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Urban Planning (ISSN: 2183–7635)
2022, Volume 7, Issue 4, Pages 61–74
https://doi.org/10.17645/up.v7i4.5674

Article

Co-Benefits of Transdisciplinary Planning for Healthy Cities

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Submitted: 27 April 2022 | Accepted: 22 August 2022 | Published: 27 October 2022

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
This article is part of the issue "Healthy Cities: Effective Urban Planning Approaches to a Changing World" edited by Elmira Jamei (Victoria University), Simona Azzali (Prince Sultan University), Hendrik Tieben (The Chinese University of Hong Kong), and K Thirumaran (James Cook University, Singapore).

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,

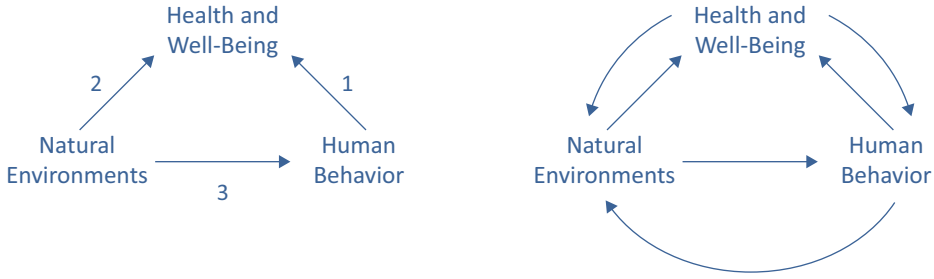

Figure 1. From linear causality to systems thinking. Notes: The relations between positive health effects of some human behaviors (physical activity, social interaction, leisure) on health (shown as 1) have been reported by empirical research. The positive impact of natural environments on human health (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

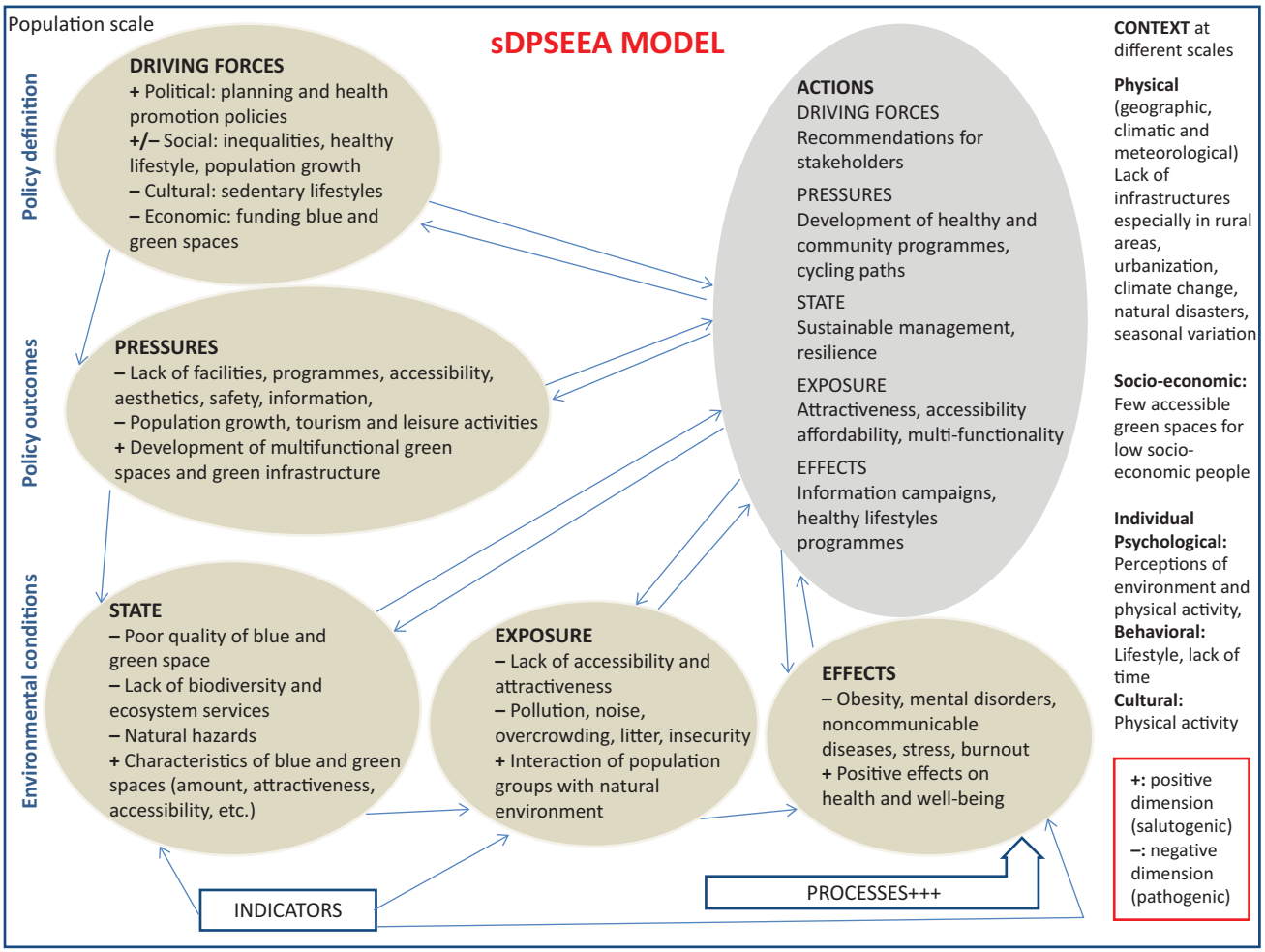

Figure 2. The sDPSEEA model proposed to incorporate systemic thinking for policymakers and practitioners concerned with identifying and monitoring the impacts of interventions on public health such as the provision of public green space.

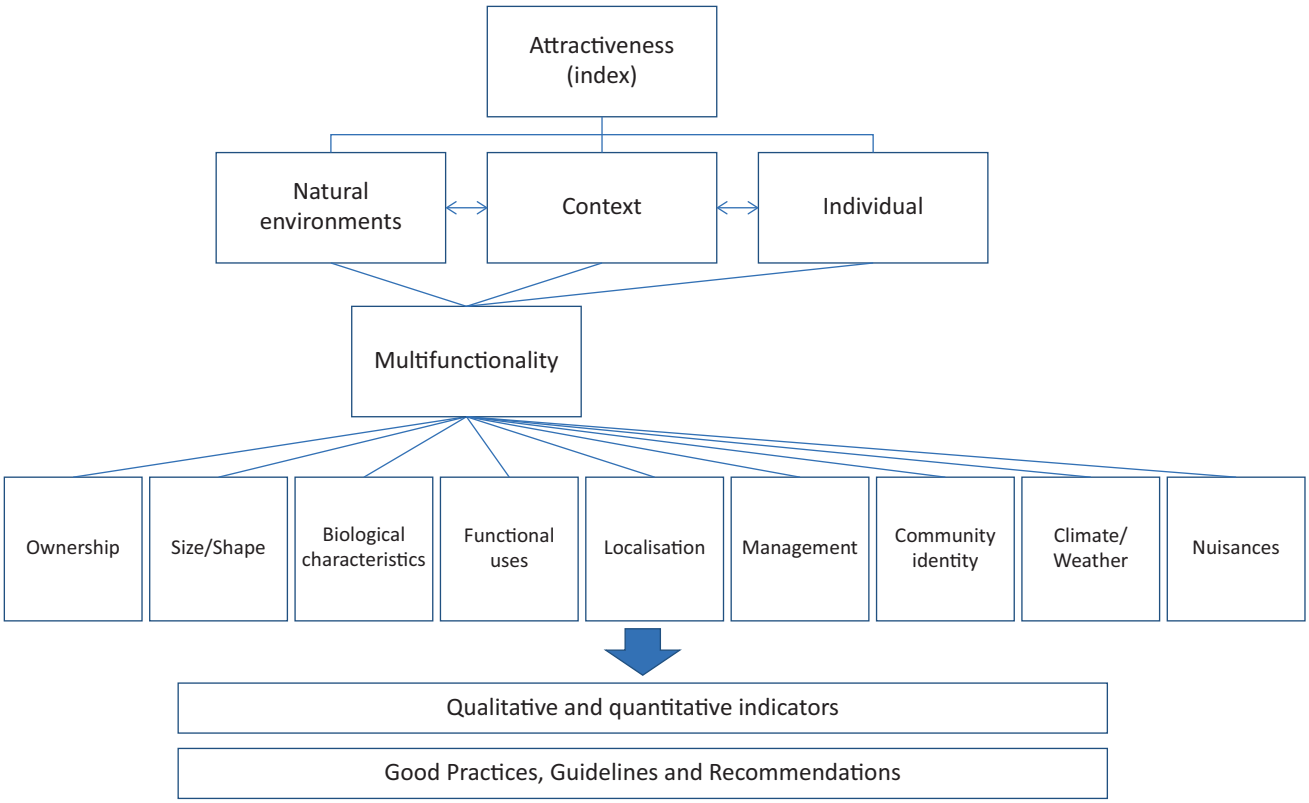

Figure 3. Nine core characteristics that contribute to the attractiveness of public green spaces are shown as ownership, size/shape, biological characteristics, functional uses, localisation, management, community identity, climate/weather, and nuisances.

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

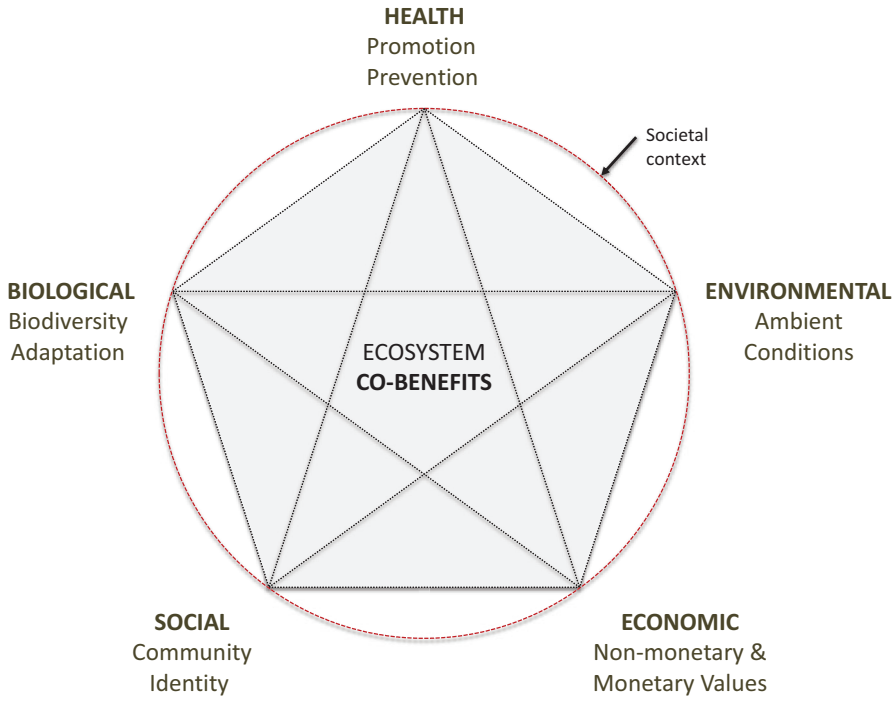

Figure 4. Co-benefits of public green space are much larger than health and support the provision of green space in cities. Notes: (a) Biological—biodiversity supports adaptability and resilience; (b) economic—increased market values for private properties; (c) environmental—trees absorb carbonic gases, 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.

Acknowledgments

The author thanks four reviewers for their feedback on the first draft of this article. There are no sources of research funding for writing this article.

Conflict of Interests

The author declares no conflict of interests.

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