find appropriate places. (Disability department facility strategist, Municipality A)

Access to public transportation is brought forward by several social service officials as an important aspect that enables the target group to maintain work, recover, and have the possibility to live independently and integrate into society. When making these demands, the social service officials support their arguments with the Social Service Act, which states that people with PD, as a group, should "live like others" in society. In one municipality, social services vetoed a proposal for locating a supported accommodation in a location that would make it difficult for the group to integrate into the community: "One of the suggestions was actually that it [accommodation] should be located far out in some forest area….I said that does not work, it is completely unsustainable. We should not isolate [people with PD]" (Head of social services, Municipality D).

In this quote, the social service official expresses a view guided by the official policy of independence and integration in the local community, but what also is visible is the voice of the advocator that speaks on behalf of somebody else.

5. Concluding Discussion

In this article, we have examined social service officials' experiences of collaborating in the development of housing and living environments for people with PD. Our point of departure was a neo-institutional perspective which sets out actors (e.g., social service officials) as acting according to a logic of appropriateness, which means that actors do "what they see as appropriate for themselves in a specific type of situation" (March & Olsen, 2009). Our analysis has shown that social service officials act according to three logics of appropriateness in

collaborative urban development, e.g., (a) a pragmatic rule of conduct through the role of the problem solver, (b), a bureaucratic rule of conduct through the role of the knowledge provider, and (c) activist rule of conduct through the role of the advocator.

The urban development situations in which pragmatism is the guiding norm are when the social service officials have to deal with urgent matters such as providing homes to acute homeless families but have little agency in elevating the matter to a structural level (e.g., building affordable housing). Here the officials are constrained to reactively deal with the situation at hand, whilst wanting to solve the problem strategically. When adopting the role of a problem solver, social service officials make use of their repertoire of skills as social workers in individual casework, i.e., proactive as well as reactive ways of working. When they collaborate with other officials from other sectors, it is to a great extent a mutual nonhierarchical work to solve specific problems.

The urban development situations in which the bureaucratic rule of conduct is the guiding norm are when the social service officials have to respond to queries from other sectors in the hierarchical organization. This could include queries for statistics or prognosis of the future need to build supported accommodation. In these instances, they uncomplicatedly provide the knowledge that is demanded. In other instances, when they are called to contribute with their knowledge and perspective in a broader sense, they feel constrained in how to share their knowledge in a meaningful way but also how to gain the attention of decision-makers about the needs in everyday life of people with PD.

Finally, the urban development situations in which an activist rule of conduct is the guiding norm are situations when they acknowledge that vulnerable groups have difficulties raising their own voices in the development of new housing areas. This includes activities such as advocating the interests of people with PD when locating new accommodations in an urban development project, but it could also include reminding the decision makers about general matters that are important for a fair, healthy urban development, for example, the need for affordable housing.

The analysis also shows that social service officials generally want to engage in preventive and strategic work in urban development but lack the confidence and an understanding of how to do so, as well as overall opportunities to do so. This is due to priorities within the internal organization of what is considered important in the social service at large, but also unclear expectations from the other departments about the specific knowledge of social service professionals. As has been concluded previously (Berglund-Snodgrass et al., 2021), it appears generally difficult to adopt and prioritize knowledge and experiences from social services in urban planning decision-making. The ways in which the social service officials act in these collaborative settings raise the question of if social dimensions in urban development processes could be more intentionally targeted and consequently gain more attention if social workers were guided by a more defined remit of work with regards to these issues. However, our study focuses on what social service officials working with matters connected to people with PD do in collaborative urban development processes and not as strategists with designated collaborative job functions. Our results should be considered against this background.

Although the social service officials in our material in many ways express difficulties in how to contribute to urban development situations, the advocator role they adopt is a long-standing issue in urban planning at large. Davidoff's (1965) seminal theory on advocacy planning from the 1960s set out the need for a pluralistic and inclusive planning process where urban planners should seek to represent the interests of various groups within society. The theory recognized that all stakeholders are not equally represented and involved in urban planning decision-making, which may risk leaving the groups of lower socioeconomic status unheard and unaccounted for. Sager (2022) highlights how the task of the advocacy planner today is often to help reverse a downward economic and social spiral and tends to concern questions such as economic development, housing eviction, and access to green space. In our material, the social service officials take on such a role and duty in urban development by acting as a spokesperson for vulnerable groups. They are, for example, pointing out what groups are not benefiting from various developments but also demanding spatial arrangements that vulnerable groups need in order to live healthy lives. Our study has shown the potential in the advocator role, and for the social service at large, in repeatedly pointing out the importance of building a society for all. The ability to incorporate the not-so-healthy, not-so-young, not-so-active, and not-so-wealthy persons' voices and needs is one of the major challenges for reaching the vision of the healthy city. The social service officials in the role of the advocator might be one step closer to fulfilling this vision.

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Conflict of Interests

The authors declare no conflict of interests.

References

Agger, A., & Sørensen, E. (2018). Managing collaborative innovation in public bureaucracies. *Planning Theory*, *17*(1), 53–73.

Barthel, S., Colding, J., Hiswåls, A. S., Thalén, P., & Yurunen, P. (2021). Urban green commons for socially sustainable cities and communities. *Nordic Social Work Research*, *12*(2), 310–322.

Barton, H., & Grant, M. (2013). Urban planning for healthy cities. *Journal of Urban Health*, *90*, 129–141.

Berglund-Snodgrass, L., Högstrom, E., Fjellfeldt, M., & Markström, M. (2021). Organizing cross-sectoral housing provision planning: Settings, problems and knowledge. *European Planning Studies*, *29*(5), 862–882.

Börjesson, U., Skillmark, M., Bülow, P. H., Bülow, P., Vejklint, M., & Wilińska, M. (2021). "It's about living like everyone else": Dichotomies of housing support in Swedish mental health care. *Social Inclusion*, *9*(3), 276–285.

Boverket. (2022). *Behov av bostadsbyggande 2022–2030* [Housing construction needs 2022–2030]. https://www.boverket.se/sv/samhallsplanering/bostadsmarknad/bostadsmarknaden/behov-av-bostadsbyggande/nationell-byggbehovsberakning-2022-2030

Brinkmann, S., & Kvale, S. (2018). *Doing interviews*. SAGE.

Bryson, J. M., Crosby, B. C., & Stone, M. M. (2006). The design and implementation of cross-sector collaborations. *Public Administration Review*, *66*(1), 44–55.

Cristiano, S., & Zilio, S. (2021). Whose health in whose city? A systems thinking approach to support and evaluate plans, policies, and strategies for lasting urban health. *Sustainability*, *13*(21), Article 12225.

Currie, G., & Spyridonidis, D. (2016). Interpretation of multiple institutional logics on the ground: Actors' position, their agency and situational constraints in professionalized contexts. *Organization Studies*, *37*(1), 77–97.

Davidoff, P. (1965). Advocacy and pluralism in planning. *Journal of the American Institute of Planners*, *31*(4), 331–338.

D'Onofrio, R., & Trusiani, E. (2018). The need for new urban planning for healthy cities: Reorienting urban planning towards healthy public policy. In D'Onofrio & E. Trusiani, *Urban planning for healthy European cities* (pp. 31–41). Springer. https://doi.org/10.1007/978-3-319-71144-7_4

Dyb, E., Lars, B., Knutagård, M., & Lindén, J. (2021). Governing through definitions and numbers: Analysis of the Nordic homeless registrations as instruments of governing homelessness. *European Journal of Homelessness*, *15*(3), 143–157.

Eriksson-Zetterqvist, U. (2009). *Institutionell teori: Idéer, moden, förändring* [Institutional theory: Ideas, fashions, and change]. Liber.

Fakhoury, W., & Priebe, S. (2007). Deinstitutionalization and reinstitutionalization: Major changes in the provision of mental healthcare. *Psychiatry*, *6*(8), 313–316.

Fjellfeldt, M., Högström, E., Berglund-Snodgrass, L., & Markström, U. (2021). Fringe or not fringe? Strategies for localizing supported accommodation in a post-deinstitutional era. *Social Inclusion*, *9*(3), 201–213.

Fjellfeldt, M., & Rokka, D. (2022). Practitioner perspectives on art therapy with couples in relational crisis: A qualitative exploration. *International Journal of Art Therapy*. Advance online publication. https://doi.org/10.1080/17454832.2022.2096087

Friesinger, J. G., Topor, A., Bøe, T. D., & Larsen, I. B. (2019). Studies regarding supported housing and the built environment for people with mental health problems: A mixed-methods literature review. *Health & Place*, *57*, 44–53.

Government Offices of Sweden. (2012). *PRIO psykisk ohälsa—Plan för riktade insatser inom området psykisk ohälsa 2012–2016* [PRIO mental ill-health: Plan for targeted measures within the area mental ill-health 2012–2016]. Ministry of Health and Social Affairs.

Government Offices of Sweden. (2018). *För att börja med något nytt måste man sluta med något gammalt* [To start with something new, one has to stop with something old] (SOU 2018:90). Norstedts Juridik.

Government Offices of Sweden. (2020). *Hållbar socialtjänst* [Sustainable social service] (SOU 2020:47). Norstedts Juridik.

Grönvall, Y. (2022). Social workers' navigation between repression and social support for men purchasing sex. *European Journal of Social Work*. Advance online publication. https://doi.org/10.1080/13691457.2022.2083587

Hansson, M., Lundgren, I., & Sjöberg, S. (2018). Fältarbete i utsatta områden [Fieldwork in vulnerable areas]. In S. Sjöberg, & P. Turunen (Eds.), *Samhällsarbete: Aktörer, arenor och perspektiv* [Societal work: Actors, arenas and perspectives] (pp. 139–157). Studentlitteratur.

Hasenfeld, Y. (Ed.). (2010). *Human services as complex organizations*. SAGE.

Healey, P. (1997). *Collaborative planning*. Palgrave Macmillan.

Högström, E. (2012). *Kalejdoskopiska rum: Diskurs, materialitet och praktik i den decentraliserade psykiatriska vården* [Kaleidoscopic spaces: Discourse, materialty and practice in decentralised mental health care] [Doctoral dissertation, KTH Royal Institute of Technology]. KTH DiVA. http://urn.kb.se/resolve?urn=urn:nbn:se:kth:diva-90968

Högström, E., Markström, U., Berglund-Snodgrass, L., Fjellfeldt, M., Andersén, J., & Lillehorn, S. (2021). *Boende och livsmiljö för personer med psykisk ohälsa* [Housing and living environments for people with mental ill-health]. Blekinge Institute of Technology Research.

Kiely, E., & Warnock, R. (2022). The banality of state violence: Institutional neglect in austere local authorities. *Critical Social Policy*. Advance online publication. https://doi.org/10.1177/026101832211049

Kritsotaki, D., Long, V., & Smith, S. (Eds.). (2016). *Deinstitutionalisation and after: Post-war psychiatry in the western world*. Palgrave Macmillan.

Larsen, M., Rantala, R., Koudenburg, O. A., & Gulis, G. (2014). Intersectoral action for health: The experience of a Danish municipality. *Scandinavian Journal of Public Health*, *42*(7), 649–657.

Lipsky, M. (2010). *Street-level bureaucracy: Dilemmas of the individual in public services*. Russell Sage Foundation.

Lowe, M., Whitzman, C. V., & Giles-Corti, B. (2018). Health-promoting spatial planning: Approaches for strengthening urban policy integration. *Planning Theory & Practice*, *19*(2), 180–197.

Macassa, G. (2022). Can the interconnection between public health and social work help address current and future population health challenges? A public health viewpoint. *Journal of Public Health Research*, *11*(2). https://doi.org/10.1177/22799036221102653

March, J. J., & Olsen, J. P. (2009). The logic of appropriateness. In M. Moran, M. Rein, & R. E. Goodin (Eds.), *The Oxford handbook of public policy* (pp. 689–708). Oxford University Press. https://doi.org/10.1093/oxfordhb/9780199548453.003.0034

Mason, K., & Evans, T. (2020). Social work, interdisciplinary cooperation and self-neglect: Exploring logics of appropriateness. *The British Journal of Social Work*, *50*(3), 664–681.

Meeuwisse, A., Swärd, H., Sunesson, S., & Knutagård, M. (2016). *Socialt arbete: En grundbok* [Social work: The first book]. Natur & Kultur.

Ministry of Health and Social Affairs. (2001). *Socialtjänstlagen* [Social service act] (SFS 2001:453).

Mourits, K., van der Velden, K., & Molleman, G. (2021). The perceptions and priorities of professionals in health and social welfare and city planning for creating a healthy living environment: A concept mapping study. *BMC Public Health*, *21*(1), Article 1085. https://doi.org/10.1186/s12889-021-11151-7

Nadin, V., Stead, D., Dąbrowski, M., & Fernandez Maldonado, A. M. (2021). Integrated, adaptive and participatory spatial planning: Trends across Europe. *Regional Studies*, *55*(5), 791–803.

Reay, T., & Jones, C. (2016). Qualitatively capturing institutional logics. *Strategic Organization*, *14*(4), 441–454.

Sager, T. (2022). Advocacy planning: Were expectations fulfilled? *Planning Perspectives*. Advance online publication. https://doi.org/10.1080/02665433.2022.2040189

Sjöberg, S., & Turunen, P. (2018). *Samhällsarbete: Aktörer, arenor och perspektiv* [Societal work: Actors, arenas and perspectives]. Studentlitteratur.

Sjöberg, S., & Turunen, P. (2022). Community work in Nordic welfare states in transformation: Directions, conditions and dilemmas. *Nordic Social Work Research*, *12*(2), 209–216.

Sones, M., Firth, C. L., Fuller, D., Holden, M., Kestens, Y., & Winters, M. (2021). Situating social connectedness in healthy cities: A conceptual primer for research and policy. *Cities & Health*. Advance online publication. https://doi.org/10.1080/23748834.2021.1926657

Stead, D., & Meijers, E. (2009). Spatial planning and policy integration: Concepts, facilitators and inhibitors. *Planning Theory & Practice*, *10*(3), 317–332.

The National Board of Social Affairs and Health. (2020). *Riksnormen för försörjningsstöd 2021* [The national standard for livelihood support 2021]. https://www.socialstyrelsen.se/globalassets/sharepoint-dokument/dokument-webb/ovrigt/riksnormen-for-forsorjningsstod-2021.pdf

The Public Health Agency of Sweden. (2022). *Nationella folkhälsomål och målområden* [National public health objectives and target areas]. Https://www.folkhalsomyndigheten.se/en-god-och-jamlik-halsa-pa-alla-nivaer/tema-folkhalsa-lokalt-och-regionalt-stod/vad-styr-folkhalsopolitiken/nationella-mal-och-malomraden/#boende

Thornton, P. H., Ocasio, W., & Lounsbury, M. (2012). *The institutional logics perspective: A new approach to culture, structure, and process*. Oxford University Press.

United Nations. (2015). *Transforming our world: The 2030 agenda for sustainable development*. https://sdgs.un.org/2030agenda

Vigar, G. (2009). Towards an integrated spatial planning? *European Planning Studies*, *17*(11), 1571–1590.

World Health Organization. (2016). *Health as the pulse of the new urban agenda*: *United Nations conference on housing and sustainable urban development, Quito, October 2016*. https://apps.who.int/iris/handle/10665/250367

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Article

Transit-Oriented Development and Livability: The Case of the Najma and Al Mansoura Neighborhoods in Doha, Qatar

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Abstract
Since the 1970s, Qatar's rapid urban growth has resulted in a segregated and poorly connected urban form, particularly in the country's capital, Doha. Although the recent opening of the Doha Metro has begun to mitigate some of the city's challenges, local authorities recognize the need for a more comprehensive urban design which can ensure safe and convenient connectivity with the public transportation system. To this end, the government has developed the Qatar National Development Framework, an action plan for the management of Qatar's urban development. One of its aims is to integrate the Doha Metro with the urban fabric of the city and to ensure that urban growth follows the principles of transit-oriented development, referring to a pattern of development centered on transit hubs supporting a mix of land uses in a well-connected and safe urban environment. This research article attempts to assess the effects of transit-oriented development on livability in mixed-use neighborhoods. The area around the Al Mansoura metro station within the Najma and Al Mansoura neighborhoods is selected as a case study. This analysis of urban form uses integrated modification methodology and focuses on three main determinants: compactness, complexity, and connectivity. Based on this analysis, several recommendations are made, whose implementation should enhance livability throughout the study area.

Keywords
Al Mansoura; livability; Najma; sustainable urbanism; transit-oriented development; urban design

Issue
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1. Introduction

Beginning at the turn of the 21st century, a construction boom in the State of Qatar has transformed the capital city, Doha, into a modern, global city. This rapid urbanization has necessitated the implementation of a physical planning process to guide the development (Salama & Wiedmann, 2016). This planning process has been largely centered around urban policies based on a 1970s master plan (Azzali & Tomba, 2018), but the government has recently developed a new Qatar National Master Plan 2032 and a Qatar National Development Framework. These aim to control the planning and management of urban growth for the upcoming two decades by building communities which are strong, sustainable, and livable. These plans include the improvement of public transport (PT) in the country, including the development of the Doha Metro, which began operation in 2019.

One of the aims of the Qatar National Development Framework is to integrate the Doha Metro project with the urban fabric of the city via the implementation of transit-oriented development (TOD). TOD is an approach to urban development in which transit hubs like metro stations are surrounded by a mix of land uses within a well-connected and safe environment. The analysis of the effects of TOD on the degree of livability in mixed-use

neighborhoods can aid the development of effective urban design frameworks. In the present case, the existing mixed-use neighborhoods in Doha lack a clear urban hierarchy which would help revitalize many areas of the city and make them more livable. The neighborhoods of Najma and Al Mansoura have been selected for investigation in this article as they exhibit features making them suitable for TOD implementation. Each neighborhood has a high population and urban density and is located in the central zone of Doha within the B and C Ring Roads; this is a busy area with a variety of activities being performed at any given time. The location of this area within Doha is shown in Figure 1. The framework proposed in this article can be used as a guide for promoting livability in Najma and Al Mansoura, as well as in other neighborhoods with similar characteristics.

The objectives of this research article are to (a) assess the current condition of TODs in mixed-use neighborhoods in Doha, (b) select a study area for analysis in order to develop an urban design framework to be used as a prototype for other mixed-use neighborhoods in Doha, and (c) to investigate the level of livability in the selected study area.

The rest of this research article is divided into four main sections. The literature review provides an overview of relevant concepts and studies. The methodological approach section provides a description and definition of the methods and tools used for data collection. The findings section presents the results, identifies gaps in the present urban design, and presents an improved urban design framework for the study area. The last section of the article is a discussion and conclusion.

2. Literature Review

Kashef (2016) defines livability as the quality of life in the urban environment. Urban livability thus relates to the suitability of a particular urban location for specific users, as well as ways to improve it. In a broad sense, it aims to understand the urban environment from socioeconomic and environmental perspectives, as opposed to strict urban planning. This includes an evaluation of the conditions of space, and how and whether people perceive it as being suitable for living (Ahmed et al., 2019, pp. 167–168). A number of researchers have helped define and fine-tune some parameters and indicators for evaluating livability in the urban environment. These can be summarized in terms of four major categories: (a) accessibility, (b) social diversity, (c) affordability, and (d) economic vitality. One of the main approaches to assessing and enhancing livability is through well-connected transit networks, understanding of which can be enhanced through the study of TOD.

The notion of TOD has become increasingly important in studies of urban planning and urban mobility since the mid-1990s (Ibraeva et al., 2020). Some studies have examined connections between the built environment and the modes of transportation that existed at the beginning of the 20th century before car ownership became widespread (Knowles, 2012). Understanding how the built environment connects to urban transportation and how to plan for it is a key factor in urban planning. Between the end of the Second World War and the 1970s, many countries faced rapid urban expansion and population growth resulting from the large-scale

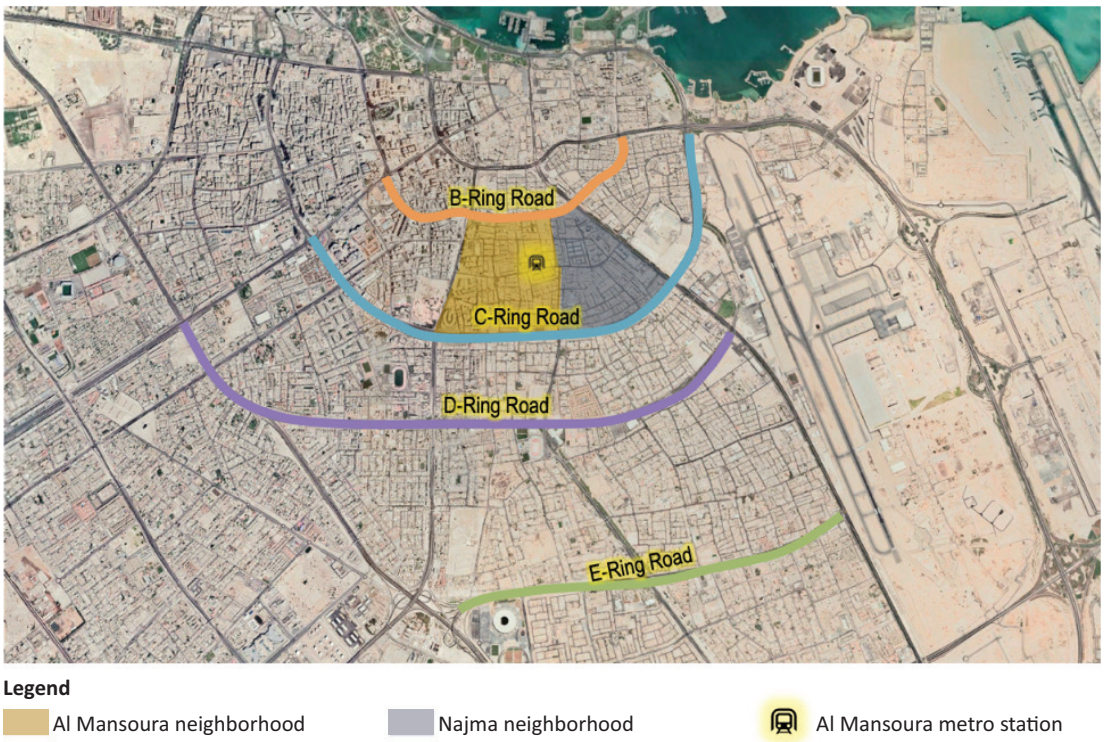

Figure 1. The location of the study area within Doha.

movement of people from suburbs into cities (Knowles & Sweetman, 2004). This has tended to result in urban sprawl, characterized by low-density settlements, and increased car ownership (Knowles, 2006).

Arrington and Cervero (2008) define TODs as neighborhoods which are walkable and compact, with mixed commercial and residential land uses. Similarly, Bishop (2015) describes TOD as a development pattern based around transit hubs, supporting mixed land uses in a well-connected and safe urban environment. Therefore, the use of the term TOD generally implies that a given area is walkable and well-integrated with its surroundings; the area should host a large number of commercial activities and offer a variety of residential options and employment opportunities (Calthorpe, 1993, p. 53; Ganning & Miller, 2020).

2.1. Transit-Oriented Development in Mixed-Use Neighborhoods

TODs are generally located in areas with a dense urban center which spreads outward into areas of lower urban density in which a variety of land uses are found (Kumar et al., 2020). TODs are located near transit centers or public transportation nodes, such as metro/train stations or tram/bus stops; hence, TODs offer optimized access to such nodes. TODs are defined as the area located within a radius of 800 m from a particular transit hub, because this is the distance a person can typically walk in 10 minutes, meaning that all parts of the TOD are easily reached on foot from the transport hub at its center (Cervero & Kockelman, 1997; Galelo et al., 2014, p. 901). Therefore, the area around the transit hub should be well connected so that access to the area's services, facilities, and businesses is facilitated. TODs are divided into two sub-areas; the area within 400 m of the hub is called the transit-oriented priority envelope, and the area within 800 m is the transit-oriented development area. The difference between the two is that the transit-oriented priority envelope is expected to have a higher urban density, so mobility within that area is especially important as this has a direct impact on the area's business activities.

Experts on TOD recognize four characteristics of TODs which make neighborhoods attractive and livable. These are (a) real estate demand, (b) accessible land for improvement, (c) available land for improvement, and (d) efficient transit lines which connect people to their workplaces (Furlan & Faggion, 2015, p. 125). The area around the central hub should be well maintained and safe for users.

TOD in mixed-use neighborhoods allows residents and visitors to perform a variety of tasks throughout the day. To keep the area sustainable in the long run, employment opportunities must be available, as this is a primary attraction of a TOD area. Urban design elements such as pedestrian pathways add additional value and attract more visitors and residents (Arrington & Cervero, 2008), and livability is further enhanced when a variety of services are available at convenient locations and in appropriate ratios (De Chiara et al., 1995). These include medical, educational, recreational, and retail facilities. An integral element of livability is how easily those facilities can be accessed (Pacione, 1989). A convenient number of public open spaces and other recreational settings should also be provided, as this yields additional social, environmental, and economic benefits (Jaafar Sidek et al., 2020; Stojanovski, 2019).

An increase in urban density around the central hub allows the built environment to expand vertically rather than horizontally (Liu et al., 2020). This emergence of high-rise mixed-use buildings can, in turn, exert a strong influence on a city's image, especially for cities that have previously been characterized by low-rise buildings (Berawi et al., 2020; Febrian Dhini & Wonorahardjo, 2020, pp. 4–5). For TODs to be successful, it is critical to assess the role of the urban visual environment and decide whether it will be seen as hindering or facilitating users' access to PT.

2.2. Benefits and Challenges Stemming From Transit-Oriented Development

The reviewed literature confirms the potential of TOD to facilitate access to destinations within the TOD area by offering transportation alternatives to users. In particular, PT ridership increases when a pleasant and safe pedestrian environment around transit stations is offered (Besser & Dannenberg, 2005). TOD also encourages multi-purpose parking lots and varied transportation alternatives that can help reduce the need for parking space and concomitant urban sprawl (Venner & Ecola, 2007). Similarly, Galelo et al. (2014) and Knowles (2012) emphasize that such strategies help boost sustainable growth, making TOD a major component of new urbanism principles.

Mixed-use neighborhoods offer a variety of land uses, which makes them an ideal setting for the development of TODs. One important advantage of such neighborhoods is that they typically provide good connections to employment centers. Curtis et al. (2016) detail the benefits associated with the use of TODs for both the private and public sectors. For example, from a safety perspective, TODs provide people with more opportunities for pedestrian activities, thus creating what Jacobs (2016) refers to as "natural surveillance" for the urban environment.

On the other hand, TODs are associated with a number of challenges. Namely, the lack of potential sites for TOD implementation, as the number of available undeveloped lands is few, and, if found, these lands would be small in size, making them unsuitable for any infill development (Cervero, 2004). For old neighborhoods, it may be difficult to incorporate TOD as the existing development structure may not support it. Also, the real estate development around the transit hub may cause a spike in rents and high building costs (Li & Huang, 2020). Other challenges for TODs involve the huge construction

and lengthy approval process with government bodies to be implemented.

2.3. Transit-Oriented Development in Doha

In recent years, there have been several TOD studies conducted for Doha, investigating neighborhoods such as Al Sadd, West Bay, and Al Waab, as well as the areas surrounding the Qatar National Museum and Souq Waqif (Alattar & Furlan, 2017; Al-Harami & Furlan, 2020; AlKhereibi et al., 2022; Alsaeed & Furlan, 2019; AlSuwaidi & Furlan, 2018; Furlan & Al-Mohannadi, 2020; Tannous et al., 2020). The present study is the first to focus on the Najma and Al Mansoura neighborhoods, which are known for their substantial daily traffic and assortment of business services. These neighborhoods are adjacent and are served by the Al Mansoura metro station on the Doha Metro's green line.

This new metro station serves as a hub for the implementation of a TOD, consistent with one of the aims of the Doha Metro project, which seeks to integrate metro stations with the existing land use and urban fabric of the areas in which they are located. With a total investment of over $35 billion, this development program will ultimately include not just the Doha Metro, but also a light rail system and a freight railway linked to wider international networks (Furlan & Sipe, 2017).

3. The Research Design

This research article aims to identify gaps in urban design approaches within the prospective TOD centered around Al Mansoura station. The theoretical framework is derived from the review of literature on topics related to TOD and livability and is supported by data collection, site analysis, and semi-structured interviews. The research design of this study is illustrated in Figure 2.

3.1. Methodological Approach

The methodological approach for this research article incorporates a qualitative method of data collection which includes a series of site visits and resultant observations, as well as semi-structured interviews with relevant professionals. The methodology is supported by the literature review in the sense that it confirms these tools as being appropriate for the aims of this study. According to the literature, the majority of researchers exploring TOD-related topics have employed a number of data collection methods, including the following:

- Use of case studies to analyze the effects of TOD on the urban environment (Al-Harami & Furlan, 2020; Alsaeed & Furlan, 2019; Furlan & Almohannadi, 2016; Furlan & Al-Mohannadi, 2020; Furlan et al., 2018, 2020, 2021; Furlan, Al-Mohannadi, et al., 2022; Furlan, Grosvald, et al., 2022; Furlan & Sinclair, 2021; Furlan & Sipe, 2017; Tannous et al., 2020, 2021);
- Field observations to assess the urban dynamics of a given study site;
- Site analysis approaches such as integrated modification methodology (IMM), a process whose goal is to assess the complexity of a city's systems at

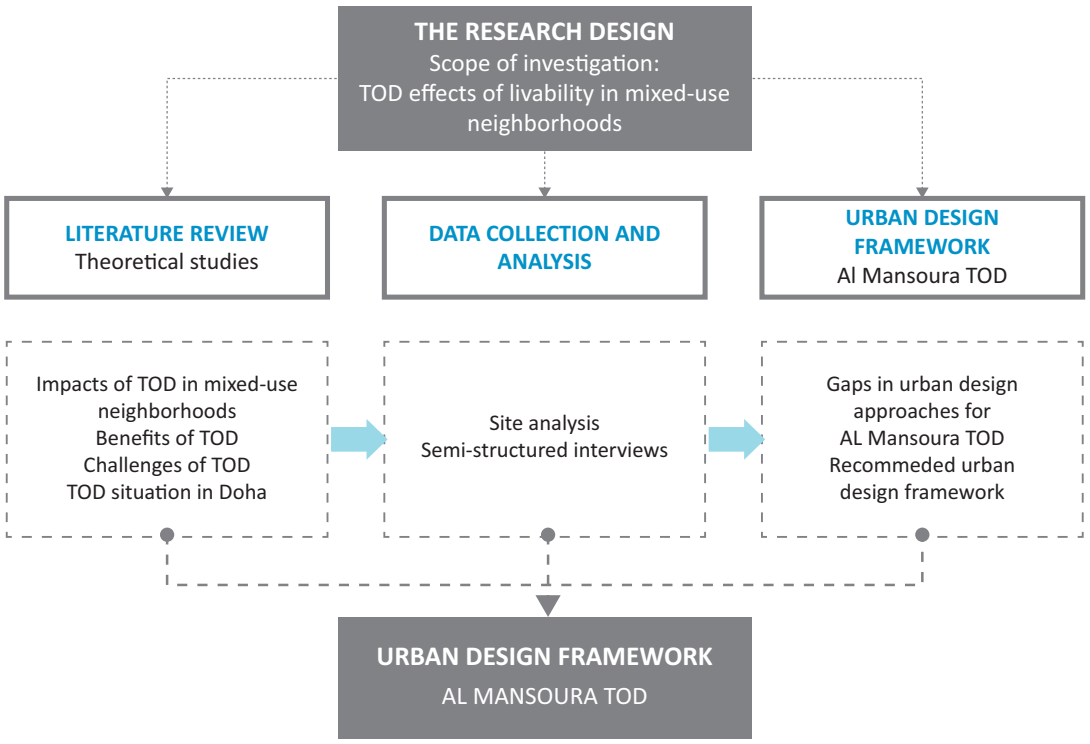

Figure 2. The research design.

various levels, ultimately seeking to improve the city as a whole, particularly with respect to its environment (Tadi et al., 2017, pp. 1–2; Tadi & Bogunovich, 2017).

The methodologies used in this research project are as follows:

- Site observation: Several site visits were required in order to understand the existing conditions in the selected study area;
- Selected parameters from IMM methodology were used in order to facilitate the site analysis (Tadi et al., 2017);
- Semi-structured interviews were conducted with professionals from Qatar Museums, Qatar Foundation, Astad project management, and Qatar University. The interviews were organized into two parts: (a) general discussions about TOD and (b) ongoing development projects in the Najma and Al Mansoura neighborhoods.

3.2. Study Site

The urban areas between the B and C Ring Roads in Doha have witnessed rapid urban growth beginning in the 1980s, due to a laissez-faire approach which had many unfortunate effects on the urban landscape. The selected study site for this research project is located in an area at which Doha's Najma and Al Mansoura neighborhoods intersect; specifically, this is defined as the area within 400 m of Al Mansoura station, whose operations began in December 2019. The study site is shown in Figure 3.

The Najma neighborhood is classified by Qatar's Ministry of Municipality and Environment (2015) as a district center, based mostly on its population density and size. As of 2015, and as shown in Figure 4, the Al Mansoura and Najma neighborhoods have almost double the population of other typical neighborhoods of similar area, highlighting how densely populated these areas are.

4. Findings

The findings section of this research article is divided into three parts. The first part presents an analysis of the area within 400 m of Al Mansoura station. The second part discusses some insights gleaned from the interviews with field professionals. The third part begins by identifying gaps in urban design in this region and then continues by presenting a set of recommended urban design guidelines which, if implemented, can improve livability in the neighborhood.

4.1. Site Analysis

The site analysis for the defined area around the metro station is based on selected design principles of IMM methodology (Tadi et al., 2017; Tadi & Bogunovich, 2017). As identified by Tadi et al. (2017), these design principles fall into the three categories of compactness, complexity, and connectivity. The findings of this section of the article are organized accordingly.

The urban compactness of the area was evaluated through the analysis of ground use balance and walkability via established pedestrian networks. As for urban complexity, this is characterized in terms of mixed-use spaces, community and public spaces, and how well-connected the open spaces are. Finally, the analysis of urban connectivity is based on the transportation modes, hubs, and networks available around the site.

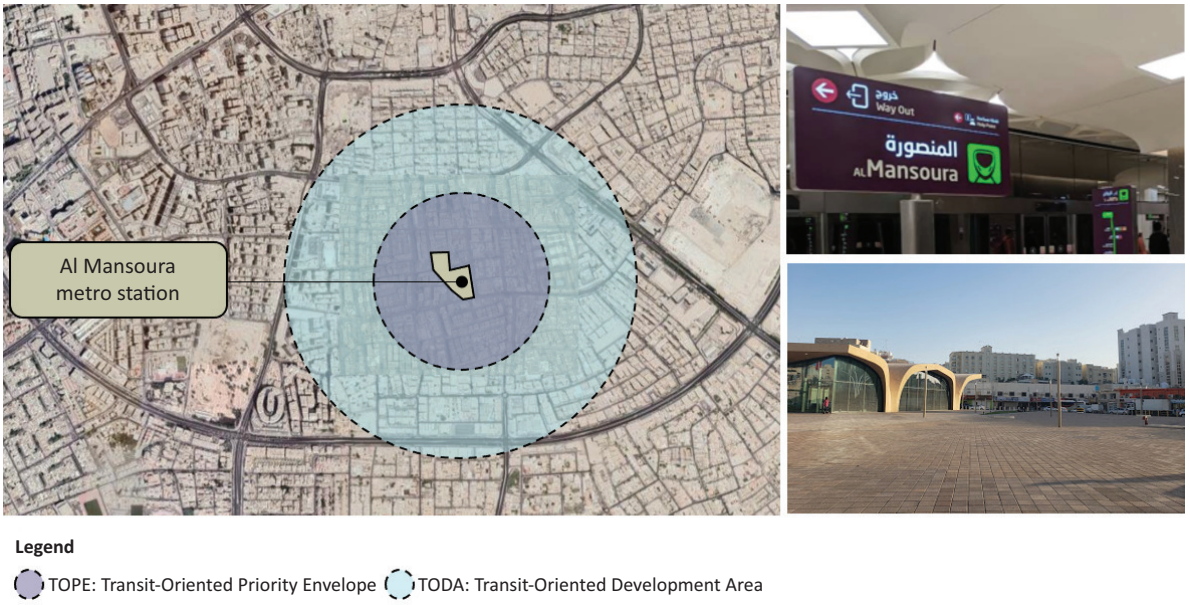

Figure 3. The study site, with Al Mansoura metro station at its center.

Year	Total Population
1986	10,658
1997	14,074
2004	19,024
2010	31,573
2015	37,082

(a) Al Mansoura's population (Zone 25)

Year	Total Population
1986	9,141
1997	10,826
2004	16,697
2010	24,763
2015	28,228

(b) Najma's population (Zone 26)

Zone no.	Neighborhood	Area (km²)	Population density per 1 km²
23	Fereej Bin Mahmoud	1.2	14,707.1
24	Rawdat Al Khail	1.7	18,200
25	Al Mansoura	1.5	24,898.9
26	Najma	1.1	24,855.4
35	Fereej Kulaib	1.1	5,819.8
44	Nuaija	1.2	3,839.2

(c) Population density per 1 km²

Figure 4. Al Mansoura's and Najma's population and population density in relation to other neighborhoods of similar area. Source: Authors' work based on Ministry of Development Planning and Statistics (2015).

4.1.1. Compactness: Ground Use Balance and Walkability

Najma is a high-density neighborhood with a variety of land uses which are integrated both horizontally and vertically. The area around the metro station is particularly dense and includes several types of building morphology, including traditional courtyard houses dating back to the 1960s (Al-Malki, 2017, pp. 97–98). As already noted, the Najma neighborhood is much denser than other neighborhoods of similar size (see also Figure 5).

The scale of buildings in the area was determined through a series of site visits. This analysis also incorporated design software and revealed how limited the number and size of urban voids are in relation to areas devoted to buildings. Some areas of the neighborhood seem problematic in terms of privacy, with some medium-rise buildings being located near some residential villas.

As illustrated in Figure 6, there are two main street typologies in the immediate surroundings of the Al Mansoura metro station. These are (a) streets enclosed by buildings on both sides (i.e., "building x building" cross-sections), and (b) streets situated between building blocks and voids (i.e., "building x void" cross-sections). In most cases, the voids are simply vacant land. The streetscapes require major retrofitting, especially along the main streets, as they do not exhibit any design rationale or cohesiveness. Most are damaged despite being active. There is a general lack of designated pedestrian pathways and shading devices throughout the area.

4.1.2. Complexity: Mixed Uses, Building Conditions, and Open Spaces

The Najma and Al Mansoura neighborhoods are largely mixed-use areas, with mostly residential and commercial land uses. The land around the metro station is mostly privately owned and includes residential villas, apartments, and work camps. There is also a notable amount of business activity, with most or all of the roads occupied by retail shops; these include car dealerships, lodgings, markets, cinemas, workplaces, and Souq Al Haraj, which is situated in the central area of the neighborhood. The study area is generally comprised of low-rise residential buildings with commercial frontages around the main streets. The tallest building in Najma is the Toyota Tower with a height of approximately 30 m, located in the southeast part of the neighborhood. More generally, the Najma and Al Mansoura neighborhoods contain mainly low- to medium-rise areas, as the maximum height allowed as per the Ministry of Municipality and

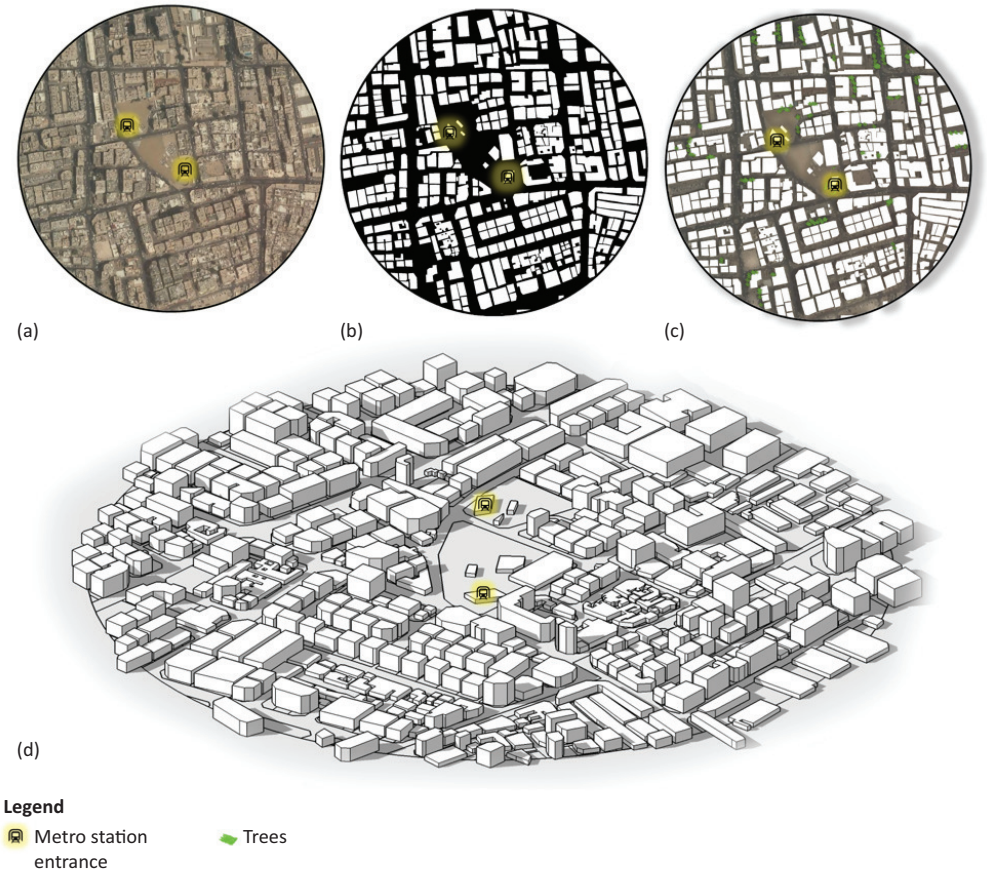

Figure 5. The surroundings of the metro station: (a) Buildings within a 400 m radius of Al Mansoura metro station, (b) built form coverage, (c) existing (and very minimal) greenery, and (d) building forms.

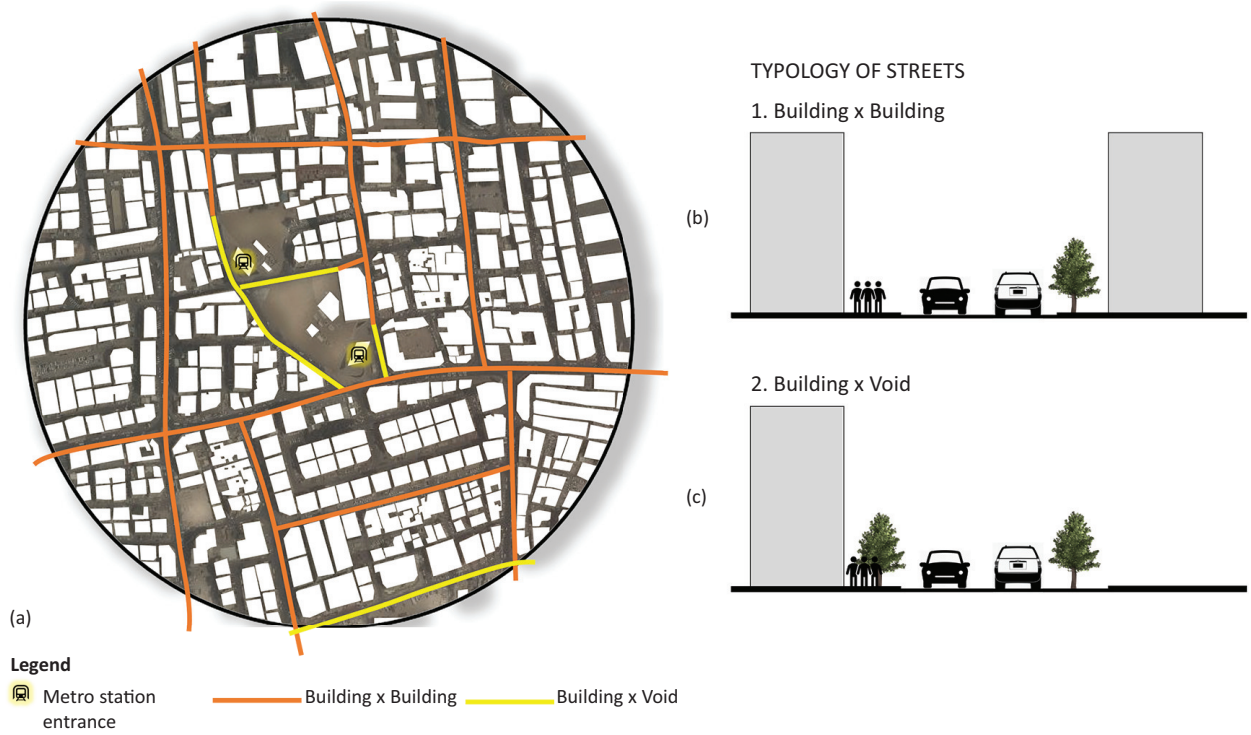

Figure 6. Typology of streets: (a) Main street typology types in the 400 m around Al Mansoura station, (b) building x building cross-section illustration, and (c) building x void cross-section illustration.

Environment is G + M + 7 for commercial buildings, and G + 7 for residential buildings (see Figure 7). G stands for ground floor and M stands for mezzanine floor.

The condition of buildings adjacent to the main streets is overall acceptable, but this is not the case with the buildings within the area's local streets. Many of those buildings show evidence of extreme deterioration, with main entrances often open and/or damaged, posing a serious problem for privacy and safety. As illustrated in Figure 8, the conditions of buildings immediately around the metro station were categorized as being of (a) sound state, (b) recoverable state, or (c) irrecoverable state. Sound buildings are those showing good architectural and structural integrity, and which generally abide by local fire and safety regulations. Recoverable buildings are those which seem to be in good condition but do not seem to adhere to local building regulations. Finally, irrecoverable buildings are those needing a substantial amount of work, as they pose a serious hazard to their occupants.

The site visits showed that there are no open spaces in the area immediately around the metro station. In addition, most of the observed greenery in the greater area appears to lack clear arrangement or design (see Figure 5c). This general absence of open spaces appears to be due to the density of the neighborhood; the open

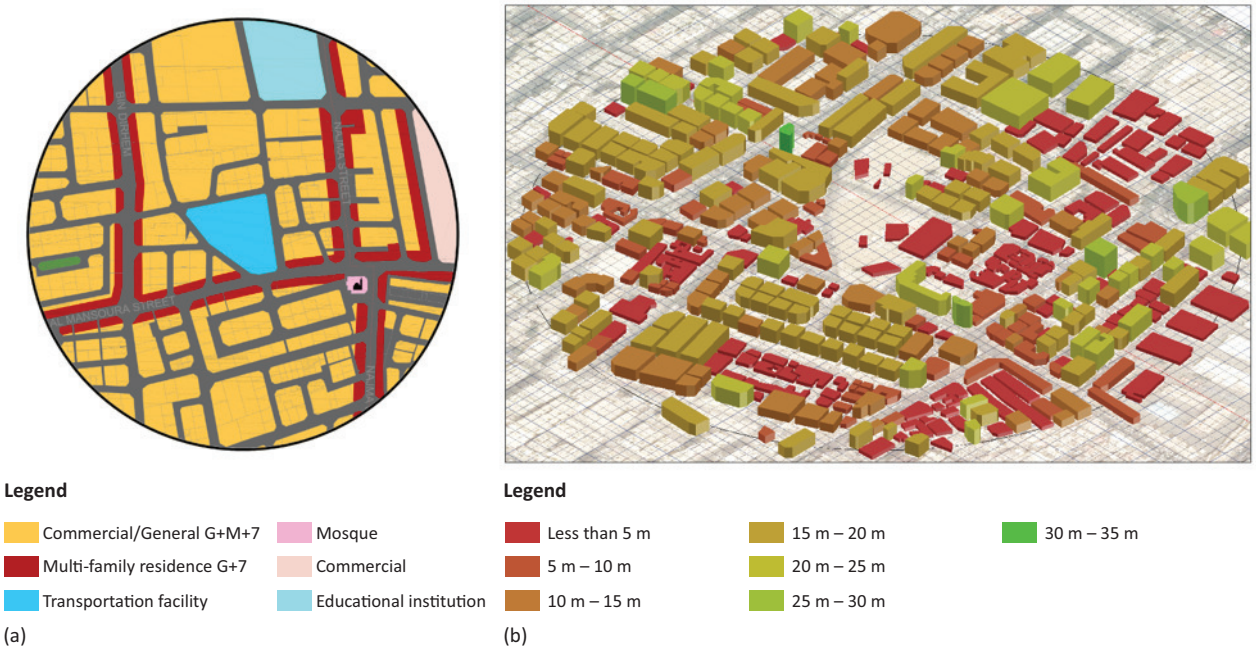

Figure 7. The surroundings within a 400 m radius: (a) Land use within 400 m of the metro station and (b) building heights within 400 m of the metro station.

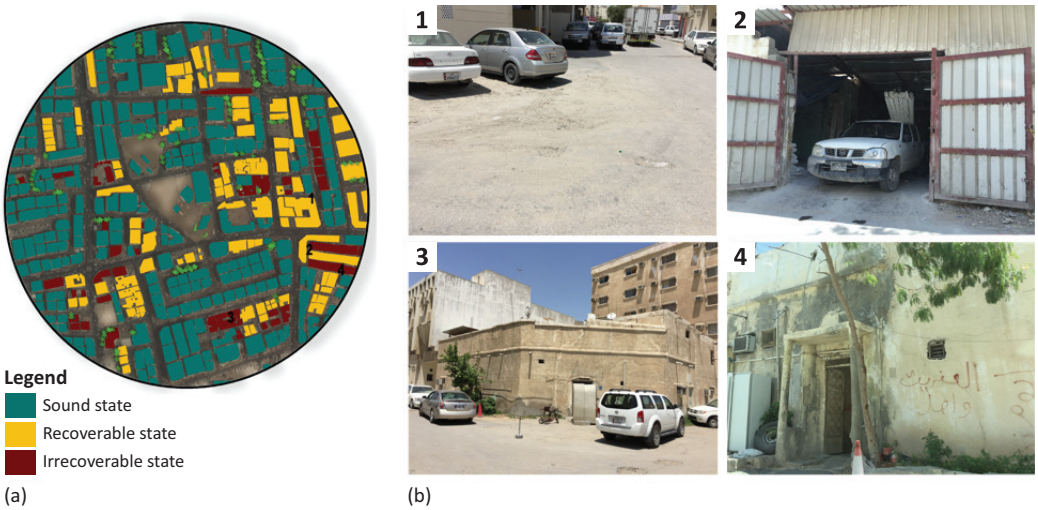

Figure 8. The surroundings within a 400 m radius: (a) Condition analysis of the area within 400 m of the metro station, and (b) photos of buildings on secondary streets which are in deteriorating condition.

spaces that do exist are currently being used as temporary parking lots or are left vacant, as shown in Figure 9.

One of the prominent landmarks in the neighborhood is Souq Al Haraj. However, the urban structure around the *souq*'s entrance does not enhance the look or feel of the place. It suffers from a general lack of pedestrian pathways and proper signage. This is illustrated in the images shown in Figure 9.

4.1.3. Connectivity: Transportation Modes, Hubs, and Networks

Najma and Al Mansoura neighborhoods are seen as an affordable living environment because of the predominance of low-middle income people living there. Although the major streets in the neighborhood are generally in good condition and are convenient for pedestrians to use, the local roads are extremely narrow without proper consideration for pedestrian movement. The street furniture does not encourage social interaction and lacks shading devices, road benches, and trash bins. Signage and wayfinding are another significant flaw here, as the majority of local streets do not have visible street names and lack a legitimate signage system. These observations are supported by a series of photographs taken during the site visits in order to document the existing conditions of the study area, some of which are shown in Figure 10.

These observations show that the area around the metro station can be accessed from three main streets and two local streets. The streets in this area show a high level of traffic congestion during the day as cars are the main mode of commuting. Other modes of transportation include public buses. Several bus stops can be found

Figure 9. Photographic survey of the area's open spaces, showing a lack of a sense of place as well as a lack of adequate signage and pedestrian facilities.

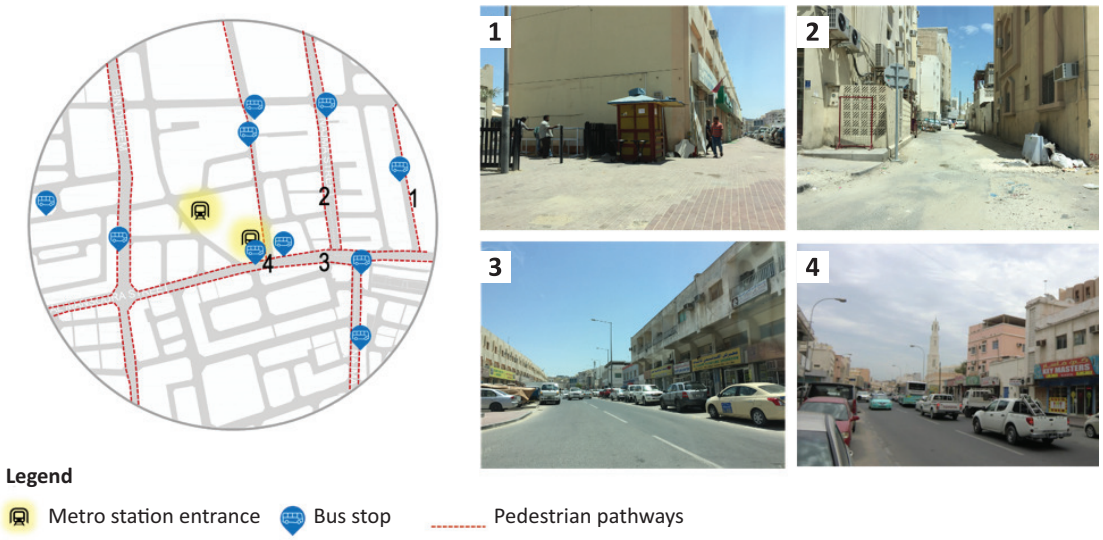

Figure 10. Available transportation modes within 400 m of the station.

in the neighborhood and three bus routes pass through the area; however, these are relatively underutilized as they are dominantly used by male workers. Cycling lanes were not observed within the neighborhood. However, a fair amount of cycling activity was seen in the streets of both Najma and Al Mansoura neighborhoods, despite the fact that neither neighborhood seems to have any established depot system for bicycles or any cycling networks. A great deal of pedestrian activity was observed during the daytime, although, as already noted, pedestrian pathways are only provided on the main streets and have minimal shading.

4.2. Interviews

The interviews followed a semi-structured format and were conducted with field professionals with varied backgrounds. Participants included architects, urban planners, and sociologists. The two main topics of discussion were TOD in general and development projects in the Najma and Al Mansoura neighborhoods in particular.

Concerning TOD, these professionals broadly agreed that the local status of TOD is not up to international standards. This is especially important since the Al Mansoura station will be one of the metro's busiest. The issue of connectivity was brought up multiple times in these interviews and is of particular concern in Doha, given the hot climate of the country and the overall lack of dedicated pedestrian and cycling lanes there. As a result, these two neighborhoods are under serious consideration for urban regeneration by the Qatar Museums Authority.

Urban regeneration feasibility studies for Najma and Al Mansoura are currently underway; these aim to preserve the urban and social diversity that is now characteristic of the two neighborhoods. One of the interviewees explained specifically that Souq Al Haraj will host a facility to teach carpentry and other crafts to interested students; carpentry workshops are one of the main businesses that these two neighborhoods are known for.

4.3. Contribution to Knowledge: Gaps in Urban Design

In recent times, there has been a noticeable shift in the urban planning approach for mixed-use neighborhoods in Doha. The current focus is on design methodologies and initiatives seeking to integrate retail and residential land uses in existing neighborhoods. Newly developed or regenerated neighborhoods, such as Lusail and Msheireb, have followed urban planning schemes which encourage urban connectivity and offer multi-modal transportation networks. However, existing neighborhoods tend to be faced with challenges related to urban sprawl and gentrification, rather than being characterized by interconnectivity. A major contributor to this is the heavy reliance on personal vehicles as the main mode of transportation. In summary, the main issues in the development of mixed-use neighborhoods, according to the literature review and case study analysis, are:

- Neighborhood characteristics, and how well these interact with the local context;
- Urban connectivity, referring to how well a given neighborhood is connected to adjacent neighborhoods and to the wider urban infrastructure;
- Accessibility, meaning how easily people can access and use the neighborhood;
- Inclusivity, meaning to what degree the neighborhood is welcoming to all types of people regardless of their background or income level;
- Whether the area can be characterized as mixed-use in nature, hosting or favoring a variety of activities.

As in many modern cities, there has been a trend for people in Doha to live in urban areas which are less interconnected and, thus, increasingly segregated. Current urban renewal and restoration initiatives often tend toward gentrification; this is implemented by shifting low-income residents from central areas to the periphery of Doha. This is the case, for example, with the Msheireb project. However, for a neighborhood to be effectively mixed-use in nature, it should incorporate individuals from every social standing and income level. Najma and Al Mansoura neighborhoods are two of the earliest-established neighborhoods in Doha, so the development of the area should be carried out in such a way that its old urban fabric is preserved, thus, maintaining the historical value of the place.

In regard to the government's role in the development of mixed-use neighborhoods, any viable approach must take into account established land use guidelines. One issue in Qatar is that many of the country's urban planning strategies are not readily available; this is in contrast to many other nations, whose approaches are published online to allow researchers, urban planners, and stakeholders to stay well-informed about design and construction processes. At present, planning processes involve many stakeholders and other entities, making the decision-making process needlessly complex and lengthy.

A city's urban fabric and its transportation network do not exist in isolation from each other; each is critical in determining how individuals interact with one another and travel within the public realm. They also affect the land uses and population density suitable for a given area. Traditional urban planning in Doha recognized all of this and, thus, reflected individuals' needs, interactions, social standing, and culture, which were the major factors that influenced the early formation of Najma and Al Mansoura.

4.4. Recommended Framework

The recommended framework developed in this article is based on the findings of the site analysis and literature

review. This framework provides urban design guidelines for land use distribution, open spaces, the transportation system, and the built environment. Al-Malki (2017, p. 149) identifies four parameters that are needed to enhance livability in mixed-use neighborhoods; these are used here in order to develop an urban design framework for the area within 400 m of Al Mansoura station. In addition to those parameters, key recommendations include:

- Using existing urban voids or infills as open spaces or plazas;
- Demolishing old buildings which have deteriorated and which are not in accordance with basic fire and other safety requirements;
- Giving clear names to streets which currently do not have names;
- Preserving and enhancing the mixed-use character of Najma and Al Mansoura neighborhoods;
- Encouraging and facilitating the use of local businesses on the part of neighborhood inhabitants;
- Providing and upgrading connectivity between Najma and Al Mansoura and the surrounding neighborhoods.

4.4.1. Land Use and Open Spaces

It is desirable to ensure that a mix of land uses is well established. The introduction of more community and public facilities would help revitalize the study area, as would the introduction of a multi-purpose parking system in order to reduce haphazard parking behavior on the area's main streets. Additional greenery and open plazas should be provided around the metro station, as the site visits showed this area to be lacking in well-designed and well-maintained greenery. Open spaces should be conveniently linked to recreational and public facilities in order to facilitate a smooth flow of people at all times. In turn, this will enhance the area's safety by supporting "natural surveillance."

As illustrated in Figure 11, Al Mansoura Street directly faces Al Mansoura station. The proposed location for the open plaza puts the plaza directly adjacent to each entrance of Al Mansoura station. It is important for this sort of open place to be provided adjacent to metro stations, as it helps shape the development pattern around the station, supports the creation of wide pathways accommodating the flow of people, and provides a convenient place for people to rest before and after traveling to/from their destination. In addition, the proposed green spine is equally important. It will act as a natural shading device in the neighborhood and as a buffer zone helping to reduce the noise generated around the metro station entrances.

4.4.2. Circulation and Built Environment

Recommendations for improving the circulation in the area within 400 m of Al Mansoura station include a new cycling network, upgrades to existing pedestrian pathways, and the installation of signalized crossings. Also, to mitigate parking issues in the area, multi-story parking facilities should be integrated with residential and commercial activities. These recommendations are illustrated in Figure 12.

With respect to the built environment, two main strategies are recommended, both of which take into

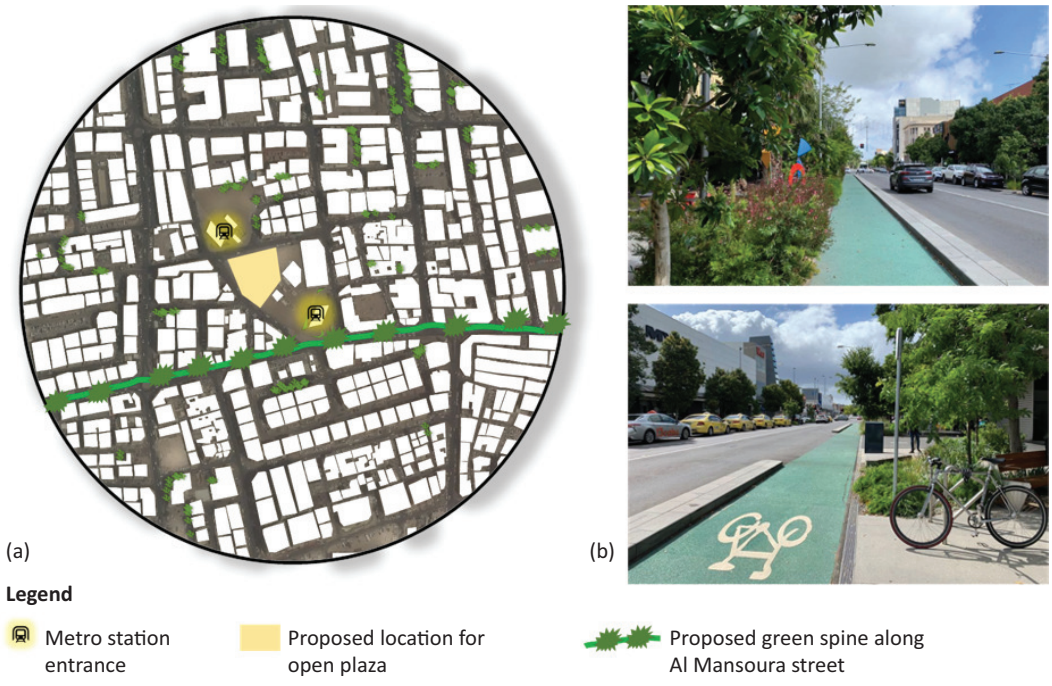

Figure 11. Proposed projects near the metro station: (a) Proposed green spine along the main street, (b) envisaged features of the green spine. Sources: (a) Authors' work; (b) Mills (2020).

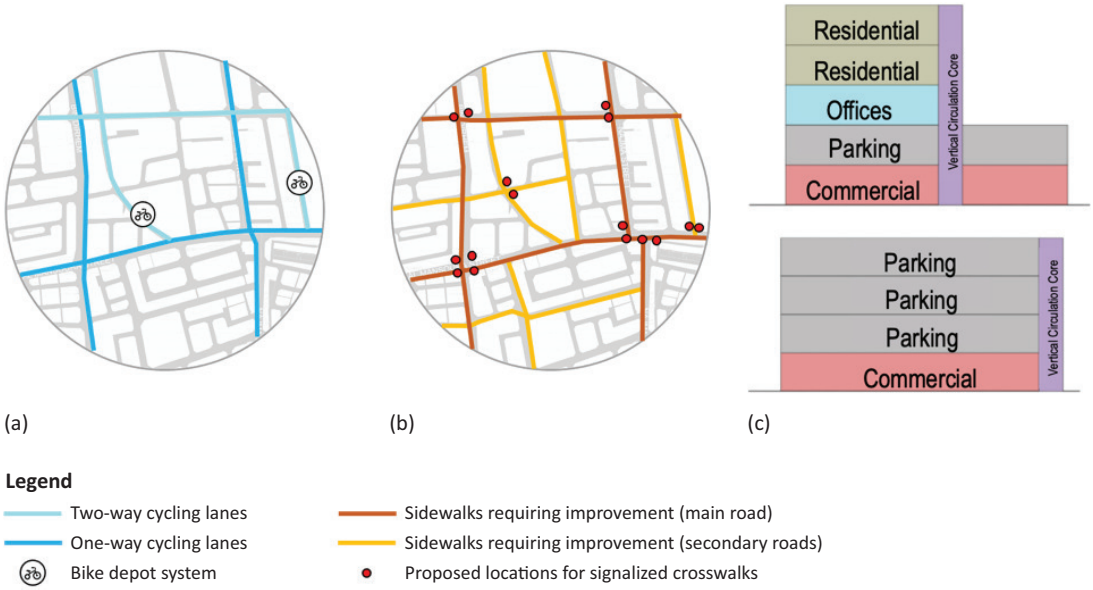

Figure 12. Transportation ideas: (a) Proposed cycling networks, (b) proposed pedestrian pathways, and (c) proposed parking strategies.

consideration the special character of Najma and Al Mansoura neighborhoods. First, buildings of historical significance, such as at Souq Al Haraj, should be restored and renovated. Second, the built form around the metro station should be rethought, in order to ensure that the varied needs of metro users are accommodated, while at the same time controlling the flow of people coming to and from the metro station. For example, revitalizing the immediate area around the metro station attracts visitors to stop and explore the area.

5. Discussion and Conclusion

In the recent past, Qatar has faced rapid urban and population growth, particularly during the last two decades. As a result, planning for a well-connected transportation network has become necessary, in order to reduce car usage and accompanying traffic congestion. With the recent implementation of the Doha Metro project, it is necessary to reanalyze the built forms of areas around the metro stations, as it is critical to ensure the livability of mixed-use neighborhoods and the sustenance of business activities. TOD can address such challenges, helping to solve transit-related problems while creating accessible, pedestrian-friendly urban areas. The study has been undertaken to assess the status of TODs in mixed-use neighborhoods in Doha and to develop an urban design framework for analyzing other mixed-use areas.

The literature review presented in this research article has focused on the topics of TOD and mixed-use neighborhoods in order to determine suitable parameters for the site analysis, which investigated Doha's Najma and Al Mansoura neighborhoods. The study site, consisting of the area within 400 m of the Al Mansoura metro station, was analyzed using IMM methodology, allowing the development of an appropriate urban design framework. Accordingly, the site analysis was undertaken through the three design principles defined in IMM methodology: compactness, complexity, and connectivity.

The first part of the findings related to the site analysis, making clear that the Doha Metro has helped to reduce traffic congestion, especially in dense neighborhoods such as Najma and Al Mansoura. Pedestrian facilities should always be considered, especially the pathways to and from the metro stations. In fact, there are two significant questions to consider when reconfiguring the connections between any given metro station and other parts of the neighborhood. First, what do visitors first see when they exit the metro station? Second, how are other parts of the neighborhood integrated with the metro station? Due to the need to preserve a neighborhood's character, local consultants should be involved when a city's PT system is designed, as such people can provide a better understanding of the local culture and site requirements that may be missed or disregarded by non-local people, such as international consultants. Successful implementation of TOD also requires that different modes of transportation be available within a given neighborhood.

The second part of the findings summarized interviews with experts about the current status of TOD in these two neighborhoods. The insights provided by the foregoing help support an urban design framework for promoting TOD around the study site, focusing on land use, open spaces, circulation, and the built environment. For land use, it is important to capitalize on the pedestrian flow to and from the station by enhancing the surrounding commercial and recreational facilities with a well-connected circulation pathway. As for open spaces,

the open plaza between the two entrances leading to the metro station can be revitalized by providing seasonal and temporary activities. Open spaces should be conveniently linked to recreational public facilities to facilitate a smooth flow of people. This will enhance the area's safety by supporting "natural surveillance." Additionally, the proposed green spine in the design framework can act as a noise buffer for the metro station, while at the same time improving the aesthetics of the main street. In terms of circulation and built environment, urban design recommendations were given to enhance the surrounding built environment. Introducing more community and public facilities would help revitalize the study area. Additional greenery and open plazas should also be provided around the metro station.

Nowadays, such a study of TOD within a mixed-use neighborhood is essential to Doha, as the metro is a recent introduction to Doha's transportation infrastructure. Moreover, since the Najma and Al Mansoura neighborhoods are two of the earliest-established neighborhoods in Doha, the development of the area should be carried out in such a way that its old urban fabric is preserved. Any viable approach must take into account established land use guidelines. Thus, researchers and urban planners can use this case study of Al Mansoura TOD as a precedent when establishing guidelines for the urban development of other mixed-use neighborhoods. This is especially so for other densely populated areas within central Doha.

Recommendations for further research include studying nearby metro stations, such as the Al Doha Al Jadeda station, which is near Al Mansoura station and thus serves a similar area. Incorporating several other parameters in the site analysis can provide a more comprehensive understanding of a neighborhood; these include the socio-economic characteristics of the neighborhood, energy use and natural environment, and cultural diversity. This would allow one to ascertain additional measures that should be incorporated into the urban design framework for improving livability within TODs in mixed-use neighborhoods.

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Conflict of Interests

The authors declare no conflict of interests.

References

Ahmed, N. O., El-Halafawy, A. M., & Amin, A. M. (2019). A critical review of urban livability. *European Journal of Sustainable Development*, *8*(1), Article 165.

Alattar, D. A., & Furlan, R. (2017). Urban regeneration in Qatar: A comprehensive planning strategy for the transport oriented development of Al-Waab. *Journal of Urban Regeneration & Renewal*, *11*(2), 168–193.

Al-Harami, A., & Furlan, R. (2020). Qatar National Museum-Transit oriented development: The masterplan for the urban regeneration of a "green TOD." *Journal of Urban Management*, *9*(1), 115–136. https://doi.org/10.1016/j.jum.2019.09.003

AlKhereibi, A. H., Onat, N., Furlan, R., Grosvald, M., & Awwaad, R. Y. (2022). Underlying mechanisms of transit-oriented development: A conceptual system dynamics model in Qatar. *Designs*, *6*(5), Article 71. https://doi.org/10.3390/designs6050071

Al-Malki, A. (2017). *Investigating livability in mixed-use neighborhoods: Case study of Najma in Doha, Qatar* [Master's thesis, Qatar University]. QSpace. https://qspace.qu.edu.qa/handle/10576/5801

Alsaeed, M., & Furlan, R. (2019). Transit-oriented development in West Bay, business district of Doha, State of Qatar: A strategy for enhancing liveability and sense of place. *Journal of Cultural Heritage Management and Sustainable Development*, *9*(3), 394–429. https://doi.org/10.1108/JCHMSD-09-2018-0062

AlSuwaidi, M., & Furlan, R. (2018). Doha metro system in the State of Qatar: The metamorphosis of Al Sadd. *Saudi Journal of Civil Engineering*, *2*, 89–109. http://hdl.handle.net/10576/11172

Arrington, G., & Cervero, R. (2008). *Effects of TOD on housing, parking, and travel*. Transit Cooperative Research Program.

Azzali, S., & Tomba, M. (2018, July 31–August 3). *The rise of mega sports events in the Gulf Region: What legacies for the city of Doha after the 2022 World Cup?* [Paper presentation]. Gulf Research Meeting, Cambridge, UK.

Berawi, M. A., Saroji, G., Iskandar, F. A., Ibrahim, B. E.,

Miraj, P., & Sari, M. (2020). Optimizing land use allocation of transit-oriented development (TOD) to generate maximum ridership. *Sustainability*, *12*(9), Article 3798. https://doi.org/10.3390/su12093798

Besser, L. M., & Dannenberg, A. L. (2005). Walking to public transit: Steps to help meet physical activity recommendations. *American Journal of Preventive Medicine*, *29*(4), 273–280. https://doi.org/10.1016/j.amepre.2005.06.010

Bishop, Z. (2015). *Transit-oriented development*. Virginia Ball Center for Creative Inquiry. http://www.indianacrossrails.com/research/transitorienteddevelopment.pdf

Calthorpe, P. (1993). *The next American metropolis: Ecology, community, and the American dream*. Princeton Architectural Press.

Cervero, R. (2004). *Transit-oriented development in the United States: Experiences, challenges, and prospects* (Vol. 102). Transportation Research Board.

Cervero, R., & Kockelman, K. (1997). Travel demand and the 3Ds: Density, diversity, and design. *Transportation Research Part D: Transport and Environment*, *2*(3), 199–219. https://doi.org/10.1016/s1361-9209(97)00009-6

Curtis, C., Renne, J. L., & Bertolini, L. (2016). *Transit oriented development: Making it happen*. Routledge.

De Chiara, J., Panero, J., & Zelnik, M. (1995). *Time-saver standards for housing and residential development*. McGraw-Hill.

Febrian Dhini, D. R., & Wonorahardjo, S. (2020). A review of urban visual environment in transit-oriented development (TOD): Visual comfort and disturbance. *IOP Conference Series: Earth and Environmental Science*, *532*, Article 012008. https://doi.org/10.1088/1755-1315/532/1/012008

Furlan, R., & Almohannadi, M. (2016). Light rail transit and land use in Qatar: An integrated planning strategy for Al-Qassar's TOD. *ArchNet-IJAR: International Journal of Architectural Research*, *10*(3), 170–192.

Furlan, R., & Al-Mohannadi, A. (2020). An urban regeneration planning scheme for the Souq Waqif heritage site of Doha. *Sustainability*, *12*(19), Article 7927. https://doi.org/10.3390/su12197927

Furlan, R., Al-Mohannadi, A., Major, M., & Paquet, T. (2022). A planning method for transit villages in Qatar: Souq Waqif historical district in Doha. *Open House International*. Advance online publication. https://doi.org/10.1108/OHI-05-2022-0121

Furlan, R., & Faggion, L. (2015). The development of vital precincts in Doha: Urban regeneration and socio-cultural factors. *American Journal of Environmental Engineering*, *5*(4), 120–129. https://doi.org/10.5923/j.ajee.20150504.04

Furlan, R., Grosvald, M., & Azad, A. (2022). A social-ecological perspective for emerging cities: The case of Corniche promenade, "urban majlis" of Doha. *Journal of Infrastructure, Policy and Development*, *6*(2), Article 1496. https://doi.org/10.24294/jipd.v6i2.1496

Furlan, R., Petruccioli, A., Major, M., Zaina, S., Zaina, S., Alsaeed, M., & Saleh, D. (2018). The urban regeneration of west-bay, business district of Doha (State of Qatar): A transit-oriented development enhancing livability. *Journal of Urban Management*, *8*(1), 126–144. https://doi.org/10.1016/j.jum.2018.10.001

Furlan, R., & Sinclair, B. R. (2021). Planning for a neighborhood and city-scale green network system in Qatar: The case of MIA Park. *Environment, Development and Sustainability*, *23*(10), 14933–14957.

Furlan, R., & Sipe, N. (2017). Light rail transit (LRT) and transit villages in Qatar: A planning strategy to revitalise the built environment of Doha. *Journal of Urban Regeneration and Renewal*, *10*(4), 379–399.

Furlan, R., Zaina, S., & Patel, S. (2020). The urban regeneration's framework for transit villages in Qatar: The case of Al Sadd in Doha. *Environment, Development and Sustainability*, *23*, 5920–5936. https://doi.org/10.1007/s10668-020-00853-4

Furlan, R., Zaina, S., & Patel, S. (2021). The urban regeneration's framework for transit villages in Qatar: The case of Al Sadd in Doha. *Environment, Development and Sustainability*, *23*(4), 5920–5936.

Galelo, A., Ribeiro, A., & Martinez, L. M. (2014). Measuring and evaluating the impacts of TOD measures—Searching for evidence of TOD characteristics in Azambuja Train Line. *Procedia-Social and Behavioral Sciences*, *111*, 899–908. https://doi.org/10.1016/j.sbspro.2014.01.124

Ganning, J., & Miller, M. M. (2020). Transit oriented development and retail: Is variation in success explained by a gap between theory and practice? *Transportation Research Part D: Transport and Environment*, *85*, Article 102357. https://doi.org/10.1016/j.trd.2020.102357

Ibraeva, A., de Almeida Correia, G. H., Silva, C., & Antunesa, A. P. (2020). Transit-oriented development: A review of research achievements and challenges. *Transportation Research Part A*, *132*, 110–130. https://doi.org/10.1016/j.tra.2019.10.018

Jaafar Sidek, M. F., Bakri, F. A., Kadar Hamsa, A. A., Aziemah Nik Othman, N. N., Noor, N. M., & Ibrahim, M. (2020). Socio-economic and travel characteristics of transit users at transit-oriented development (TOD) stations. *Transportation Research Procedia*, *48*, 1931–1955. https://doi.org/10.1016/j.trpro.2020.08.225

Jacobs, J. (2016). *The death and life of great American cities*. Vintage.

Kashef, M. (2016). Urban livability across disciplinary and professional boundaries. *Frontiers of Architectural Research*, *5*(2), 239–253.

Knowles, C., & Sweetman, P. (2004). *Picturing the social landscape: Visual methods and the sociological imagination*. Routledge.

Knowles, R. (2012). Transit oriented development

in Copenhagen, Denmark: From the finger plan to Ørestad. *Journal of Transport Geography*, *22*, 251–261. https://doi.org/10.1016/j.jtrangeo.2012.01.009

Knowles, R. D. (2006). Transport shaping space: Differential collapse in time–space. *Journal of Transport Geography, 14*(6), 407–425. https://doi.org/10.1016/j.jtrangeo.2006.07.001

Kumar, P. P., Parida, M., & Sekhar, C. R. (2020). Developing context sensitive planning criteria for transit oriented development (TOD): A fuzzy-group decision approach. *Transportation Research Procedia*, *48*, 2421–2434. https://doi.org/10.1016/j.trpro.2020.08.278

Li, J., & Huang, H. (2020). Effects of transit-oriented development (TOD) on housing prices: A case study in Wuhan, China. *Research in Transportation Economics*, *80*, Article 100813. https://doi.org/10.1016/j.retrec.2020.100813

Liu, L., Zhang, M., & Xu, T. (2020). A conceptual framework and implementation tool for land use planning for corridor transit oriented development. *Cities*, *107*, Article 102939. https://doi.org/10.1016/j.cities.2020.102939

Mills, N. (2020, February 26). Geelong council votes to spend $2 million to rip up part of the city's $8 million "green spine." *ABC News*. https://www.abc.net.au/news/2020-02-26/geelong-council-votes-to-rip-up-malop-st-green-spine-bike-lane/12002544

Ministry of Municipality and Environment. (2015). *Qatar national master plan*. http://www.mme.gov.qa/QatarMasterPlan/English/centers.aspx?panel=about

Pacione, M. (1989). Access to urban services—The case of secondary schools in Glasgow. *Scottish Geographical Magazine, 105*(1), 12–18. https://doi.org/10.1080/00369228918736746

Salama, A. M., & Wiedmann, F. (2016). *Demystifying Doha: On architecture and urbanism in an emerging city*. Routledge.

Stojanovski, T. (2019). Urban design and public transportation—Public spaces, visual proximity and transit-oriented development (TOD). *Journal of Urban Design*, *25*(1), 134–154. https://doi.org/10.1080/13574809.2019.1592665

Tadi, M., Biraghi, C. A., & Zadeh, H. M. (2017). Urban transition, a new pilot eco-district in Porto di Mare area (Milan) via IMM methodology. In M. Talia (Ed.), *Un futuro affidabile per la città: Apertura al cambiamento e rischio accettabile nel governo del territorio* [A reliable future for the city: Openness to change and acceptable risk in territorial governance] (pp. 171–180). Planum.

Tadi, M., & Bogunovich, D. (2017). *New Lynn–Auckland IMM case study: Low-density urban morphology and energy performance optimisation—A new pilot project in Auckland using integrated modification methodology (IMM)*. Unitec ePress.

Tannous, H. O., Furlan, R., & Major, M. D. (2020). Souq Waqif neighborhood as a transit-oriented development. *Journal of Urban Planning and Development*, *146*(4). https://doi.org/10.1061/(ASCE)UP.1943-5444.0000615

Tannous, H. O., Major, M. D., & Furlan, R. (2021). Accessibility of green spaces in a metropolitan network using space syntax to objectively evaluate the spatial locations of parks and promenades in Doha, State of Qatar. *Urban Forestry & Urban Greening*, *58*, Article 126892.

Venner, M., & Ecola, L. (2007). Financing transit-oriented development: Understanding and overcoming obstacles. *Transportation Research Record*, *1996*(1), 17–24. https://doi.org/https://doi.org/10.3141%2F1996-03

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Article

Rethinking the Contextual Factors Influencing Urban Mobility: A New Holistic Conceptual Framework

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Abstract
Urbanisation, urban mobility (active travel), and public health continue to be three defining issues of the 21st century. Today, more than half of humanity lives in cities, a proportion that is expected to reach 70% by 2050. Not surprisingly, urbanisation has significant impacts on mobility, health, and well-being. Today's cities struggle with health challenges such as those that are either a direct result of infectious and non-communicable diseases or issues related to violence and injuries. According to the World Health Organisation, the lack of suitable space in urban areas for physical activities and active living has turned cities into epicentres for diseases. The concept of urban mobility and its connection to health is not new. However, the ways through which a healthy city objective is achieved are poorly investigated in the academic literature. Accordingly, this article proposes a holistic conceptual framework by consolidating knowledge around factors impacting urban mobility by adopting a scoping review methodology to determine the field's scope, coverage, and existing knowledge gap. To achieve the above objectives, 3,189 research articles and book chapters published between 2014 and 2021 were screened. A total of 92 studies were identified as eligible for inclusion in the scoping review. This approach revealed the importance of understanding urban mobility and healthy cities and of identifying and enacting associated enablers. Covid-19 has amplified the urgency of giving attention to these issues. The scoping review also showed a need for further research that investigates the future of urban mobility and healthy cities. A conceptual framework has been drawn from the literature to guide such future research.

Keywords
healthy cities; social-ecological systems resilience theory; socio-economic factors; theory of planned behaviour; urban mobility; urbanisation; well-being

Issue
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1. Introduction

For decades, city and transportation planning in developed and developing countries has primarily focused on accommodating the fast-growing demand for the use of private cars (i.e., auto-centric planning), resulting from experiencing rapid economic growth. Although due to the negative consequences of such planning approaches (Banister, 2011; Harrington & McConnell, 2003), the underlying paradigm around urban mobility has been shifting. The new focus seems to be related to a few factors across cities, including socio-economic

factors (Ahmad & Oliveira, 2016), the characteristics of the transport systems (Ingvardson & Nielsen, 2018), different dimensions of urban mobility, and land use patterns (Newman & Kenworthy, 2015). A recent study by Teoh et al. (2020) found consistent evidence that urban mobility transitions through economic growth and rising levels of income. Cities prioritising these socio-economic aspects in their planning approaches are more likely to improve urban mobility. These findings are not surprising as the concept of urban mobility has direct economic roots. Heterodox economic theories such as the bid rent theory, the post-Keynesian notion of convention, agglomeration economies, and the theory of the location of industries create a dynamic foundation to configure the concept of urban mobility in modern days. Bid rent theory was first introduced by David Ricardo (1817) as an agricultural analogy and later was used in economic geography and urban economics. The theory defines the changes in real estate price and demand as a function of distance from the central business district, indicating more competition and higher processes for lands closer to the central business district. This theory is essential to understanding the configuration of capitalist cities.

Post-Keynesian literature provides further emphasis on urban economics. It details the concepts of uncertainty and conventions, emphasising that economic agents' (i.e., individuals and firms) uncertainty and expectations have significant and inevitable impacts on the types and volumes of economic activities. This approach influenced urban economics literature by arguing that the economic landscape can be described as a "landscape of uncertainty," as mentioned in Clarke et al. (1986).

Furthermore, the theory of the location of industries originated based on the "least cost principle," and it is used to explain the locational decisions of the manufacturing industries. The theory presupposes aggregate demand uniformity and transportation as a function of cargo weight and distance. And finally, the perennial gale of "creative destruction" theorised by Schumpeter (1942) saw disruptions leading to the destruction of old and redundant technologies and the reallocation of market resources to create more contemporary industry jobs and opportunities (Chaiechi, 2014). This phenomenon of creative destruction ultimately increases the profitability of new ways of production, altering agglomeration economies and changing spatial urban landscapes (Holgersen, 2014) through mobilising resources and re-shaping urban zones.

Classical location theories suggest that some activities with weaker associations with main commercial centres may occur around an isolated urban centre and are independent of the rest of the economic system (Figueiredo & Crocco, 2015). These theories fail to regard the factors that lead to the concentration of activities in urban spaces. However, a few heterodox economists and economic geographers proposed disagglomerative and fragmented models to define the shape of the cities and the formation of consumer centres (away from the central business districts). Economic geographer Christaller introduced the central place theory in 1933 and associated the concept of the neighbourhood with factors such as density, income (affordability and per capita income), education, culture, and transport and the cost of travel to get to a place (Christaller, 1933/1966). Heterodox economist Lemos (1988) placed transportation cost at the centre of his disagglomerative models, and while his work was mainly concentrated on commercial location decisions, it has opened a dialogue around transport and its cost to getting to optimum places. As it is becoming more evident today, urban transport planning and policies have a significant impact on public health (Khreis et al., 2017; Nieuwenhuijsen & Khreis, 2019), and the concept of mobility and access are becoming increasingly regarded as an essential leverage point to tackle the climate crisis (Khomenko et al., 2020).

Together, these theories provide a coherent heterodox context to understand city dynamics and shape new urban conventions' frontiers. Nonetheless, considering socio-economic factors in planning for urban mobility is not adequately explored in the context of accommodating configurations of urban structure. Furthermore, how a healthy city objective is achieved is poorly understood in the literature. The other under-researched area is understanding ways through which cities can prepare for achieving increasingly essential goals such as enhanced urban mobility, walkability (Habitat III, 2016; Principle 8), transit-friendliness (Principle 8), urban safety (Principle 9) while protecting the vulnerable population. The significance of accomplishing such goals is further intensified when studying tropical cities that are swiftly expanding due to the growth of tropical economies, increasing urban entrepreneurial activities and accelerating demographics (Chaiechi & Eijdenberg, 2022; Choongo et al., 2020).

Despite economic prosperity achieved through market-oriented reforms in the post-World War II era, wealthy cities still face increasing social and environmental problems. To address these issues and build healthy and liveable cities, "beyond-gross domestic product" indicators must be integrated into urban planning and economic decisions. Consequently, the unsustainable economic growth in recent decades has turned cities into arenas for political struggles to create a balance between the environment, society, and economy. Optimum urban mobility does not only ensure access to economic opportunities and services for city dwellers, but it also provides the potential to address some of the global concerns such as human health, sustainable economic development, and the natural environment. Despite the existence of such multidisciplinary evidence, there is still a compelling need for a holistic conceptual framework that provides a single source of evidence-based and informed best-practice planning guidelines.

Recognising that cities are complex systems and urban health outcomes depends on interactions with a

wide range of indicators and feedback loops, this study utilises a scoping review to propose a holistic conceptual framework to predict patterns of urban mobility. Through this process, this study identifies the key contextual factors that influence urban mobility and presents a framework for further investigations.

2. Material and Methods

2.1. The Scoping Review

This article primarily follows Arksey and O'Malley's (2005) scoping review methodology to determine the field's scope, coverage, and existing knowledge gaps. Arksey and O'Malley (2005) developed a six-stage methodological framework (optional sixth step). This article follows the mandatory five steps, including:

1. Identify the search (guiding) question;
2. Identify relevant studies;
3. Study selection;
4. Charting the data;
5. Summarising and reporting the results.

These stages are iterative rather than linear, and researchers are encouraged to intuitively engage with each stage where needed (Mushaya et al., 2022). Following Chaiechi (2020) and Azzali et al. (2022), the article established review strategies in the form of an a priori protocol, including developing a guiding question and identifying eligibility criteria (as represented in Figure 1 and Table 1), search strategy and literature profiling techniques. The guiding question used to search for articles was: What are the economic impacts of urban mobility and healthy cities? The search strategy involved utilising the Science Direct search engine, which was then replicated to extend to Google Scholar.

Only research articles and book chapters were included in the search. Review articles, book reviews, conference papers, short communications, case reports, data articles, and encyclopedias were excluded from the search. The time span was set to include all publications between 2014 and 2021. The year 2014 was selected as the starting year as it marks the launch of the Urban Electric Mobility Initiative by UN-Habitat during the UN Climate Summit in September 2014 in New York. Working with authorities, industry, SMEs, knowledge partners, and international agencies, Urban Electric Mobility Initiative aims to pursue sustainable development goals, particularly transport and urban mobility (UN Habitat, 2013). Accordingly, appropriate filters were used in ScienceDirect and Google Scholar

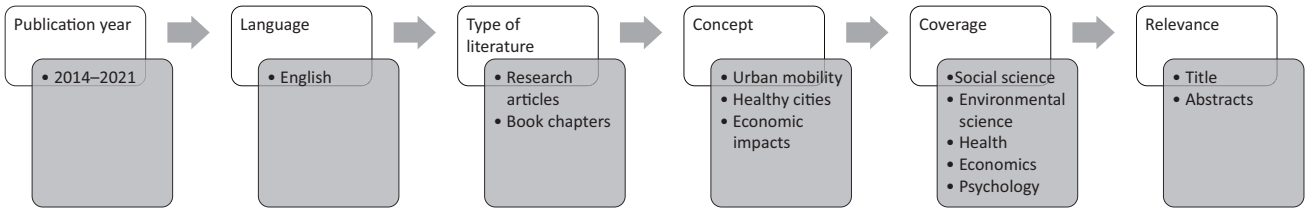

Figure 1. Inclusion criteria.

Table 1. Inclusion and exclusion criteria.

Criteria	Inclusion	Exclusion
Publication year	Studies published in the years between 2014 and 2021	Studies outside this time span
Language	English only	Studies in languages other than English
Type of literature	Research articles and book chapters	Reports, grey literature, books, review articles, book reviews, conference abstracts, editorials, data articles, correspondence, case reports, and encyclopedias
Concept	Concepts related to urban mobility, healthy cities, and economic impacts	Concepts unrelated to urban mobility, healthy cities, and economic impacts
Coverage	Social sciences, environmental science, health, economics, psychology, business, and management and accounting	Medicine, agricultural and biological sciences, nursing and health professions, engineering, and energy
Relevance	Relevance of titles and abstracts to the topic coverage	Titles and abstracts that did not appear related to the topic coverage

search engines to extract studies limited to the selected time span. The time span was set to include all publications between 2014 and 2021.

To uncover topical relationships between the articles in the sample and explore the parallel existence of discrete knowledge sources, the articles were grouped based on their discipline specifics and dissemination specifics. The subject areas were quite diverse, demonstrating complementary capabilities of academic fields that contributed to the topic area. The subject areas included: business; decision science; economics, econometrics and finance; environmental sciences; social sciences; environmental sciences; management and accounting; medicine; psychology; and engineering.

The initial search on the Science Direct database resulted in 3,144 articles, of which 2,685 were research articles and 459 were book chapters. The Google Scholar database has limited filters that include years of publication and sorting options based on relevance applied in our search. Google Scholar does not distinguish between types of articles, books, review articles, and book chapters. Accordingly, the search result was exhaustive and selecting appropriate studies required due diligence. Overall, an additional 45 articles were collected through Google Scholar, resulting in an initial sample of 3,189 articles, including a search in the James Cook University Library One Search Database, resulting in 35 new articles. The authors screened all articles by title and abstract according to eligibility criteria.

A step-by-step screening approach was followed based on the eligibility criteria (as depicted in Figure 2). Eligible articles were then reviewed in full text to confirm eligibility. The relevance was explored firstly upon inspection of the titles and the abstracts, then based on the full-paper evaluation. The duplicate articles were removed from the sample following this screening step. Ultimately, after going through over 3,189 search results, 92 studies were selected and included in the final review.

As part of "charting the data"—i.e., step 4 in Arksey and O'Malley's (2005) protocol—the literature was initially profiled to extract relevant information or data from each article and book chapter. This information allowed for a descriptive summary of the data. It also enabled data to be collated and summarised to provide a scope of the extant literature. The results are presented below.

3. Results

One of the main aspects of profiling the data was identifying the geographical scope of the selected articles and book chapters. Figure 3 shows that, overall, nine countries were identified from the selected studies, with most articles (n = 20) being related to the United States, closely followed by China, Spain, and Canada, with the most publication representations in the selected sample.

Figure 4 shows only occasional publications focusing on the relationship between urban mobility and healthy cities from 2011 to 2019, but the topic area seems to gain impetus in 2020 and 2021. The stacked column represented in Figure 4 is useful in comparing the year of publication and the geographical scopes of the studies in the sample, which captures the cumulative magnitude of both elements.

To improve our initial understanding of how the concepts of urban mobility and health are presented in

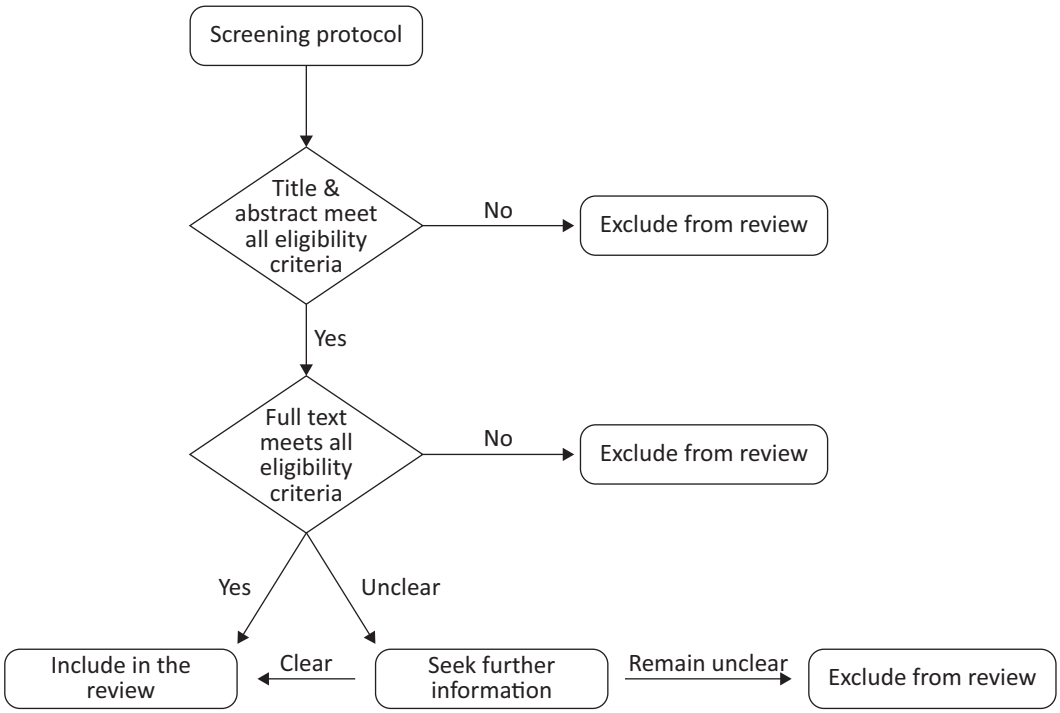

Figure 2. The screening protocol.

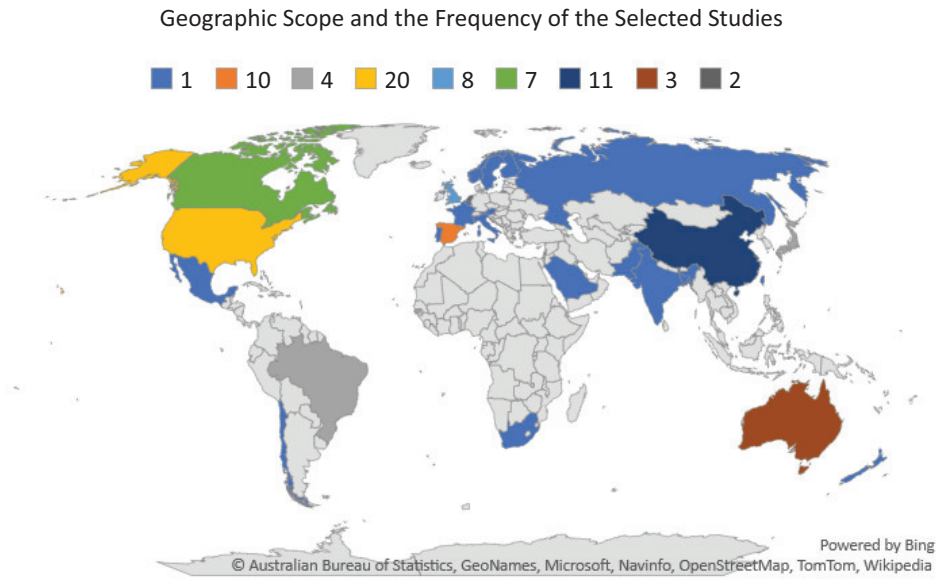

Figure 3. Geographic scope and the frequency of the selected studies. Data source: Authors.

the selected sample, a word frequency cloud was produced, which is shown in Figure 5. The word cloud displays the 100 most frequently used words in the selected articles, and the size of each word indicates its greater dominance. Figure 5 shows that most of these articles have also paid great attention to the concepts of health, transport, urban, public, walkability, mobility, and physical activity.

As the 92 articles were reviewed, it was possible to identify four main areas of research that were being explored in the articles. These were: active travel and safe neighbourhoods, the role of perception in promoting active travel, and the impact of the Covid-19 pandemic on active travel.

3.1. Urban Mobility and Urban Living

Urban mobility or active modes of travel (i.e., "active travel" or "soft urban mobility") are means of transport that promote physical activities such as walking, cycling, running, skateboarding, etc. (Louro et al., 2019; Oja et al., 2011). Enhanced urban mobility has proven to improve populations' access to places, hence increasing the competitiveness of different areas of a city or neighbourhood (Banister & Button, 1993; May et al., 2006). Soft urban mobility has motivated some policy-makers to adopt an integrated policy centred around sustainable and healthy modes of transport. Examples include Interreg CHIPS (cycle highways innovation for smarter people

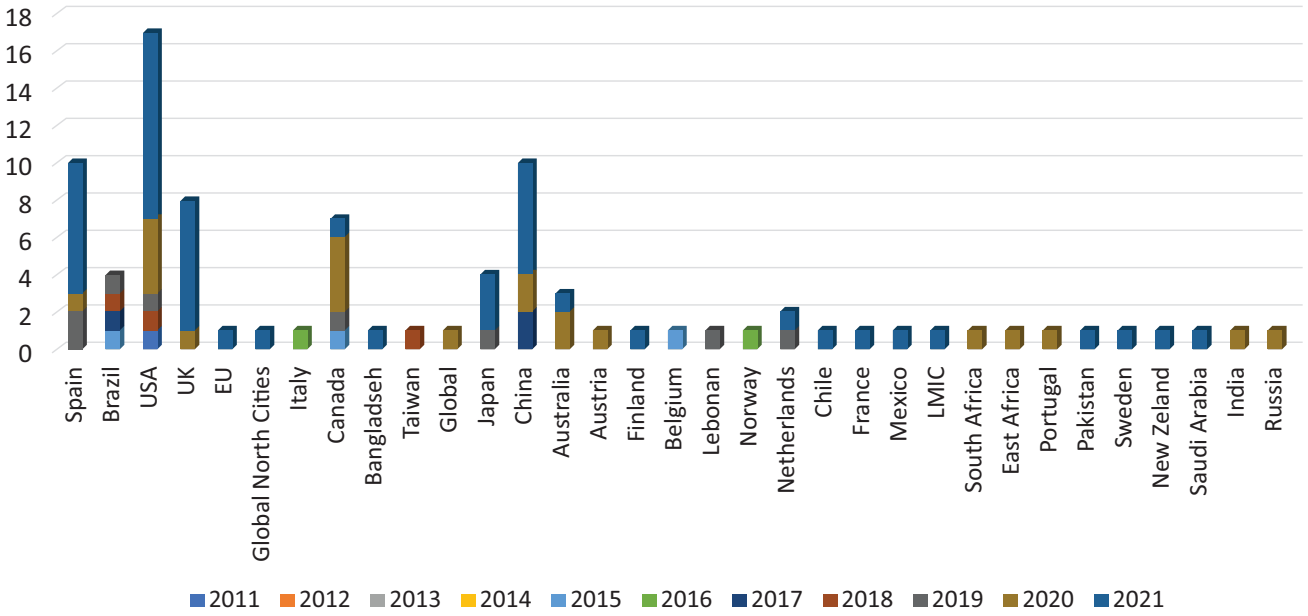

Figure 4. The cumulative magnitude of studies concerning their geographical scope and year of publication.

Figure 5. Word frequency cloud.

transport and spatial planning) in Belgium, Germany, the Netherlands, and the UK, or DePICT (designing and policy implementation for encouraging cycling and walking trips) in Brazil, the Netherlands, Designing And Policy Implementation for Encouraging Cycling and Walking Trips (DePICT) in the UK, and HANDSHAKE (supporting the take-up and transfer of successful cycling measures) cycling capital cities (i.e., in Amsterdam, Copenhagen, and Munich). These policies have not only contributed to improved public health outcomes but have also reduced the number and length of car trips, diminishing the negative impact of traffic and pollution on the environment and on the economy (loss of time and loss of productivity; Maltese et al., 2021). Active travel also has the capability to improve urban design and planning (López-Lambas et al., 2021). This relationship between the "built environment" and "active travel" is represented in Figure 6.

A group of studies in the literature sample consider urban and neighbourhood walkability as an important factor that positively impacts public health (Cebrecos et al., 2019; S. R. Liu et al., 2018; Y. Liu et al., 2017; Yoon et al., 2021). This relationship is depicted in Figure 6 (Active travel/Subjective well-being). Other studies focused on older and ageing adults and associated the concept of healthy cities with a number of influencing factors such as city and neighbourhood safety, accessibility, physical

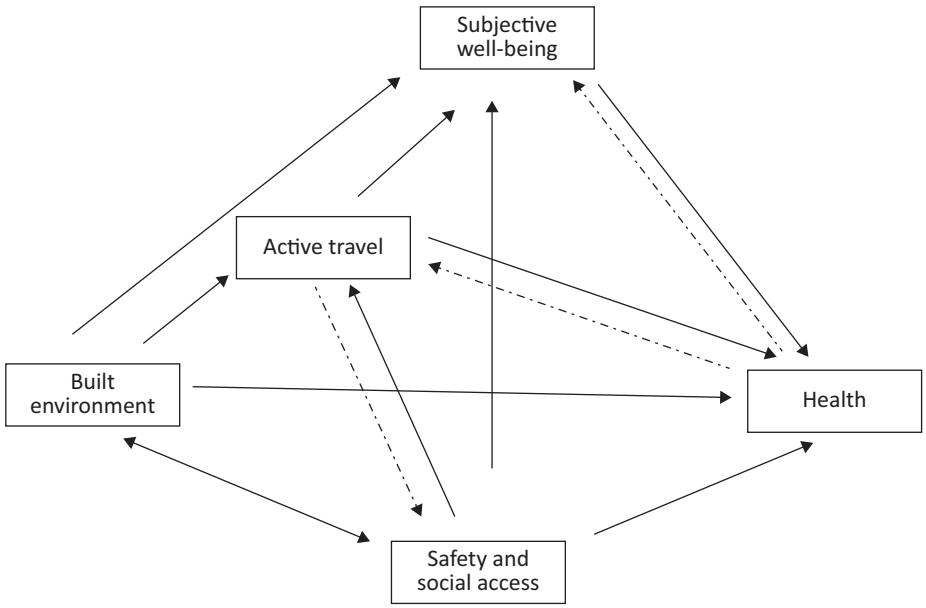

Figure 6. Relationship between safety, social access, and active travel. Source: Authors' work based on selected studies.

and social environment, and subjective well-being (Ronit et al., 2021; Sharov, 2020; Yin & Zhang, 2021), as noted in Figure 6 (Active Travel/Safety and social access, Active Travel/Subjective well-being, Active Travel/Health). The role of safety in promoting walkability is not extensively researched; nonetheless, some studies link poor walking and travel behaviour with safety concerns associated with the built environment, including long distances to amenities, shortages of sidewalks, traffic, and lack of cycling paths (Cambra & Moura, 2020; Iroz-Elardo et al., 2021; Lee et al., 2020; S. R. Liu et al., 2018; Y. Liu et al., 2017; Riggs et al., 2020). With respect to policies focusing on the built environment, the availability of safe and connected sidewalks and cycling paths is crucial for enhancing the overall rate of active travel adoption (Maltese et al., 2021; Rivera-Navarro et al., 2021). This conceptual relationship is depicted in Figure 7.

Nagata et al. (2020) focus on micro-scale walkability to promote walking behaviour and find a relationship between leisure walking by ageing females and micro-scale walkability based on the quantified streetscape. Nevertheless, studies indicate that due to a lack of research and data constraints, the practical advantages of walkability and associated measures are not fully explored in the literature (Nagata et al., 2020; Ronit et al., 2021).

3.2. The Role of Perception and Attitude in Promoting Urban Mobility

Another group of studies in the sample emphasised the deep connection between individuals' perceptions of and attitudes toward walking environments and social environments (Chen et al., 2021; Fontán-Vela et al., 2021; Huerta & Utomo, 2021; Iroz-Elardo et al., 2021; Klein et al., 2021; Lee et al., 2021; Rivera-Navarro et al., 2021; Weimann et al., 2020). In particular, it has been noted that "social access" plays a key role in perceptions and attitudes toward urban mobility. For example, investigating through 20 survey instruments, Iroz-Elardo et al. (2021) found that social interactions and networks (e.g., walking partners, knowing neighbours, and neighbourhood events), social cohesion (e.g., getting along, mutual trust, general view of the neighbourhood, community identity; Rivera-Navarro et al., 2021), and social conduct norms (e.g., knowing other who walk, catching up with others while walking) are positively connected with neighbourhood walkability. Personality traits have also been directly associated with perceptions relating to the quality of neighbourhood walkability. For example, along with health status, individuals' moods have been found to directly impact urban mobility and recreation (Chen et al., 2021).

The four main dimensions associated with social access have included people, activity, novelty, and ability. These four aspects have been explored in connection with urban mobility in public spaces. A few studies found that individuals relate to public places through other individuals or activities they know and are familiar with (Klein et al., 2021). Hence, emphasising the importance of safety and social access to urban mobility. Moreover, the affordability to travel to public spaces and the readiness with which previous experiences are described are also found to promote visiting public spaces in urban areas (Emerson et al., 2011; Klein et al., 2021). These relationships illustrate that perceptions and attitudes impact "willingness to use public spaces" and, ultimately, urban mobility, as depicted in Figure 7.

At the same time, perceptions of fear, insecurity, and dirtiness negatively affect physical activities, as such perceptions would keep people unmotivated (Rivera-Navarro et al., 2021). So, in such cases,

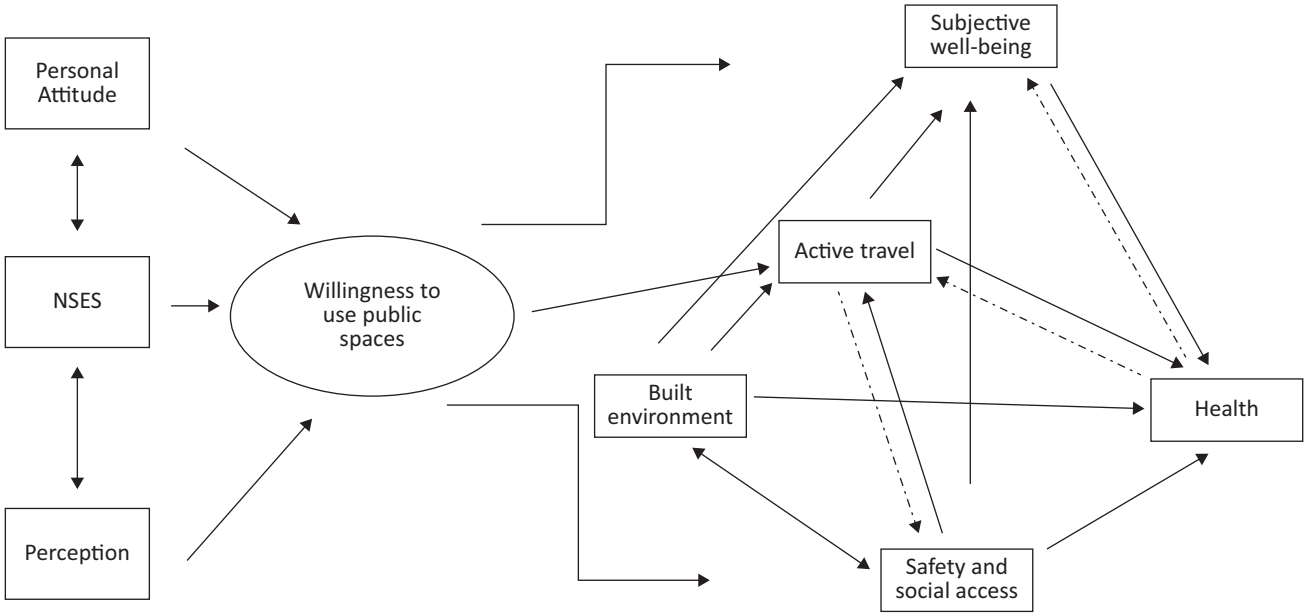

Figure 7. The relationship between perception, personal attitudes, and active travel.

governments' policies, practices, and interventions in the maintenance of public places are important. For instance, socio-spatial policing is an effective tool for the regulation of drug use in neighbourhoods (Ezell et al., 2021) and urban green spaces (Huerta & Utomo, 2021). In so doing, public and personal attitudes can be positively influenced. The relationship between personal attitudes and use of public spaces is also noted in Figure 7.

Nonetheless, proactive government interventions to improve well-being in urban areas could be hindered by society's negative perceptions of surrounding neighbourhoods. For example, neighbourhoods known for substance abuse and crime create negative perceptions of the surrounding built environment, resulting in feelings of hopelessness and, therefore, impacting mental health and active travel (Weimann et al., 2020).

Complementing the abovementioned views, the neighbourhood socio-economic status (NSES) of the residents, their gender, and age groups (Cheng et al., 2019; Khomenko et al., 2020; S. R. Liu et al., 2018; Mifsud et al., 2019; Rivera-Navarro et al., 2021) are found to impact how individuals interact with green public spaces (Fontán-Vela et al., 2021), as illustrated in Figure 7. Regardless, there seems to be a need for a better understanding of how these factors influence the attractiveness and perceptions of the neighbourhood environment to promote the active use of public spaces.

3.3. The Covid-19 Pandemic, Social Distancing, and Urban Mobility

Heterodox economics explains the economic processes of external events and disasters as a non-equilibrium phenomenon that opposes classical equilibrium economic theories (Chaiechi, 2020). Recent studies have broadly discussed the economic impacts of external risks and threats such as climate change, natural disasters, and public health emergencies. However, most of these discussions fail to investigate these economic effects concerning changes in human physical and mental health and behaviour during and post-disaster. Nonetheless, a few theories have been developed to account for the complex dynamic behaviours that emerge during unexpected changes. One of these theories is the social-ecological systems resilience (SERS) theory which refers to the adaptive capacity to transform and support human well-being in the presence of unexpected changes. Emerging from the works of Gunderson et al. (1995), Holling (1978), and Walters (1986), SERS has grown into an integrative and transdisciplinary approach that combines natural and social sciences perspectives of human well-being without looking at the economic factors associated with the concept of well-being. SERS appears to be applicable in studies regarding pandemic control measures, including extensive lockdowns, restricted mobility, and social isolation. The built environment has been associated with health and active travel (Cambra & Moura, 2020; Iroz-Elardo et al., 2021; Lee et al., 2020; S. R. Liu et al., 2018; Y. Liu et al., 2017; Maltese et al., 2021; Riggs et al., 2020; Rivera-Navarro et al., 2021). Living in larger dwellings, living farther from city centres and near large park areas (Mouratidis, 2020), and other positive neighbourhood features (such as quality of dwellings, availability of sidewalks, etc.) have also been linked with mental health and the ability to handle stress (Finucane et al., 2022; Vatavali et al., 2020; White & Van Der Boor, 2020). These articles highlight that "proximity" is another factor to be considered when addressing the use of public spaces and mobility. They suggest that any urban planning and focus on the built environment should also include considerations of proximity. Accordingly, this has now been captured in the conceptual framework proposed in the next section.

The Covid-19 pandemic's social and mental health impacts have been found to be more severe on socio-economically disadvantaged groups in segregated neighbourhoods and non-white communities (Barber et al., 2020; Falchetta & Noussan, 2020; Finucane et al., 2022). As the mental health of the urban population deteriorated due to Covid-19 restrictions on movement, the value of urban public and green spaces significantly increased in people's perceptions of these places (Huerta & Utomo, 2021; Rahman et al., 2021).

Restricted physical activity resulting from home confinement has also impacted the population's eating habits and overall well-being (Ammar et al., 2020). At the same time, neighbourhood trips significantly increased after curfew periods, while transit travels plummeted (Rahman et al., 2021). Unfortunately, however, there is a lack of remote sensed-based data on fuel consumption (as an indicator for car-based travels) and active travel, particularly in developing nations; nonetheless, studies highlight the importance of urban green and public spaces as a tool to improve community resilience, subjected well-being and overall physical and mental health (Huerta & Utomo, 2021; Rahman et al., 2021).

3.4. Proposed Conceptual Framework to Predict Urban Mobility

Collectively, the studies extracted from the scoping review evidence the elements of a conceptual framework that predicts urban mobility (active travel). They highlighted that perception strongly influences "willingness to use public spaces" through its interplay with NSES and personal attitudes (Figures 6 and 7). The relationship between willingness to use public spaces and urban mobility is also impacted by factors such as safety, social access, perceived external threats (e.g., Covid-19), and, most importantly, the built environment (Figures 6 and 7). The intent or willingness to use public spaces can ultimately result in urban mobility and, subsequently, subjective well-being, good public health, and healthy cities, as noted in Figure 7. SERS theory provides some explanation for the realisation of active travel. More broadly, the conceptualisation of personal attitudes and

perceptions through a willingness to use public spaces for urban mobility can best be explained by the theory of planned behaviour (TPB).

The TPB is an evolution of the theory of reasoned action, which was originally proposed and described by Ajzen and Fishbein in the 1980s (Drennan & Pryce, 2022). TPB seeks to explain the often-observed discrepancy between behavioural intentions and actual behaviour (Ajzen, 1985, 1991). Both TPB and theory of reasoned action (TRA) recognise that "subjective norms" can influence behavioural intentions, but the TPB extends that thinking by arguing that "perceived behavioural control" influences behaviour, either directly or through behavioural intentions. Ajzen (1985, 1991) contended that where perceived behaviour control works through behavioural intentions to affect behaviour, it is indicative of motivational factors. Hence, it is reasonable to advance TRA as a way to explore and understand how willingness to use public spaces and urban mobility are enacted because, according to TRA, individuals' perceptions and attitudes influence and are influenced by factors such as NSES and the built environment. Equally, TRA provides a richer and deeper insight into the factors at play between the willingness to use public spaces (i.e., behavioural intentions) and urban mobility (behaviour). Additionally, it can lead to informed decisions being made in relation to policies.

According to Badami (2009), worldwide experiences show that adding new roads is beneficial only in the short term, improving speed and easing congestion only briefly. Over time, the resulting increase in travel by single motorised vehicles, shifting of travel from public modes to cars, and diversion of traffic from other destinations and routes will instead cause new and longer car-based trips and decrease active travel. As previous studies showed, the lack of detailed urban design guidelines impedes the creation of pedestrian-friendly environments (Zhang et al., 2018). In this sense, planning public consultation policies could help better understand the "willingness to use public space" by capturing diverse and different attitudes and perceptions and, in this way, involve the local population in the transportation design process.

The proposed framework (Figure 8) can support local policies and further investigations aimed at defining new ways to face the urban mobility challenge, focusing, for example, on relevant areas of intervention such as integrating land-use and transport planning; and supporting a multi-modal approach to transportation (integrating different modes) that facilitates the shift from one option to another, and, in turn, fosters urban mobility. The proposed framework brings together concepts and constructs (i.e., attitudes, perceptions, subjective well-being, public health, healthy cities, willingness to use public spaces, and urban mobility) and associated factors (e.g., built environment, safety, social access, NSES, and external threats) that can inform policies and plans that promote increased willingness to use public spaces and urban mobility.

4. Conclusion

Around the world, urban mobility associated with rapid urbanisation and motorisation presents challenges to individuals, cities, and nations. New urban developments are experiencing impressive rapid growth in demand for transportation and increased demand to cope with limited infrastructure and deterioration of health and

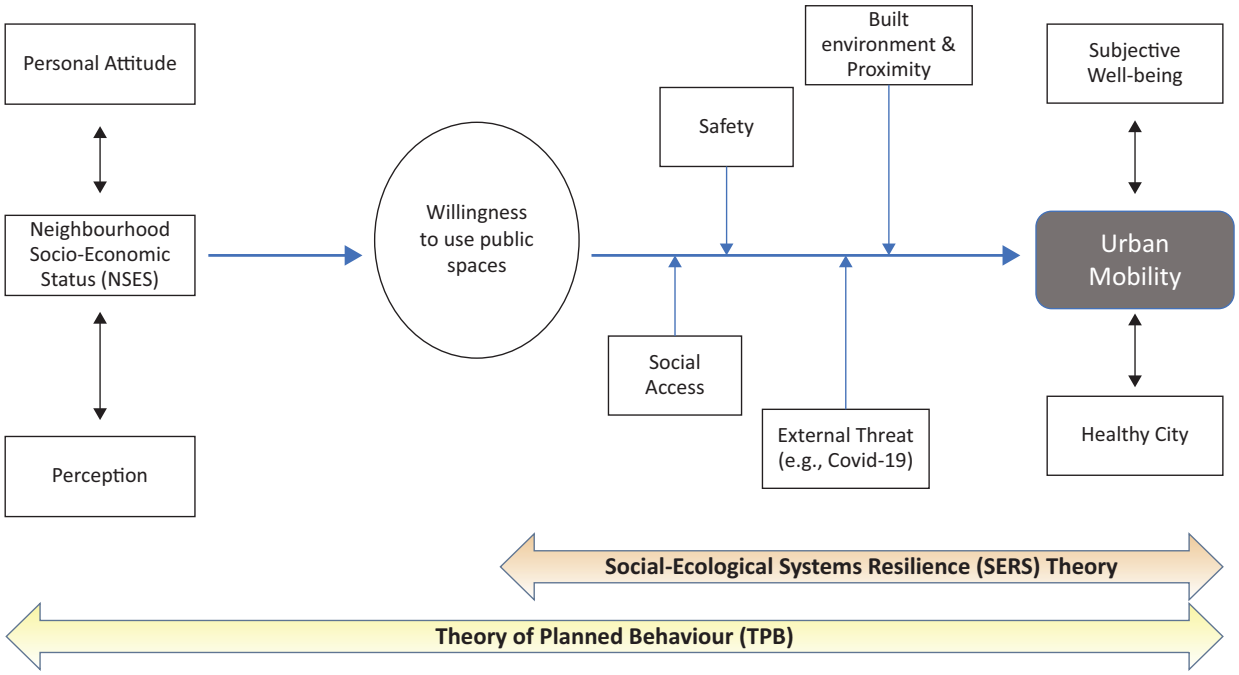

Figure 8. Proposed conceptual model to predict patterns of urban mobility in cities in the post-pandemic period.

well-being due to limited urban mobility. Within this context, this scoping review sought to determine the economic impacts of urbanisation on urban mobility and healthy cities. It found that the focus of the literature emphasised factors beyond economic aspects. In particular, the literature highlighted that urban mobility was a fundamental aspect of urbanisation and that it was instrumental in enabling subjective well-being and positive health outcomes. The studies also revealed that willingness to use public spaces was a key element for achieving urban mobility and that this behaviour was enacted through personal attitudes and perceptions, both of which were impacted by NSES.

Beyond the demographic variables, the studies noted that external variables (e.g., the built environment, social access, and safety) also impacted people's intentions to use public spaces and related urban mobility. Furthermore, the scoping review highlighted that the relationship between willingness to use public spaces and urban mobility is impacted by perceived external threats (e.g., Covid-19). In bringing together the findings from the scoping review, it was realised that the SERS theory presented explanations for the mechanisms of these relationships, and TPB afforded an extended conceptualisation of the relationships indicated by the literature. This realisation allowed for the development of a conceptual framework (Figure 8) that lends explanations for why individuals do or do not engage in urban mobility. Accordingly, the study proposes that this conceptual framework can support local policies to further define new ways to face the challenges of urban mobility, focusing on relevant areas of intervention such as integrating land-use and transport planning and supporting multi-modal approach transportation.

The proposed conceptual model could also serve as a point of departure for further theory development through empirical studies. Researchers could explore the different variables and interrelations between the variables of the conceptual model, such as examining how a neighbourhood's socio-economic status determines urban mobility and how this causal relationship is mediated by the willingness to use public spaces. The use of surveys that target various stakeholders would be a starting point for gathering such data. Additionally, insights from qualitative interviews could enrich the quantitative findings by providing contextualisation and deeper meaning to the numbers. Ultimately, increasing urbanisation demands that attention be given to urban mobility. Here, an integrated approach is proposed that allows for alleviating some of the potentially deleterious impacts of urbanisation.

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Conflict of Interests

The authors declare no conflict of interests.

References

Ahmad, S., & Oliveira, J. A. (2016). Determinants of urban mobility in India: Lessons for promoting sustainable and inclusive urban transportation in developing countries. *Transport Policy*, *50*, 106–114. https://doi.org/10.1016/j.tranpol.2016.04.014

Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In J. Kuhland & J. Beckham (Eds.), *Action-control: From cognitions to behavior* (pp. 11–39). Springer. https://doi.org/10.1007/978-3-642-69746-3_2

Ajzen, I. (1991). The theory of planned behavior. *Organisational Behavior and Human Decision Processes*, *50*(2), 179–211. http://dx.doi.org/10.1016/0749-*5978*(91)90020-T

Ammar, A., Brach, M., Trabelsi, K., Chtourou, H., Boukhris, O., Masmoudi, L., Bouaziz, B., Bentlage, E., How, D., Ahmed, M., Müller, P., Müller, N., Aloui, A., Hammouda, O., Paineiras-Domingos, L. L., Braakman-Jansen, A., Wrede, C., Bastoni, S., Pernambuco, C. S., . . . Hoekelmann, A. (2020). Effects of Covid-19 home confinement on eating behaviour and physical activity: Results of the ECLB-COVID19 international online survey. *Nutrients*, *12*(6), Article 1583. https://doi.org/10.3390/nu12061583

Arksey, H., & O'Malley, L. (2005). Scoping studies: Towards a methodological framework. *International Journal of Social Research Methodology*, *8*(1), 19–32. https://doi.org/10.1080/1364557032000119616

Azzali, S., Yew, A. S. Y., Chaiechi, T., & Wong, C. (2022). Urbanisation and well-being of ageing population in the twenty-first century: A scoping review of available assessment tools. In T. Chaiechi & J. Wood (Eds.), *Community empowerment, sustainable cities, and transformative economies* (pp. 129–149). Springer. https://doi.org/10.1007/978-981-16-5260-8_9

Badami, M. G. (2009). Urban transport policy as if people and the environment mattered: Pedestrian accessibility the first step. *Economic and Political Weekly*, *64*(33), 43–51.

Banister, D. (2011). Cities, mobility and climate change. *Journal of Transport Geography*, *19*(6), 1538–1546. https://doi.org/10.1016/J.JTRANGEO.2011.03.009

Banister, D., & Button, K. (1993). *Transport, the environment and sustainable development*. Routledge.

Barber, S., Headen, I., Branch, B., Tabb, L., & Yadeta, K. (2020). *Covid-19 in context: Racism, segregation and racial inequities in Philadelphia*. Drexel University Urban Health Collaborative. https://drexel.edu/~/media/Files/uhc/briefs/COVID_DATA.ashx?la=en

Cambra, P., & Moura, F. (2020). How does walkability change relate to walking behavior change? Effects of a street improvement in pedestrian vol-

umes and walking experience. *Journal of Transport & Health*, *16*, Article 100797. https://doi.org/10.1016/j.jth.2019.100797

Cebrecos, A., Escobar, F., Borrell, L. N., Díez, J., Gullón, P., Sureda, X., Klein, O., & Franco, M. (2019). A multicomponent method assessing healthy cardiovascular urban environments: The heart healthy hoods index. *Health & Place*, *55*, 111–119. https://doi.org/10.1016/j.healthplace.2018.11.010

Chaiechi, T. (2014). The broken window: Fallacy or fact—A Kaleckian–post-Keynesian approach. *Economic Modelling*, *39*, 195–203. https://doi.org/10.1016/j.econmod.2014.02.025

Chaiechi, T. (2020). Sustainable tropical cities: A scoping review of multidisciplinary methods for urban planning. *eTropic: Electronic Journal of Studies in the Tropics*, *19*(2), 25–51. https://doi.org/10.25120/etropic.19.2.2020.3743

Chaiechi, T., & Eijdenberg, E. L. (2022). Entrepreneurship, knowledge-economy and economic success of cities: A scoping review and thematic analysis. In T. Chaiechi & J. Wood (Eds.), *Community empowerment, sustainable cities, and transformative economies* (pp. 73–94). Springer. https://doi.org/10.1007/978-981-16-5260-8_6

Chen, J., van den Bosch, C. C., Lin, C., Liu, F., Huang, Y., Huang, Q., Wang, M., Zhou, Q., & Dong, J. (2021). Effects of personality, health and mood on satisfaction and quality perception of urban mountain parks. *Urban Forestry & Urban Greening*, *63*, Article 127210. https://doi.org/10.1016/j.ufug.2021.127210

Cheng, L., Chen, X., Yang, S., Cao, Z., De Vos, J., & Witlox, F. (2019). Active travel for active ageing in China: The role of built environment. *Journal of Transport Geography*, *7*, 142–152.

Choongo, P., Eijdenberg, E. L., Chabala, M., Lungu, J., & Taylor, T. K. (2020). The evolution of urban entrepreneurship in Zambia. In M. V. Iftikhar, J. B. Justice, & D. B. Audretsch (Eds.), *Urban studies and entrepreneurship* (pp. 249–269). Springer. https://doi.org/10.1007/978-3-030-15164-5_13

Christaller, W. (1966). *Central places in Southern Germany*. Prentice Hall. (Original work published 1933)

Clark, G., Gertler, M., & Whiteman, J. (1986). *Regional dynamics: Studies in adjustment theory*. Allen & Unwin.

Drennan, M., & Pryce, J. (2022). Influences on stakeholder attitudes towards government's Great Barrier Reef regulations: A scoping review for the case of sugar cane farmers in Queensland. *Journal of Resilient Economies*, *2*(1). https://doi.org/10.25120/jre.2.1.2022.3908

Emerson, R. M., Fretz, R. I., & Shaw, L. L. (2011). *Writing ethnographic fieldnotes*. University of Chicago Press.

Ezell, J. M., Ompad, D. C., & Walters, S. (2021). How urban and rural built environments influence the health attitudes and behaviors of people who use drugs. *Health & Place*, *69*, Article 102578.

Falchetta, G., & Noussan, M. (2020). The impact of Covid-19 on transport demand, modal choices, and sectoral energy consumption in Europe. *IAEE Energy Forum*, *2020*, 48–50.

Figueiredo, A., & Crocco, M. (2015). The role of money in the locational theory: A post-Keynesian approach. *Brazilian Journal of Regional and Urban Studies*, *2*(1), 33–54.

Finucane, M. L., Beckman, R., Ghosh-Dastidar, M., Dubowitz, T., Collins, R. L., & Troxel, W. (2022). Do social isolation and neighborhood walkability influence relationships between Covid-19 experiences and well-being in predominantly black urban areas? *Landscape and Urban Planning*, *217*, Article 104264. Https://doi.10.1016/j.landurbplan.2021.104264

Fontán-Vela, M., Rivera-Navarro, J., Gullón, P., Díez, J., Anguelovski, I., & Franco, M. (2021). Active use and perceptions of parks as urban assets for physical activity: A mixed-methods study. *Health & Place*, *71*, Article 102660. https://doi.org/10.1016/j.healthplace.2021.102660

Gunderson, L. H., Holling, C. S., & Light, S. S. (1995). *Barriers and bridges to the renewal of regional ecosystems*. Columbia University Press.

Habitat III. (2016). *The New Urban Agenda*. https://habitat3.org/the-new-urban-agenda

Harrington, W., & McConnell, V. (2003). *Motor vehicles and the environment*. Resources for the Future. https://media.rff.org/documents/RFF-RPT-carsenviron.pdf

Holgersen, S. (2014). Economic crisis, (creative) destruction, and the current urban condition. *Antipode*, *47*(3), 689–707.

Holling, C. S. (1978). *Adaptive environmental assessment and management*. Wiley.

Huerta, C. M., & Utomo, A. (2021). Evaluating the association between urban green spaces and subjective well-being in Mexico City during the Covid-19 pandemic. *Health & Place*, *70*, Article 102606. https://doi.org/10.1016/j.healthplace.2021.102606

Ingvardson, J. B., & Nielsen, O. A. (2018). How urban density, network topology and socio-economy influence public transport ridership: Empirical evidence from 48 European metropolitan areas. *Journal of Transport Geography*, *72*, 50–63. https://doi.org/10.1016/J.JTRANGEO.2018.07.002

Iroz-Elardo, N., Adkins, A., & Ingram, M. (2021). Measuring perceptions of social environments for walking: A scoping review of walkability surveys. *Health & Place*, *67*, Article 102468. https://doi.org/10.1016/j.healthplace.2020.102468

Khomenko, S., Nieuwenhuijsen, M., Ambròs, A., Wegener, S., & Mueller, N. (2020). Is a liveable city a healthy city? Health impacts of urban and transport planning in Vienna, Austria. *Environmental Research*, *183*, Article 109238. https://doi.org/10.1016/j.envres.2020.109238

Khreis, H., van Nunen, E., Mueller, N., Zandieh, R., &

Nieuwenhuijsen, M. J. (2017). How to create healthy environments in cities. *Epidemiology*, *28*(1), 60–62.

Klein, W., Dove, M. R., & Felson, A. J. (2021). Engaging the unengaged: Understanding residents' perceptions of social access to urban public space. *Urban Forestry & Urban Greening*, *59*, Article 126991. https://doi.org/10.1016/j.ufug.2021.126991

Lee, J., Baig, F., & Pervez, A. (2021). Impacts of Covid-19 on individuals' mobility behavior in Pakistan based on self-reported responses. *Journal of Transport & Health*, *22*, Article 101228. https://doi.org/10.1016/j.jth.2021.101228

Lee, S., Lee, C., Nam, J. W., Abbey-Lambertz, M., & Mendoza, J. A. (2020). School walkability index: Application of environmental audit tool and GIS. *Journal of Transport & Health*, *18*, Article 100880. https://doi.org/10.1016/j.jth.2020.100880

Lemos, M. B. (1988). *Espaço e capital: Um estudo sobre a dinâmica centro x periferia* [Space and capital: A study on the center x periphery dynamic] (Doctoral dissertation). IE/Unicamp, Campinas.

Liu, S. R., Kia-Keating, M., Santacrose, D. E., & Modir, S. (2018). Linking profiles of neighborhood elements to health and related outcomes among children across the United States. *Health & Place*, *53*, 203–209. https://doi.org/10.1016/j.healthplace.2018.08.013

Liu, Y., Dijst, M., Faber, J., Geertman, S., & Cui, C. (2017). Healthy urban living: Residential environment and health of older adults in Shanghai. *Health & Place*, *47*, 80–89. https://doi.10.1016/j.healthplace.2017.07.007

López-Lambas, M. E., Sánchez, J. M., & Alonso, A. (2021). The walking health: A route choice model to analyse the street factors enhancing active mobility. *Journal of Transport & Health*, *22*, Article 101133. https://doi.org/10.1016/j.jth.2021.101133

Louro, A., Marques da Costa, N., & Marques da Costa, E. (2019). Sustainable urban mobility policies as a path to healthy cities—The case study of LMA, Portugal. *Sustainability*, *11*(10), Article 2929.

Maltese, I., Gatta, V., & Marcucci, E. (2021). Active travel in sustainable urban mobility plans: An Italian overview. *Research in Transportation Business & Management*, *40*, Article 100621. https://doi.org/10.1016/j.rtbm.2021.100621

May, A. D., Kelly, C., & Shepherd, S. (2006). The principles of integration in urban transport strategies. *Transport Policy*, *13*(4), 319–327. https://doi.org/10.1016/j.tranpol.2005.12.005

Mifsud, D., Attard, M., & Ison, S. (2019). An exploratory study of the psychological determinants of mobility of older people in Malta. *Research in Transportation Business & Management*, *30*, Article 100373. https://doi.org/10.1016/j.rtbm.2019.100373

Mouratidis, K. (2020). Commute satisfaction, neighbourhood satisfaction, and housing satisfaction as predictors of subjective well-being and indicators of urban livability. *Travel Behaviour and Society*, *21*, 265–278. https://doi.org/10.1016/j.tbs.2020.07.006

Mushaya, C., Chaiechi, T., & Pryce, J. (2022, July 2–3). *Integrated risk management, a conduit to building resilient and sustainable local government communities: A scoping review. Community empowerment, sustainable cities, and transformative economies* [Paper presentation]. BEMAS: 1st International Conference in Business, Economics, Management, and Sustainability, Cairns, Queensland, Australia.

Nagata, S., Nakaya, T., Hanibuchi, T., Amagasa, S., Kikuchi, H., & Inoue, S. (2020). Objective scoring of streetscape walkability related to leisure walking: Statistical modeling approach with semantic segmentation of Google Street View images. *Health & Place*, *66*, Article 102428. https://doi.org/10.1016/j.healthplace.2020.102428

Newman, P., & Kenworthy, J. (2015). *The end of automobile dependence*. Island Press.

Nieuwenhuijsen, M., & Khreis, H. (2019). Urban and transport planning, environment and health. In M. Nieuwenhuijsen & H. Khreis (Eds.), *Integrating human health into urban and transport planning* (pp. 3–16). Springer. https://doi.org/10.1007/978-3-319-74983-9_1

Oja, P., Titze, S., Bauman, A., de Geus, B., Krenn, P., & Reger-Nash, B. (2011). Health benefits of cycling: A systematic review. *Scandinavian Journal of Medicine & Science in Sports*, *21*(4), 496–509. https://doi.org/10.1111/j.1600-0838.2011.01299.x

Rahman, S. M., Ratrout, N., Assi, K., Al-Sghan, I., Gazder, U., Reza, I., & Reshi, O. (2021). Transformation of urban mobility during Covid-19 pandemic—Lessons for transportation planning. *Journal of Transport & Health*, *23*, Article 101257. https://doi.org/10.1016/j.jth.2021.101257

Ricardo, D. (1817). *On the principles of political economy and taxation*. John Murray.

Riggs, W., Appleyard, B., & Johnson, M. (2020). A design framework for livable streets in the era of autonomous vehicles. *Urban, Planning and Transport Research*, *8*(1), 125–137. https://doi.org/10.1080/21650020.2020.1749123

Rivera-Navarro, J., Bonilla, L., Gullón, P., González-Salgado, I., & Franco, M. (2021). Can we improve our neighbourhoods to be more physically active? Residents' perceptions from a qualitative urban health inequalities study. *Health & Place*, *27*, Article 102658. https://doi.10.1016/j.healthplace.2021.102658

Ronit, R., Dalmat, R. R., Mooney, S. J., Hurvitz, P., Zhou, C., Moudon, A. V., & Saelens, B. E. (2021). Walkability measures to predict the likelihood of walking in a place: A classification and regression tree analysis. *Health & Place*, *72*, Article 102700. https://doi.org/10.1016/j.healthplace.2021.102700

Schumpeter, J. (1942). *Capitalism, socialism, and democracy*. Harper & Bros.

Sharov, M. (2020). Reliability as index of formation of sustainable urban passenger transport system, exem-

plified by cities in Russian Federation. *Transportation Research Procedia*, *50*, 647–653. https://doi.org/10.1016/j.trpro.2020.10.076

Teoh, R., Anciaes, P., & Jones, P. (2020). Urban mobility transitions through GDP growth: Policy choices facing cities in developing countries. *Journal of Transport Geography*, *88*, Article 102832. https://doi.org/10.1016/j.jtrangeo.2020.102832

UN Habitat. (2013). *Revised compilation for sustainable cities & human settlements in the sustainable development goals (SDGs) within the post-2015 development agenda*.

Vatavali, F., Gareiou, Z., Kehagia, F., & Zervas, E. (2020). Impact of Covid-19 on urban everyday life in Greece: Perceptions, experiences and practices of the active population. *Sustainability*, *12*(22), Article 9410. https://doi.org/10.3390/su12229410

Walters, C. (1986). *Adaptive management of renewable resources*. Macmillan.

Weimann, A., Kabane, N., Jooste, T., Hawkridge, A., Smit, W., & Oni, T. (2020). Health through human settlements: Investigating policymakers' perceptions of human settlement action for population health improvement in urban South Africa. *Habitat International*, *103*, Article 102203. https://doi.org/10.1016/j.habitatint.2020.102203

White, R. G., & Van Der Boor, C. (2020). Impact of the Covid-19 pandemic and initial period of lockdown on the mental health and well-being of adults in the UK. *BJPsych Open*, *6*(5), Article e90. https://doi.org/10.1192/bjo.2020.79

Yin, L., & Zhang, H. (2021). Building walkable and safe neighborhoods: Assessing the built environment characteristics for pedestrian safety in Buffalo, NY. *Journal of Transport & Health*, *22*, Article 101129. https://doi.org/10.1016/j.jth.2021.101129

Yoon, H., Choi, K., Kim, J., & Jang, Y. (2021). Neighborhood walkability, personal active travel, and health in Asian Americans: Does English proficiency matter? *Journal of Transport & Health*, *21*, Article 101082. https://doi.org/10.1016/j.jth.2021.101082

Zhang, Y., Azzali, S., Janssen, P., & Stouffs, R. (2018, December 10–12). *Design for walkable neighbourhoods in Singapore using form-based codes* [Paper presentation]. IFoU 2018: Reframing urban resilience implementation, Barcelona, Spain. https://doi.org/10.3390/IFOU2018-05934

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Article

Inequitable Housing Practices and Youth Internalizing Symptoms: Mediation Via Perceptions of Neighborhood Cohesion

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Abstract
Disordered urban environments negatively impact mental health symptoms and disorders. While many aspects of the built environment have been studied, one influence may come from inequitable, discriminatory housing practices such as redlining, blockbusting, and gentrification. The patterns of disinvestment and reinvestment that follow may be an underlying mechanism predicting poor mental health. In this study, we examine pathways between such practices and internalizing symptoms (i.e., anxiety and depression) among a sample of African American youth in Baltimore, Maryland, considering moderation and mediation pathways including neighborhood social cohesion and sex. In our direct models, the inequitable housing practices were not significant predictors of social cohesion. In our sex moderation model, however, we find negative influences on social cohesion: for girls from gentrification, and for boys from blockbusting. Our moderated mediation model shows that girls in gentrifying neighborhoods who experience lower social cohesion have higher levels of internalizing symptoms. Likewise for boys, living in a formerly blockbusted neighborhood generates poorer social cohesion, which in turn drives higher rates of internalizing symptoms. A key implication of this work is that, in addition to standard measures of the contemporary built environment, considering other invisible patterns related to discriminatory and inequitable housing practices is important in understanding the types of neighborhoods where anxiety and depression are more prevalent. And while some recent work has discussed the importance of considering phenomena like redlining in considering long-term trajectories of neighborhoods, other patterns such as blockbusting and gentrification may be equally important.

Keywords
anxiety; Baltimore; blockbusting; depression; gentrification; internalizing symptoms; neighborhood social cohesion; redlining

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1. Background

The links between urban development and mental health are well-established. Internalizing symptoms (including anxiety and depression) are relatively common across adolescence (Merikangas et al., 2010), but minority youth living in cities may be at heightened risk due to the higher crime rates and disadvantages (e.g., lower parental wealth, home ownership, residential stability) that often characterize their communities (Dupéré et al., 2012; Formoso et al., 2010). This may in part be because of the added stress of living in distressed communities, and how stress contributes to anxiety and depression (Wallace, 2012). Such symptoms have been predictive ofearly-onset substance use/misuse (King et al., 2004), suicidality (Nock et al., 2006), and other risky behaviors (Wickrama & Wickrama, 2010). Consistent with life course and social determinants of health theories, discriminatory and racist housing practices may affect youth's outcomes across development and have upstream effects on mental health. Historical and contemporary discriminatory practices—such as redlining, blockbusting, and gentrification—have shaped and continue to shape the social and material resources available to minority youth living in disinvested urban communities. In turn, these disparities in access to resources may influence the way children experience and cope with stressors.

While redlining was outlawed in 1968, the decades-long practice of excluding minorities from access to mortgages created huge gaps in accrued wealth. The ensuing practice of blockbusting and white flight—generated by the mortgage and banking industry in the 1970s and 1980s to spark panic selling and "flip" previously all-white neighborhoods (Gotham, 2000)—led to a massive shift of resources in communities. While now also illegal in practice, the legacy of blockbusting contributes to rates of predatory lending and continued racial steering today (Kahrl, 2017). More recently, other inequitable forms of redevelopment—whereby investments are made in communities that often do not benefit existing minority residents—continue the pattern of uneven urban development (Gotham, 2002) that shapes place-based health disparities.

Disinvested urban environments trend with higher rates of anxiety and depression among youth (Cooley-Strickland et al., 2011; Rathus et al., 1995; Von Nebbitt et al., 2008), though elements of connectedness like social cohesion may buffer against the negative outcomes felt in such neighborhoods. Thus, being in a community where cohesion is hard to form—or where the built environment creates daily stressful experiences—may increase the levels of internalizing symptoms among youth in neighborhoods where redlining or blockbusting once took place, or where gentrification is currently occurring (and these may operate differently across neighborhood types). Given the negative behavioral health outcomes associated with internalizing symptoms, further inquiry regarding the potential impact of inequitable and discriminatory housing practices and inequities within the built environment is necessary to inform interventions aimed at reducing these symptoms and related sequelae.

In the current study, we examined: (a) whether inequitable housing practices—specifically redlining, blockbusting, and gentrification—were associated with internalizing symptoms, (b) whether these practices predict levels of neighborhood cohesion for boys and girls, and (c) whether neighborhood social cohesion mediated the relation between these neighborhood practices and internalizing symptoms. We examine all three practices in this article because the associations between the processes and outcomes are likely distinct, and merit consideration.

Such practices are essential to consider and correct because the decades-long processes of structural racism in housing make us more vulnerable to the impacts of climate and urban change (Saign, 2021; Toolis, 2021). American cities are weaker by way of these practices, which artificially depressed densities and property values, making the provision of basic city services more difficult (Kaplan & Sommers, 2009; Lee, 1996; Ross & Leigh, 2000; Rugh & Massey, 2010). The ways we have harmed our cities and the people in them undoubtedly negatively impact the progress we should be making toward achieving World Health Organization-recommended sustainable development goals for healthy cities. By quantifying and understanding how such structural racism disadvantages urban residents, we will be better equipped to build healthier cities in the future that account for past wrongs by maintaining a focus on equity and justice.

1.1. Inequitable Housing Practices in the US

1.1.1. Redlining and Blockbusting

Redlining and blockbusting are two inequitable housing practices that have upheld racial and economic residential segregation and are responsible for vast differences in the quality of the built environment. Prior to 1968, no federal law ensured fair housing for all races (Kanter, 1993). Starting in the 1930s, the Home Owners' Loan Corporation formalized an exclusionary practice known as redlining. This in effect provided a basis on which many agencies withheld loans to people living in neighborhoods considered to be too high a financial risk (Hillier, 2003). The practice of categorizing neighborhoods according to their suitability for receiving mortgages was, in practice, racist. While redlined areas included a mix of white, black, and other minority neighborhoods, almost every majority African American neighborhood was redlined (Michney, 2021; Sadler et al., 2020). Though research examining the impact of living in areas with a history of discriminatory housing practices on mental health is limited, a recent study showed that adults living in areas with a prior history of redlining were more likely to report poorer health outcomes

including cancer, diabetes, obesity, stroke, and poorer mental health (Nardone et al., 2020).

Following redlining's prohibition, blockbusting was used to maintain segregation. Real estate agents and the mortgage industry colluded to create panic selling in previously all-white neighborhoods, convincing white residents to sell low and re-selling these homes at a premium to African American and other minority families (Highsmith, 2012). Blockbusting reproduced the segregated neighborhoods common to the redlining era, leading to massive disinvestment in previously middle-class neighborhoods (Sadler & Lafreniere, 2017).

In addition to the direct financial implications of housing discrimination (Priester et al., 2017), it also causes "pain, hurt, humiliation, and insult" (Heinrich, 1992, p. 52) and negative health outcomes among residents (Yang et al., 2016). Because housing discrimination can take new forms in spite of policy change (e.g., the shift from redlining to blockbusting to more contemporary patterns like gentrification), it has been referred to as a moving target (Massey, 2005). Continued inquiry into its various forms—and their impact on mental health—is therefore of importance.

1.1.2. Gentrification

Gentrification commonly entails an in-migration of middle-income residents, while spurring displacement of lower-income residents (Mujahid et al., 2019). It often includes new investments in communities (many of which are poor or formerly segregated) which bring increased institutional resources, improved mechanisms for informal social control, and improved academic and employment outcomes (Formoso et al., 2010). Gentrification is not as explicitly racist as past practices, because it is a function of market-driven urban policy that favors market-rate housing, relegates social problems, and reshapes social-cultural patterns in cities (Fraser et al., 2013). Even so, the inequality and displacement it creates make it similar to segregation in some ways (Wyly & Hammel, 2004).

A number of studies have linked gentrification with myriad health outcomes, although findings are mixed (Schnake-Mahl et al., 2020). Gentrification can negatively impact the well-being of existing residents by (a) displacing residents and businesses alike resulting in social network disruptions, (b) exacerbating income inequality between existing and incoming residents, and (c) adding stress to existing residents both by way of social marginalization for those remaining in place and displacement for those unable to afford to stay (Elliott-Cooper et al., 2020; Formoso et al., 2010; Wilder et al., 2017). Households that are displaced may also experience financial hardships of relocating and lose access to institutions (e.g., school) or other resources (e.g., job; Schnake-Mahl et al., 2020).

However, there is also evidence that gentrification may contribute to better health outcomes. For example, increased empowerment for community improvement and cross-cultural exchange may bring new opportunities (Wilder et al., 2017). Moreover, as noted by Schnake-Mahl et al. (2020), gentrification may result in greater economic opportunities, increased safety, and increased access to resources (e.g., health care services, green spaces). Indeed, there is evidence that economically or physically vulnerable adults in gentrifying neighborhoods have reported experiencing better health than those in unchanging low-income neighborhoods (Smith et al., 2017). Given these mixed findings, further investigation of gentrification's effects is warranted.

1.2. Inequitable Housing Practices and Internalizing Symptoms

Inequitable housing practices uphold racial and economic residential segregation and influence unequal access to resources and treatment (White & Lawrence, 2018) that create disparities in multiple health outcomes (Acevedo-Garcia et al., 2003; Mendez et al., 2014; Shaw et al., 2010). Beyond negative interpersonal outcomes, the effects of discrimination shape the environments where we live and the opportunities people have for employment, education, and social interaction (Williams et al., 2019).

While segregation may have a protective effect on mental distress via living among one's own group (Nobles et al., 2017), it typically entails unequal access to resources (Do et al., 2017; Kwate, 2017). The incurred time burden involved in accessing resources precludes residents from investing their time in other activities (work, social/family life, education), and can not only reinforce cycles of poverty but also compromise mental health and potentially make individuals feel helpless and defeated (Beidas et al., 2012; Hurd et al., 2013).

People in segregated or resource-scarce neighborhoods may also internalize these environments as a personal deficit instead of seeing the structural racism that caused it, which may contribute to feelings of depression and anxiety. Conversely, racist societal assumptions contribute to the racial empathy gap and implicit bias that is negatively experienced among minority populations. Ethnic density can lessen depressive symptoms to a point but is shown to contribute to higher levels in highly segregated neighborhoods (Bécares et al., 2014). Additional evidence suggests that segregation and residential instability both negatively contribute to mental health among children (Alegría et al., 2015; Jones et al., 2019). The instability caused by gentrification may have similar negative impacts as well. Taken together, the limited research examining the impact of historical neighborhood practices on internalizing symptoms is unclear and warrants further investigation to inform the development of interventions aimed at attenuating youth internalizing symptoms.

Where new investments do take place (often in areas considered to be gentrifying), the resulting housing

inequalities may confer risk for internalizing symptoms among existing youth. For example, research suggests that more affluent older adults reported higher levels of anxiety and depressive symptoms relative to adults living in more economically depressed areas which may be due to concerns over increases in the cost of living, and anxiety regarding housing displacement and closure of businesses (Smith et al., 2017).

1.3. Neighborhood Social Cohesion and Internalizing Symptoms

Neighborhood social cohesion is defined by one's sense of community, neighborly trust, and the positive social interactions that occur therein (Buckner, 1988; Robinette et al., 2018). While historical processes play a role in shaping internalizing symptoms, perceived contemporary neighborhood cohesion and connectedness may greatly influence these relations. Individuals in low-income neighborhoods who also perceive their neighborhoods as less cohesive are more likely to experience anxiety and depression (Kingsbury et al., 2015; Rabinowitz et al., 2016). In contrast, cohesion moderates the relation between neighborhood disadvantage and depressive symptoms (Dawson et al., 2019) such that higher levels of cohesion and collective efficacy contribute to a slower onset of internalizing symptoms in disadvantaged communities (Browning et al., 2013; Glasheen et al., 2014; Pearson et al., 2019).

Indeed, research suggests that social connectedness may buffer against the negative impacts of gentrification, particularly among vulnerable populations (Fong et al., 2019), although some work suggests that gentrification can be beneficial for promoting collective efficacy (Steinmetz-Wood et al., 2017). But because new development often rapidly prices out the most vulnerable populations, polarizes the social structure, and undermines social cohesion, these benefits are not always seen, and we, therefore, cannot assume only positive effects from gentrification (Butler, 2003; Cole et al., 2017; Uitermark et al., 2007). Conversely, the social structures of close-knit communities may also predispose a greater likelihood of internalizing symptoms among children via excessive parental monitoring (Kingsbury et al., 2015). Yet other forms of connectedness—such as intergenerational closure, where social networks between youth extend to their parents—may also be protective against developing internalizing symptoms (Formoso et al., 2010). One other potential mechanism related to neighborhood change is that moving out of violent, low collective efficacy neighborhoods can have a beneficial impact on adolescents' self-efficacy (Dupéré et al., 2012), which has been predictive of decreases in internalizing symptoms (Singh & Bussey, 2011). Thus, even when residents are displaced, perceiving one's neighborhood as cohesive may be associated with attenuated internalizing symptoms.

1.4. Sex Differences, Internalizing Symptoms, and Neighborhood Variables

While it is possible that historical neighborhood practices and perceived neighborhood cohesion may impact internalizing symptoms, there is reason to believe that sex differences may impact these relations. For example, living in a low-income neighborhood has been shown to predict social anxiety for girls, but not boys (Vine et al., 2012). Additionally, neighborhood disorder positively predicted internalizing symptoms for girls (Browning et al., 2013), including depression, anxiety, and autonomic arousal (Hill et al., 2005). Conversely, for boys, no associations were found between disorder and collective efficacy in internalizing symptoms (Browning et al., 2013).

In addition, girls may be impacted more by their environments than boys (Milam et al., 2012). For example, research suggests that boys may experience lower levels of anxiety and depression upon moving out of their neighborhoods relative to girls (Leventhal & Brooks-Gunn, 2003). Moreover, lower levels of neighborhood crime have been associated with lower internalizing symptoms among boys, but not girls (Rabinowitz et al., 2016). Although the mechanisms through which neighborhood practices may affect boys and girls differently are unclear, it has been hypothesized that the effects of neighborhood social cohesion may be more pronounced in girls relative to boys as girls tend to be more affiliative than boys (Frydenberg & Lewis, 1991), and are more likely to seek out social support from others when exposed to stressors (Piko, 2001).

1.5. Current Study

To address the existing gaps in the literature, the current study examined pathways between inequitable housing practices and internalizing symptoms and the differential impact of these effects on boys and girls. We hypothesized that (a) there would be a direct and positive effect of inequitable housing practices on internalizing symptoms, (b) housing practices would also predict neighborhood cohesion and that these relations would be further moderated by sex, and, finally, (c) neighborhood cohesion would mediate the relation between housing practices and internalizing symptoms in both boys and girls.

2. Methods

Participants were predominantly African American youth from Baltimore, Maryland, originally recruited for the Youth Opportunity (YO) program. The YO program's goals are to increase access to educational, occupational, and training opportunities for adolescents and young adults (Sonenstein et al., 2011). The YO program was implemented in two neighborhoods (in East and West Baltimore), but participants came from 49 of Baltimore's 55 community statistical areas (also referred to here as neighborhoods). Inclusion criteria required

youth to be between 16 and 23 years old and not be in foster care. Informed consent and assent were obtained from adult and youth participants, respectively. The study was approved by the Johns Hopkins University School of Medicine Institutional Review Board. A more detailed description of the YO program and study design is detailed elsewhere (Sonenstein et al., 2011; Tandon et al., 2015).

Data were collected at three time points: baseline (when the study began in 2008), six months post-baseline, and one to two years post-baseline. Baseline data for the current study included 782 youth (51.0% female; 93.7% African American; M_{age} = 18.76, *SD* = 1.71). Given the very small percentage of the sample that was not African American, only African Americans were included in the analyses (*N* = 733; 51.0% female; M_{age} = 18.75, *SD* = 1.71, range: 16–23). Approximately 60% of the sample participated in one of the YO programs and about 10% of the sample reported being employed (see Table 1 for additional sample information and descriptive statistics).

2.1. Measures

2.1.1. Neighborhood Social Cohesion

We assessed neighborhood social cohesion using a three-item scale developed by Kerrigan et al. (2006). One item, for example, is "people in my neighborhood are willing to help each other." Items were rated on a four-point Likert scale (1 = *strongly agree* to 4 = *strongly disagree*), reverse coded, and summed with higher scores reflecting higher levels of social cohesion. In the current sample, the measure demonstrated excellent internal reliability (coefficient alpha = 0.75).

2.1.2. Inequitable Housing Practices

For each participant, we joined variables denoting whether they lived in an area that had been redlined, blockbusted, or gentrified (a summary map is included in Figure 1). We used geographic information systems (GIS) software to join each participant to their neighborhood (defined as their community statistical area)

Table 1. Characteristics of the analytic sample.

Characteristic	*n* (%)		
Sex			
Male	374 (51.0%)		
Female	359 (49.0%)		
Years of schooling			
Less than 9th grade	98 (13.3%)		
9th grade	188 (25.6%)		
10th grade	174 (23.7%)		
11th grade	143 (19.5%)		
12th grade	98 (13.4%)		
Beyond high school	32 (4.4%)		
General education degree			
Yes	27 (4.5%)		
No	576 (95.5%)		
Employed part- or full-time			
Yes	85 (11.6%)		
No	648 (88.4%)		
Intervention			
Yes	418 (62.1%)		
No	255 (37.9%)		
	M (*SD*)	range	*n*
Age	18.76 (1.71)	16–23	733
Neighborhood cohesion	6.76 (2.35)	3–12	719
Blockbusting	0.38 (0.41)	0.00–1.00	706
Gentrification	0.08 (0.23)	0.00–1.00	706
Redlining	0.22 (0.33)	0.00–1.00	706
Depressive symptoms (CES-D)	14.76 (9.89)	0–56	729
Anxiety symptoms (BAI)	6.41 (7.93)	0–63	732

Notes: CES-D—Center for Epidemiological Studies of Depression; BAI—Beck anxiety inventory.

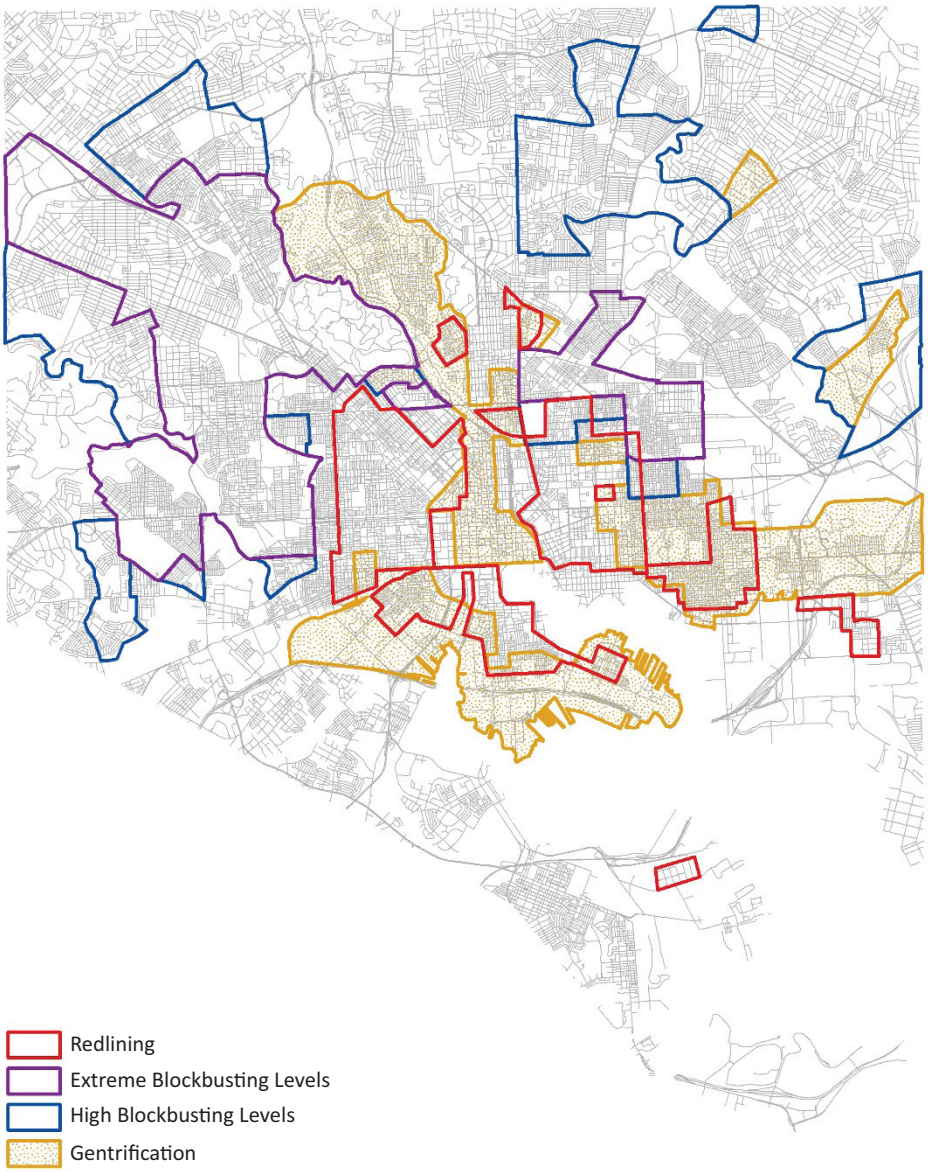

Figure 1. Map of Baltimore illustrating locations of inequitable housing practices.

and appended characteristics from that neighborhood to the participant.

Gentrification was measured according to the metric created by the National Community Reinvestment Coalition, which incorporates socioeconomic and demographic changes from the 2000 to 2010 censuses (Richardson et al., 2019). Socioeconomic changes are measured as increases above the 60th percentile in median home value and college-educated population. Demographic changes are measured as a 5% or greater decline in the predominant racial/ethnic group, or a decline in the percentage of the population of more than two standard deviations from the national mean. This metric is of interest here because Baltimore has one of the highest rates of gentrification in the US (Richardson et al., 2019). Neighborhoods were classified by the percentage of land area that fell within a gentrified census unit. Although our sample is not longitudinal, we assume that most youths in gentrifying neighborhoods are not in the incoming, higher-income group, based on the nature of the program from which our sample was drawn.

Redlining was measured according to the original metric created by the Home Owners' Loan Corporation in the 1930s. We digitized the redlining maps and outlined all areas that fell within a "red" zone. We then overlapped the redlining variable with the neighborhoods, and, like gentrification, neighborhoods were classified by the percentage of land area that fell within a formerly redlined neighborhood. These metrics reflect GIS-based practices for redlining in past work (Hillier, 2003; McClure et al., 2019; Sadler & Lafreniere, 2017).

Unlike gentrification and redlining, blockbusting has not commonly been considered as a potential determinant of contemporary health disparities or negative mental health outcomes. In fact, prior to Sadler and Lafreniere (2017), no study had operationalized a

definition of blockbusting for GIS-based inquiries. Thus, here we replicate their procedure for identifying potentially blockbusted neighborhoods. We calculated the percentage of change in the white population in the census periods between 1950 and 1980. Neighborhoods where a majority of the white population moved within one decade (>50%) are considered to have been blockbusted. These values were then overlapped with neighborhoods as the gentrification and redlining variables had been, and neighborhoods were assigned the percentage of land area that was blockbusted.

2.1.3. Internalizing Symptoms

Internalizing symptoms were assessed by creating a composite of measures of anxiety and depressive symptoms. Anxiety symptoms were evaluated using the BAI (Beck & Steer, 1990). The BAI is a 21-item measure that assesses physiological, behavioral, and cognitive indicators of anxiety. One item, for example, is "during the past month, how much have you been bothered by a fear of losing control?" Items were rated on a three-point Likert scale (1 = *mildly but it didn't bother me much* to 3 = *severely—it bothered me a lot*) and summed to create a composite score (α = 0.90). The measure demonstrated excellent internal reliability in the current sample (coefficient alpha = 0.89).

Depression symptoms were assessed using the CES-D (Radloff, 1977). The CES-D assesses four main constructs including depressed affect, anhedonia, somatic activity, and interpersonal difficulties. Participants were asked to rate how they felt or behaved in the past week, such as whether they felt fearful or that their life had been a failure. Items were rated on a four-point Likert scale (0 = *rarely or none of the time* to 4 = *most or all of the time*) and summed to create a composite score (α = 0.86). In the current sample, the measure demonstrated internal reliability (coefficient alpha = 0.79). The anxiety and depression composites were *z*-scored (M = 0, SD = 1) and summed to create an internalizing symptom composite (coefficient alpha = 0.81).

2.2. Statistical Analyses

Patterns of missing data and univariate normality were examined for all variables. Means and standard deviations between key study variables were also evaluated. Inequitable housing practices were examined in separate models to reflect the distinct time periods and investment patterns of each practice. Each of the hypotheses regarding the effects of inequitable housing practices was tested in a series of main effect and mediation models. First, the direct effects of sex, age, and each of the three inequitable housing practice predictors (i.e., redlining, blockbusting, and gentrification) on internalizing symptoms were evaluated. Second, the main effects of housing practices on neighborhood cohesion were examined. Next, we examined whether these relations were moderated by sex. Finally, we evaluated a moderated mediation model in which we examined whether the indirect pathway from inequitable housing practices to internalizing symptoms via neighborhood cohesion differed for boys and girls (see Figure 2).

All analyses were run in SPSS Version 24 using the PROCESS macro. Non-parametric bootstrapping procedures (repeated, random sampling with replacement of indirect effect estimates) were utilized to evaluate the significance of the indirect effects as well as examine an index of moderated mediation. Unlike hypothesis testing based on parametric statistics, bootstrapping procedures do not assume that the indirect effect (the product of the effect of the independent variable to the mediator and the effect of the mediator on the outcome) is normally distributed (Preacher & Hayes, 2008). Indirect effects estimates with 95% bootstrapped confidence intervals that do not include zero indicate a statistically significant mediation effect.

3. Results

Very low rates of missing data were found for each variable (0–3.7%). All dependent variables were found to be within acceptable ranges for skew and kurtosis (≤3.0).

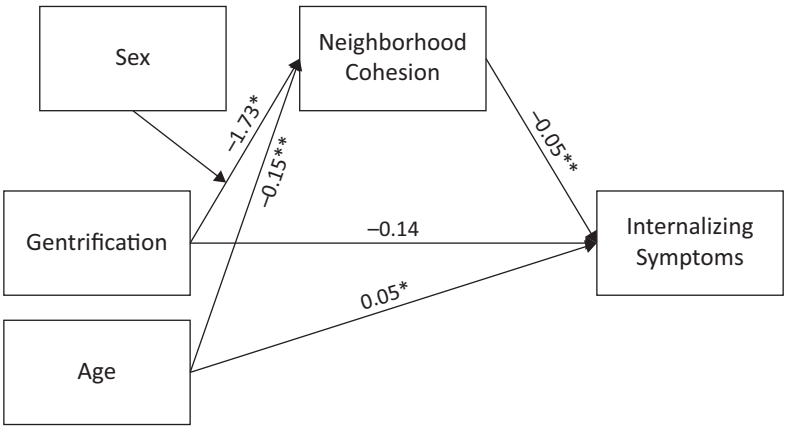

Figure 2. Model depicting mediation pathways linking gentrification, neighborhood cohesion, and internalizing symptoms. Note: *p < 0.05, **p < 0.01.

The correlations between blockbusting and both redlining (r = −0.39) and gentrification (r = −0.31) were moderate and negative, while the relation between redlining and gentrification was moderate and positive (r = 0.35). Results for the primary analyses are presented below.

3.1. Direct Effects of Inequitable Housing Practices on Internalizing Symptoms

Our first set of models evaluated the effect of redlining, gentrification, and blockbusting as predictors of internalizing symptoms (controlling for participant age and sex) in three separate models. Across all models, only sex and age were significant predictors of internalizing symptoms, which indicated that girls and older youth experienced greater levels of symptomatology.

3.2. Main Effects of Inequitable Housing Practices on Neighborhood Cohesion

In our second set of models, we examined inequitable housing practices as predictors of neighborhood cohesion in three separate models. In each of the models, only younger age was consistently linked to greater perceived neighborhood cohesion. Sex was also associated with neighborhood cohesion, indicating that boys reported higher levels of perceived neighborhood cohesion. None of the inequitable housing practices was a significant predictor of cohesion.

3.3. Moderation Models

Next, we examined whether sex moderated the pathway between inequitable housing practices and neighborhood cohesion in three separate models (controlling for participant age). The first model found a marginally significant interaction between gentrification and sex (β = −0.233, p = 0.050), such that there was a negative effect of gentrification on neighborhood cohesion for girls only (see Table 2). In other words, girls in gentrified neighborhoods reported lower perceived neighborhood cohesion (see Figure 3). We also found a significant interaction between sex and blockbusting (β = 0.400, p = 0.002); however, this effect was in the opposite direction. Results suggest a significant, negative effect of blockbusting on neighborhood cohesion for boys only, indicating that boys who lived in areas with higher rates of blockbusting reported less neighborhood cohesion (see Figure 3). Finally, there was not a significant interaction between sex and redlining predicting neighborhood cohesion.

3.4. Moderated Mediation Models

Finally, we examined a series of moderated mediation models. To examine the impact of gentrification on internalizing symptoms via neighborhood cohesion, we first conducted a mediation model controlling for participant age and sex. We did not find a significant direct effect of gentrification on internalizing symptoms, nor a significant indirect effect through neighborhood cohesion. We then added sex as a moderator of the pathway from gentrification to neighborhood cohesion and conducted a moderated mediation model predicting internalizing (controlling for participant age). Results support a moderated mediation model, indicating a significant indirect effect of gentrification on internalizing symptoms for girls only (IE = 0.06, 95% bootstrapped CI = 0.01 to 0.14).

Table 2. Unstandardized and standardized beta weights from the final steps of hierarchical models of discriminatory housing practices' associations with neighborhood cohesion.

Variable	*B*	*SEB*	*β*	*t*	*p*
Intercept	9.85	1.00	—	9.90	<0.001
Sex	−0.22	0.19	−0.05	−1.17	0.243
Age	−0.14	0.05	−0.11	−0.79	0.005
Gentrification	1.65	1.21	0.16	1.37	0.172
Sex × Gentrification	−1.51	0.77	−0.23	−1.96	0.050
Int.	10.66	1.02	—	10.48	<0.001
Sex	−0.84	0.24	−0.18	−3.52	<0.001
Age	−0.14	0.05	−0.10	−2.70	0.007
Blockbusting	−2.11	0.69	−0.37	−3.06	0.002
Sex × Blockbusting	1.33	0.43	0.40	3.11	0.002
Int.	9.71	1.01	—	9.66	<0.001
Sex	−0.19	0.21	−0.04	−0.91	0.365
Age	−0.14	0.05	−0.10	−2.67	0.008
Redlining	0.79	0.88	0.11	0.90	0.368
Sex × Redlining	−0.68	0.54	−0.16	−1.26	0.209

Notes: Sex is coded 1 for male and 2 for female.

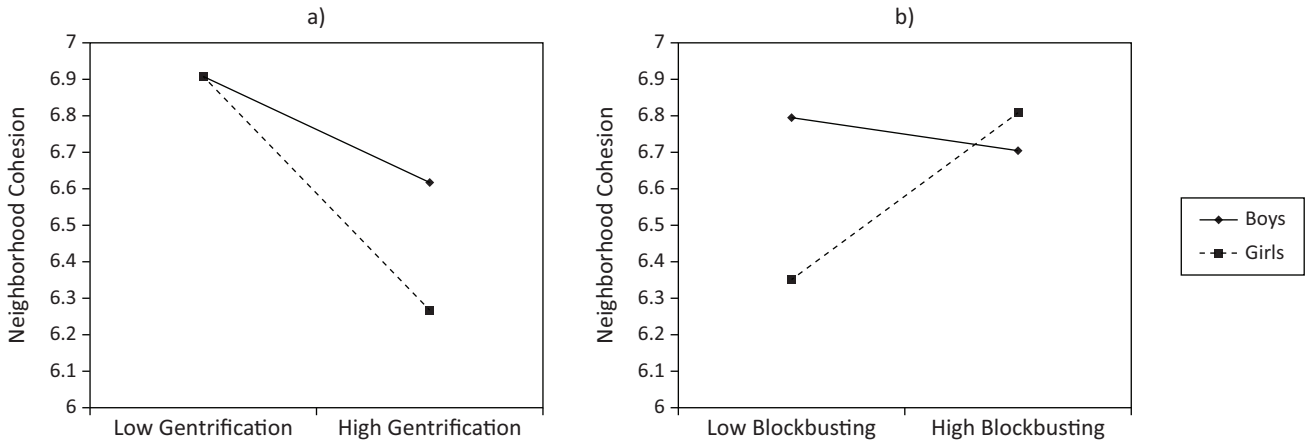

Figure 3. Plots of two-way interactions between sex and (a) gentrification and (b) blockbusting.

Moreover, the difference between the indirect effects for boys and girls was statistically significant (index of moderated mediation = 0.08, 95% bootstrapped CI = 0.01 to 0.18). These findings indicate girls exposed to higher rates of gentrification experienced lower neighborhood cohesion which, in turn, predicted elevated levels of internalizing symptoms (see Figure 2).

Our next set of models evaluated a mediation model in which exposure to blockbusting predicted neighborhood cohesion which, in turn, predicted internalizing symptoms (controlling for participant age and sex). Findings suggest that the direct effect of blockbusting on internalizing symptoms was not significant, nor was the indirect effect via neighborhood cohesion. We then added sex as a moderator of the pathway from blockbusting to neighborhood cohesion within the larger mediation model (continuing to control for participant age). Results indicate that a significant interaction effect between sex and blockbusting predicting neighborhood cohesion in the same pattern as reported above. Findings suggest a significant moderated mediation effect, indicating that living in a historically blockbusted area was associated with lower neighborhood cohesion for boys only and that this, in turn, predicted higher rates of internalizing symptoms (*IE* = 0.04, 95% bootstrapped CI = 0.01 to 0.08). The index of moderated mediation was also significant (–0.06, 95% bootstrapped CI = −0.12 to −0.02) suggesting these differences were statistically significantly different between boys and girls.

We then examined the same series of models using redlining as a predictor. Looking first at the relation between redlining and internalizing symptoms via neighborhood cohesion (controlling for participant age and sex), we found no direct or indirect effect of redlining on internalizing symptoms. We then considered a moderated mediation model (controlling for participant age). We found that sex did not moderate the pathway from redlining to neighborhood cohesion and that there was not a significant moderated mediation effect. All moderated mediation models were also run controlling for each of the other housing practices. An identical pattern of results emerged.

4. Discussion

Our first major finding is that girls living in gentrifying neighborhoods reported lower perceived neighborhood cohesion, which in turn predicted elevated levels of internalizing symptoms. The fact that girls in gentrifying neighborhoods experienced greater levels of internalizing symptoms suggests that neighborhoods may fail to incorporate some existing residents into the new and changing social life of the community, which contributes to the development of internalizing symptoms, particularly among girls.

A second major finding was that boys living in previously blockbusted neighborhoods reported less neighborhood cohesion which in turn predicted higher rates of internalizing symptoms. Blockbusted neighborhoods are effectively places of severe white flight and disinvestment (Gotham, 2002). That boys feel less neighborhood cohesion and subsequent elevations in levels of internalizing symptoms here suggests that these places may fail to provide social spaces or engender a sense of community trust (in this case, particularly for boys). Given levels of disinvestment in blockbusted neighborhoods, some such places may also have higher crime rates. Internalizing symptoms among males are worse in high-crime neighborhoods, thus if the two are coincident, it would explain the relation between blockbusting and internalizing symptoms among boys. Further investigation of this potential relationship is warranted.

Our analyses did not find any impacts of redlining on social cohesion or internalizing symptoms. Although the impacts of redlining on inter-generational wealth and other issues remain unresolved, the lack of an association suggests that people physically living in these spaces do not experience significantly worse outcomes than people in other neighborhoods. And while redlining and gentrification were coincident in some cases (Figure 1),

blockbusting almost always occurred apart from either of these. In Figure 1, we distinguish extreme blockbusting (>75% of the white population) from high blockbusting (50–75% of the white population) neighborhoods, but they are treated the same in analysis.

Given the significant effects of blockbusting on health outcomes, these findings are important; they illustrate the need for land use policies that address legacy effects of types of housing discrimination beyond redlining. Such understanding is essential for future urban planning approaches that aim to build more equitable cities.

4.1. Limitations

Despite these strengths, our findings should be considered in light of a few limitations. First, the study utilized a cross-sectional design, which prevented us from disentangling the temporal relations between neighborhood cohesion and internalizing symptoms. It is possible that youth who experience higher levels of internalizing symptoms may, in turn, experience their neighborhoods as less interconnected. Second, we utilized self-report assessments to capture individuals' perceptions regarding both neighborhood characteristics and internalizing symptoms, which may have introduced bias related to shared method variance. Subsequent research into these domains may consider using other methods to evaluate neighborhood cohesion, including social network analyses, to more objectively capture these relations. Third, few studies have used an operational GIS-based definition of blockbusting (as in Sadler & Lafreniere, 2017). While this adds important novelty to our findings, it will also be important for future studies to validate further these approaches. Moreover, future research examining the impact of historical discriminatory housing practices on other indicators of health among individuals across the life course is warranted.

4.2. Policy Implications and Conclusions

As the fields of public health and urban planning continue their path toward reconnection (Corburn, 2004; Pastor & Morello-Frosch, 2014), we also highlight here several strengths of our work on which future work can build. Our article makes a novel contribution to the literature by examining whether historical neighborhood practices are associated with internalizing symptoms and whether neighborhood cohesion influences the relation between inequitable housing practices and internalizing symptoms in a sample of low-income African American adolescents and young adults.

Specifically, our use of GIS to connect individual participants' neighborhoods to inequitable housing practices is particularly novel. This approach allowed us to capture objective measures of historical neighborhood characteristics and examine the influence of participants' perceptions of neighborhood cohesion and mental well-being. Additional strengths of the study include the careful examination of the role of participant sex in study constructs. While other studies suggest that geographic characteristics may impact boys' and girls' mental health differentially (Leventhal & Brooks-Gunn, 2003; Popkin et al., 2010), this is the first study to examine neighborhood social cohesion as a potential pathway that may influence associations between discriminatory housidiscriminatory housing practices and internalizing symptom associations as a function of participant sex. Although the examination of individual discriminatory housing practices in relation to youth internalizing symptoms is novel, it is likely that the experience of more than one type of historical discriminatory neighborhood practice may not only shape the physical environment, but also one's subjective experience of that environment. Future research should leverage person-centered approaches (e.g., latent profile analysis) to identify typologies of historical neighborhood practices and whether these typologies are differentially associated with youth outcomes. Finally, our study examined these processes in a vulnerable sample of adolescents and young adults from disadvantaged neighborhoods. Operationalizing knowledge of the effects of inequitable housing practices can help redevelopment plans to be more intentional in their design and deliberately incorporate aspects that help prevent the onset of or stem the presence of internalizing symptoms and related negative sequelae.

These results have potential policy applications, as they demonstrate the impacts of decades of housing practices on mental health outcomes. These findings highlight the need for considering mental health in determining housing policy (Acevedo-Garcia et al., 2004) and suggest that both historical (blockbusting) and current (gentrification) housing trends impact residents' well-being. Improving understanding of neighborhood context can help in devising more explicit and effective interventions to ameliorate the negative effects of disinvestment and discrimination. Cities and advocates can leverage our work and other future studies to inform remunerative and regenerative approaches to reinvestment in formerly disinvested communities.

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Conflict of Interests

The authors declare no conflict of interests.

References

Acevedo-Garcia, D., Lochner, K. A., Osypuk, T. L., & Subramanian, S. V. (2003). Future directions in residential segregation and health research: A multilevel

approach. *American Journal of Public Health*, *93*(2), 215–221.

Acevedo-Garcia, D., Osypuk, T. L., Werbel, R. E., Meara, E. R., Cutler, D. M., & Berkman, L. F. (2004). Does housing mobility policy improve health? *Housing Policy Debate*, *15*(1), 49–98.

Alegría, M., Green, J. G., McLaughlin, K. A., & Loder, S. (2015). *Disparities in child and adolescent mental health and mental health services in the US*. William T. Grant Foundation.

Bécares, L., Nazroo, J., & Jackson, J. (2014). Ethnic density and depressive symptoms among African Americans: Threshold and differential effects across social and demographic subgroups. *American Journal of Public Health*, *104*(12), 2334–2341.

Beck, A. T., & Steer, R. A. (1990). *Manual for the Beck anxiety inventory*. Psychological Corporation.

Beidas, R. S., Suarez, L., Simpson, D., Read, K., Wei, C., Connolly, S., & Kendall, P. (2012). Contextual factors and anxiety in minority and European American youth presenting for treatment across two urban university clinics. *Journal of Anxiety Disorders*, *26*(4), 544–554.

Browning, C. R., Soller, B., Gardner, M., & Brooks-Gunn, J. (2013). "Feeling disorder" as a comparative and contingent process: Gender, neighborhood conditions, and adolescent mental health. *Journal of Health and Social Behavior*, *54*(3), 296–314.

Buckner, J. C. (1988). The development of an instrument to measure neighborhood cohesion. *American Journal of Community Psychology*, *16*(6), 771–791.

Butler, T. (2003). Living in the bubble: Gentrification and its "others" in North London. *Urban Studies*, *40*(12), 2469–2486.

Cole, H. V., Lamarca, M. G., Connolly, J. J., & Anguelovski, I. (2017). Are green cities healthy and equitable? Unpacking the relationship between health, green space and gentrification. *Journal of Epidemiology and Community Health*, *71*(11), 1118–1121.

Cooley-Strickland, M. R., Griffin, R. S., Darney, D., Otte, K., & Ko, J. (2011). Urban African American youth exposed to community violence: A school-based anxiety preventive intervention efficacy study. *Journal of Prevention & Intervention in the Community*, *39*(2), 149–166.

Corburn, J. (2004). Confronting the challenges in reconnecting urban planning and public health. *American Journal of Public Health*, *94*(4), 541–546.

Dawson, C. T., Wu, W., Fennie, K. P., Ibañez, G., Cano, M. Á., Pettit, J. W., & Trepka, M. J. (2019). Perceived neighborhood social cohesion moderates the relationship between neighborhood structural disadvantage and adolescent depressive symptoms. *Health & Place*, *56*, 88–98.

Do, D. P., Frank, R., & Iceland, J. (2017). Black-white metropolitan segregation and self-rated health: Investigating the role of neighborhood poverty. *Social Science & Medicine*, *187*, 85–92.

Dupéré, V., Leventhal, T., & Vitaro, F. (2012). Neighborhood processes, self-efficacy, and adolescent mental health. *Journal of Health and Social Behavior*, *53*(2), 183–198.

Elliott-Cooper, A., Hubbard, P., & Lees, L. (2020). Moving beyond Marcuse: Gentrification, displacement and the violence of un-homing. *Progress in Human Geography*, *44*(3), 492–509.

Fong, P., Cruwys, T., Haslam, C., & Haslam, S. A. (2019). Neighbourhood identification buffers the effects of (de-)gentrification and personal socioeconomic position on mental health. *Health & Place*, *57*, 247–256.

Formoso, D., Weber, R. N., & Atkins, M. S. (2010). Gentrification and urban children's well-being: Tipping the scales from problems to promise. *American Journal of Community Psychology*, *46*(3/4), 395–412.

Fraser, J. C., Chaskin, R. J., & Bazuin, J. T. (2013). Making mixed-income neighborhoods work for low-income households. *Cityscape*, *15*(2), 83–100.

Frydenberg, E., & Lewis, R. (1991). Adolescent coping: The different ways in which boys and girls cope. *Journal of Adolescence*, *14*(2), 119–133.

Glasheen, C., Novak, S., & Williams, J. (2014). The role of social cohesion, neighborhood disorder and neighborhood decline on internalizing symptom development in children aged 6 to 18. *British Journal of Education, Society & Behavioural Science*, *4*(12), 1716–1729.

Gotham, K. F. (2000). Separate and unequal: The Housing Act of 1968 and the Section 235 Program. *Sociological Forum*, *15*(1), 13–37.

Gotham, K. F. (2002). Beyond invasion and succession: School segregation, real estate blockbusting, and the political economy of neighborhood racial transition. *City & Community*, *1*(1), 83–111.

Heinrich, L. (1992). The mental anguish and humiliation suffered by victims of housing discrimination. *John Marshall Law Review*, *26*, 39–52.

Highsmith, A. R. (2012). Prelude to the subprime crash: Beecher, Michigan, and the origins of the suburban crisis. *Journal of Policy History*, *24*(4), 572–611.

Hill, T. D., Ross, C. E., & Angel, R. J. (2005). Neighborhood disorder, psychophysiological distress, and health. *Journal of Health and Social Behavior*, *46*(2), 170–186.

Hillier, A. E. (2003). Redlining and the home owners' loan corporation. *Journal of Urban History*, *29*(4), 394–420.

Hurd, N. M., Stoddard, S. A., & Zimmerman, M. A. (2013). Neighborhoods, social support, and African American adolescents' mental health outcomes: A multilevel path analysis. *Child Development*, *84*(3), 858–874.

Jones, N. L., Gilman, S. E., Cheng, T. L., Drury, S. S., Hill, C. V., & Geronimus, A. T. (2019). Life course approaches to causes of health disparities. *American Journal of Public Health*, *109*, S48–S55.

Kahrl, A. W. (2017). Investing in distress: Tax delinquency

and predatory tax buying in urban America. *Critical Sociology*, *43*(2), 199–219.

Kanter, A. S. (1993). A home of one's own: The Fair Housing Amendments Act of 1988 and housing discrimination against people with mental disabilities. *American University Law Review*, *43*, Article 925.

Kaplan, D. H., & Sommers, G. G. (2009). An analysis of the relationship between housing foreclosures, lending practices, and neighborhood ecology: Evidence from a distressed county. *The Professional Geographer*, *61*(1), 101–120.

Kerrigan, D., Witt, S., Glass, B., Chung, S. E., & Ellen, J. (2006). Perceived neighborhood social cohesion and condom use among adolescents vulnerable to HIV/STI. *AIDS and Behavior*, *10*(6), 723–729.

King, S. M., Iacono, W. G., & McGue, M. (2004). Childhood externalizing and internalizing psychopathology in the prediction of early substance use. *Addiction*, *99*(12), 1548–1559.

Kingsbury, M., Kirkbride, J. B., McMartin, S. E., Wickham, M. E., Weeks, M., & Colman, I. (2015). Trajectories of childhood neighbourhood cohesion and adolescent mental health: Evidence from a national Canadian cohort. *Psychological Medicine*, *45*(15), 3239–3248.

Kwate, N. O. A. (2017). The race against time: Lived time, time loss, and black health opportunity. *Du Bois Review: Social Science Research on Race*, *14*(2), 497–514.

Lee, C. (1996). *Environmental justice, urban revitalization, and brownfields: The search for authentic signs of hope*. United States Environmental Protection Agency.

Leventhal, T., & Brooks-Gunn, J. (2003). Moving to opportunity: An experimental study of neighborhood effects on mental health. *American Journal of Public Health*, *93*(9), 1576–1582.

Massey, D. S. (2005). Racial discrimination in housing: A moving target. *Social Problems*, *52*(2), 148-151.

McClure, E., Feinstein, L., Cordoba, E., Douglas, C., Emch, M., Robinson, W., Galea, S., & Aiello, A. E. (2019). The legacy of redlining in the effect of foreclosures on Detroit residents' self-rated health. *Health & Place*, *55*, 9–19.

Mendez, D. D., Hogan, V. K., & Culhane, J. F. (2014). Institutional racism, neighborhood factors, stress, and preterm birth. *Ethnicity & Health*, *19*(5), 479–499.

Merikangas, K. R., He, J.-P., Burstein, M., Swanson, S. A., Avenevoli, S., Cui, L., Benjet, C., Georgiades, K., & Swendsen, J. (2010). Lifetime prevalence of mental disorders in U.S. adolescents: Results from the National Comorbidity Survey Replication—Adolescent Supplement (NCS-A). *Journal of the American Academy of Child and Adolescent Psychiatry*, *49*(10), 980–989.

Michney, T. M. (2021). How the city survey's redlining maps were made: A closer look at HOLC's Mortgagee Rehabilitation Division. *Journal of Planning History*. Advance online publication. https://doi.org/10.1177/15385132211013361

Milam, A. J., Furr-Holden, C. D., Whitaker, D., Smart, M., Leaf, P., & Cooley-Strickland, M. (2012). Neighborhood environment and internalizing problems in African American children. *Community Mental Health Journal*, *48*(1), 39–44.

Mujahid, M. S., Sohn, E. K., Izenberg, J., Gao, X., Tulier, M. E., Lee, M. M., & Yen, I. H. (2019). Gentrification and displacement in the San Francisco bay area: A comparison of measurement approaches. *International Journal of Environmental Research and Public Health*, *16*(12), Article 2246.

Nardone, A., Chiang, J., & Corburn, J. (2020). Historic redlining and urban health today in U.S. cities. *Environmental Justice*, *13*(4), 109–119.

Nobles, C. J., Valentine, S. E., Zepeda, E. D., Wang, Y., Ahles, E. M., Shtasel, D. L., & Marques, L. (2017). Residential segregation and mental health among Latinos in a nationally representative survey. *Journal of Epidemiology and Community Health*, *71*(4), 318–323.

Nock, M. K., Joiner, T. E., Jr., Gordon, K. H., Lloyd-Richardson, E., & Prinstein, M. J. (2006). Non-suicidal self-injury among adolescents: Diagnostic correlates and relation to suicide attempts. *Psychiatry Research*, *144*(1), 65–72.

Pastor, M., & Morello-Frosch, R. (2014). Integrating public health and community development to tackle neighborhood distress and promote well-being. *Health Affairs*, *33*(11), 1890–1896.

Pearson, A. L., Sadler, R. C., & Kruger, D. J. (2019). Social integration may moderate the relationship between neighborhood vacancy and mental health outcomes: Initial evidence from Flint, Michigan. *Applied Research in Quality of Life*, *14*(4), 1129–1144.

Piko, B. (2001). Gender differences and similarities in adolescents' ways of coping. *The Psychological Record*, *51*(2), 223–235.

Popkin, S. J., Leventhal, T., & Weismann, G. (2010). Girls in the "hood": How safety affects the life chances of low-income girls. *Urban Affairs Review*, *45*(6), 715–744.

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, *40*(3), 879–891.

Priester, M. A., Foster, K. A., & Shaw, T. C. (2017). Are discrimination and social capital related to housing instability? *Housing Policy Debate*, *27*(1), 120–136.

Rabinowitz, J. A., Drabick, D. A., & Reynolds, M. D. (2016). Youth withdrawal moderates the relationships between neighborhood factors and internalizing symptoms in adolescence. *Journal of Youth and Adolescence*, *45*(3), 427–439.

Radloff, L. S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*, *1*(3), 385–401.

Rathus, J., Wetzler, S., & Asnis, G. (1995). Posttraumatic

stress disorder and exposure to violence in adolescents. *JAMA*, *273*(22), 1734–1734.

Richardson, J., Mitchell, B., & Franco, J. (2019). *Shifting neighborhoods: Gentrification and cultural displacement in American cities*. National Community Reinvestment Coalition.

Robinette, J. W., Charles, S. T., & Gruenewald, T. L. (2018). Neighborhood cohesion, neighborhood disorder, and cardiometabolic risk. *Social Science & Medicine*, *198*, 70–76.

Ross, C. L., & Leigh, N. G. (2000). Planning, urban revitalization, and the inner city: An exploration of structural racism. *Journal of Planning Literature*, *14*(3), 367–380.

Rugh, J. S., & Massey, D. S. (2010). Racial segregation and the American foreclosure crisis. *American Sociological Review*, *75*(5), 629–651.

Sadler, R. C., Bilal, U., & Furr-Holden, C. D. (2020). Linking historical discriminatory housing patterns to the contemporary food environment in Baltimore. *Spatial and Spatio-temporal Epidemiology*, *36*, Article 100387.

Sadler, R. C., & Lafreniere, D. J. (2017). Racist housing practices as a precursor to uneven neighborhood change in a post-industrial city. *Housing Studies*, *32*(2), 186–208.

Saign, A. (2021). Environmental gentrification: Urban sustainability and the equity deficit. *Minnesota Undergraduate Research & Academic Journal*, *4*(4). https://pubs.lib.umn.edu/index.php/muraj/article/view/3666

Schnake-Mahl, A. S., Jahn, J. L., Subramanian, S. V., Waters, M. C., & Arcaya, M. (2020). Gentrification, neighborhood change, and population health: A systematic review. *Journal of Urban Health*, *97*(1), 1–25.

Shaw, R. J., Pickett, K. E., & Wilkinson, R. G. (2010). Ethnic density effects on birth outcomes and maternal smoking during pregnancy in the US linked birth and infant death data set. *American Journal of Public Health*, *100*(4), 707–713.

Singh, P., & Bussey, K. (2011). Peer victimization and psychological maladjustment: The mediating role of coping self-efficacy. *Journal of Research on Adolescence*, *21*(2), 420–433.

Smith, R. J., Lehning, A. J., & Kim, K. (2017). Aging in place in gentrifying neighborhoods: Implications for physical and mental health. *The Gerontologist*, *58*(1), 26–35.

Sonenstein, F. L., Marshall, B. D., & Tandon, S. D. (2011). Employment and training programs: A context for reaching out of school youth with mental health and other health programs. *Adolescent Medicine: State of the Art Reviews*, *22*(3), Article 441.

Steinmetz-Wood, M., Wasfi, R., Parker, G., Bornstein, L., Caron, J., & Kestens, Y. (2017). Is gentrification all bad? Positive association between gentrification and individual's perceived neighborhood collective efficacy in Montreal, Canada. *International Journal of Health Geographics*, *16*(1), 1–8.

Tandon, S. D., Latimore, A. D., Clay, E., Mitchell, L., Tucker, M., & Sonenstein, F. L. (2015). Depression outcomes associated with an intervention implemented in employment training programs for low-income adolescents and young adults. *JAMA Psychiatry*, *72*(1), 31–39.

Toolis, E. E. (2021). Restoring the balance between people, places, and profits: A psychosocial analysis of uneven community development and the case for placemaking processes. *Sustainability*, *13*(13), Article 7256.

Uitermark, J., Duyvendak, J. W., & Kleinhans, R. (2007). Gentrification as a governmental strategy: Social control and social cohesion in Hoogvliet, Rotterdam. *Environment and Planning A*, *39*(1), 125–141.

Vine, M., Stoep, A. V., Bell, J., Rhew, I. C., Gudmundsen, G., & McCauley, E. (2012). Associations between household and neighborhood income and anxiety symptoms in young adolescents. *Depression and Anxiety*, *29*(9), 824–832.

Von Nebbitt, E., Lombe, M., & Williams, J. H. (2008). Assessing the moderating effects of anxiety sensitivity on antisocial behavior among urban African American youth. *Journal of Health Care for the Poor and Underserved*, *19*(1), 277–293.

Wallace, D. (2012). Examining fear and stress as mediators between disorder perceptions and personal health, depression, and anxiety. *Social Science Research*, *41*(6), 1515–1528.

White, K., & Lawrence, J. A. (2018). Racial/ethnic residential segregation and mental health outcomes. In M. M. Medlock, D. Shtasel, N. H. T. Trinh, & D. R. Williams (Eds.), *Racism and psychiatry: Contemporary issues and interventions* (pp. 37–53). Springer.

Wickrama, T., & Wickrama, K. A. S. (2010). Heterogeneity in adolescent depressive symptom trajectories: Implications for young adults' risky lifestyle. *Journal of Adolescent Health*, *47*(4), 407–413.

Wilder, V., Mirto, A. L., Makoba, E., & Arniella, G. (2017). The health impact of gentrification. *Journal of General and Emergency Medicine*, *4*, 1981–1991.

Williams, D. R., Lawrence, J. A., & Davis, B. A. (2019). Racism and health: Evidence and needed research. *Annual Review of Public Health*, *40*, 105–125.

Wyly, E. K., & Hammel, D. J. (2004). Gentrification, segregation, and discrimination in the American urban system. *Environment and Planning A*, *36*(7), 1215–1241.

Yang, T. C., Chen, D., & Park, K. (2016). Perceived housing discrimination and self-reported health: How do neighborhood features matter? *Annals of Behavioral Medicine*, *50*(6), 789–801.

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Article

Hawker Centres: A Social Space Approach to Promoting Community Wellbeing

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Abstract
This article sets out to examine how the use of social spaces, namely hawker centres, has contributed to community wellbeing during the Covid-19 pandemic. Using an extensive thematic analysis of online conversations, we have identified that the use of social spaces can have a positive influence on individual, relational and social wellbeing. Access to social spaces during stressful events contributes to the feeling of normalcy, supports routines and structured activities, encourages responsible behaviours, facilitates social connectedness, and helps maintain community resilience. We present a new framework for urban social space characterisation containing three dimensions: coaction, copresence, and colocation (the three Cs). Here, coaction is associated with better visibility of community practices, copresence enhances the sense of connectedness, and colocation is concerned with the use of spatial design factors for influencing movement and interactions. The framework is central to our understanding of social space and its impact on wellbeing. Underpinning the three Cs is the notion of the integration of policy, community wellbeing, and various urban agendas. The findings were considered in terms of their relevance for social space development in Singapore.

Keywords
coaction; colocation; community wellbeing; copresence; hawker centres; social space; urban development

Issue
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1. Introduction

The proportion of urban dwellers is expected to increase to 68% by 2050 (United Nations Department of Economic and Social Affairs, 2018). Accelerating global urbanisation fuels the interest in the effects of urban living on human health and wellbeing (Pykett et al., 2020). Congruent with the notion that the improvement of wellbeing of the population is a key societal aspiration (Davern et al., 2007), this article invites a closer look at how the sociospatial processes of cities benefit urban residents.

The promotion of mental health and wellbeing in urban communities is a challenge that both urbanised and rapidly urbanising societies face (Pykett et al., 2020). In the case of a highly urbanised state such as Singapore, the search for wellbeing through urban design is of primary concern to urban planners, policymakers, and researchers as well as to citizens looking to connect the dots between urban environment and human wellbeing (Andreucci et al., 2019; Bhati et al., 2022; Matsuoka & Kaplan, 2008). Recently, this challenge has been further exacerbated by the Covid-19 pandemic (Corburn et al., 2020), which has drastically reshaped the relationship between cities and quality of life. What came into focus during the pandemic is twofold: The role of public space changed, and access to public space is firmly linked to the quality of life in cities (Mouratidis, 2021).

Increasingly, urban spaces are associated with better health outcomes (Anderson et al., 2017; Gearey et al., 2019; Kleinert & Horton, 2016). Yet, the research focused on this area remains uneven. Much of the work is dedicated to linkages between urban parks and physical activity (Liu et al., 2017); community gardens, food knowledge, and physical health (Firth et al., 2011; Malberg Dyg et al., 2020); and urban green infrastructure and mental health (Andreucci et al., 2019). However, the role of social spaces in the production of wellbeing has scarcely been explored. While some urban spaces (open spaces, green spaces, art spaces, and pedestrian areas) receive special attention and coverage (Kleinert & Horton, 2016), social spaces such as hawker centres (HCs) receive limited research recognition despite their functionality and serious economic and sociocultural contribution (Tarulevicz, 2013). This gap hinders urban health research and practice advancement and creates barriers to the implementation of new initiatives in Singapore.

This work examines how the use of social spaces in Singapore, namely HCs, contributes to community wellbeing. The search for wellbeing has taken place against the Covid-19 backdrop. The aim is to assess how access to social spaces can affect mental health and subjective wellbeing, especially during times when access is not available or is restricted. We capture HCs patrons' sentiments and employ the transactional theory of emotion and coping (Lazarus & Folkman, 1987), together with Plutchik's (1988) model of emotions, to study emotions and analyse experiences. We introduce the concept of the three Cs, which defines the social space as a system for enabling coaction, copresence, and colocation. The former two are linked to emotional and social evaluations and are concerned with HCs as a conduit for various degrees of social interaction, participation, and engagement. The latter is linked to structural evaluations and the use of design opportunities in addressing urban stress and promoting wellbeing in urban communities.

The main argument advanced in this article is that various aspects of interaction in and with social space have a strong link to wellbeing. The results of this study could help inform holistic approaches to wellbeing as well as facilitate the rethinking of policy and urban initiatives. This study advocates that responsive urban planning and design are key to securing a healthy urban lifestyle.

2. Singapore in the Wake of the Covid-19 Pandemic

Urban health is an intersectoral arena that links the public health and urban planning sectors (Damiani & Jevtic, 2021). In Singapore, a variety of public health specialists, academics, researchers, and policymakers engage in communitarian strategies that aim to promote the wellbeing of the population. The Ministry of Health and the Ministry of Manpower are among those responsible for the public's health and safety. Together with various authorities and advisory groups, they work on a range of policy initiatives and campaigns that aim to improve the wellbeing of the city's inhabitants.

In recent years, a steady increase in programmes (the Youth Support Youth Programme, in 2012), campaigns (the Covid-19 Mental Wellness Taskforce, in 2020), and initiatives (It's OKAY to Reach Out, in 2021) that focus on the diverse aspects of wellbeing signals a change in the intervention strategies that previously mainly aimed at the protection of physical health. This gradual shift in the framing of public health and wellbeing coincides with the increasing acknowledgement of the important role that mental health and wellbeing play in achieving global development goals (United Nations Sustainable Development, n.d.).

In the years leading up to the pandemic, both the Ministry of Manpower and the Ministry of Health reported an increase in physical and mental health challenges (Khor, 2019; Ministry of Manpower et al., 2020). The Singapore Mental Health Study conducted in 2016 found that one in seven persons had experienced a mental health condition in their lifetime, an increase from one in eight persons since 2010 (Khor, 2019). The psychological burden of the Covid-19 pandemic made matters worse, with the Ministry of Manpower et al. (2020) reporting an increase in stress, anxiety, loneliness, and depression in individuals. A study by the Institute of Mental Health found that 13% of the surveyed Singaporeans reported experiencing symptoms of depression or anxiety in the period from May 2020 to June 2021 (Ministry of Health, 2021).

These changes were framed by the major lockdown measures. The first nationwide lockdown, known as a circuit breaker, was implemented starting on 7 April 2020, resulting in all nonessential workplaces being closed (Phase 1). Food and beverage (F&B) outlets were left with takeaway and delivery-only options for two months. On 19 June 2020, the Multi-Ministry Taskforce announced the beginning of Phase 2 (Singapore Government, 2020). Dining in was allowed with strict hygiene and safe distancing protocols. In HCs, seating arrangements were changed to adhere to safe distancing measures. Food courts installed plastic barriers, nets, and table shields to separate diners. These measures remained in place for the rest of the year. During the second half of 2020, Singaporeans were encouraged to continue working from home. The continued loss of customer traffic resulted in many food stalls ceasing operations, with new closures reported almost daily (Murphy, 2022). Vaccines became available in December 2020. The same month, hawker culture was added to the list of Intangible Cultural Heritage of Humanity.

The new year saw a gradual reduction of access control. Interim fencing was removed at selected HCs and adjacent markets. The number of diners remained limited. Return to heightened alert happened occasionally throughout 2021, with some relaxation of measures taking place around early August 2021. From late

November, groups of up to five fully vaccinated persons were allowed to dine in together at F&B establishments. HCs were required to "access control" as well as conduct checks on the vaccination status of their customers. Unvaccinated or partially vaccinated customers could only purchase food to take away. The authorities continued to encourage seniors to minimise dining activity at HCs and coffee shops. The year of 2022 brought further easing of the restrictions, with dining in being allowed for groups of up to 10 people starting in April.

Singapore's response to the Covid-19 pandemic, though decisive and collective (Chua et al., 2020), provides important learning points. Many health and wellbeing initiatives in Singapore are underpinned by an emphasis on personal responsibility (Tan et al., 2021). The existing initiatives mainly encourage a proactive approach to problem-solving (proactive coping), which includes individuals' active participation in counselling and support programmes. In the wake of Covid-19, more voices were calling for a comprehensive solution and creation of approaches that would focus on social and environmental factors, including the use of urban spaces for wellbeing management (Baharudin, 2021). In this work, we offer a framework for considering public social spaces from a wellbeing management viewpoint. We believe that the transformative power of social spaces has the potential to deliver positive effects on physical and mental health. Before we proceed to the theoretical examination of social space properties, we need to describe the dimensions of social space through the prism of HCs.

3. Hawker Centres as a Social Space

To understand the contemporary dimensions of a social space concept, we need to discuss its application in urban research. Space-to-human relations have commanded the attention of scholars for over a century. The topic of space was prominent in Émile Durkheim's writings (Buttimer, 1969), and Durkheim was among the first to offer insights into the role of space in social processes. According to his sociospatial theory, social life is connected through social groups to social space (Shimazu, 1995). As a key variable in the formation of social life, social space incorporates both physical and social environments, including virtual space. A social space is an essential counterpart to private home and workspaces (Anderson et al., 2017), though sadly it does not receive as much research attention.

There is a fine distinction between public space and social space. A public space is a human-oriented accessible space. It can be privately or publicly owned. A street and a beach are equally considered public spaces. However, a public space used for the sake of getting in touch with others, a place to meet or communicate, is a social space. A social space is physical or virtual, designed for specific social groups or populations. It is not a natural space; rather, social forces produce the space (Glover, 2017). Normalised practices and social values play a central role in the conception of social space (Kinkaid, 2020).

Different societies relate to space in distinctive ways (Schroer, 2021). A social space is unique to the social system, and it is also unique to the individuals who participate in social interaction within its settings. Hence, the study of social space must be tightly linked to social context, which consists of multimodal social properties such as beliefs and behaviours of individuals, and details of their physical environment.

In Singapore, HCs function as sites responsible for the production of social space. HCs can be broadly described as Singapore's community dining rooms. Offering an array of stalls under one roof, they are conveniently located in areas with high pedestrian activity, often with adjoining wet markets and shopping malls. According to UNESCO (2021), HCs play a crucial role in strengthening the social fabric of Singapore. The spatial formations of HCs display a functional relationship between the need to maximise space usage in land-scarce Singapore and provide a landing spot for numerous hungry residents without overcrowding or compromising consumers' need for convenience—a mission that would not be possible without the ingenuity of the residents and hawkers alike. The local hawkers are well adapted to the daily social rhythm of the city-state, catering to early birds and night owls, office workers and leisure visitors, kopi (black coffee with sweetened milk) connoisseurs, and brunch aficionados.

4. Hawker Centres and Wellbeing

The meaning of social space goes beyond its functionality. Though primarily intended as a communication environment, it has a greater social significance. HCs involve the practice of dining and mingling. They enable individual and neighbourhood-level social interactions and shape local social relations (Tarulevicz, 2013). Such activities have been shown to facilitate social bonding and group membership (Conein, 2011; Forrest & Kearns, 2001), which in turn help build and maintain collaborative and social capital (Lochner et al., 1999). The latter can lead to greater social cohesion, more active participation in civic affairs, and better public health (Kawachi et al., 2008).

Jennings and Bamkole (2019) state that interpersonal dynamics and a sense of social connectedness are associated with psychological health benefits. Positive social interactions reinforce feelings of belonging and acceptance (Steger & Kashdan, 2009; Walton et al., 2012). Warm relationships with others are also found to have a significant and positive influence on life satisfaction (Tan & Tambyah, 2016). In contrast, the circumstances that lead to social isolation reduce opportunities for social engagement and lessen the potential for developing social cohesion. The Covid-19 lockdown(s) and the absence of the usual social support presented significant hardships to many individuals (Sheek-Hussein et al., 2021).

The literature leads us to make the following assumption: There is a link between access to social spaces and subjective wellbeing. We believe that evidence of the necessary conditions for supporting wellbeing can be found in "natural" online settings, but first, we need to find theories that can provide insights into the varied dimensions of subjective wellbeing.

5. Theoretical Underpinnings

5.1. Theoretical Considerations

Wellbeing studies underline the importance of analysing emotion-focused coping mechanisms during traumatic events (Fuller & Huseth-Zosel, 2021; Wanzer et al., 2005). The transactional theory of emotion and coping is useful when trying to detect signs of coping and protective wellbeing mechanisms (Lazarus & Folkman, 1987). According to Lazarus and Folkman (1987), individuals are involved in continuous evaluation of experienced events as threats or challenges. Both challenge and threat appraisals involve the assessment of personal resources as sufficient or insufficient, which leads to an emotional response that is either positive or negative. A challenge state is associated with more positive emotions and resources perceived as sufficient. A threat state is linked to more negative emotions and insufficient resources to meet the demands of a situation. The researchers need to look for signs of emotional regulation and coping—often hidden—to find evidence of wellbeing.

Coping styles are inextricably linked to basic emotions (Plutchik, 1989). Extracting and measuring emotions is a vexing but necessary process. Plutchik's (1988) model of emotions offers a systematic way of identifying and organising feelings and sentiments expressed in a text. The application of Plutchik's model of emotions when studying urban experiences is a tested and viable method (Stals et al., 2014). This model will aid our investigation of the constructs of coping and emotional regulation.

The transactional theory suggests that the way a person reacts to threatening, challenging, or difficult situations requires the conjunction of an environment with certain attributes. Therefore, in addition to personal variables, environmental variables such as social factors and physical attributes must be considered when studying coping mechanisms. The person–environment fit theory suggests that just as the individual influences the environment, the environment shapes the individual (Edwards & Cooper, 1990). If the fit is optimal, the individual's functioning is facilitated, but if the environment is unsuitable, the individual may experience maladaptation (Holmbeck et al., 2008). The analysis of the person–environment relationship can provide insights into the changes in subjective wellbeing.

Building on the above, we hypothesise that a social space can facilitate coping and provide support during trying times. We suggest that a more outward-looking approach, whereby wellbeing is defined as a multidimensional concept, is most appropriate for this study. To this end, we need to develop a framework that supports and describes the emotional, social, and environmental components of wellbeing.

5.2. Coaction, Copresence, and Colocation

We offer a new framework for urban social space characterisation that has three parts: coaction, copresence, and colocation—the three Cs. The three parts do not seem to appear as complementary concepts in urban design literature. Discussed mostly in social studies as separate concepts or sometimes as coaction–copresence combinations, the three Cs are yet to receive research recognition.

People in a public space can be engaged in a calculated copresence. Zhao (2003) defines copresence as a sociological concept that describes the conditions in which human individuals interact with one another. He notes that copresence has two dimensions: copresence as a mode of being with others (social projection) and copresence as a sense of being with others (emotional projection). Mode of copresence refers to the social and physical conditions that structure human interactions. Sense of copresence, on the other hand, refers to the subjective experience of being with others that an individual acquires in an interaction. Copresence enables not only social proximity (social closeness and familiarity) but also reciprocity, accessibility, and availability to each other (Creangă, 2019; Zhao, 2003). It facilitates supportive social relationships and contributes to the sense of connectedness among people.

A socially shared experience can support processes that enable coaction with like-minded others (Radomskaya & Pearce, 2021; Stewart et al., 2019). A coaction effect is a phenomenon whereby task performance can increase as a result of the presence of others (social facilitation, see Harkins, 1987). The presence of other people as well as the apprehension about being evaluated by others is important for social facilitation to occur. Public spaces offer better observability of self and others and, by extension, provide better visibility of community practices. In other words, a public space can help people gain awareness of what constitutes socially acceptable or unacceptable behaviour and thus support coaction.

While "being with" might be considered an equivalent of copresence, "being in" is considered an equivalent of colocation (Creangă, 2019). In a broad sense, colocation means to be located jointly or together. It can also mean "working together in one space" (Ghorob & Bodenheimer, 2012). In this context, we define colocation as a physical location that can enable rich communication. Colocation is concerned with the smart use of spatial design factors for influencing movement and social interactions. By finding traces of colocation in the data, we hope to understand how space shapes and is shaped by people's lives.

Building on the literature, we hypothesize that social spaces such as HCs can serve as a system for enabling the three Cs. We argue that the three Cs is a useful new tool that should be studied in conjunction with varied aspects of urban development and wellbeing.

6. Methodology

For this qualitative research, the scholars chose a deliberate sampling strategy. Criterion sampling was used to identify relevant user content. Among the initial broad criteria were timeframe (mid-2020 to early 2022) and relevance. The user comment was deemed relevant if it focused on HCs and related experiences. The researchers used online social media platforms as data sources (Facebook, Twitter, Google reviews, Reddit, YouTube). Over 1,500 posts met our initial inclusion criteria. These were further narrowed down to posts that contain information "other than purely gastronomical or service-related." For example, content that exclusively focused on meal description or service rating was excluded. About one-third of the original sample was retained for further analysis.

The extracted data were coded using first and second cycle codes. A coding manual was developed by two researchers to maintain the reliability of coding. The first cycle codes were mostly inductive and descriptive, designed to help cluster and summarise segments of data. The second cycle codes were inferential, designed to group the summaries into themes and concepts. The schematic representation of the coding logic is presented below (Figure 1). The labels (the three Cs, levels, challenges, and threats) helped organise data into conceptual categories. The codes, labels, and themes are not mutually exclusive and some overlap is expected.

Of the selected user posts, 119 were retained for an in-depth thematic analysis. These were user texts created by patrons: self-identified regular customers and hawker supporters. User-supplied information (e.g., "I come here all the time") was used to verify the "patron"

	Coaction	Copresence	Colocation	
First cycle codes*	*[We call for] government support, development programmes, relief funs, rental waivers, subsidies…*	*[We] a community, society, Singaporeans, patrons, neighbours, volunteers, supporters…*	*[General attributtes] CBD, central area, district, suburb, residential area…*	**National level** — broader social actions — broader social belonging — broad spatial settings
	[I see people in HCs] wearing masks, social distancing, observing rules, supporting others, reporting violations…	*[In HCs, people] socialise, meet people, engage w/others, stay connected, help each other, volunteer…*	*[Local attributes] parking, public transport, walkability, neighbourhood characteristics, access to green space, bike-friendly*	**Local level** — local actions — local interactions — local spatial settings
	[In HCs, I can] keep others safe, follow rules, social distance, clear table/tray/seat, support others, discourage violations of safety…	*[I go to HCs] to meet others, to socialise, observe others, support businesses, patronise hawkers, enjoy a meal…*	*[Subjective assess.] layout, seating, crowds, cleanliness/safety perceptions, facilities, accessibility, ambience, maintenance…*	**Individual level** — individual actions — individual interactions — subjective spatial characteristics
Second cycle codes**	*Socially responsible behaviours, proactive/ productive behaviours, health-promoting behaviours…*	*[In HCs, people] socialise, meet people, engage w/others, stay connected, help each other, volunteer…*	*[Local attributes] parking, public transport, walkability, neighbourhood characteristics, access to green space, bike-friendly*	**Challenging**
	Breaches of safety measures, vaccine hesitancy, risky behaviours…	*Loneliness/isolation, absence of routines, limited activities, boredom, anxiety…*	*Bad ventilation, poor cleanliness, low seating capacity, business closures, explicit safety control mechanisms…*	**Threatening**

* Additional first level codes: **source, data, HC location**
** Additional second level codes: **emotional projection** (e.g., sadness, joy, anger), **behavioural reaction** (e.g., avoiding crowds, praising the effort, seeking company)

Figure 1. Examples of coding and organising data.

status. The retained user texts were coded for emotions. We used Plutchik's model of emotions to classify semantic units of text into a set of emotion classes. These emotions, together with the codes, themes, and labels helped assess and describe the changes in the subjective wellbeing of HC patrons. The results are presented in a narrative format below.

7. Results and Discussion

Most data were collected from Google reviews (67%), Facebook (19.5%), Twitter (7%), and Reddit (4%). The category Other (YouTube and blogs) accounted for the remaining 2.5%. The majority of posts were created in 2021 (69%). Only 11% were created in 2020. The limited amount of data from 2020 can be explained by the reduced activity of HCs during the first year of the pandemic. The HC locations are shown below (Figure 2). The locations were chosen based on Google ratings (higher than four stars).

The analysis revealed that most patrons assessed the reality brought on by the Covid-19 pandemic as challenging (72%) rather than threatening (28%). The theme of support, either sought or received, emerged as a major aspect of the experiences described. The calls for "neighbours to come together" and "do our bit by going to our favourite stalls" are common in the dataset. This coping strategy can be described as "taking control" coping. By taking control, patrons felt more empowered. Common empowerment examples that emerged from the data were linked to decisions to support seniors, "adopt" a hawker stall, support businesses, participate in community projects, and volunteer. This ability to contribute to community outcomes was generally linked to reduced feelings of uncertainty and apprehension and was associated with better mood and motivation. The HCs acted as a spatial catalyst for proactive and productive behaviours.

The most talked about Covid-19 restrictions were the stay-at-home orders and the ban on social gatherings. Patrons' perceptions and emotions helped frame the themes within the context. Among patrons, the feelings of loneliness and claustrophobia ("feel like a corralled animal," "wondering when freedom will arrive"), low morale ("I expect many suicides"), and anxiety ("sense of despair and anxiety that hangs in the air") were relatively common during the early stages of the pandemic. That said, low morale persisted in 2021 despite the easing of restrictions. We can attribute that to general Covid-19 fatigue. Boredom and stress were also mentioned, but by a lower percentage of patrons. These sentiments appeared in various contexts, some of which can be glimpsed in the provided quotes. Interestingly, loneliness and boredom were mostly associated with a person projecting an emotion, the focus of the projection being seniors. Seniors were also perceived to be at risk due to the absence of routines. For example:

> Spare a thought for the lonely old folks….I feel so sorry for our senior citizens who are missing their first cup of morning kopi at their *fave* food court….Their golden years during Covid times can be made more tolerable. If Covid-19 doesn't kill, boredom and loneliness may.

> Asking [seniors] to stay home and not even dine out at HCs—that's like imposing a mini circuit breaker [lockdown] for more than half of all Singaporeans. Humans are social creatures. Asking seniors to stay at home for prolonged periods of time, especially if they live alone, is just not good for mental health.

The need to keep routines was attributed to seniors, though most users making the projection were younger people, who, probably, experienced the most interruption. Overall, the ability to practice "normal activities" in familiar settings was identified as a path to

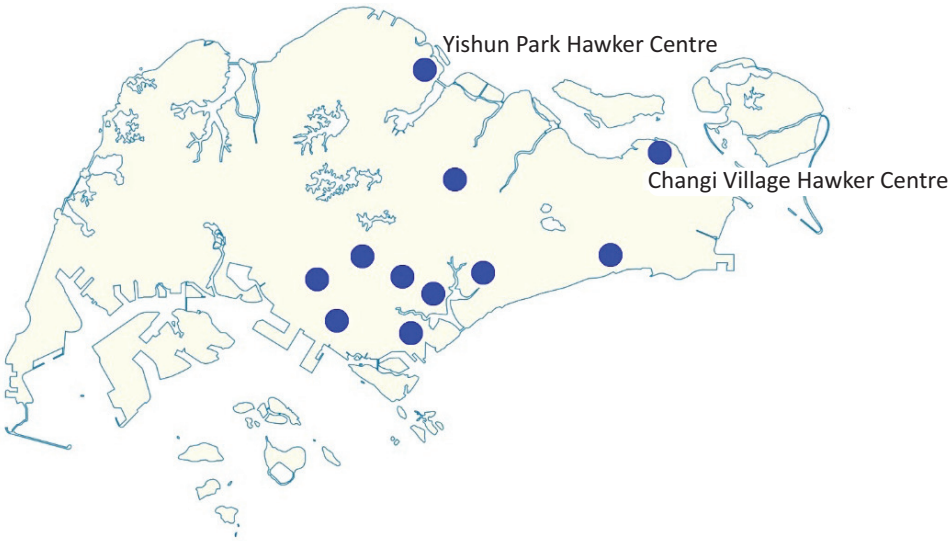

Figure 2. HC locations.

subjective wellbeing. The absence of routine, expressed through the inability to congregate and assemble in food courts, was generally perceived as a threat. We suggest that finding ways to support routines and structured activities should be a consideration when designing a social space.

Linked to routine was the feeling of "normalcy." The users identified the ability to enjoy a meal in a HC as contributing to their feeling of normalcy and even being able to reduce tension and stress. The HCs' association with normalcy, routine, and even tradition is a big part of HC appeal, as it promotes both emotional and social wellbeing. This, in turn, suggests that access to social spaces can be a valuable resource during times of uncertainty. Yet, it is also a challenge that needs to be addressed in tandem with the smart implementation of regulatory policies and innovation in urban planning.

Among other significant social–emotional themes was the reassessment of the value of human interaction. The comments highlighted how seemingly normal human interactions could elicit strong positive emotional responses. Some pointed out that during the first year of the pandemic, most of their social interactions tended to happen in HCs (e.g., on the way to pick up food). For many, HC space was conducive to social interaction:

> Looking forward to [the] resumption of dine-in… [the] simple pleasure of sipping kopi at hawker centre, [and going to a] coffeeshop with family and friends. Just to be safe even if allowed, [I] will first do so with [my] own social bubble as championed by Dr Lye [patron's friend].

The most common theme in the dataset was copresence. A sense of copresence facilitated social relationships and, according to our data, contributed to relational and individual wellbeing. Furthermore, we found many examples of HCs' environment being conducive to prosocial behaviour. For example:

> Do you know that this is a stall with a heart? Free porridge for the senior citizens, up to two bowls each….Asked the stall owner why, he said, "we all must try to do our part for the seniors, in whatever way we can." Kudos to this stall, worth supporting and eating from them, IMHO [in my honest opinion].

Pro-social behaviour was expressed in numerous ways: by volunteering, "patronising hawkers," launching online campaigns and posting on social media (#supporthawkers, #hawkerculture, #supportlocal), teaching seniors digital literacy, or simply inquiring about the wellbeing of others. Pro-social behaviours are linked to social wellbeing.

In the data, we saw many examples of copresence and coaction working together: when a smile, an act of kindness, a simple encouragement seemingly contributed to feelings of connectedness, security, and trust. The coaction–copresence synergy helped support perceived community wellbeing and maintain resilience. Building resilience is an important precondition for successfully combatting future outbreaks, and social spaces are ideally suited to such a task. Prior research shows that not only performing acts of kindness but also recalling them can increase wellbeing (Ko et al., 2021). We hope that the communal effort to support each other during Covid-19 will have a lasting positive effect on citizen morale even as time progresses.

Our findings show that social connectedness was the most prevalent subtheme associated with the use of HCs (43% of the comments). We found numerous examples of HCs acting as a spatial catalyst for purposeful human interaction.

> Times are bad and the days ahead may get more difficult for many, many of us—from the person walking on the street to someone cooking up a humble storm behind the counter….Such times call for resilience, care for one another, and support for each other. Warmest cheers to those in the F&B businesses (industry). Remember to look out for each other…

The social connectedness subtheme often appeared as being linked with socially responsible behaviours. We found that copresence−coaction synergy contributed to the enhancement of different types of health-promoting behaviours. The ability to facilitate socially responsible behaviours while also discouraging risky behaviours is an important characteristic of a social space. Our data revealed that people who were concerned with the resurgence of Covid-19 used coaction as a form of safety citizenship behaviour, hoping that increased communal participation in safety compliance (e.g., returning dirty trays, wearing masks) would lead to better safety outcomes. The coaction would often manifest as a word/persuasion/demand ("we all must try") and/or a personal example:

> This HC gives me a very welcoming, fresh, and even new (literal sense!) kind of feeling! [Look at how] well organized as captured in the photos—there's a hand wash area, tray return station, top-up station (membership card top-up to be used at the HC), etc., everything [is] nicely and neatly organized! Well maintained too! Hawkers are all so friendly—at least the few stores that I patronized, love this place!

Coaction was mostly associated with positive emotions, yet in some cases it was linked to annoyance (e.g., why should we when the government does not; why offload complex problems onto citizens). A few comments observed that poor safety compliance and breaches of safety, when performed in a public space, could lead to complacency. That said, the net positive effect of coaction observed within and facilitated by social space was prominent. We conclude that social spaces can be

an effective instrument for increasing awareness and encouraging pro-community behaviours.

As mentioned previously, HCs as social spaces can add to the feeling of connectedness and social cohesion through coaction and copresence. There are spatial attributes that can facilitate connectedness and social cohesion and factors that can discourage them. We can explore these factors through colocation.

Research suggests that the management of the flow of people has a direct impact on social wellbeing (Carson et al., 2004). The management of people-flow in social spaces during the Covid-19 pandemic was a challenging task. Our observations show that HCs faced numerous difficulties adapting to the new Covid-19 normal. Many solutions—from entry and exit points to the need to perform safety checks—ended up provoking general confusion and "crowds waiting to check in at peak hours". Patrons reported feeling unsafe, frustrated, and angry. Some measures even contributed to HC avoidance.

Patrons questioned the efficacy of controlled entry and exit points at HCs, arguing that the rules that apply to other F&B outlets (with more controlled entry/exit points) should not be enforced on HCs and need revising. The management of the flow of people through physical–spatial factors raised many questions regarding the quality and efficacy of safety management strategies at HCs. For example:

> HC and Kopitiam [controlled entry and exit point] not practical to do so. Unless you want to cordon off and do it like wet markets, then you see huge crowds waiting to check in…it is just a nightmare to try to enforce the rule at HCs and coffeeshops when there is no controlled access point…

Our findings suggest that the use of soft management strategies that utilise space design elements to control human flow implicitly (innovative layout and new seating arrangements) rather than explicitly (by putting up nets and fences) might deliver better results. We found evidence that the use of explicit control mechanisms contributed to dissatisfaction and was even met with resistance. For example, the netting used to cordon off tables and exits received mostly negative feedback, with some people describing their experience as "sitting in a cage." Some pointed out that it was a nuisance and a safety hazard:

> *Dunno* which *dumbass* decided to net the seats. Stupid design. I was at Chinatown HC two weeks ago and my two-year-old nearly trip over the netting. I was holding a tray of soup and rice. Lucky my mom saw and pulled her away, then immediately behind me one auntie tripped over the netting and fell on both hands. She totally blanked out and sat there for three minutes. Even *tho* my mom offered a hand to pull her up, she wanted to sit there on the floor for a while. Senior citizens tripping over is really dangerous.

Urban planners and policymakers need to consider these factors and plan for people-centric urban solutions that are in line with population expectations and needs.

A social space can serve as a conveyor of multiple messages, values, and meanings. A well-designed social space can instigate social interactions and increase satisfaction with life. Social interactions, however, are not limited to communicative interactions. Our data identified that "people watching" was an important social activity within HCs. Less activity and fewer crowds during the Covid-19 pandemic opened more opportunities to engage in people-watching. We suggest that urban designers explore solutions for the static use of space and seek designs that create comfortable conditions for people watching in urban social spaces.

Our data revealed that among the many HC properties, ventilation, cleanliness, and appropriate seating arrangements contributed most to the feeling of safety. Airiness, brightness, and openness were also associated with better experiential outcomes. Here, it may be prudent to look at some examples. Depending on their needs, people assess and reassess the characteristics of space and their own relationship with it. For example, the Yishun Park HC (Figure 3) had a pronounced colocation theme, which was also the driver of copresence. The patrons pointed out that its modern look ("spacious and airy," "uncluttered," "fresh") and access to green infrastructure (adjacent greenery, near a park, indoor plants) had a positive impact on overall satisfaction. A big number of young entrepreneurs working within the space and access to modern conveniences (cashless payment options, automatic tray collection stations) added to patrons' feelings of happiness and comfort.

That is not to say that a modern look is a highly coveted attribute for a social space. A variety of tangible and intangible experiences create conditions that facilitate meaningful engagement with space and place. For example, many patrons of the Changi Village HC indicated that the ambience and cultural significance contributed to their connection with the space. We also found that nostalgia was an important meaning-making resource that contributed to place attachment:

> Coming here [Changi Village HC] for nasi lemak today brought back memories of my NS [national service] days in the early 1970s when we would take the bumboat from Changi Point jetty to Pulau Tekong for field camp and live-firing exercises. Back in those days, this HC was already known for its nasi lemak. So it's THE PLACE to come to for your nasi lemak binge….What makes it worthwhile to make the trip to this far eastern tip of Singapore is that after your meal you can enjoy a relaxing stroll at the windy stretch of beach a short bridge away. You'll also feel less guilty about the heavy meal u just had. Bring your family or your cat or a book if you have time—or MAKE time—to spare.

Figure 3. Yishun Park HC. Source: Courtesy of Yishun Park HC.

Our findings also suggest that place familiarity was a significant positive feature of social space, one that contributes to visitation interest. For many, the feeling of connectedness (e.g., social connection with local hawkers) was a driver for their visit. The variability of opinions expressed in the comments reinforces the notion that a social space is not just a conglomerate of social and spatial conditions, but is a commentary on the process of urban change and wider social transformation.

8. Conclusion

This study set out to examine how the use of social spaces contributes to subjective wellbeing. We found that the use of social spaces can have a positive influence on individual, relational, and social wellbeing. The results showed that access to social spaces during stressful events contributes to the feeling of normalcy and supports routine and structured activities. Access to social space can encourage responsible behaviours, facilitate social connectedness, and help maintain community resilience during difficult times.

Overall, our findings confirm that the three-dimensional coaction-copresence-colocation (three Cs) framework is useful for defining and understanding social space. We found that copresence twinned with coaction under the effect of colocation is what makes a space truly belong to society. The use of three Cs framework in social space design offers potential pathways to reduce vulnerabilities during times of uncertainty.

The three Cs framework contributes to the theoretical understanding of our how space shapes and is shaped by people's lives. If further developed, the three Cs can be used as the basis for establishing performance metrics for social spaces and as criteria for social space design. The current three Cs framework has a loose structure that allows room for other processes and tools to be included.

The study of social spaces can be useful both in practice and as a focus for future social scientific research. For urban planners, the expansion of the social space concept can inform their understanding of social cohesion in urban settings. For health practitioners, it is a way to improve psychological resilience and wellbeing within a community. In addition, this work provides a solid basis for the growth of the social space concept in urban wellbeing initiatives.

We are limited to what we see in the public domain. Therefore, our data only partially capture the emerging conditions of today's use of HCs as social spaces. Inferences had to be made when interpreting emotional and social projections. While capturing various HC locations, we overlooked food courts located in the west of Singapore. That said, the concentration of HCs in the west is low. The limited space available to us means we can only briefly discuss the coaction–copresence–

colocation role in urban management and planning. We invite future contributors to critically engage with the concept and suggest further refinements. We also suggest using the three Cs as factors in models that explore the person–environment link. We believe that the continued investigation of social spaces is a great opportunity for city planners and health professionals to work together to improve health and wellbeing on a wide scale.

We would like to conclude with the following HC patron quote:

> So, HCs play a crucial role in social bonding and nation building. In a way, HCs are like school tuckshops but on a nationwide scale. They are like social nodes, knots in a fishing net which hold Singapore's multicultural social fabric together.

Conflict of Interests

The authors declare no conflict of interests.

References

Anderson, J., Ruggeri, K., Steemers, K., & Huppert, F. (2017). Lively social space, well-being activity, and urban design: Findings from a low-cost community-led public space intervention. *Environment and Behavior*, *49*(6), 685–716. https://doi.org/10.1177/0013916516659108

Andreucci, M. B., Russo, A., & Olszewska-Guizzo, A. (2019). Designing urban green blue infrastructure for mental health and elderly wellbeing. *Sustainability*, *11*(22), Article 6425. https://doi.org/10.3390/su11226425

Baharudin, H. (2021, June 26). Tweaks to Singapore's health and urban policies needed in new Covid-19 normal, say experts. *The Straits Times*. https://www.straitstimes.com/singapore/tweaks-to-health-and-urban-policies-needed-in-new-covid-19-normal-say-experts

Bhati, A., Mohammadi, Z., Agarwal, M., Kamble, Z., & Donough-Tan, G. (2022). Post COVID-19: Cautious or courageous travel behaviour? *Asia Pacific Journal of Tourism Research*, *27*(6), 581-600.

Buttimer, A. (1969). Social space in interdisciplinary perspective. *Geographical Review*, *59*(3), 417–426.

Carson, D., Gilmore, A., Ascenção, M. P., & Fawcett, L. (2004). Holistic tourist industry marketing: Significant deficiencies in relation to natural tourist sites. *Journal of Marketing Theory and Practice*, *12*(4), 49–59. https://doi.org/10.1080/10696679.2004.11658532

Chua, A. Q., Tan, M. M. J., Verma, M., Han, E. K. L., Hsu, L. Y., Cook, A. R., Teo, Y.-Y., Lee, V. J., & Legido-Quigley, H. (2020). Health system resilience in managing the Covid-19 pandemic: Lessons from Singapore. *BMJ Global Health*, *5*(9), Article e003317. https://doi.org/10.1136/bmjgh-2020-003317

Conein, B. (2011). Gossip, conversation and group size: Language as a bonding mechanism. *Irish Journal of Sociology*, *19*(1), 116–131.

Corburn, J., Vlahov, D., Mberu, B., Riley, L., Caiaffa, W. T., Rashid, S. F., Ko, A., Patel, S., Jukur, S., & Martínez-Herrera, E. (2020). Slum health: Arresting Covid-19 and improving well-being in urban informal settlements. *Journal of Urban Health*, *97*(3), 348–357.

Creangă, R. (2019). A dive into copresence and presence literature. *Journal of Comparative Research in Anthropology and Sociology*, *10*(2), 31–41.

Damiani, G., & Jevtic, M. (2021). Workshop: SDGs as a roadmap for citizens, environment and public health. *European Journal of Public Health*, *31*(Suppl. 3). https://doi.org/10.1093/eurpub/ckab164.730

Davern, M. T., Cummins, R. A., & Stokes, M. A. (2007). Subjective wellbeing as an affective-cognitive construct. *Journal of Happiness Studies*, *8*(4), 429–449. https://doi.org/10.1007/s10902-007-9066-1

Edwards, J. R., & Cooper, C. L. (1990). The person-environment fit approach to stress: Recurring problems and some suggested solutions. *Journal of Organizational Behavior*, *11*(4), 293–307. https://www.jstor.org/stable/2488277

Firth, C., Maye, D., & Pearson, D. (2011). Developing "community" in community gardens. *Local Environment*, *16*(6), 555–568. https://doi.org/10.1080/13549839.2011.586025

Forrest, R., & Kearns, A. (2001). Social cohesion, social capital and the neighbourhood. *Urban Studies*, *38*(12), 2125–2143. https://doi.org/10.1080/00420980120087081

Fuller, H. R., & Huseth-Zosel, A. (2021). Lessons in resilience: Initial coping among older adults during the Covid-19 pandemic. *The Gerontologist*, *61*(1), 114–125. https://doi.org/10.1093/geront/gnaa170

Gearey, M., Robertson, L., Anderson, J., Barros, P., & Cracknell, D. (2019). Re-naturing the city for health and wellbeing: Green/blue urban spaces as sites of renewal and contestation. In F. Lemes de Oliveira & I. Mell (Eds.), *Planning cities with nature: Theories, strategies and methods* (pp. 153–168). Springer. https://doi.org/10.1007/978-3-030-01866-5_11

Ghorob, A., & Bodenheimer, T. (2012). Share the Care™: Building teams in primary care practices. *The Journal of the American Board of Family Medicine*, *25*(2), 143–145.

Glover, T. (2017). Leisure, social space, and belonging. In K. Spracklen, B. Lashua, E. Sharpe, & S. Swain (Eds.), *The Palgrave handbook of leisure theory* (pp. 873–890). Palgrave Macmillan. https://doi.org/10.1057/978-1-137-56479-5_49

Harkins, S. G. (1987). Social loafing and social facilitation. *Journal of Experimental Social Psychology*, *23*(1), 1–18.

Holmbeck, G. N., Jandasek, B., Sparks, C., Zukerman, J., & Zurenda, L. (2008). Theoretical foundations of developmental-behavioral pediatrics. In M. L. Wol-

raich, D. D. Drotar, P. H. Dworkin, & E. C. Perrin (Eds.), *Developmental-behavioral pediatrics* (pp. 13–45). Mosby. https://doi.org/10.1016/B978-0-323-04025-9.50005-2

Jennings, V., & Bamkole, O. (2019). The relationship between social cohesion and urban green space: an avenue for health promotion. *International Journal of Environmental Research and Public Health*, *16*(3), Article 452. https://doi.org/10.3390/ijerph16030452

Kawachi, I., Subramanian, S. V., & Kim, D. (2008). Social capital and health. In I. Kawachi, S.V. Subramanian, & D. Kim (Eds.), *Social capital and health* (pp. 1–26). Springer.

Khor, A. (2019). *Speech by Dr Amy Khor, senior minister of state for health, at the Singapore mindfulness conference 2019* [Speech transcript]. Ministry of Health. https://www.moh.gov.sg/news-highlights/details/speech-by-dr-amy-khor-senior-minister-of-state-for-health-at-the-singapore-mindfulness-conference-2019-at-the-nus-university-cultural-centre-hall

Kinkaid, E. (2020). Re-encountering Lefebvre: Toward a critical phenomenology of social space. *Environment and Planning D: Society and Space*, *38*(1), 167–186. https://doi.org/10.1177/0263775819854765

Kleinert, S., & Horton, R. (2016). Urban design: An important future force for health and wellbeing. *The Lancet*, *388*(10062), 2848–2850.

Ko, K., Margolis, S., Revord, J., & Lyubomirsky, S. (2021). Comparing the effects of performing and recalling acts of kindness. *The Journal of Positive Psychology*, *16*(1), 73–81.

Lazarus, R. S., & Folkman, S. (1987). Transactional theory and research on emotions and coping. *European Journal of Personality*, *1*(3), 141–169.

Liu, H., Li, F., Li, J., & Zhang, Y. (2017). The relationships between urban parks, residents' physical activity, and mental health benefits: A case study from Beijing, China. *Journal of Environmental Management*, *190*, 223–230.

Lochner, K., Kawachi, I., & Kennedy, B. P. (1999). Social capital: A guide to its measurement. *Health & Place*, *5*(4), 259–270.

Malberg Dyg, P., Christensen, S., & Peterson, C. J. (2020). Community gardens and wellbeing amongst vulnerable populations: A thematic review. *Health Promotion International*, *35*(4), 790–803. https://doi.org/10.1093/heapro/daz067

Matsuoka, R. H., & Kaplan, R. (2008). People needs in the urban landscape: Analysis of landscape and urban planning contributions. *Landscape and Urban Planning*, *84*(1), 7–19. https://doi.org/10.1016/j.landurbplan.2007.09.009

Ministry of Health. (2021). *Covid-19 mental wellness taskforce proposes recommendations to enhance national mental health strategy*. https://www.moh.gov.sg/news-highlights/details/covid-19-mental-wellness-taskforce-proposes-recommendations-to-enhance-national-mental-health-strategy

Ministry of Manpower, Singapore National Employers Federation, & National Trades Union Congress. (2020). *Tripartite advisory on mental well-being at workplaces*. Ministry of Manpower. https://www.mom.gov.sg/covid-19/tripartite-advisory-on-mental-well-being-at-workplaces

Mouratidis, K. (2021). How Covid-19 reshaped quality of life in cities: A synthesis and implications for urban planning. *Land Use Policy*, *111*, Article 105772. https://doi.org/10.1016/j.landusepol.2021.105772

Murphy, A. (2022, May 10). How Covid nearly killed Singapore's hawker culture. *Asia Media Centre*. https://www.asiamediacentre.org.nz/features/how-covid-nearly-killed-singapores-hawker-culture

Plutchik, R. (1988). The nature of emotions: Clinical implications. In M. Clynes & J. Panksepp (Eds.), *Emotions and psychopathology* (pp. 1–20). Springer. https://doi.org/10.1007/978-1-4757-1987-1_1

Plutchik, R. (1989). Measuring emotions and their derivatives. In R. Plutchik & H. Kellerman (Eds.), *The measurement of emotions* (pp. 1–35). Academic Press. https://doi.org/10.1016/B978-0-12-558704-4.50007-4

Pykett, J., Chrisinger, B., Kyriakou, K., Osborne, T., Resch, B., Stathi, A., Toth, E., & Whittaker, A. C. (2020). Developing a citizen social science approach to understand urban stress and promote wellbeing in urban communities. *Palgrave Communications*, *6*(1), Article 85. https://doi.org/10.1057/s41599-020-0460-1

Radomskaya, V., & Pearce, P. L. (2021). Adding character: The role of destination mascots in tourism development. *Tourism Management*, *84*, Article 104248. https://doi.org/10.1016/j.tourman.2020.104248

Schroer, M. (2021). Durkheim and the sociality of space. In H. Joas & A. Pettenkofer (Eds.), *The Oxford handbook of Emile Durkheim*. Oxford University Press. https://doi.org/10.1093/oxfordhb/9780190679354.013.22

Sheek-Hussein, M., Abu-Zidan, F. M., & Stip, E. (2021). Disaster management of the psychological impact of the Covid-19 pandemic. *International Journal of Emergency Medicine*, *14*(1), Article 19. https://doi.org/10.1186/s12245-021-00342-z

Shimazu, T. (1995). Durkheim's theory of social space. *Annals of the Association of Economic Geographers*, *41*(1), 20–36. https://doi.org/10.20592/jaeg.41.1_20

Singapore Government. (2020). *Moving into phase 2: What activities can resume*. http://www.gov.sg/article/moving-into-phase-2-what-activities-can-resume

Stals, S., Smyth, M., & Ijsselsteijn, W. (2014). Walking & talking: Probing the urban lived experience. In V. Roto & J. Häkkilä (Eds.), *NordiCHI '14: Proceedings of the 8th Nordic Conference on Human-Computer Interaction: Fun, fast, foundational* (pp. 737–746).

Association for Computing Machinery. https://doi.org/10.1145/2639189.2641215

Steger, M. F., & Kashdan, T. B. (2009). Depression and everyday social activity, belonging, and well-being. *Journal of Counseling Psychology*, *56*(2), 289–300.

Stewart, A. L., Leach, C. W., Bilali, R., Çelik, A. B., & Cidam, A. (2019). Explaining different orientations to the 2013 Gezi Park demonstrations in Istanbul, Turkey. *British Journal of Social Psychology*, *58*(4), 829–852.

Tan, C. C., Lam, C. S. P., Matchar, D. B., Zee, Y. K., & Wong, J. E. L. (2021). Singapore's health-care system: Key features, challenges, and shifts. *The Lancet*, *398*(10305), 1091–1104. https://doi.org/10.1016/S0140-*6736*(21)00252-X

Tan, S. J., & Tambyah, S. K. (2016). Shifting values and life satisfaction: A sequential cross-sectional study of the influence of values on subjective wellbeing in Singapore. *Social Indicators Research*, *127*(3), 1391–1416. https://doi.org/10.1007/s11205-015-1015-5

Tarulevicz, N. (2013). *Eating her curries and kway: A cultural history of food in Singapore*. University of Illinois Press.

UNESCO. (2021). *The lists of intangible cultural heritage and the register of good safeguarding practices* [Data set]. https://ich.unesco.org/en/lists

United Nations Department of Economic and Social Affairs. (2018). *68% of the world population projected to live in urban areas by 2050, says UN*. https://www.un.org/development/desa/en/news/population/2018-revision-of-world-urbanization-prospects.html

United Nations Sustainable Development. (n.d.). *Goal 3: Ensure healthy lives and promote well-being for all at all ages*. https://www.un.org/sustainabledevelopment/health

Walton, G. M., Cohen, G. L., Cwir, D., & Spencer, S. J. (2012). Mere belonging: The power of social connections. *Journal of Personality and Social Psychology*, *102*(3), 513–532.

Wanzer, M., Booth-Butterfield, M., & Booth-Butterfield, S. (2005). "If we didn't use humor, we'd cry": Humorous coping communication in health care settings. *Journal of Health Communication*, *10*(2), 105–125. https://doi.org/10.1080/10810730590915092

Zhao, S. (2003). Toward a taxonomy of copresence. *Presence: Teleoperators and Virtual Environments*, *12*(5), 445–455. https://doi.org/10.1162/105474603322761261

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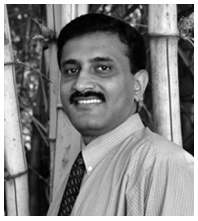

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Article

Enlarging the Human Climate Niche: Integrating Urban Heat Island in Urban Planning Interventions

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Abstract
This article explores the potential of linking the scholarship on the human climate niche and heat island research. One such combination leads to a better understanding of the liveability of urban areas and thereby offers a contribution to emerging healthy urban planning. Whereas former research has primarily focused on the parameters influencing urban heat island and mitigation solutions, it remains short on quantifying these solutions and conceptualising the cumulative impacts of urban heat island on health and vulnerable populations. Based on the coupling of ENVI-met computational simulation and the local climate zone method, this article quantifies mitigation solutions and associates the frequency and intensity of heat stress and health-related symptoms in various urban settings. Drawing on a real-case urban intervention in Paris, it offers a more effective health-related and comfort-focused approach to urban planning and interventions to expand the human climate niche. This should contribute to transforming the planning and conception of public spaces into "liveable refuges" for all population types, including the most vulnerable. The results stemming from the simulations of mitigation measures help design a hierarchy of interventions to tackle urban heat islands according to the intensity of their ability to reduce heat stress risk. This hierarchy is then adjusted to other parameters contributing to a healthy, liveable urban environment and urban planning, making interventions on urban heat islands a matter of (multidimensional) care for urban dwellers.

Keywords
health; human climate niche; liveability; microclimates; simulations; urban heat island

Issue
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1. Introduction

Various works on climate change and biodiversity loss have put the emphasis on one specific transformation: the shrinking number of shelters and refuges for various species (Shaffer, 2018; Tanner et al., 2017), making urban places somewhat alternative refuges (Uchida et al., 2021). What this process entails is that their various "environmental niches" are highly threatened by variegated pressures. As explained by Xu et al. (2020, p. 1350), "all species have an environmental niche, and despite the advances in technology, humans are unlikely to be an exception"; this niche is characterised by a set of climatic features that have a decisive influence on thermal comfort as well as on life expectancy. Passing certain (climatic) thresholds would thereby lead to both the shrinkage of this niche and an enhanced level of vulnerability for the affected populations, endangering (human) liveability in certain areas. Ensuring the conservation of this environmental niche is then a major health issue, health being here broadly construed as the combination of physical, mental, and social well-being (Capeille, 2018).

One such conservation entails preventive (and also corrective) measures to preserve correct/healthy living conditions. Amongst the places where the pressure on the niche is increasingly problematic and challenges the liveability of human settlements, urban areas seem to concentrate the highest threats, mainly due to the urban heat island (UHI) effect (along with other factors such as pollution or access to resources, which are closely intertwined with UHI). The UHI effect is a phenomenon that occurs in cities and is attributed to the difference in temperatures between an urban area or a metropolitan area and its surrounding rural areas. This phenomenon's formation can be traced to different parameters, which are characteristic of dense cities (Santamouris, 2020). Congested urban morphologies and dark impervious surfaces favour shortwave radiation trapping and heat absorption. Coupled with anthropogenic heat and extremely high temperatures, amongst other things, UHI intensity can reach up to +10 °C.

Yet scant works try to articulate these issues of the liveability of urban areas and climatic transformations with the types of urban planning interventions that can be achieved in already built areas. Surprisingly enough, while some research has put forward an urban liveability index (Higgs et al., 2019), this index does not take environmental issues into account beyond access to green spaces or air pollution, and largely neglects the elements integral to thermal comfort and the sanitary effects of UHIs. In this article, we show how interventions for healthy urban planning targeting UHI prevent the degradation of this niche at a microlevel.

One should acknowledge that the articulation of UHI and health concerns is by no means a completely new topic. It has even been at the core of seminal works on the topic, as early as Webster's contribution in 1799 with his *Brief History of Epidemic and Pestilential Diseases* (as cited in Meyer, 1991, and Stewart, 2019). At that time, Webster insisted on the prejudice against health exerted by the extreme heat of cities and sketched what can be considered a pre-discovery of the functioning of modern urban climate. Provocatively enough, in 1807, Caldwell even suggested that the most comfortable place in cities to escape from the health effects of heat would be jails, due to their thick walls and small windows. These premises for understanding UHI effects in relation to urban health placed emphasis on the need to integrate heat in the design of a sanitary city.

With the acceleration of climate change, these pressures on the thermal conditions of urban areas are reaching a new threshold, leading to a shift in the approach of urban design: the traditional comfort-oriented perspective on UHI (as detailed in Watkins et al., 2007) is increasingly becoming replaced by a health-oriented perspective (D'Onofrio & Trusiani, 2018). One such shift follows recent development in the research as well as in professional practices, in light of project-based literature on urbanism favourable to health (Capeille, 2018), which identifies factors of crisis and vectors of well-being within cities. Following this vein, we scrutinise urban planning practices in favour of healthy urban planning, seen through the lenses of UHI effects. In this article, we argue that analysing UHI and modelling it at a microclimatic level (Mayer & Höppe, 1987) offers tools to design urban planning interventions, preserving, if not enlarging, the human climate niche by limiting UHI. Through one urban project in Paris inspired by the principles of healthy urban planning, we model and analyse both the contributions of the planned interventions to UHI reduction and the heat- and health-related potential of other interventions on other determinants integral to UHI (Santamouris et al., 2004). Through this, we produce a UHI-oriented hierarchy of urban interventions that can contribute to improved liveability of the concerned areas.

In the next sections of this article, we show through a literature review how UHI, health issues, and urban planning interventions can be articulated and somewhat form a nexus, illustrating the interest of localised climate modelling to identify places where the effects are the most prevalent, and where the interventions could contribute to a diminution of this effect (Section 2). Drawing from the modelling of an urban project in Paris with ENVI-met software (Section 3), we simulate the various effects of UHI-oriented urban interventions adopted on that site (Section 4). We expand this first simulation beyond the already planned interventions and test a larger set of possible solutions to provide a hierarchy of possible interventions for healthy urban planning, whose aim is to lower UHI and thus enhance the liveability of some urban projects (Section 5). The various possibilities of urban interventions are then further discussed in terms of urban arbitrages (Section 6).

2. How to Link Health, Urban Heat Island, and Urban Planning: Literature Review

Looking at UHI induces an understanding of its effects on surfaces, but also on urban dwellers. These effects are often reduced to psychological impacts linked with discomfort. Yet one can clearly identify a series of direct and indirect effects on health due to UHI. They all contribute to increasing the vulnerability of people affected by UHI.

A growing body of literature is placing emphasis on the development of "urban ills," or "big city diseases," amongst which one could list UHI (Li et al., 2021). This can be taken metaphorically, as in Li et al.'s text, to denounce the important stress generated by various forms of density, but also materially and physically through a systemic analysis of the articulation between UHI and health.

2.1. Urban Heat Island as an Accelerator of Health Issues

The articulation between UHI and health issues reveals the role of catalyst played by UHI on various forms of health issues. The existence of UHIs acts as an accelerator of heat waves and makes them particularly lethal

(Robine et al., 2008; Vandentorren et al., 2004). This has to be determined cautiously by distinguishing between the types of temperatures (surface temperature and air temperature; Stewart et al., 2021) to robustly grasp the magnitude of UHI and its health effect. As documented in various works, UHI enhances the severity of extreme heat events, such as heat waves, and thereby contributes to an increase in morbidity and mortality (Gosling et al., 2009; Nogueira et al., 2020).

This catalytic aspect of UHI is even reinforced when combined with degrading air quality (Richard et al., 2021). There is a direct correlation between the production of the smog effect and high air temperatures, thereby reinforcing the UHI effect. A smog bubble forms when hot air lifts pollutants and particle matter (such as PM10, PM2.5, O_3, and NO_2) to higher altitudes. Cooler air from the outskirts of the city heats up and stops penetrating the city centre. The hot air cushion can generate an inversion at night, preventing the city from cooling and preventing the air from mixing with fresh air from the countryside (Krusche et al., 1982). The combination of UHI and air quality pollution increases the risk of developing several health effects such as asthma, chronic bronchitis, lung irritation, and cancer, and increases hospital admissions resulting from cardiovascular and respiratory diseases (Dandotiya, 2019). These health effects are predominantly linked to anthropogenic emissions, mainly coming from car exhausts and factories.

As climate change has been proven to exacerbate the UHI effect (Chapman et al., 2017), its catalytic power becomes an increasingly important threat to urban dwellers' health and their climate niche.

2.2. Urban-Heat-Island-Related Health Risks: Direct and Indirect Risks

UHI has long been considered a matter of concern by urban planners and the associated academic literature, but not for purely sanitary reasons. In a large amount of research, the objective is to assess and transform thermal comfort to improve the physical perception of space but not to limit health-related risks (Erlwein & Pauleit, 2021; Mittermüller et al., 2021). Yet a growing body of literature, coming from the urban health field rather than urban planning, details how UHI can be linked to a wide range of health impacts (Hammer et al., 2020).

These effects of UHI can be sorted into two categories: critical direct effects and indirect aggravation of existing conditions. Figures from the Centres for Disease Control and Prevention demonstrate how extreme heat events and heat stress more generally, bolstered by UHI, can directly lead to heat exhaustion and heat stroke (Kovats & Hajat, 2008). Records from recent experiences with heat waves show that extremely hot temperatures are correlated with an increase in excess mortality and morbidity (Guo et al., 2018). The 2003 European heat wave was recorded at the time as the hottest summer since at least the 14th century. France, and specifically very urbanised areas, was highly affected during that period, recording 18 consecutive days with temperatures above 35 °C (Météo France, 2020) and experiencing abnormal mortality levels largely due to this phenomenon.

Indirect effects can also be observed through the exacerbation of certain medical conditions: UHI will, for instance, reinforce effects related to diabetes, obesity, cardiovascular diseases, and asthma (Reid et al., 2009). It has been recorded that morbidity related to respiratory admissions increases by 4.5% for every 1 °C increase in temperature above the human climate niche threshold for the 75+ group (Michelozzi et al., 2009). Mortalities due to respiratory complications tend to peak three weeks after exposure to extreme heat stress (Michelozzi et al., 2009). People with chronic diseases and underlying conditions are also vulnerable during heat waves, as the body is less efficient at regulating core temperatures due to a decreased thermoregulatory ability. Obese and overweight individuals are considered in some studies to be 3.5 times more susceptible to fatal heatstroke (Kenny et al., 2010).

Neuropsychiatric damage has also been reported as an indirect health effect of heat. In fact, heat exposure for an extended period can lead to worse moods, depression, and suicidal tendencies in some individuals. It also harms cognitive performance via reductions in memory, attention, and processing speed (Obradovich et al., 2017). Coupled with direct health effects and increasing air pollution due to heat, these combinations increase the vulnerability of the human body and the rates of morbidity and mortality.

2.3. Heat-Related Health Issues as a Socially Situated Phenomenon

Yet, these elements should not eclipse the fact that heat-related health issues are a socially situated phenomenon (Basu & Samet, 2002), linked to urban living conditions (Friel et al., 2011). This shows how health is conditioned by the qualities of the built environment, and somewhat reflects other forms of social inequalities such as access to systems or services that will thwart the physical and medical effects of UHI.

Individuals living in poor-quality buildings and unable to afford air conditioning are, for instance, more at risk of heat illnesses, as an air conditioner or a working fan can reduce heat-related risks by 80% and 30% (Kenny et al., 2010). Poor-quality constructions in general largely reinforce the health-induced effects of UHI, notably by night, when the body is recovering. During the night, the geometric shape of dense cities traps shortwave radiation from the sun, creating long-lasting hot zones. Furthermore, dark materials that form the urban morphology release all their accumulated heat, during the night, conversely slowing down the cooling of the ambient air temperatures (Atelier Parisien d'Urbanisme, 2017). This accounts for various UHI-induced health

disorders: Most heat-related strokes happen at night due to the canyon effect and the thermal properties of dark materials. At night-time, high temperatures significantly influence sleep patterns, increasing susceptibility to chronic illnesses and diseases. Studies show for instance that a +1 °C deviation in night-time temperatures produces an increase of three insufficient nights of sleep per 100 individuals per month (Obradovich et al., 2017).

These various elements demonstrate the close relationship between health issues, UHI, and the built environment. They are highly intertwined and clearly determinants of the human climate niche: Working on UHI mitigation through urban interventions thus brings about an improvement in health conditions for urban dwellers. From an urban planning perspective, this clearly raises questions about the need to grasp the precise features of UHI to transform both the built environment and city dwellers' health. The challenge is therefore to identify interventions according to their capacity to limit UHI. Microclimatic modelling offers a fruitful approach to testing this, as developed in the next sections.

3. Methodology: Modelling Microclimatic Conditions to Address the Health–Urban Heat Island–Urban Planning Nexus

3.1. Modelling Microclimatic Urban Conditions

Whereas previous research has primarily focused on the parameters influencing UHI and mitigation solutions, it remains short on quantifying these solutions and conceptualising the cumulative impacts of UHI on health and vulnerable populations (Enete et al., 2014; Ulpiani, 2021). Mitigating the UHI effect, and thus reducing urban temperatures, revolves around treating three main controllable parameters (environmental parameters deemed uncontrollable) that influence UHI: morphological, surficial, and anthropogenic (ADEME, 2012; Santamouris et al., 2004). Morphological solutions refer to altering the built environment, considering its shape, size, organisation, distribution, orientation, exposure, and density to adopt an urban fabric more resilient to heat. Surficial solutions consist of adopting lighter and permeable surfaces, as well as using the cooling potential of vegetation and water bodies. Anthropogenic solutions promote active mobility and support more sustainable buildings to reduce carbon emissions over their life cycle. Hence, for the purpose of this article, we simulated solutions resting on these parameters in a specific urban project in Paris (designed by AIA Life Designers) which is inspired by the principles of healthy urban planning. Based on the coupling of ENVI-met computational simulation and the local climate zone (LCZ) method, we quantify both the mitigation solutions planned for the site and other interventions tackling UHI key parameters (surficial, morphological, and anthropogenic), in order to offer a panorama of the urban planning possibilities to tackle the UHI-health-planning nexus.

The LCZ method, developed by Stewart and Oke (2012), is used to identify the UHI intensity based on a defined set of properties on already existing territories. It rests on the idea that certain "types" of urban configurations display similar thermal behaviours. This approach is considered a fairly quick method that gives an idea of the UHI intensity without the use of computational simulations, and consequently informs urban decision-making processes (Lensholzer, 2015).

ENVI-met is a three-dimensional simulation software that forecasts the impact of urban interventions on the surrounding environment and takes into account an array of different indicators, which explains its growing use in academic articles (Crank et al., 2018; Simon et al., 2018). In this project, ENVI-met is being used to quantify the cooling effect of different solutions that can be implemented in an urban setting. The quantitative data resulting from the simulation of several microclimates can assist architects and urban planners in making their projects safer for users and vulnerable populations. The purpose of our simulations is to identify possibilities to create shelters and thereby mitigate UHI and enhance the human climate niche. To produce a possible hierarchy of urban interventions according to their health-related impact, all microclimates have been simulated under the same conditions on one specific site.

3.2. Application in a Parisian Case Study

The case study is located in Paris, in a dense urban area (Figure 1). Records from previous heat waves have shown that Paris suffers from an intense UHI that can reach up to +10 °C (Météo France & Agence Parisienne du Climat, 2018), which makes it an interesting case to explore. The site is categorised as an LCZ 2 (compact mid-rise) due to its morphology of four to eight-storey buildings, and the recurrence of dark asphalt with the exception of a few planted areas. The local surficial properties favour heat absorption and the intensification of the UHI effect (the site's average albedo reaches 0.2 and impervious surfaces cover around 80%), and the morphological configuration suggests a higher risk of diurnal thermal discomfort for pedestrians due to limited shading from the buildings, coupled with the small presence of trees.

The urban project (as designed by AIA Life Designers and not yet fully implemented) seeks to transform the area's liveability through various urban interventions on surficial parameters, ranging from doubling the presence of various strata of vegetation to removing 70% of the existing asphalt surfaces and using less reflective materials to avoid thermal discomfort for pedestrians (Crank et al., 2018). These interventions were conceived in terms of urban comfort and were not associated with a quantified measure of their impact on UHI. It thereby offers an interesting site to simulate the contributions of these interventions to mitigating UHI. Correlatively,

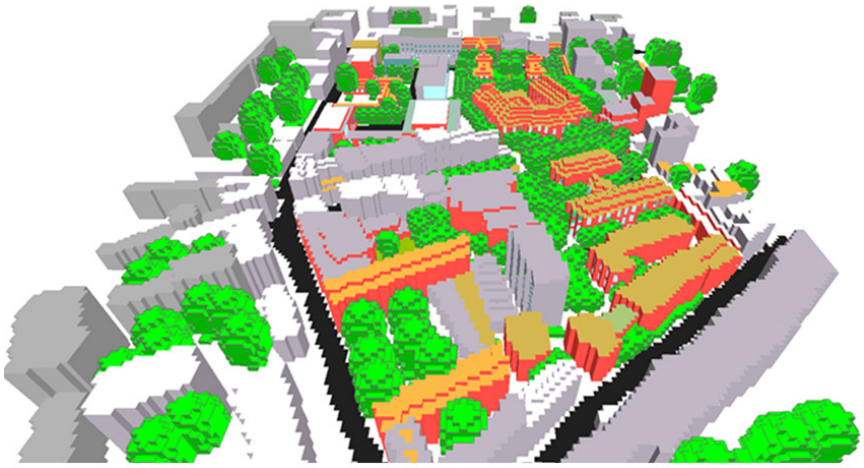

Figure 1. 3D representation of the case study from ENVI-met.

even if not directly measurable, these contributions will have health-related impacts by increasing the climatic liveability of the area and then maintaining the human climate niche.

The differences between the existing state of the site and the projected one with solutions displayed can be seen in Figure 2. The changes between the two states are listed as follows:

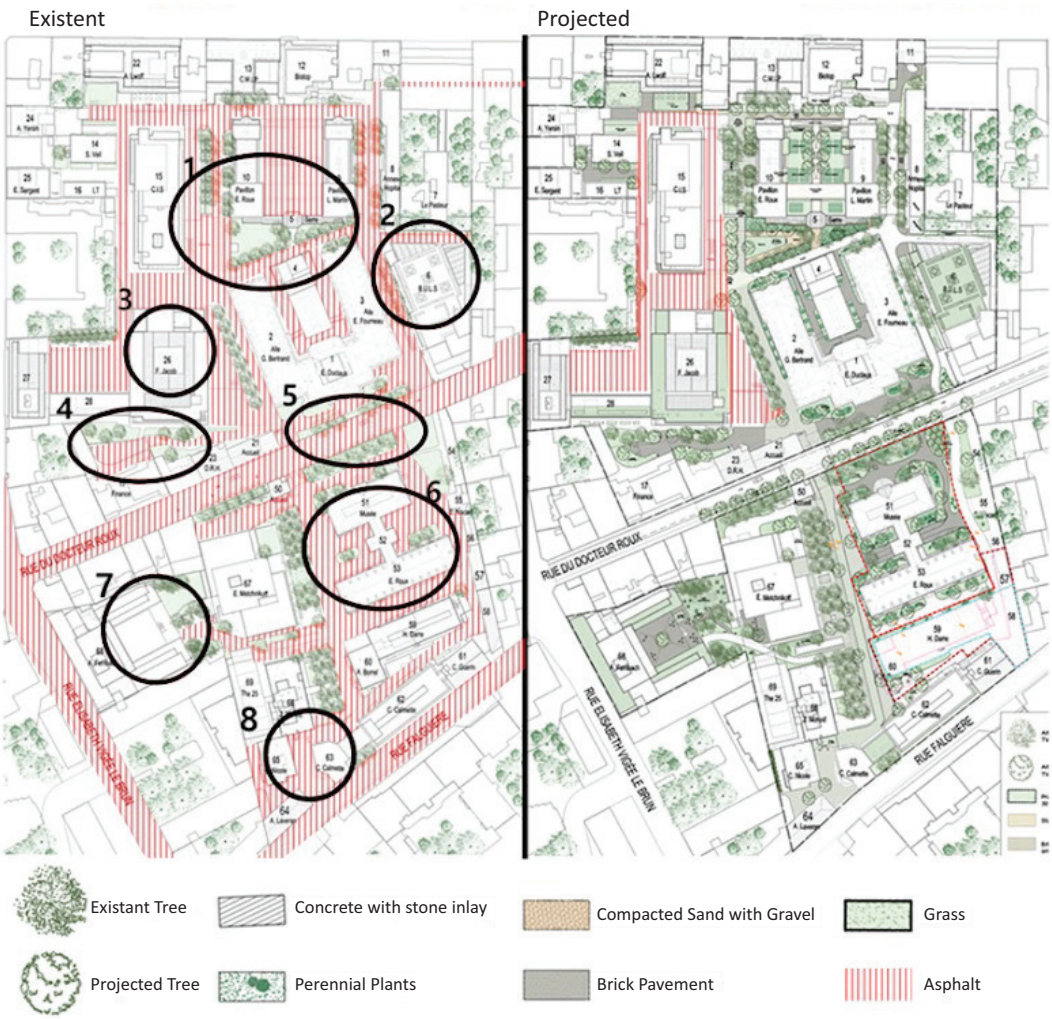

Figure 2. Comparison between the existing state of the chosen site and the intervention plan. Source: Courtesy of AIA Life Designers.

1. The soil of the first highlighted area is changed from impervious asphalt to compacted sand and gravel; the presence of vegetation is also increased.
2. The roof of the second area is transformed from concrete to green.
3. In the third area, a similar roof transformation occurs.
4. The asphalt in the fourth area is removed and replaced by brick tiles. Perennials are also added to the green areas to form three layers of vegetation.
5. The pavement of the fifth area is planted with trees.
6. The sixth area is planted with perennials and more trees.
7. The soil type is changed from asphalt to paving stone and is planted with more trees and perennials in the seventh area.
8. In the eighth area, asphalt is replaced by deactivated concrete with stone inlay.

The methodological protocol followed a two-step approach. First, the case study (as is and with the planned interventions) was simulated with meteorological data that depicts a heat wave that previously hit Paris in 2018. The simulated period spans three days, with a maximum temperature of 37.3 °C, a minimum temperature of 21 °C, and a mean temperature of 29.3 °C. ENVI-met was used to model, simulate, and analyse the gathered data. The mean radiant temperature (MRT) and potential air temperature (PAT) indicators were chosen to measure the intensity of UHI. The MRT is a heuristic indicator, as it highlights thermal radiant exchanges of surfaces in the thermal environment (Kántor & Unger, 2011).

Second, we expanded simulations to other types of interventions that were not planned for this site, regardless of their potential financial constraints. These interventions were selected based on the controllable parameters influencing UHI (surficial, morphological, and anthropogenic), and we tested their consequences on the temperature of the area. Through this, we can observe the contributions to lowering UHI from the various options that would constitute patterns of healthy urban planning. The results of these simulations open up the possibility of forming a hierarchy of urban planning actions according to their cooling potential and hence their potential to limit health issues relating to UHI.

4. Results: Simulations of Urban-Heat-Island-Related Actions

The results stemming from the simulations of the existing state and the intervention state of the chosen site confirm the theoretical observations outlined above. In the existing phase, with the exception of some planted areas, the MRT of asphalt surfaces reaches up to 55 °C. The surfaces that benefit from the shading effect of nearby trees and buildings have an MRT spanning between 25 and 30 °C. In the projected phase, we notice that the entire site benefits from a lower MRT in comparison to the existing state, except the north-western area, which is a technical zone with underground parking that underwent little to no modification. In the eight highlighted zones below, we observe a remarkable reduction of the MRT of about 30 °C, mainly due to the surficial modifications (a category that includes vegetation).

In order to analyse the evolution of UHI during the simulated period of three days, we determined the most frequented areas of the site. Six points were scattered across the main exterior zones for an analysis combining both MRT and PAT indicators. As the simulations show similar patterns in the six points, and to avoid repetition, only two of them are presented here: A and B, the two most frequented points (Figures 3 and 4).

In the projected phase, Point A (Figures 3 and 4) is situated in an area dominated by vegetation and permeable soil (grass and a pathway of compacted sand and gravel). The compacted sand and gravel have no energy storage capacity due to their porous nature, but a high albedo, hence cooling down immediately in the evening (Atelier Parisien d'Urbanisme, 2017). Furthermore, trees cover the area, as well as some perennials. In its existing phase, this area consisted solely of grass and a few trees at its extremities. The simulation results show that there is a 27 °C difference in the MRT measured at 1.5 m during the day, and more precisely from 10 am to 6 pm due to the intervention. The 27 °C delta can be attributed to evapotranspiration and the shading effect of the trees.

During the night, we notice that the MRT in the existing conditions is lower by around 3 °C. This is attributed to the fact that trees have a reverse influence during the night, trapping radiation under their canopies (Perini et al., 2018) and leading to slightly higher nocturnal MRTs. This high reduction in MRTs by around 27 °C between the two cases leads to the intervention state having roughly 2 °C lower PATs at some points during the day. This reduction is directly correlated with the cooling and shading effect stemming from the deployment of the different strata of vegetation.

Point B (Figures 3 and 4) is situated in an area with less vegetation in comparison to Point A. In the existing phase, point B has an asphalt surface and one tree. In the intervention state, Point B has a surface of deactivated concrete with stone inlay, which has a higher albedo than asphalt, as well as additional vegetation on the sides. We notice that, unlike the first case, both the existing and the intervention states receive direct solarisation, with the existing one receiving sunlight between 10 am and 2 pm, and shade from 2 pm onwards; however, due to the intervention state's lower albedo surface, the MRT is reduced by about 12 °C at 1 pm. Between 2 pm and 5 pm, while the existing phase is receiving direct sunlight, the intervention phase benefits from the shading effect of the added trees and thus has an MRT reduced by about 30 °C. Similarly to Point A, this reduction in MRT results in a lower PAT, albeit to a lesser extent, by about 1.5 °C at some points during the day.

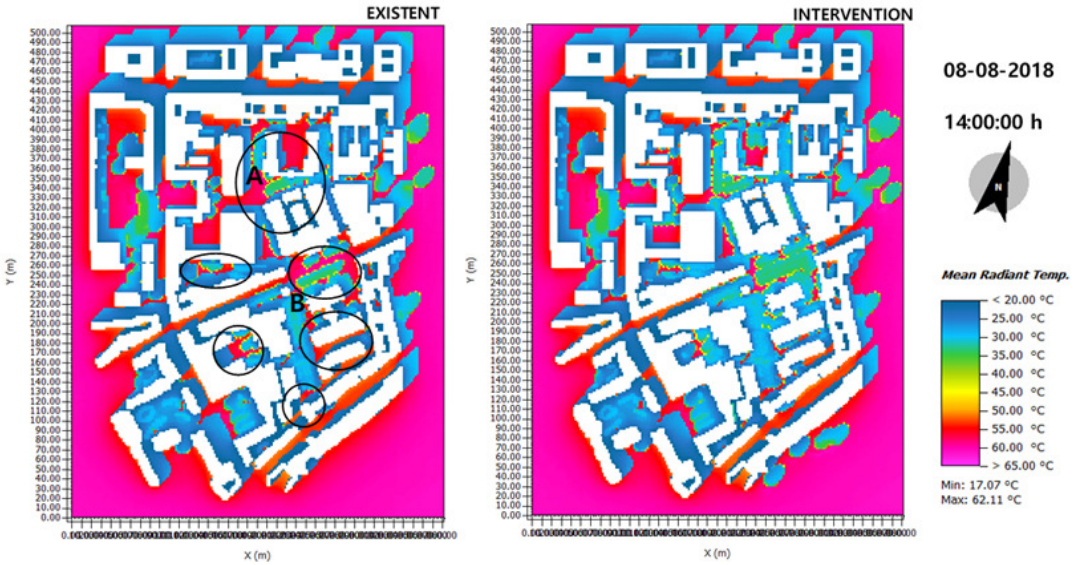

Figure 3. Comparison of the MRT at 1.5 m elevation between the existing state of the case study and the intervention plan generated on ENVI-met.

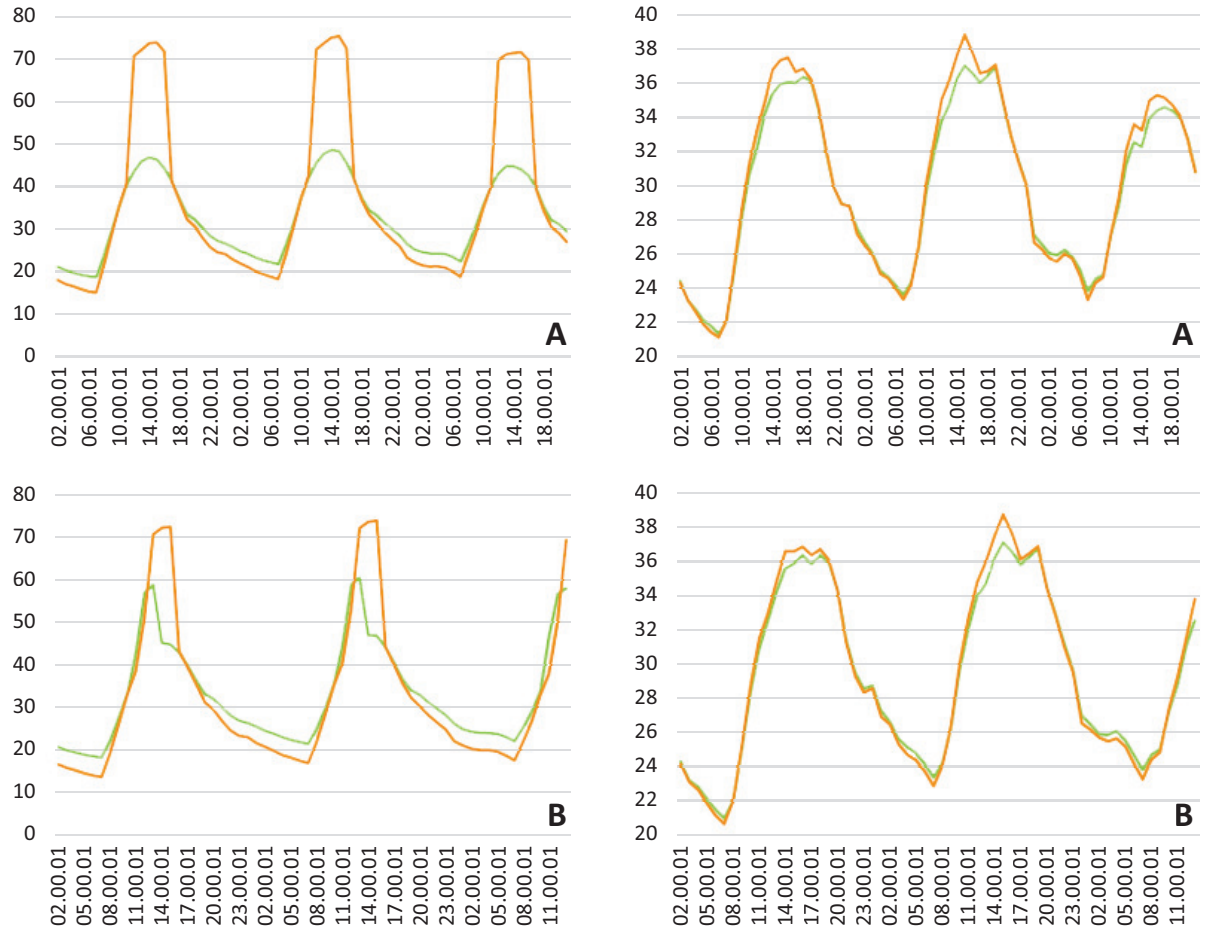

Figure 4. Comparison between the existing state of the case study (orange) and the intervention plan (green) looking at the MRT and PAT for the duration of the simulation at 1.5 m, generated on ENVI-met. Notes: The left side graphs show the MRT, and the right side shows the PAT; points A and B can be spotted on the map in Figure 3.

To summarise, this difference between the existing and intervention states of the site highlights the importance of the changes implemented. Even though the intervention was mainly based on surficial parameters, its effect was felt with a 30 °C reduction of MRTs during sun hours, creating a more liveable environment for site users to form places to be occupied not to be avoided. In that sense, this intervention increased the liveability of the area and contributed to maintaining the human climate niche at this microlevel.

5. Discussion: How to Hierarchise Urban-Heat-Island-Related Interventions

This simulation of the microclimatic and health-related effects of an urban project can be extrapolated to other types of interventions that are within the scope of UHI-controllable parameters (surficial and morphological) and were not adopted in the chosen site. Therefore, we simulated the potential of water bodies, fountains, morphological transformations, and other surficial transformations such as the use of different types of vegetation. As mentioned beforehand, these microclimates were simulated under similar conditions to the case study, but for a shorter period due to hardware limitations. As such, the results presented here stem from microclimates located in Paris, and simulated under extreme heat conditions for 24 hours, with a mean temperature of 29.3 °C, a maximal temperature of 37.3 °C, and a minimum temperature of 21 °C. Soil temperatures were set at 22.5 °C and soil humidity at 70%.

The simulation provides the possibility to test the cooling potential and consequently the health-related impacts of these various interventions, and to rank them accordingly (Table 1), as detailed in this section. This approach allows us to put the interventions chosen in the site into perspective from a UHI-oriented point of view, and to discuss their contribution to the human climate niche.

Table 1. Results of the hierarchisation of the cooling effect (PAT) of all simulated solutions on ENVI-met.

Solution	Description	Measuring point	Cooling potential (PAT)	Remarks
1. Fountains	Size: 8 × 12 m (metres) Results are in comparison to a model without a fountain	10 m (metres) to the side of the fountain	−5° C	The fountain used for this simulation is a fairly large one, which explains the high cooling effects. Works best in dry climates.
		20 m to the side of the fountain	−2.3 °C	
	Fountain facing 3 m/s direct winds	70 m to the side of the fountain	−1.5 °C	
2. Pond	Size: 28 × 54 m Depth: 4.5 m Results are in comparison to a model without a pond	1.5 m above water level, taking from the centre of the pond	−2.7 °C	The cooling effect of small and shallow ponds is insignificant. Works best in dry climates.
3. Albedo	Albedo: 0.8 Results are in comparison to a model with an albedo of 0.2	1.5 m above ground level, in an area receiving direct sunlight	−2.1 °C	A very high albedo can increase the mean radiant temperature and decrease diurnal thermal comfort.
	Albedo: 0.5 (red asphalt) Results are in comparison to a model with an albedo of 0.2 (conventional asphalt)	1.5 m above ground level, in an area receiving direct sunlight	−1 °C	
4. Vegetation	4 strata of vegetation Results are in comparison to a model without vegetation and with a surface made of asphalt (albedo 0.2)	1.5 m above ground level	−1.8 °C	Dependent on the essence of vegetation, climate type and nature of soil.
	Results in comparison to a model with grass (one stratum of vegetation)	1.5 m above ground level	−1.5 °C	
	4 strata of vegetation with a soil humidity of 70% Results are in comparison to the same model with soil humidity of 10%	1.5 m above ground level	−1 °C	

Table 1. (Cont.) Results of the hierarchisation of the cooling effect (PAT) of all simulated solutions on ENVI-met.

Solution	Description	Measuring point	Cooling potential (PAT)	Remarks
5. Maximising wind penetration	Windspeed = 6 m/s Results are in comparison to a model with windspeeds of 3 m/s	1.5 m above ground level	−1.5 °C	Dependent on the rugosity of the urban morphology.
	Streets with maximum wind penetration (parallel to the dominant winds) Results are in comparison to a model with minimal wind penetration (perpendicular to dominant winds)	1.5 m above ground level	−0.4 °C	
6. Morphology / aspect ratio	Aspect ratio: 1.6 Results are in comparison to a model with an aspect ratio of 0.85	1.5 m above ground level	−1.2 °C	The cooling potential can be attributed to the shadows cast by the urban morphology. However, the model with a 0.85 aspect ratio cools faster during the night, reducing in turn the intensity of night-time UHI.
7. White roofs	Albedo: 0.8 Results in comparison to a model with an albedo of 0.5	1.5 m above roof level	−0.5 °C	The cooling effect is only felt at roof level and does not contribute to the cooling of the streets below.
8. Green roofs	Substrate: 30 cm + Shrub stratum (intensive) Results are in comparison to a model with a roof albedo of 0.5	1.5 m above roof level	−0.5 °C	Provides additional benefits such as better insulation for the whole building, and better rainwater management.
	Substrate: 30 cm (intensive without shrubs) Results are in comparison to a model with an extensive green roof (15 cm substrate)	1.5 m above roof level	−0.3 °C	
	Substrate: 15 cm (extensive) Results are in comparison to a model with a roof albedo of 0.5	1.5 m above roof level	−0.3 °C	
9. Green wall	Green wall on southern elevations of buildings (ivy plant) Results are in comparison to a model with no green wall	1.5 m above ground level and 2 m away from the wall	−0.4 °C	The cooling effect is only reserved in front of the wall. Provides additional benefits for the building.

5.1. Water bodies and Fountains

According to our simulations, the evaporative cooling of fountains yielded the highest delta between a base scenario urban setting and the same model with a 4 × 4 m fountain in the centre of the square. When measured 10 m away from the fountain, the cooling effect is −5 °C. This cooling effect is only local as it becomes negligible further than 20 m from the radius of the fountain under 0.8 m/s winds. However, when the fountain is placed in a strategic position facing winds of 3.2 m/s, the cooling effect persists more than 70 m away (cooling of up to −1.5 °C) and is −2.3 °C at 20 m.

In fact, fountains cool the air using a different mechanism than that used by ponds. While both use evaporation to cool the ambient air, fountains mechanically release aerosols into the air, acting similarly to mist machines. According to Atelier Parisien d'Urbanisme

(2014), the effectiveness of induced evaporation is greater than that of natural evaporation. Ponds and lakes are also effective when it comes to reducing ambient temperature, albeit less so than fountains. The cooling effect of ponds is correlated with their size and depth. Our simulations show that a 28 x 54 m pond with a depth of 4.5 m reduces ambient air temperatures by 2.7 °C when measured at 1.5 m above it, and by 1 °C at 20 m away (Figure 5).

Due to the water's thermal inertia, the same mechanism that cools the surroundings during the day, as water takes more time to heat up, acts in reverse at night, as the water body takes more time to cool, making it warmer than the ambient air surrounding it. This mechanism implies that water bodies may actually enhance nighttime UHIs (Jacobs et al., 2020). Furthermore, water bodies are the most effective in dry climates, yet can become controversial in certain configurations when accessibility to water resources is highly constrained.

5.2. Morphological Transformations

Morphological parameters are highly influential in the formation of UHI. However, implementing solutions for urban morphology entails important economic and temporal burdens, which largely explains why cities often opt for easier and cheaper solutions. Nonetheless, transforming buildings to better withstand extreme temperatures reduces the effects of heat stress on the human body. Creating openings in dense morphologies helps with airflow circulation, which dissipates heat and prevents urban canyons from becoming hot spots (Santamouris et al., 2004). Our simulations show that under West European climatic conditions such as those in Paris, a 3 m/s increase in wind speed cools down air temperature by −1.5 °C. Furthermore, a street that is parallel to the dominant winds recorded temperature deltas of −0.4 °C in comparison to a street that is perpendicular to the same dominant winds. These findings agree with the results of previous studies like Giannaros and Melas (2012) or Atelier Parisien d'Urbanisme (2017), according to which a 10 m/s increase in wind speed is correlated with a −3 °C reduction in temperature felt.

5.3. Vegetation

Planting vegetation is a conventional solution that cities have been implementing to mitigate UHI. Trees cool the

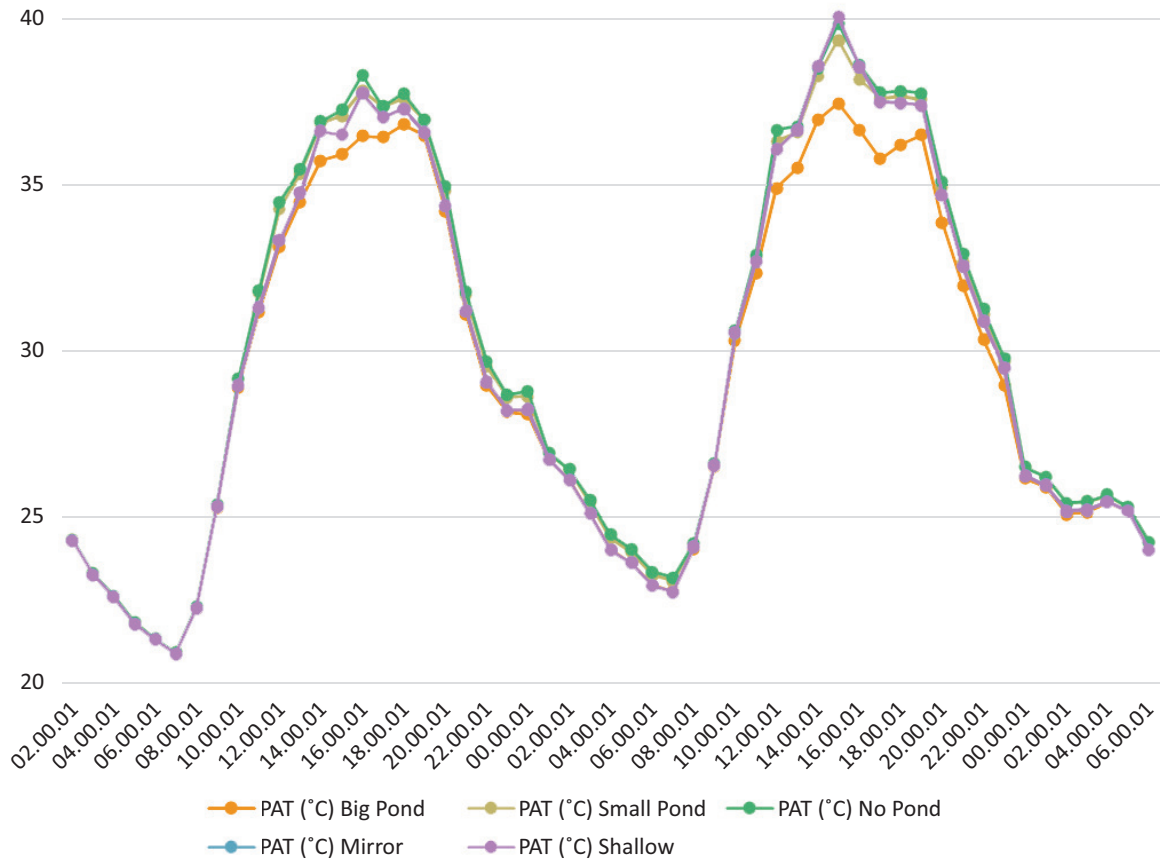

Figure 5. Comparison of the influence of waterbodies on the PAT, depending on size and depth using ENVI-met software. Notes: Pond dimensions—Big pond (28 m wide × 54 m long × 4.5 m deep), small pond (8 m × 14 m × 4.5 m), shallow pond (28 m × 54 m × 0.5 m), and mirror pond (28 m × 54 m × 0.04 m).

air by evapotranspiration and by blocking shortwave radiation, letting only 20% through and providing shade in return (Atelier Parisien d'Urbanisme, 2017). A tree in full leaf can block up to 95% of incoming radiation (Santamouris et al., 2004). However, the effectiveness of tree cooling relies on the species used, the way it was planted, the location in which it was planted, and the number of strata used. A deciduous tree can emit up to 375 kg of water per day through evapotranspiration, which is equivalent to an energy consumption of 870 MJ, or the cooling effect of five air conditioners during 20 hours in a hot and dry climate (Santamouris et al., 2004). According to our results (Figure 5), the cooling effect of four strata of vegetation (arborescent, shrub, herbaceous, and muscular) is −1.8 °C in comparison to a model with asphalt instead of vegetation, and −1.5 °C in comparison with one stratum of vegetation. The interest in biodiversity lies in the diversification of spaces with more or less developed vegetation strata. By creating a mosaic of vegetation, the ecosystem becomes considerably more complex, and the richness of flora and fauna increases. The use of several vegetation strata favours evapotranspiration and refreshes the urban climate (LPO Isère, 2019).

One downside stemming from the implementation of tree solutions is the fact that they might impede wind flows (Atelier Parisien d'Urbanisme, 2017). This is correlated to the shape and size of the leaves. For example, coniferous trees facilitate wind circulation more than broadleaved trees due to their narrower shape (Choi et al., 2021). This parameter is the most impactful when treating an urban canyon, since wind flow is already obstructed as it is, even before the implementation of tree solutions. Additionally, the cooling effect of vegetation is directly correlated with soil humidity. Our simulations show that a decrease of 60% in soil humidity reduces the cooling effect of trees by 0.2 °C. This explains why it remains important to have more pervious surfaces, and single continuous pits for trees all along pavements (Atelier Parisien d'Urbanisme, 2017).

5.4. Changing the Albedo of Surfaces

Increasing the albedo of surfaces is another conventional solution already implemented in numerous cities worldwide, like Chicago, Zenata, Tokyo, etc. (ADEME & Agence Française de Développement, 2021; Mackey et al., 2012). A lighter surface absorbs less radiation than a darker one, reflecting it as longwave radiation. This phenomenon helps reduce air temperature. According to our simulations (Figure 6), an increase of albedo from 0.2 to 0.8 reduces air temperatures by −2.1 °C.

Illustratively, the figure above shows the cooling effect correlated with the use of red asphalt (albedo of 0.5) instead of conventional black asphalt (albedo of 0.2). The cooling potential of the red asphalt material is −0.3 °C in the shade, and −1 °C when not shaded.

However, as more light is reflected by the surfaces, MRTs increase when the albedo of a material increases. As such, these high albedo materials strongly reflect

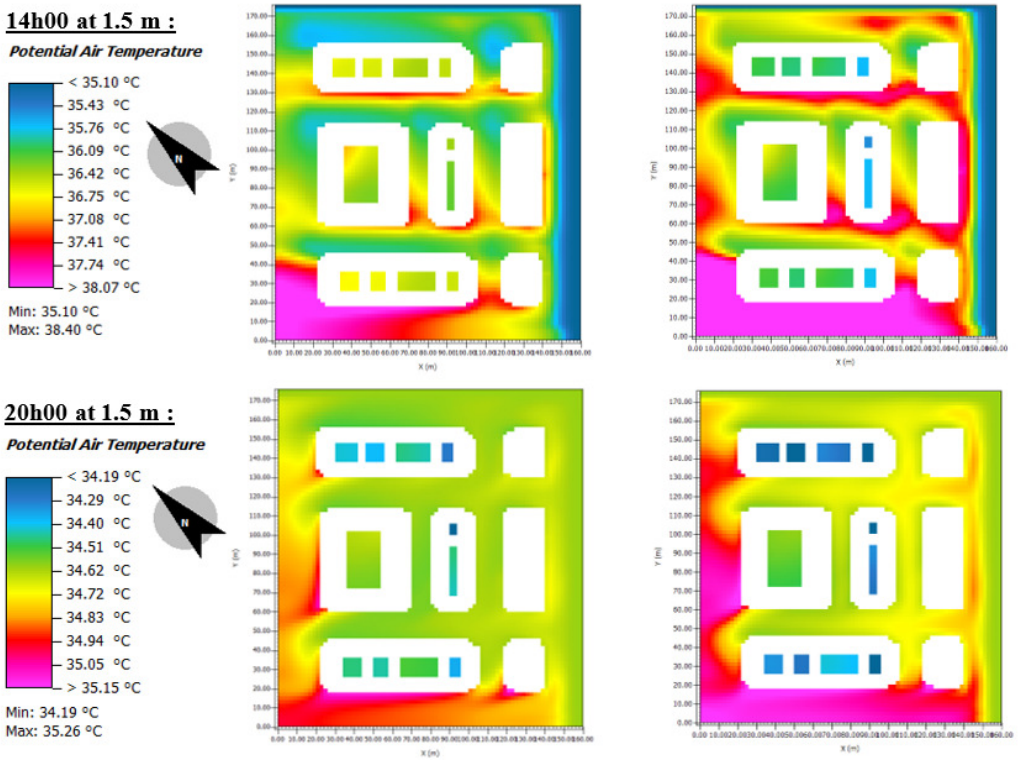

Figure 6. Comparison of the influence of red asphalt (left side) and black asphalt (right side) on the PAT at 2 pm and 8 pm using ENVI-met software.

sunlight at the expense of thermal comfort. The reflected solar energy dazzles pedestrians and heats them with twice the solar radiation (Atelier Parisien d'Urbanisme, 2017). Hence, in this case, the reduction in PAT is also associated with an increase in MRT by 20 °C (Figure 7). In fact, by increasing the albedo by 0.1, the physiological equivalent temperature increases by 0.8 °C (Crank et al., 2018). Coupling a higher albedo with tree canopies to shade blocks receiving solar radiation reduces the MRT by 30 °C, ensuring better pedestrian thermal comfort during the day. In turn, the whiter surfaces accumulate less heat (from shading and from the higher albedo), which reduces the intensity of night-time UHI.

Roof solutions, especially the increase of albedo for roof surfaces, are a quick and cheap fix widely implemented in many cities. Chicago brought in policies that saw a conversion from normal roofs to white roofs associated with an area of 271 km² between 1995 and 2009. The results of these policies showed that reflective roofs produced the most intense cooling, as well as

Figure 7. Comparison of the influence of surface albedo on the PAT for an entire day of simulation using ENVI-met software. Notes: LS = light surface (albedo = 0.8), BS = black surface (albedo = 0.2), WS = wet surface (albedo = 0.4).

the greatest amount of cooling for the smallest amount of money invested (Mackey et al., 2012). According to our simulations, the cooling effect of white roofs (albedo of 0.8) in comparison to a base scenario (albedo of 0.5) is −0.5 °C.

Opting for a green roof is a more expensive solution, but an effective one nonetheless, with regard to temperature. Our simulations show a cooling effect associated with green roofs of −0.5 °C for intensive green roofs (30 cm + substrate with shrubs), and −0.3 °C for extensive green roofs (15 cm substrate). Furthermore, additional benefits span from green roof solutions such as better insulation and thermal comfort for the building and its occupants, better rainwater management, and more space for biodiversity to flourish inside the city. However, results also show that the cooling effect stemming from roof solutions is only felt at the roof level and does not impact the street below, reducing its contribution to healthier urban planning and an increase of the human climate niche.

The health-induced effects of these various interventions cannot be directly measured through these microclimatic simulations. Yet, various works like Di Napoli et al. (2018) have shown that an improvement of MRT and PAT is associated not only with mitigation of UHIs but also with better physiological responses to heat and a diminished risk of heat-related diseases.

6. Conclusive Discussions on Urban Heat Island Urban Interventions and Urban Arbitrages

The solutions suggested in this article to mitigate both the UHI effect and its health-related impacts are based on microclimatic modelling and are highly, if not solely, focused on the possibilities of lowering these effects. Their contribution to an area's liveability is thus thought of almost exclusively from a temperature-oriented perspective. Our simulations have shown that some urban planning options could be quite advantageous within this framework: In this regard, water bodies are highly effective in cooling the ambient air, with a cooling potential of −2 °C and greater in some cases. Yet this capacity is also dependent on the size of the water body and is most effective in dry climates. However, one should keep in mind the situatedness of the intervention to adequately grasp the climatic variability and the contribution of the various options, which can differ from the one presented here in other climatic conditions.

The simulations produced in this article also demonstrate the interest in associating urban planning interventions with a clear and quantified measure of their effect on temperature: This should help enrich decision-making processes when developing projects under the umbrella of healthy urbanism and could be of utmost importance to adapt urban environments to the acceleration of climate change. Combining the various solutions presented in several zones within the city should help limit the intensity of UHI during heat waves. The areas of intervention can register air temperature cooling ranging between −2 and −5 ˚C, proving to be highly desirable shelters for the community. In large cities where UHI intensity can reach 10 ˚C in extreme cases, local cooling shelters can reduce UHI intensity by half in the best cases, thus enlarging, even though mostly at microlevel, the human climate niche in the process.

Yet it is important to mention that this study voluntarily disregarded some other major elements influencing urban interventions, and specifically economic ones: UHI-related urban planning solutions were not discussed here in terms of economic feasibility. The simulations should be considered here predominantly as tools for decision-makers and instruments for urban arbitrages for healthy urban planning; they have a socio-political dimension, linked to their sanitary contribution, which should be taken into account in long-term perspectives and in ways that solely the economic cost of installation will be unable to correctly grasp. They obviously need to be combined with additional elements to target vulnerable locations and populations to make the interventions as healthy and fair as possible.

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Conflict of Interests

The authors declare no conflict of interests.

References

ADEME. (2012). *Guide de recommandation pour lutter contre l'îlot de chaleur urbain* [Recommendations to tackle urban heat island effect].

ADEME, & Agence Française de Développement. (2021). *Des solutions pour rafraîchir les villes: S'inspirer d'expériences dans le monde selon la variabilité des climats d'aujourd'hui et de demain* [Solutions for cooling cities: Drawing from international experiences according to today's and tomorrow's climate variability]. ADEME Éditions.

Atelier Parisien d'Urbanisme. (2014). *Les îlots de chaleur urbains à Paris: Cahier#2—Simulations climatiques de trois formes urbaines parisiennes et enseignements* [Urban heat islands in Paris. Climate simulations of three Parisian urban forms and lessons from these simulations].

Atelier Parisien d'Urbanisme. (2017). *Les îlots de chaleur urbains à Paris: Cahier #3—Brises thermiques* [Urban heat islands in Paris. Thermal breezes].

Basu, R., & Samet, J. M. (2002). Relation between elevated ambient temperature and mortality:

A review of the epidemiologic evidence. *Epidemiologic Reviews*, *24*(2), 190–202. https://doi.org/10.1093/epirev/mxf007

Capeille, J. F. (Ed.). (2018). *Bien vivre la ville: Vers un urbanisme favorable à la santé* [Living well in the urban area, towards healthy urban planning]. Fondation AIA.

Chapman, S., Watson, J., Salazar, A., Thatcher, M., & McAlpine, C. (2017). The impact of urbanization and climate change on urban temperatures: A systematic review. *Landscape Ecology*, *32*(10), 1921–1935. https://doi.org/10.1007/s10980-017-0561-4

Choi, G., Kim, H., Kim, H., & Lee, J. (2021). How do paving and planting strategies affect microclimate conditions and thermal comfort in apartment complexes? *International Journal of Climate Change Strategies and Management*, *13*(2), 97–119. https://doi.org/10.1108/ijccsm-06-2020-0063

Crank, P., Sailor, D., Ban-Weiss, G., & Taleghani, M. (2018). Evaluating the ENVI-met microscale model for suitability in analysis of targeted urban heat mitigation strategies. *Urban Climate*, *26*, 188–197. https://doi.org/10.1016/j.uclim.2018.09.002

Dandotiya, B. (2019). Health effects of air pollution in urban environment. In A. Karmaoui (Ed.), *Advances in environmental engineering and green technologies* (pp. 96–115). IGI Global. https://doi.org/10.4018/978-1-5225-7387-6.ch006

Di Napoli, C., Pappenberger, F., & Cloke, H. L. (2018). Assessing heat-related health risk in Europe via the universal thermal climate index (UTCI). *International Journal of Biometeorology*, *62*(7), 1155–1165. https://doi.org/10.1007/s00484-018-1518-2

D'Onofrio, R., & Trusiani, E. (2018). The need for new urban planning for healthy cities: Reorienting urban planning towards healthy public policy. In R. D'Onofrio & E. Trusiani, *Urban planning for healthy European cities* (pp. 31–41). Springer.

Enete, I. C., Awuh, M. E., & Amawa, S. (2014). Assessment of health related impacts of urban heat island (UHI) in Douala Metropolis, Cameroon. *International Journal of Environmental Protection and Policy*, *2*(1), 35–40.

Erlwein, S., & Pauleit, S. (2021). Trade-offs between urban green space and densification: Balancing outdoor thermal comfort, mobility, and housing demand. *Urban Planning*, *6*(1), 5–19. https://doi.org/10.17645/up.v6i1.3481

Friel, S., Hancock, T., Kjellstrom, T., McGranahan, G., Monge, P., & Roy, J. (2011). Urban health inequities and the added pressure of climate change: An action-oriented research agenda. *Journal of Urban Health*, *88*(5), 886–895. https://doi.org/10.1007/s11524-011-9607-0

Giannaros, T., & Melas, D. (2012). Study of the urban heat island in a coastal Mediterranean city: The case study of Thessaloniki, Greece. *Atmospheric Research*, *118*(15), 113–120. https://doi.org/10.1016/j.atmosres.2012.06.006

Gosling, S. N., Lowe, J. A., McGregor, G. R., Pelling, M., & Malamud, B. D. (2009). Associations between elevated atmospheric temperature and human mortality: A critical review of the literature. *Climatic Change*, *92*(3/4), 299–341. https://doi.org/10.1007/s10584-008-9441-x

Guo, Y., Gasparrini, A., Li, S., Sera, F., Vicedo-Cabrera, A. M., de Sousa Zanotti Stagliorio Coelho, M., Saldiva, P. H. N., Lavigne, E., Tawatsupa, B., Punnasiri, K., Overcenco, A., Correa, P. M., Ortega, N. V., Kan, H., Osorio, S., Jaakkola, J. J. K., Ryti, N. R. I., Goodman, P. G., & Zeka, A. (2018). Quantifying excess deaths related to heatwaves under climate change scenarios: A multicountry time series modelling study. *PLOS Medicine*, *15*(7), Article e1002629. https://doi.org/10.1371/journal.pmed.1002629

Hammer, J., Ruggieri, D. G., Thomas, C., & Caum, J. (2020). Local extreme heat planning: An interactive tool to examine a heat vulnerability index for Philadelphia, Pennsylvania. *Journal of Urban Health*, *97*(4), 519–528. https://doi.org/10.1007/s11524-020-00443-9

Higgs, C., Badland, H., Simons, K., Knibbs, L. D., & Giles-Corti, B. (2019). The urban liveability index: Developing a policy-relevant urban liveability composite measure and evaluating associations with transport mode choice. *International Journal of Health Geographics*, *18*(1), Article 14. https://doi.org/10.1186/s12942-019-0178-8

Jacobs, C., Klok, L., Bruse, M., Cortesão, J., Lenzholzer, S., & Kluck, J. (2020). Are urban water bodies really cooling? *Urban Climate*, *32*, Article 100607. https://doi.org/10.1016/j.uclim.2020.100607

Kántor, N., & Unger, J. (2011). The most problematic variable in the course of human-biometeorological comfort assessment—The mean radiant temperature. *Open Geosciences*, *3*(1). https://doi.org/10.2478/s13533-011-0010-x

Kenny, G. P., Yardley, J., Brown, C., Sigal, R. J., & Jay, O. (2010). Heat stress in older individuals and patients with common chronic diseases. *Canadian Medical Association Journal*, *182*(10), 1053–1060. https://doi.org/10.1503/cmaj.081050

Kovats, R. S., & Hajat, S. (2008). Heat stress and public health: A critical review. *Annual Review of Public Health*, *29*(1), 41–55. https://doi.org/10.1146/annurev.publhealth.29.020907.090843

Krusche, P., Althaus, D., & Gabriel, I. (1982). *Ökologisches Bauen* [Ecological construction]. Vieweg + Teubner Verlag Wiesbaden.

Lensholzer, S. (2015). *Weather in the city: How design shapes urban climate*. nai010.

Li, B., Yi, H., & Wu, J. (2021). In search of effective and practical urban governance to address crises. *Urban Governance*, *1*(1), 1–3. https://doi.org/10.1016/j.ugj.2021.12.006

LPO Isère. (2019). *Biodiversité & paysage urbain: Stratification végétale (Fiche 13)* [Biodiversity

and urban landscape. Vegetal stratification]. https://www.biodiversiteetbati.fr/Files/Other/FT%20BPU/FT13-StratificationVegetale.pdf

Mackey, C., Lee, X., & Smith, R. (2012). Remotely sensing the cooling effects of city scale efforts to reduce urban heat island. *Building and Environment*, *49*, 348–358. https://doi.org/10.1016/j.buildenv.2011.08.004

Mayer, H., & Höppe, P. (1987). Thermal comfort of man in different urban environments. *Theoretical and Applied Climatology*, *38*(1), 43–49. https://doi.org/10.1007/BF00866252

Météo France. (2020). *La canicule d'août 2003* [August 2003 French heatwave].

Météo France, & Agence Parisienne du Climat. (2018). *L'îlot de chaleur urbain* [Urban heat island]. Agence Parisienne du Climat.

Meyer, W. B. (1991). Urban heat island and urban health: Early American perspectives. *The Professional Geographer*, *43*(1), 38–48. https://doi.org/10.1111/j.0033-0124.1991.00038.x

Michelozzi, P., Accetta, G., De Sario, M., D'Ippoliti, D., Marino, C., Baccini, M., Biggeri, A., Anderson, H. R., Katsouyanni, K., Ballester, F., Bisanti, L., Cadum, E., Forsberg, B., Forastiere, F., Goodman, P. G., Hojs, A., Kirchmayer, U., Medina, S., Paldy, A., . . . Perucci, C. A. (2009). High temperature and hospitalizations for cardiovascular and respiratory causes in 12 european cities. *American Journal of Respiratory and Critical Care Medicine*, *179*(5), 383–389. https://doi.org/10.1164/rccm.200802-217oc

Mittermüller, J., Erlwein, S., Bauer, A., Trokai, T., Duschinger, S., & Schönemann, M. (2021). Context-specific, user-centred: Designing urban green infrastructure to effectively mitigate urban density and heat stress. *Urban Planning*, *6*(4), 40–53. https://doi.org/10.17645/up.v6i4.4393

Nogueira, M., Lima, D., & Soares, P. (2020). An integrated approach to project the future urban climate response: Changes to Lisbon's urban heat island and temperature extremes. *Urban Climate*, *34*, Article 100683.

Obradovich, N., Migliorini, R., Mednick, S. C., & Fowler, J. H. (2017). Nighttime temperature and human sleep loss in a changing climate. *Science Advances*, *3*(5), Article e1601555. https://doi.org/10.1126/sciadv.1601555

Perini, K., Chokhachian, A., & Auer, T. (2018). Green streets to enhance outdoor comfort. In G. Pérez & K. Perini (Eds.), *Nature based strategies for urban and building sustainability* (pp. 119–129). Butterworth-Heinemann. https://doi.org/10.1016/B978-0-12-812150-4.00011-2

Reid, C., O'Neill, M., Gronlund, C., Brines, S., Brown, D., & Diez-Roux, A. (2009). Mapping community determinants of heat vulnerability. *Environmental Health Perspectives*, *117*(11), 1730–1736. https://doi.org/10.1289/ehp.0900683

Richard, Y., Pohl, B., Rega, M., Pergaud, J., Thevenin, T., Emery, J., Dudek, J., Vairet, T., Zito, S., & Chateau-Smith, C. (2021). Is urban heat island intensity higher during hot spells and heat waves (Dijon, France, 2014–2019)? *Urban Climate*, *35*, Article 100747. https://doi.org/10.1016/j.uclim.2020.100747

Robine, J., Cheung, S., Le Roy, S., Van Oyen, H., Griffiths, C., Michel, J., & Herrmann, F. (2008). Death toll exceeded 70,000 in Europe during the summer of 2003. *C R Biol*, *331*(2), 171-178. https://doi.org/10.1016/j.crvi.2007.12.001

Santamouris, M. (2020). Recent progress on urban overheating and heat island research. integrated assessment of the energy, environmental, vulnerability and health impact synergies with the global climate change. *Energy and Buildings*, *207*, Article 109482. https://doi.org/10.1016/j.enbuild.2019.109482

Santamouris, M., Adnot, J., Alvarez, S., Klitsikas, N., Orphelin, M., Lopes, C., & Sanchez, F. (2004). *Cooling the cities—Rafraîchir les villes*. Presses des Mines.

Shaffer, H. B. (2018). Urban biodiversity arks. *Nature Sustainability*, *1*(12), 725–727. https://doi.org/10.1038/s41893-018-0193-y

Simon, H., Lindén, J., Hoffmann, D., Braun, P., Bruse, M., & Esper, J. (2018). Modeling transpiration and leaf temperature of urban trees: A case study evaluating the microclimate model ENVI-met against measurement data. *Landscape and Urban Planning*, *174*, 33–40. https://doi.org/10.1016/j.landurbplan.2018.03.003

Stewart, I. (2019). Why should urban heat island researchers study history? *Urban Climate*, *30*, Article 100484.

Stewart, I. D., Krayenhoff, E. S., Voogt, J. A., Lachapelle, J. A., Allen, M. A., & Broadbent, A. M. (2021). Time evolution of the surface urban heat island. *Earth's Future*, *9*(10), Article e2021EF002178. https://doi.org/10.1029/2021ef002178

Stewart, I. D., & Oke, T. R. (2012). Local climate zones for urban temperature studies. *Bulletin of the American Meteorological Society*, *93*(12), 1879–1900. https://doi.org/10.1175/bams-d-11-00019.1

Tanner, E. P., Elmore, R. D., Fuhlendorf, S. D., Davis, C. A., Dahlgren, D. K., & Orange, J. P. (2017). Extreme climatic events constrain space use and survival of a ground-nesting bird. *Global Change Biology*, *23*(5), 1832–1846. https://doi.org/10.1111/gcb.13505

Uchida, K., Blakey, R. V., Burger, J. R., Cooper, D. S., Niesner, C. A., & Blumstein, D. T. (2021). Urban biodiversity and the importance of scale. *Trends in Ecology & Evolution*, *36*(2), 123–131. https://doi.org/10.1016/j.tree.2020.10.011

Ulpiani, G. (2021). On the linkage between urban heat island and urban pollution island: Three-decade literature review towards a conceptual framework. *Science of The Total Environment*, *751*, Article 141727.

Vandentorren, S., Suzan, F., Medina, S., Pascal, M., Maulpoix, A., Cohen, J., & Ledrans, M. (2004). Mor-

tality in 13 French cities during the August 2003 heat wave. *Am J Public* Health, *94*(9), 1518-1520. https://doi.org/10.2105/ajph.94.9.1518

Watkins, R., Palmer, J., & Kolokotroni, M. (2007). Increased temperature and intensification of the urban heat island: Implications for the human comfort and urban design. *Built Environment*, *33*, 85–96.

Xu, C., Kohler, T., Lenton, T., Svenning, J.-C., & Scheffer, M. (2020). Future of the human climate niche. *Proceedings of the National Academy of Sciences*, *117*, 11350–11355.

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Article

Sustainable Heritage Preservation to Improve the Tourism Offer in Saudi Arabia

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Abstract
In recent years Saudi Arabia has launched many campaigns to promote a model of global excellence to be a pioneer in future growth. As part of the Kingdom of Saudi Arabia's National Vision 2030, the country encourages the improvement of national quality services based on the commitment of the government to build up a prosperous country, starting with the valorisation of local traditions. In particular, the Saudi, Arab, and Islamic heritage, built by an ancient civilisation and deeply rooted in the country's history, is currently valorised to strengthen the national identity of local Arab values. The country aspires to preserve heritage sites and the local environment by promoting hospitality services for tourism. In the last years, Muslim pilgrims and all visitors to heritage sites entering the country from abroad have reached eight million people, tripling the numbers in the last decade. The government has started many initiatives and promoted many urban planning processes, programmes, and projects to enhance the touristic offer. The intent is to reach a sustainable approach to target the healthy growth of the country and the Saudi Arabian cities. The article presents some interventions that are currently under development to pursue the Saudi Vision 2030 and its goals. The recent third expansion of the Two Holy Mosques, the modernization of national airports, and the Mecca Metro project to complement the railroad and train public transportation offer will be presented and discussed as part of the national strategy to achieve a sustainable economy and tourism.

Keywords
healthy cities; public health; Saudi Arabia; sustainable economy; urban planning; walkability

Issue
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1. Introduction: Saudi Arabian Global Excellence, a Pioneer in Urban Growth, Targeting Healthy Cities, and Promoting Heritage Conservation

In recent years, Saudi Arabia has opened its doors to new growth, embracing the opportunity of adopting new strategies as a pioneer for a sustainable approach in the post-oil era. The country faces a new economic boom that involves many aspects of society, including promoting new businesses and local and international investments in tourism. The government has recently invested many efforts in conserving the county's national heritage to enhance the local values and strengthen tourism promotion and business. The national target is to adopt differentiated strategies of sustainability to afford the post-oil era and build a future based on new resources through a multisectoral change targeting the healthy growth of the country and the well-being of communities. The change has strategically been linked with the growth of many sectors, including public transportation and healthy lifestyle considerations in constructing new Arabian globalised cities.

The health condition of a population is based on a complex interaction of factors that affect the whole life of the community. As stated by the National Health Center and the World Health Organization (World Health Organization & UN-Habitat, 2016), some conditions of life affect the health status of a population, such as education, transportation, housing, public spaces, employment, and industry. They must be considered in

establishing political practices for planning the healthy growth of any country. Based on the evidence, the approach I will be following in this article to study how urban planning policy impact health and how to improve synergies and positive effects is the health impact assessment (HIA; Douglas et al., 2001). The HIA provides a combination of instruments, procedures, and methods adopted for having potential effects on the healthy condition of the population.

Saudi Arabia's growth targets global excellence and follows the World Health Organization Healthy Cities programme and HIA, aiming at reaching the goal of health as a priority through health considerations in urban planning processes and strategies. The communities' well-being, especially in fast-growing countries such as Saudi Arabia and the Middle East, has raised the importance of implementing sustainable healthy growth by developing urban heritage preservation programmes to enhance local traditions and embed the communities with a sense of social belonging. The preservation programme will mainly impact the effect of tourism on urban development through national heritage promotion. The appropriate urban planning and landscape design combined with heritage conservation can promote and encourage interactions and social connections of the population and the general healthy conditions of a nation (Barton & Tsourou, 2000).

This article presents some examples of how the rise of heritage values can enhance the valorisation of the health of communities' lives by improving national public transportation, urban heritage branding strategies, promoting social life, and the quality of life in public spaces.

2. Literature Review: The Governing Policies in Creating Liveable Communities and Healthy Cities

The liveability indicators and health impact factors are fundamental for the economy, social inclusion, and public health of all populations. All levels of government internationally recognise the importance of the liveability factors for safe, habitable, and healthy communities that are responsible for building up an environmentally sustainable future for the cities. Public transport, walking and cycling infrastructures, open public places, social and recreational opportunities, cultural spaces, and education are fundamental indicators that usually help implement the governing policies of cities and help create liveable, healthy communities. Such national health and liveability indicators are adopted to compare cities and help urban design strategies, infrastructures, and services needed to achieve healthy growth.

Many authors (Campbell, 1996; Davern et al., 2016; Giles-Corti et al., 2015; Lowe et al., 2015; Samet, 2011) debate the importance of urban planners in making fundamental decisions. They must promote sustainable development, enhance the use of green strategies, and advocate for healthy societies, especially for the post-oil growth of Arabian cities. The conflicts between ecological, economic, and political processes are not purely abstract but are essential for the environment, health, and economy of the entire world. The term "healthy" is strictly connected with the term "liveable," which is widely adopted and debated in urban policies worldwide. Although the definitions are not yet clearly stated in urban policies or literature, "liveable" and "healthy" communities are both linked to many similar indicators such as socially inclusive, safe, attractive, environmentally sustainable, affordable, accessible, easily connected with public economic transportation, walkable and cyclable, provided with public open spaces, health infrastructure for community services, educational and cultural leisure, and entertainment opportunities (Lowe et al., 2015). Liveable cities improve the health of communities and the sustainable economic growth of every country (World Health Organization & UN-Habitat, 2016). The achievements of the United Nations Sustainable Development Goals (United Nations, 2015) and New Urban Agenda (United Nations, 2016) are encouraged by promoting and adopting healthy strategies to design liveable communities by adopting urban design and planning that create walkable and pedestrian-friendly neighbourhoods. Walkable residential areas have higher residential densities and provide well-established benefits and a healthy lifestyle by reducing the risk of major chronic diseases and reducing obesity (Giles-Corti et al., 2015). Public transportation services and facilities minimise traffic congestion, air, and noise pollution and are also associated with the quality of mental health (Kjellstrom & Hinde, 2006). Public transport facilities are linked to transport-related walking, reducing the risk of obesity, which is estimated to increase by 6% for each hour spent driving a car (Frank et al., 2004). Cars and motorbikes are associated with traffic injury risks that are a significant cause of death and global disability (Giles-Corti et al., 2016). Easy accessibility and reachability of public open spaces are fundamental to increasing the community's urban life quality and creating attractive, convivial environments (Villanueva et al., 2015) that improve people's health, life, and well-being. High-quality public open spaces improve mental health by promoting open-air physical activities and a recreational, social environment (Giles-Corti et al., 2016; Sallis et al., 2011).

The current trend in the growth of globalised cities in Middle East Countries, subjected to increased densification, is the decline of public and semi-public open spaces due to ongoing privatisation. Such fundamental topics of research and discussion are critical for the world population's health and well-being (Davern et al., 2016), and should be connected with the public spaces' accessibility. The improvement of the population health conditions in the Middle East in the post-oil era is currently based on adopting unique urban settings and planning strategies that support delivering healthy and sustainable communities by following the latest international development strategies and the use of HIA in urban planning. Governmental institutions and practitioners face

fundamental challenges in providing alternatives and solutions that enhance health and well-being in urban settings worldwide (Vohra, 2007). Political institutions, planners, and health professionals will be requested to ensure the effectiveness of the HIA impact assessment targeting well-being achievement through diverse strategies of urban proposals and policies adopting adequate scales of development (Thompson, 2007). With the predicted increases in urban population and the growing spread of cities, the urban environmental strategies will impact the population's physical and mental health.

Many results have been achieved in the profession of town planning for the people's well-being and health, especially with the heritage conservation and the replacement of old city centre slums, crowded and neglected, transformed into a new urban environment to promote social cohesion and a sense of community belonging through the preservation of traditional values. Worldwide, the health system has recognised the importance of culture and history, improving individual and community well-being with many examples of urban planning and conservative development that restore heritage and reuse ancient architecture by enhancing the residents' life quality. The article presents the selected case studies of urban heritage preservation projects that have involved ancient residential areas and promoted the healthy lifestyle condition of inhabitants. The research explains how sustainable heritage conservation and cultural values' enhancement, combined with strategic interventions for implementing public transportation and promoting open spaces and services for communities, are combined in designing healthy cities in Saudi Arabia.

3. Heritage Preservation

3.1. Promotion of Tourism Offer, Transportation Development, and Healthy Growth of Cities

Many new opportunities have recently been launched in the Kingdom of Saudi Arabia to promote diversification for economic growth by improving the quality of the services through the privatisation of some activities and the enhancement of the business sector with many connections, both locally and internationally.

The aim is to build a healthy, sustainable future based on the commitment of the government and private services to meet the needs of the citizens and to build up a prosperous country starting from the heritage values of its origins (Mazzetto & Petruccioli, 2018). The requalification of the Saudi Islamic heritage, deeply rooted in the past of ancient societies and commercial trades, is currently an important part of the Saudi Vision 2030 (GOV.SA, 2016) to promote the Arab cultures and Islamic values and enhance national identity (Mazzetto, 2018). Many national interventions have been recently launched to restore heritage and requalify the ancient local culture and improve public accessibility by promoting cultural events and festivals to attract visitors, improve the tourism offer and enhance social cohesion (Bonita, 2006). The country has always been devoted to hospitality and tourism offered to Muslim pilgrims coming from all over the world. Saudi Arabia has a relevant role in the Islamic religion and has been consistently associated with hospitality to all Muslims and visitors to the two Holy Mosques and the Islamic holy sites. The number of visitors entering the country for tourism (heritage and religious) has tripled in the last decade, reaching eight million people. However, the Covid-19 pandemic has restricted the accessibility to all sites and reduced the number of visit visas. The religious tourism offer and Saudi Arabia's hospitality to pilgrims have always been part of the national programme for religious heritage promotion with the recent third expansion to the two Holy Mosques in Mecca and Medina. To improve the tourism offers, the country has also launched the Mecca Metro project to increase the railroad and train service capability to serve the visitors of the Holy Mosques. Recently, strategic modernisation has also been announced to increase the capacities of the Kingdom's airports, together with the national transportation programme, including the Saudi cities' metro projects. The transportation system is crucial for the urban development of cities in Saudi Arabia by providing mobility for people. It can influence the growth pattern (Priemus et al., 2001) and many economic levels through land accessibility (Meyer & Miller, 2001), including the reachability of many neglected Saudi heritage sites. Transportation is considered one of the main reasons for urban growth (Bhatta, 2010), being a complex network that can shape many social, geographical, environmental, and economic factors for the healthy life of communities (Wang et al., 2008).

Since transportation plays a vital role in every country's economic growth, in Saudi Arabia, transportation is strongly associated with environmental sustainability and the improvement of the population's health conditions. Many Saudi governmental institutions cooperate among sectors and high-level political management to enhance the transportation offer and promote a healthy life with the valorisation of culture through the heritage restoration of old urban settlements (Figure 7).

In 2000, the Saudi Commission for Tourism and National Heritage was established by the Saudi Council of Ministers as the first government institution to promote heritage preservation and the tourism sector in the Kingdom. In 2020, the Saudi Heritage Commission was established under the Ministry of Culture, and, in 2021, the National Antiquities register was founded with the intent to record and preserve the historic, cultural, and archaeological sites in the Kingdom. The commission is responsible for the development, preservation, and maintenance of the national Saudi heritage and for boosting the cultural economy in the country and internationally by respecting principles of sustainability.

The Saudi Heritage Preservation Society (SHPS) was also established in 2010 as a charitable society to

preserve the national heritage. It is currently one of the most important international nongovernmental organisations involved in safeguarding heritage.

This article presents the selected heritage conservation projects completed or under completion in the main cities of Saudi Arabia. It discusses how the interventions have been combined with transportation services' improvements to promote the touristic offer by generating beneficial effects on the living conditions of the cities inhabitants.

The criteria for selection of the case studies and the analyses have been based on the literature review and bibliographic research. The approach has selected the most important cities starting from the capital and moving to the most known for heritage and tourism. Additionally, the criteria of the most advanced and well-served areas for transportation and communication have been considered. The methods to classify all the governmental institutions involved not only with heritage rehabilitation but also with the national transportation strategy and the urban planning approaches for the healthy growth of cities (Figure 7) have been based on holistic criteria for understanding the ongoing current collaborations between institutions and possible future connections to improve the interaction and sharing of information.

The national urban planning strategy has involved many ministries and governmental institutions, as listed and compared in Figure 7, to promote collaboration by adopting the online unified national platform Saudi National Portal for Government Services (GOV.SA, 2021). The discussed projects are selected in the most important cities of Saudi Arabia, characterised by recent interventions developed to improve the tourism offer and heritage restoration:

- Mecca and Medina: Two Holy Mosques, expansion projects;
- Old Jeddah: Al-Balad historical city centre, urban preservation;
- Riyadh: At-Turaif District in Al Diriyah and Al Janadriyah cultural and urban heritage preservations (Figure 1).

The research methodology has analysed and compared the selected case study in terms of the governmental institutions involved in supervising the heritage interventions, classifying the categories of the projects, analysing the implementation of the transportation projects for each case study, and the tourism sector (cultural, social, religious) that is targeted to enhance the heritage reuses.

3.2. Mecca and Medina: The Two Holy Cities' Growth

Saudi Arabia has an ancient religious and architectural history with a rich number of ancient mosques from the origin of the Islamic era. The country is the home of the Two Holy Mosques. Since 2018, many projects have been launched by Crown Prince Mohammed Bin Salman to restore more than 130 historic religious buildings. The National Religious Heritage counts about 1,300 historical mosques in various regions of the Kingdom under the Saudi Heritage Commission's supervision. Each mosque dates back to different periods of Islamic architecture. About 30 historic mosques have already been completely restored, including the Al-Duwaihra Mosque in Diriyah and the Al-Hanafi Mosque in Al-Balad, Jeddah.

One of the most recognised responsibilities of the Kingdom is the valorisation of the religious site of the Two Holy Mosques, and the governmental authorities have recently resumed the third expansion phase of the project at Mecca's Grand Holy Mosque after the

Figure 1. At-Turaif District in Al Diriyah, Riyadh: Physical model of the urban regeneration project and the new phases of development in the Diriyah Gate Development Authority main office.

corona-virus interruption. The Custodian of the Two Holy Mosques Programme provides pilgrims and visitors of the Grand Mosque in Mecca and the Prophet's Mosque in Medina with the highest services. The programme received the award for best government initiative in the Kingdom by increasing the buildings' capacity to accommodate pilgrims and enhancing the main gates, entrances, and minarets in coordination with the infrastructure projects supervised by the Construction Management Office of the Ministry of Finance.

In this region, the transportation system was quickly developed due to the large number of pilgrims and visitors who annually visited the two holy cities of Mecca and Medina. In the past, the expansion of the asphalted roads started in 1970 (Aldagheiri, 2009) during the pre-oil period to facilitate the pilgrims' movements through the territory. Some years later, in 1979, the Saudi Public Transport Company was established as the governmental institution responsible for national transportation. Nowadays, it operates about eight million people's monthly transportation among the Kingdom's cities. It also operates special bus services during the Hajj pilgrimage, carrying approximately 15,000 pilgrims between the two holy sites. In Medina, there is a sophisticated bus service with 10 lines that connect the different regions and serve the holy sites in combination with the Mecca Metro (Figure 2), a rapid system for connection, including the line Al Mashaaer–Al Muqadassh in Mecca city known also has Hajj Metro Train. Completed in 2011 and claimed to have the highest capacity in the world, it has drastically reduced traffic congestion to a minimum due to busses, cars, and motor vehicles in transit in the holy city of Mecca during the Hajj period. Another important metro is the three-line extension of the public transportation master plan in Medina, announced recently by the Al Medina Region Development Authority. The Kingdom metro public transportation also includes the Riyadh Metro project (Figure 3) in the capital city, which is almost completed with the Jeddah Metro project, still under completion and expected to be open in 2025. In the Kingdom, the Haramain high-speed railway line was completed in 2017. It consists of 453 km of railways to connect the two holy cities of Mecca and Medina with the Kind Abdulaziz International Airport and the economic city centre in Jeddah.

Additionally, a new expansion phase for King Abdulaziz International Airport in Jeddah has been announced. The airport is the busiest in Saudi Arabia, known especially for its Hajj terminal dedicated to pilgrims annually directed to visit Mecca and Medina. The airport has a passenger capacity of 80,000, and it accommodates the highest number of aircraft in the world. The airport has undergone extensive expansion phases in the past years. The first expansion was completed in 2017 and has expanded its capacity to 30 million passengers annually. The second phase will be completed by 2025 by expanding the capacity to 43 million. The last announced phase to be completed in 2035 is planned to expand the airport capacity to 80 million passengers annually, becoming the largest airport in the world.

The high level of complexity in Jeddah's transportation system and the entire Kingdom will create urban

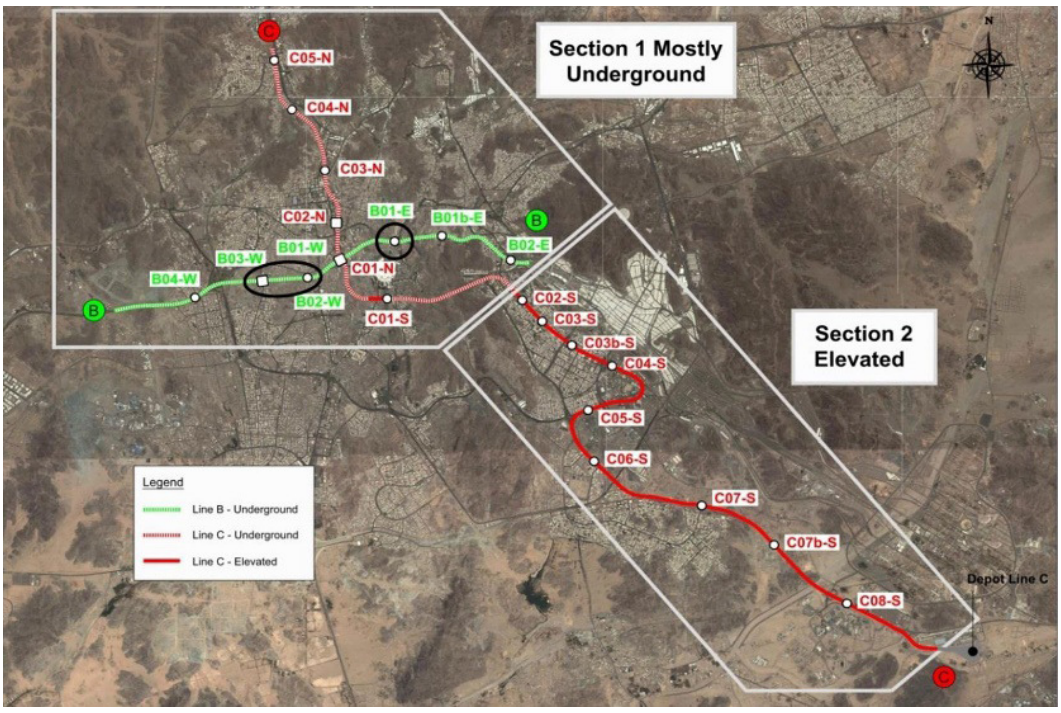

Figure 2. The Mecca Metro map consists of four lines and the public transport is operated by Mecca Mass Rail Transit Company. Source: 3TI Progetti (n.d.).

growth and healthier living conditions by improving the tourist offer and reducing the risk of diseases and injuries due to traffic congestion and the high risk of accidents.

3.3. Old Jeddah City Centre Al-Balad

As part of the country's growth (GOV.SA, 2016), to create an attractive investment environment for local and international investors and promote tourism offer combined with sustainable heritage restoration and healthy city growth, the Saudi governmental institutions have completed many extensive urban heritage preservation projects linked with enhanced public transportation and connections between the Kingdom's cities. The interventions involved not only religious sites but many heritage urban settlements.

The Historical Old Jeddah dates back to the seventh century and has many examples of the traditional Hijaz architecture typical of the Western Arabian Peninsula. The district is also called Al-Balad and has been inscribed on the UNESCO world heritage list since 2014 (UNESCO, 2014).

To strengthen the value of international recognition, the site has been preserved by the intervention of public authorities and the owners of some historical buildings. The interventions were partially financed by public funds and partially by private funds, under the Saudi Authorities' supervision of the Al-Balad Historical Area Preservation Department, established in 1990, to promote cultural tourism in the area. In 1991, the municipality founded the Jeddah Historical Preservation Society to preserve the historical architecture and culture of Al-Balad and strengthen its cultural identity.

The authorities have also financed the improvement of the public infrastructure in the area by promoting the healthy condition of the neighbourhood and the tourism offer of the site with high levels of comfort and safety, enhancement of cultural values, and pleasing entertainment experiences. The area has become a well-recognised tourism destination where tourists appreciate heritage values and culture (Alawi et al., 2017).

The Old Jeddah is located in the centre of contemporary Jeddah city. It has always been recognised as the commercial area and the main gate for pilgrims to Mecca. It includes many heritage residential buildings, the Old Jeddah defensive walls, six defensive towers, and the fort. There are many mosques, such as Al Pasha Mosque, Al Shafi'i Mosque, Uthman Ibn Affan Mosque, Al Hanafi Mosque, Al Memar Mosque, and Akash Mosque.

During the early 20th century, the defensive walls were replaced for urban growth and the modern expansion of the city. The area is currently subdivided into many neighbourhoods with specific names due to the local cultural heritage buildings or traditions that attract many tourists every year and are essential elements for enhancing the local tourism industry (Alzua et al., 1998).

About a thousand heritage buildings in Old Jeddah have survived after many years of being neglected. Half of them have been classified as "buildings of architectural and historical significance" and subject to preservation and protection. Many abandoned houses in old Jeddah have been restored and reused to revitalise the site. In addition, many festivals (Helmy, 2008) are arranged every year to create new links with the cultural traditions and merge the old and new generations.

In Old Jeddah, the massive national investment in urban heritage preservation has promoted tourism offers by linking the site with public transportation and promoting the healthy development of the city through the improvement of living conditions and health protection due to the risk reduction of traffic accidents. The Saudi government has launched many mega infrastructure projects in the city of Jeddah (Figure 3) linking the Corniche Tram, the Old Jeddah city centre, and the Jeddah international airport (King Abdulaziz International Airport). The transportation projects are not only targeted to improve the public services for the Mecca and Jeddah region but also for pilgrims and visitors. Particularly, public intervention in Jeddah will be supported by new services of light rail, train, and bus networks under development, in an integrated public transportation system.

Figure 3. The Jeddah Metro map consists of four lines. Source: HiJazzey (2016).

3.4. Riyhad: At-Turaif Urban Preservation and Al Janaderiah Heritage Festival

In the capital city of the Kingdom, Riyadh, many other urban heritage preservation projects have been completed to enhance cultural values and promote touristic offers. At-Turaif Quarter in Al Diriyyah, which has been listed in UNESCO World Heritage since 2010 (UNESCO, 2010), is located on the west side of Riyadh in the valley of Wadi Hanifa. The area is an important historical settlement for the unification of the political powers in Saudi Arabia and was recently converted and reused as a sustainable open-air museum where one can observe the traditional Najdi heritage and architectural style. The site dates back to 1744 and lasted till 1818 after being occupied during the Ottoman-Saudi war. It was the ancient capital city of the Saudi royal family, founded in the 15th century and later expanded during the 16th century. The site grew at the beginning of the 19th century, becoming the new Saudi capital under the government of the Saud family. The fortified royal palace resisted many invaders' attacks and was the most secure centre of At-Turaif, with the Salwa palaces located in the citadel. The site is a valuable example of Najdi town planning from the mid-18th century until the 19th century. Buildings are constructed with adobe materials adopting special construction techniques to resist extreme weather conditions. The urban preservation started in 2009 and has brought a new life to the old urban settlement. The urban preservation programme was carried out under the supervision of the Diriyah Gate Development Authority, a governmental institution established in 2017 to preserve the UNESCO site. In the Al Bujairi pedestrian area, there are many cafes and craft shops, close to the Diriyah Museum, where one can learn about the local Saudi history and visit the restored Al-Zawihra Mosque. The At-Turaif Bath House has been entirely restored to demonstrate the use of space in ancient times. The sustainable reuse of the At-Turaif heritage site has brought new life to the ancient socio-cultural characteristics of the place. The requalification of the urban area has promoted tourism and offers visitors a sense of attachment to the local tradition. New touristic entertainment and the enhancement of public open spaces have strengthened local historical values. From a socio-economic point of view, the conservation project has improved the importance of old areas after being abandoned for many years in alignment with the Saudi Vision 2030 (GOV.SA, 2016) of sustainable economic growth.

Urban preservation includes a temporary transformation of the public domain of the urban space. By adopting a "branding urban heritage" approach (Helmy, 2008), the old site of Al Janaderiah in Riyadh has been preserved and valorised by promoting its annual cultural and heritage festival. Sponsored in 1985 by the Saudi Arabian National Guard, the festival revitalises traditional activities and sports, including camel races, falconry, arts, history, classic art, and craft. Public life is enhanced by the space utilisation of particular cultural events.

Every year, during the annual festival, the new dimension of the public spaces in the city improves the cultural and historical perception of the heritage site and is strongly focused on cultural tourism. Every year, the cultural event attracts many local and international investments and encourages tourism offer.

The urban revitalisation is an example of the Saudi Vision 2030 promotion of urban growth through the valorisation of cultural tradition and areas financed by the governmental authorities to stimulate local and international investment in tourism and promote sustainable and economic development. The urban heritage festivals have the advantage of strengthening the identity of the place and improving its economic value.

The heritage intervention has enhanced the quality of local inhabitants' lives, provided better conditions in the public realm, and improved the sense of belonging to the heritage sites by preserving the local identity and urban life. The restoration has promoted the accessibility to historical areas within the cities and increased the overall health of the urban public spaces.

Riyadh is a fast-growing city with many ongoing projects and business opportunities. The heritage interventions have been linked to the last changes in public transportation. In the previous 25 years, Riyadh has relied only on the capacity of the road infrastructure, basing the capital population's main transportation on cars. Riyadh's inhabitants (around seven million) in early 2000 had no public transportation. However, recently, the government authorities Riyadh Public Transport Project have approved a complex strategy to realise a public transportation system consisting of six world-class metro lines (Figure 4) and a comprehensive bus network to link the city centre and the metropolitan areas together, and with international connections (King Khalid International Airport). The intent is to promote the sustainable and healthy growth of the capital, reduce the use of individual cars and traffic congestion, and improve inhabitants' safety, life condition, and comfort, as promoted by the Royal Commission for Riyadh City (Figure 5).

The capital's inhabitants are expected to reach 15 million by 2030, following the Saudi Vision 2030 (GOV.SA, 2016). The intent is to deliver sustainable public transportation that will link the heritage sites with the local and international tourism offer through sustainable public connection and transport.

The ambitious programme of the Royal Commission for Riyadh City targets the sustainable and healthy growth of the capital to reform its economy and society and to address the challenges of its sustainable environmental development appropriately.

The accessibility of public networks is expected to increase the city's public transport from 2% to around 20%, satisfying the growing population's demand while reducing traffic jams and improving air quality and healthy living conditions (Figure 6).

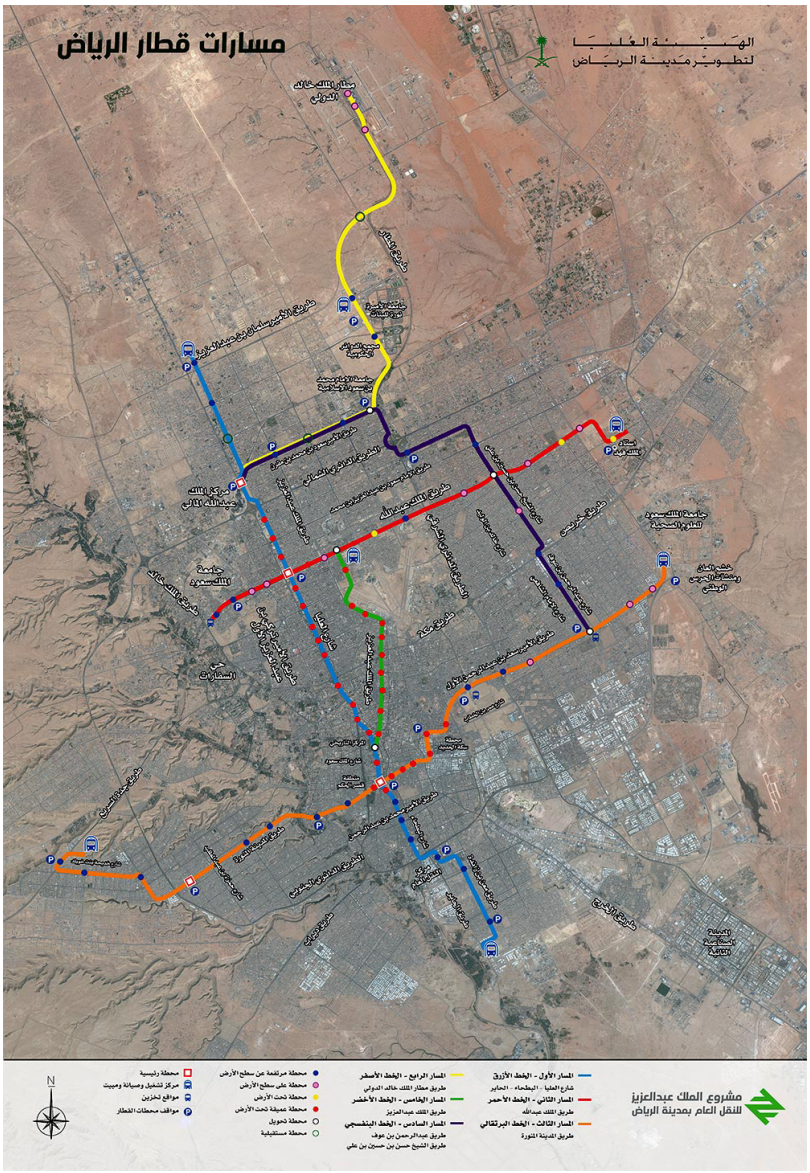

Figure 4. The Riyadh Metro map consists of six main lines with 176 km in length and 85 stations in total. Source: Royal Commission for Riyadh City (n.d.).

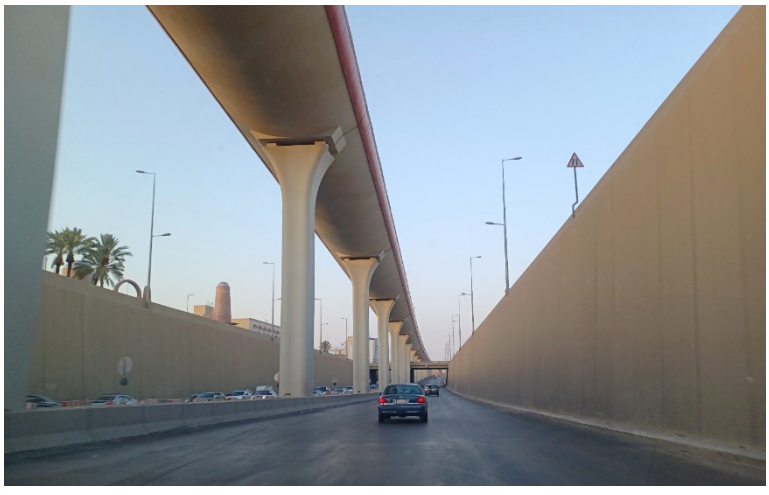

Figure 5. The Riyadh Metro: Work in progress for the metro line.

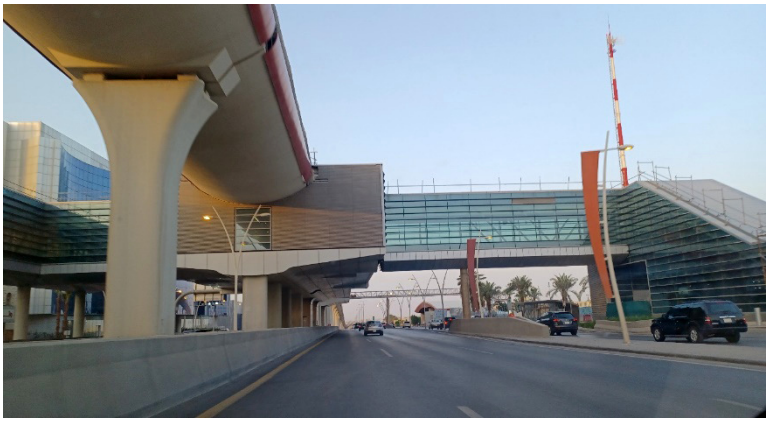

Figure 6. The Riyadh Metro project: Work in progress, pedestrian bridge for the metro station.

Saudi Arabia has recently started to put its hands on the planned airport expansion, which is part of its programme to diversify the economy, create jobs, and reduce dependence on oil revenues. To support the rapidly expanding population and post-oil economy, the Kingdom authorities have announced the expansion of the three major airports in Damman, Jeddah, and Riyadh. The Riyadh King Khaled International Airport has seen a rapid increase in passengers over the last two decades by almost duplicating the demand. The primary intent is to satisfy the estimated future capacity of 140 million passengers each year, support the country's fast growth and improve the tourism offers together with international business.

4. Conclusions

In conclusion, Saudi Arab and Islamic heritage is based on ancient civilisation and commercial international trade routes. The national heritage is deeply rooted in the country's history. Saudi National Vision 2030 (GOV.SA, 2016) promotes its preservation to strengthen national unity and identity. The aim is to transfer the heritage values to Saudi future generations and also to promote Islamic and Arab history with heritage tourism. The Kingdom has recently started many initiatives and many urban planning processes. Programmes and projects target healthy growth of the country and its cities. The presented heritage conservation projects completed or under completion in Mecca and Medina (Two Holy Mosques expansion projects), Old Jeddah (Al-Balad urban preservation), and Riyadh (Al-Turaif and Al Janadriyah cultural and urban heritage preservation) have promoted the local cultures and improved the tourism offers of the Kingdom as part of the national strategy to achieve a sustainable economy and healthy growth in the post-oil era. The aim is to provide tourists with high services and excellent public transportation hubs to promote sustainable and healthy cities. The Kingdom's multi-sectoral development has affected many ministries and governmental institutions that are strictly connected to the national growth strategy. It is recommended to promote collaboration between institutions through the unified national platform Saudi National Portal for Government Services (GOV.SA, 2021) to coordinate the urban planning strategies and provide collaborative responses on how land-use, transport, infrastructure, and heritage requalification can be properly planned and strategically linked to health considerations in the urban planning process for the growth of Saudi cities (Figure 7).

The research has compared the selected case studies in the main capital and cities of the Kingdom that are currently under development for improving the tourism offer and the health conditions of inhabitants as targeted in the Saudi Vision 2030 (GOV.SA, 2016; Table 1).

The case studies selected for the main cities of the Kingdom present diverse interventions on heritage rehabilitation both at architectural and urban scales. Each intervention has been supervised by different governmental institutions showing the complexity of interactions and collaboration between diverse departments and various ministries and the specificity of each case study. All the heritage interventions have been implemented with the improvement of transportation systems linking the international connection of the main cities' airports with the local transportation hubs of metros, trains, and buses. The intervention aims to provide a better service to the users of heritage sites by implementing various sectors of targeted tourism, subdivided into three main categories: religious pilgrims, cultural tourists, and social tourists. Table 1 shows the framework to link urban conservation initiatives with changes and improvements in public transportation as central concepts of the research and presented the main following liveability indicators and improvement of health conditions:

- Walkable and pedestrian-friendly heritage site;
- Easy accessibility and reachability of public open spaces;
- Promoting open-air physical activities, recreational and social environments;
- Reduction of obesity risks;

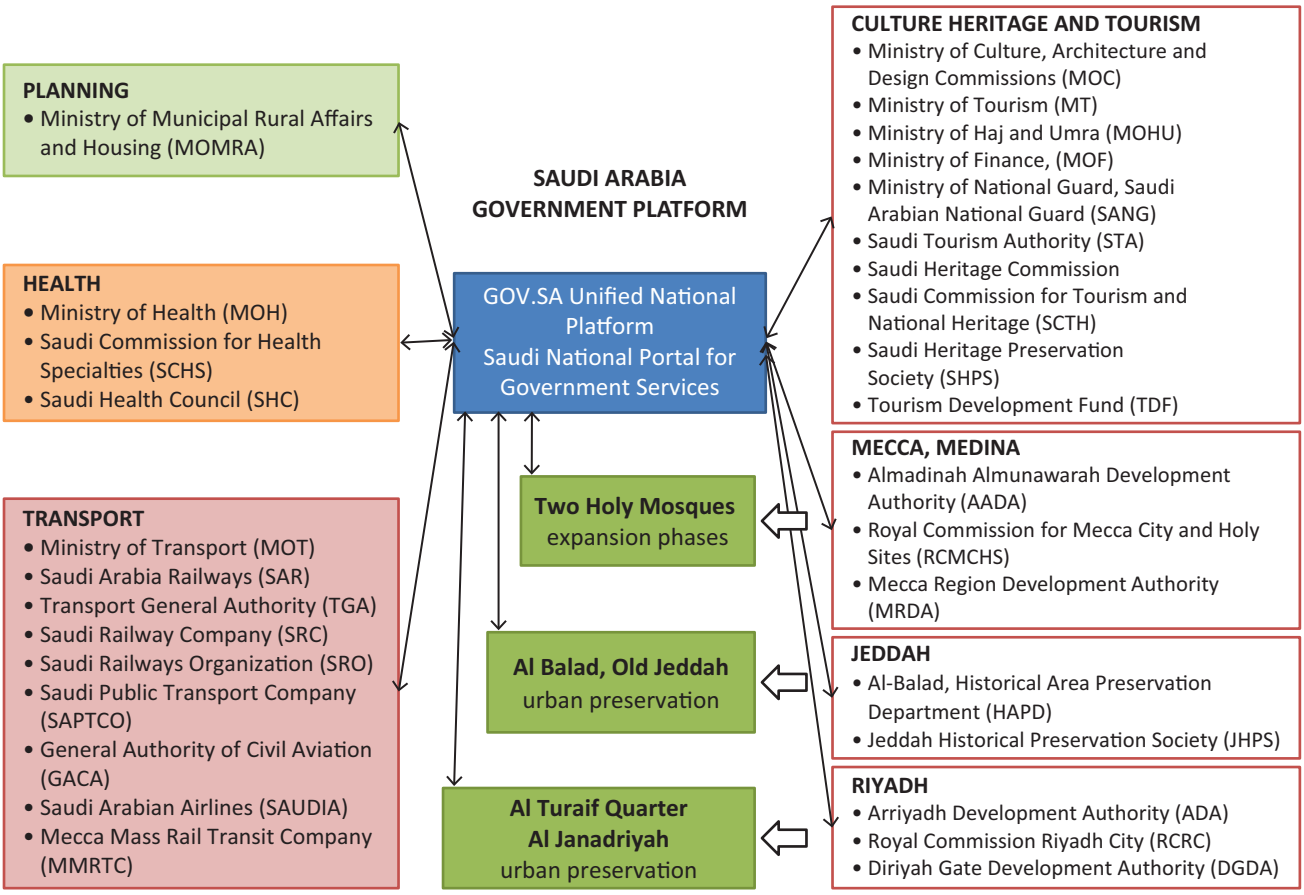

Figure 7. The unified national platform Saudi National Portal for Government Services: Proposed framework for collaboration between ministries and governmental institutions.

Table 1. Comparisons between the analysed heritage rehabilitation projects, showing the improvement of the transportation systems of the selected case studies and the enhancement of tourism sectors.

City	Heritage Project	Government Institution	Project Categories	Transportation Interventions	Tourism Sector	Healthy and Liveable Cities
Mecca	Grand Holy Mosque	Royal Commission for Mecca City and Holy Sites	Architectural preservation, expansion projects	• King Abdulaziz International Airport • Mecca Metro project • Hajj Metro • Haramain high-speed railway	Religious tourism	• Traffic congestion reduction • Accidents reduction • Minimised air and noise pollution • Improved health conditions • Promotion of cultural/religious values
Medina	Prophet's Mosque	Almadinah Almunawarah Development Authority	Architectural preservation, expansion projects	• King Abdulaziz International Airport • Mecca Metro project • Hajj Metro • Haramain high-speed railway	Religious tourism	• Traffic congestion reduction • Accidents reduction • Minimised air and noise pollution • Improved health conditions • Promotion of cultural/religious values
Old Jeddah	Al-Balad	Al-Balad Historical Area Preservation Department	Urban preservation	• King Abdulaziz International Airport • Jeddah Metro project • Tram, train, light rail, and bus networks	Cultural and social tourism	• Walkable and pedestrian-friendly heritage site • Easy accessibility and reachability of public open spaces • Reduction of obesity risks • Promotion of cultural and social values
Riyadh	At-Turaif District in Al Diriyah	Diriyah Gate Development Authority	Urban preservations	• King Khalid International Airport • Riyadh Metro project • Bus network	Cultural tourism	• Walkable and pedestrian-friendly heritage site • Easy accessibility and reachability of public open spaces • Reduction of obesity risks • Promoting open-air physical activities and recreational, social environments • Promotion of cultural values
Riyadh	Al Janadriyah	Saudi Arabian National Guard	Cultural and urban preservations	• King Khalid International Airport • Riyadh Metro project • Bus network	Cultural and social tourism	• Walkable and pedestrian-friendly heritage site • Promotion of open-air recreational and social environment • Promotion of cultural and social values • Promotion of social cohesion and community sense of belonging

- Promotion of cultural and social values;
- Promoting social cohesion and community sense of belonging;
- High-quality public open spaces improve mental health by promoting open-air physical activities and a recreational, social environment.

In the post-oil era, the population health conditions and quality improvements in Middle East lives are fundamental for urban settings and planning strategies to deliver healthy and sustainable communities.

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Conflict of Interests

The author declares no conflict of interests.

References

3TI Progetti. (n.d.). *Makkah plans four new metro lines*. https://www.3tiprogetti.it/project/makkah-metro

Alawi, G., Jamjoum, H., & Haitham, S. (2017). Enhancing the cultural tourism experience: The case of historical Old Jeddah *WIT Transactions on The Built Environment*, *177*, 39–50.

Aldagheiri, M. (2009). The role of the transport road network in the economic development of Saudi Arabia. *WIT Transactions on the Built Environment*, *107*, 275–286.

Alzua, A., O'Leary, J. T., & Morrison, A. M. (1998). Cultural and heritage tourism: Identifying niches for international travelers. The *Journal of Tourism Studies*, *9*(2), 2–13.

Barton, H., & Tsourou, C. (2000). *Healthy urban planning: A WHO guide to planning for people*. Spon Press.

Bhatta, B. (2010). *Analysis of urban growth and sprawl from remote sensing data*. Springer.

Bonita, M. K. (2006). *Tourism marketing for cities and towns: Using social media and branding to attract tourists*. Routledge.

Campbell, S. (1996). Green cities, growing cities, just cities? Urban planning and the contradictions of sustainable development. *Journal of the American Planning Association*, *62*(3), 296–312. https://doi.org/10.1080/01944369608975696

Davern, M., Farrar, A., Kendal, D., & Giles-Corti, B. (2016). *Quality green public open space supporting health, wellbeing, and biodiversity: A literature review.* The National Heart Foundation of Australia.

Douglas, M. J., Conway, L., Gorman, D., Gavin, S., & Hanlon, P. (2001). Developing principles for health impact assessment. *Journal of Public Health Medicine*, *23*(2), 148–254.

Frank, L., Andresen, M., & Schmid, T. (2004). Obesity relationships with community design, physical activity, and time spent in cars. *American Journal of Preventive Medicine*, *27*(2), 87–96.

Giles-Corti, B., Foster, S., Koohsari, M. J., Francis, J., & Hooper, P. (2015). The influence of urban design and planning on physical activity. In H. Barton, S. Thompson, S. Burgess, & M. Grant (Eds.), *The Routledge handbook of planning for health and well-being: Shaping a sustainable and healthy future* (pp. 155–169). Routledge.

Giles-Corti, B., Vernez-Moudon, A., Reis, R., Turrell, G., Dannenberg, A. L., Badland, H., Foster, S., Lowe, M., Sallis, J., Stevenson, M., & Owen, N. (2016). City planning and population health: A global challenge. *The Lancet*, *388*(10062), 2912–2924.

GOV.SA. (2016). *Saudi vision 2030*. https://www.vision2030.gov.sa/media/rc0b5oy1/saudi_vision203.pdf

GOV.SA. (2021). *Saudi national portal for government services*. https://www.my.gov.sa/wps/portal/snp/main

Helmy, M. (2008). *Urban branding strategies and the emerging cityscape: The image of the Gulf City*. University of Stuttgart.

HiJazzey. (2016). *Jeddah approved: Public transport and monorail*. Skyscraper City. https://www.skyscrapercity.com/threads/jeddah-l-approved-l-public-transport-and-monorail.834132/page-19

Kjellstrom, T., & Hinde, S. (2006). Car culture, transport policy, and public health. In I. Kawachi & S. Wamala (Eds.), *Globalization and health* (pp. 98–121). Oxford University Press.

Lowe, M., Whitzman, C., Badland, H., Davern, M., Aye, L., Hes, D., Butterworth, I., & Giles-Corti, B. (2015). Planning healthy, liveable and sustainable cities: How can indicators inform policy? *Urban Policy and Research*, *33*(2), 131–144. https://doi.org/10.1080/08111146.2014.1002606

Mazzetto, S. (2018). Heritage restoration as a tool to promote architectural identity in the Gulf Regions. *Preservation, Digital Technology & Culture*, *47*(1), 3–11. https://doi.org/10.1515/pdtc-2017-0015

Mazzetto, S., & Petruccioli, A. (2018). Methods and techniques used in significant restoration projects, in Qatar. *Studies in Conservation*, *63*(5), 303–314.

Meyer, M. D., & Miller, E. J. (2001). *Urban transportation planning* (2nd ed.). McGraw-Hill.

Priemus, H., Nijkamp, P., & Banister, D. (2001). Mobility and spatial dynamics: An uneasy relationship. *Journal of Transportation Geography*, *9*(3), 167–171.

Royal Commission for Riyadh City. (n.d.). *King Abdulaziz project for Riyadh public transport*. https://www.rcrc.gov.sa/en/projects/riyadh-metro

Sallis, J., Millstein, R., & Carlson, J. (2011). Community design for physical activity. In A. Dannenberg,

H. Frumkin, & R. Jackson (Eds.), *Making healthy places: Designing and building for health, well-being, and sustainability* (pp. 33–49). Island Press.

Samet, J. (2011). Community design and air quality. In A. Dannenberg, H. Frumkin, & R. Jackson (Eds.), *Making healthy places: Designing and building for health, well-being, and sustainability* (pp. 63–76). Island Press.

Thompson, S. M. (2007). A planner's perspective on the health impacts of urban settings. *New South Wales Public Health Bulletin*, *18*(10), 157–160.

UNESCO. (2010). *At-Turaif District in ad-Dir'iyah*. https://whc.unesco.org/en/list/1329

UNESCO. (2014). *Historic Jeddah, the Gate to Makkah*. http://whc.unesco.org/en/list/1361

United Nations. (2015). *The 17 goals*. https://sdgs.un.org/goals

United Nations. (2016). *The new urban agenda—Habitat III*. https://habitat3.org/the-new-urban-agenda

Villanueva, K., Badland, H., Hooper, P., Koohsari, M. J., Mavoa, S., Davern, M., Roberts, R., Goldfeld, S., & Giles-Corti, B. (2015). Developing indicators of public open space to promote health and well-being in communities. *Applied Geography*, *57*, 112–119. https://doi.org/10.1016/j.apgeog.2014.12.003

Vohra, S. (2007). International perspective on health impact assessment in urban settings. *New South Wales Public Health Bulletin*, *18*(9/10), 152–154.

Wang, J., Lu, H., & Peng, H. (2008). System dynamics model of urban transportation system and its application. *Journal of Transportation Systems Engineering and Information Technology*, *8*(3), 83–89.

World Health Organization, & UN-Habitat. (2016). *Global report on urban health: Equitable healthier cities for sustainable development*. https://apps.who.int/iris/handle/10665/204715

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