Paradigms, clusters and traditions on urban health - Articulating diverse ontological perspectives to urban health research and policymaking

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Paradigms, clusters and traditions on urban health
- Articulating diverse ontological perspectives to urban health research and policymaking

Jinhee Kim

A thesis in fulfilment of the requirements for the degree of Doctor of Philosophy

School of Population Health
Faculty of Medicine
May 2023
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**Publication Details #1**

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| Authors: | Jinhee Kim, Evelyne de Leeuw, Ben Harris-Roxas, Peter Sainsbury |
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| Authors: | Jinhee Kim, Ben Harris-Roxas, Evelyne de Leeuw, David Lilley, Alana Crimeen, Peter Sainsbury |
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| The Candidate's Contribution to the Work: | I contributed to the conceptualisation, development of the methodology, data analysis and drafting of the manuscript. |
| Location of the work in the thesis and/or how the work is incorporated in the thesis: | This publication is presented in Chapter 4 in its entirety. |</p>
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I confirm that where I have used a publication in lieu of a chapter, the listed publication(s) above meet(s) the requirements to be included in the thesis. I also declare that I have complied with the Thesis Examination Procedure.
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<th>Description</th>
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<tr>
<td>AACODS</td>
<td>Authority, Accuracy, Coverage, Objectivity, Date, Significance</td>
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<tr>
<td>CR</td>
<td>Critical realism</td>
</tr>
<tr>
<td>GIS</td>
<td>Geographic Information System</td>
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<tr>
<td>Hip</td>
<td>Health in All Policies</td>
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<tr>
<td>IUHPE</td>
<td>International Union for Health Promotion and Education</td>
</tr>
<tr>
<td>MMAT</td>
<td>Mixed Methods Appraisal Tool</td>
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<tr>
<td>OSF</td>
<td>Open Science Framework</td>
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<tr>
<td>PRISMA-P</td>
<td>Preferred Reporting Items for Systematic Review and Meta-Analysis Protocol</td>
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<td>RAMESES</td>
<td>Realist And Meta-narrative Evidence Syntheses: Evolving Standards</td>
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<td>TD</td>
<td>Transdisciplinary</td>
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<tr>
<td>UN</td>
<td>United Nations</td>
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<td>UN-Habitat</td>
<td>United Nations Human Settlements Programme</td>
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<tr>
<td>WHO</td>
<td>World Health Organisation</td>
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<tr>
<td>WoSCC</td>
<td>Web of Science Core Collection</td>
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<td>WPC</td>
<td>Western Parkland City</td>
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Whenever we hear about a new urban development plan, my dad reminds me that at the height of urbanisation in South Korea in the 1970s, more than 900 people moved into Seoul every single day. The city was busy accommodating these migrants by barely providing housing, water, sewage, electricity, heating, and other essential services. Plans to expand and build the city were executed at an extraordinary speed and scale. The singular goal of the top-down urban policies was to efficiently provide the newly arrived residents with basic shelter, food and water.

By the early 2000s, things had changed: as elsewhere in the world, in Korea, too, the healthy cities movement was gaining momentum as an intersectoral and participatory approach to address the wider social determinants of urban health. The Gangnam area, one of the newly constructed urban centres in Seoul to house the urban migrants in the 1970s, had now become the most prosperous area in the country. And in 2009, I was recruited as a healthy cities project coordinator in a local government in the Gangnam area of Seoul Metropolitan City.

Within the first few months in the job, I realised that what public health researchers claimed policies “ought to be” was rarely, if ever, picked up by policymakers. Researchers were obsessed over rigor of methodology and the strength of evidence, while policymakers seemed to brush away the best scientific evidence if it did not fit with their policy agenda. I also witnessed a stark difference in communication styles between the world of academia and the world of policymaking. My work supervisor often complained about the reporting style of academics as spending too much time presenting the evidence and then finally stating the conclusion at the very end, whereas policymakers preferred the conclusion up front followed by the why and how.

Not only was I surprised by the differences between academia and policymaking, but I was also disappointed by the lack of enthusiasm displayed by my colleagues within the local government office when approached with the healthy cities idea. I had hoped to develop a comprehensive healthy cities project with collaboration across diverse sectors (such as
housing, transportation, education, social services, culture). However, working across sectors was beyond reality; in fact, I did not even speak to others in the health department, or in the same office space.

No one is really against the principle of ensuring and promoting human health as their ultimate policy goal, but why is it hard for sectors to work across the vertical silos to achieve this common goal? Is it because mandates assign each sector a role and create institutional boundaries? The urban planning sector builds the physical infrastructure of cities, the transportation sector develops mobility systems for people to move around, the housing sector oversees the provision of adequate homes for people, and the health sector develops programs to prevent diseases and promote healthy lifestyles. The urban infrastructure - roads, buildings, transportation networks, housing, parks, schools and workplaces - provides the resources and access to the physical and social conditions that are conducive to health. And if not planned well, they can have a detrimental effect on health. Moreover, the benefits of these urban conditions should reach everyone equally and the harms should not unfairly burden specific groups in the population.

Building equitable healthy cities requires the participation of multiple disciplines and sectors. The fact that the healthy cities movement has spread widely around the world is a testament to this call. But time and time again, collaboration seems to exist only in theory and impossible to attain in practice, like a mythical creature in a fairy tale – we all have our own ideal image of what the creature looks like, but the creature seems to not exist in real life. Urban health researchers and practitioners easily blame institutional boundaries that are creating ‘silos’. They express powerlessness in crossing those boundaries and call for political or institutional change that can only originate from a higher level of power. My naive and somewhat arrogant mind kept questioning, does not the whole purpose of politics and policymaking lie in changing the rules of the system? Why is no one doing anything about breaking down the institutional barriers?

By the time I had moved through various positions with all levels of government, I found myself gradually conforming to the institutional standards by ‘staying in my own lane’. However, I always wondered if there were any other things that may facilitate intersectoral
and interdisciplinary collaboration for better urban health. This PhD journey is a quest for some answers.

In popular literary structure, the tale of a quest starts with the hero/ine setting forth from the world of the everyday into a land of adventure to achieve a specific prize. A PhD is like a Hero/ine’s Journey, in which:

“A hero/ine ventures forth from the world of common day into a region of supernatural wonder: fabulous forces are there encountered and a decisive victory is won: the hero/ine comes back from this mysterious adventure with the power to bestow boons on his/her fellow people.”

For this PhD journey,

“I, the PhD researcher, venture forth from the current world of urban health policy making and practice into a PhD research program at UNSW Australia: mentors, colleagues, theories, methodologies, literature, obstacles and breakthroughs are there encountered and the PhD thesis is accepted. I come back from this mysterious adventure with new knowledge, tools and skills to facilitate interdisciplinary collaborations and promote healthier and equitable urban policies for the urban health research, practice and policy community.”

Under the guidance of my wise supervisors, Evelyne de Leeuw, Ben Harris-Roxas, and Peter Sainsbury, I embarked on a mission to gain a deeper understanding of urban health policymaking. This quest led me to explore various fields such as public health, urban planning, political science, and urban studies. Along the way, I met numerous peers and colleagues who provided invaluable support, pushed me to think critically, and helped shape my ideas. This thesis documents the story of my PhD journey.
Chapter 1:

**INTRODUCTION**
In this chapter, the mission of the PhD quest, or, in the academic language, the research question is introduced. In literary narrative, a quest often starts when the heroine’s life is disrupted by a threat or challenge that requires them to take action. Similarly, in a PhD, the researcher encounters questions and challenges that must be answered to address a critical problem in their field of study.

My research question examines the disjunction between the idealistic goal of achieving transdisciplinary and transsectoral action in urban health research, practice and policy and the lack of such examples in reality. I argue that a fundamental cause of this gap is the failure to recognise and resolve the diversity of ontological perspectives held by the various actors involved in urban health.

I begin by introducing the research question and providing context on the transdisciplinary nature of the research question and my view on the urban health system. I present the critical realist perspective as the philosophical theory for my research and explain how this position guides the research question, methods and interpretation of the findings.

1.1 Introducing the research question

1.1.1 Background

Urban policies have direct and indirect health impacts through the multitude of interactions and connections between determinants within the complex urban system (Bettencourt, 2019). Policymakers with a focus on health in cities aim to prioritise health as a fundamental goal, requiring interdisciplinary and intersectoral collaboration. However, policy actors often face disagreements about priority areas, causes of urban health problems, responsibility for promoting urban health, policy instruments to implement, and which evidence to reference. These disagreements can lead to conflicts, resulting in fragmented policies.

Many guidelines and recommendations have been developed to bridge the differences and facilitate intersectoral and interdisciplinary collaboration for urban health (Rantala et al., 2014; UN-HABITAT and World Health Organization, 2020). These are based on practical evidence from case studies, offering knowledge on the desirable conditions or
recommended actions that may bridge intersectoral division. However, they do not sufficiently consider the underlying reasons for disciplinary or sectoral differences. They provide remedies for symptoms but do not explain how actions can address underlying disjunctions between sectors.

Therefore, I am curious about the nature of the disjunctions in the view on urban health issues held by researchers, practitioners and policy actors from diverse backgrounds. Do we have completely different foundational understandings about important urban health issues and the best policy options to address them? I focus on the different underlying ontological frameworks that underpin the differences in current urban health thinking.

Colloquially, it is easily recognised that different groups of researchers and policy actors have different understandings and approaches to urban health. An epidemiologist, who would be concerned about the origins of diseases, might research the urban health issue to identify the causal pathways, risk factors and determinants at multiple levels and sectors. A health promotion practitioner might be interested in empowering the community to take control over the decisions that impact their health. An urban planner might focus on the spatial planning process and the parameters that characterise a healthy physical urban infrastructure, e.g., buildings, roads, land-use decisions, transportation networks, etc. A social planner may approach urban health from the perspective of the social infrastructure such as affordable housing and its implications for the health of urban dwellers. A developer, who designs and builds the physical infrastructure contingent on the statutory regulations, may be interested in appealing to liveability, accessibility and other desirable lifestyle conditions that are attractive to consumers.

Differences in views on urban health issues appear to originate from sectoral responsibilities and disciplinary standards. However, a critical thinker may question why and how disciplinary or sectoral views differ in the first place, i.e., why are these particular views adopted? The diversity of views is embedded in a more fundamental view of urban health concepts, theories, methods and instruments. These fundamental beliefs define the nature of the urban health issue, specify the type of policy goals or research questions that are regarded as important, the preferred policy instruments and research methodologies.
In policymaking, policy entrepreneurs frame policy ideas to persuade and negotiate with policy actors to bring about policy change (Béland & Cox, 2016; Cairney, 2011; Weible & Sabatier, 2017). Just as a skilled language interpreter would have to understand the context, culture and history to deliver precise interpretations between languages, a good policy entrepreneur would need to first understand the paradigms that underpin the different views. Only based upon this understanding of different paradigms can a policy entrepreneur effectively communicate with different policy actors and promote policy change.

1.1.2 The research question

Filled with these puzzles of the world of current policymaking, my PhD quest is a journey to explore the following overarching research question:

*What are the diverse ontological perspectives on urban health and what implications do they have in advancing transdisciplinary approaches to urban health?*

This research question seeks two objectives:

- Objective 1. To identify and articulate differing ontological perspectives on urban health.
- Objective 2. To examine the implications of these differing perspectives in advancing transdisciplinary approaches to urban health.

1.2 Context of the research question

When I began my PhD, I held certain assumptions about the context in which I would be working. However, as my journey progressed, my views on this context evolved. Some of the initial assumptions I held were not consistent with the complex and transdisciplinary nature of my research question and the critical realist approach that was guiding the discovery. The change of my perspectives is reflected by the subheadings in this section.
1.2.1 Disciplinary positioning

1.2.1.1 Starting from an ‘inter’disciplinary perspective...

Upon starting my PhD journey, the nature of this research question seemed to place my thesis at the intersection of the public health, urban planning and political science disciplines, or fields of study (Figure 1.1). The subject of urban health involves investigating the factors that cause ill health or promote health in urban settings using the theories and methodologies that are traditionally in the realm of the public health discipline. The technical and political processes that oversee the spatial design and development of the urban built environments are studied in the urban planning discipline. Meanwhile, the political science discipline lends theories on the policy process which explain how policy actors and their ideas are essential in developing urban health policies. My research question addresses ontological frameworks on urban health held by researchers and policy actors to facilitate transdisciplinary collaborations, thus placing the question at the intersection of public health, urban planning and political science.

Figure 1.1 Interdisciplinary positioning of my research question
However, as the journey progressed, I came to realise that my initial view of the research question as being strictly interdisciplinary was ontologically inaccurate. Rather, my research question weaves through various disciplines, including both those with shared commonalities and those without (as depicted in Figure 1.2). While I continue to use the Venn diagram to represent the disciplinary positions in a simplified manner, it is important to emphasise that a transdisciplinary approach is required for my research question, connecting all sections, particularly those without shared commonalities. I remained open to the possibility of exploring additional disciplines within the scope of the research.

The transdisciplinary viewpoint not only informs the disciplinary positions of the research question but is also its primary focus. I argue that improving health in urban environments requires a transdisciplinary approach, which goes beyond an interdisciplinary approach, to integrate evidence, methods, and findings from multiple disciplines. While interdisciplinary approaches to urban health focus on shared understandings within disciplines, transdisciplinary approaches require collaboration in areas that may fall outside disciplinary boundaries. This approach necessitates a more integrated and holistic view of urban health,
drawing on diverse knowledge systems and perspectives to develop more comprehensive and effective policy solutions. By transcending disciplinary boundaries and collaborating with experts from different fields, transdisciplinary approaches lead to more innovative and effective solutions for urban health (Lawrence & Gatzweiler, 2017).

Another key characteristic of the transdisciplinary approach is its emphasis on not only the integration of concepts and methods, but further generating new conceptual frameworks, problem definitions and methodologies that transcend the boundaries of the participating disciplines and fields. Moreover, transdisciplinary approaches place a strong emphasis on translating research findings into practical solutions to complex social problems. According to Stokol et al. (2013), the transdisciplinary approach is defined as “an integrative process whereby scholars and practitioners from both academic disciplines and nonacademic fields work jointly to develop and use novel conceptual and methodological approaches that synthesise and extend discipline-specific perspectives, theories, methods, and translational strategies to yield innovative solutions to particular scientific and social problems.

In essence, transdisciplinary approaches extend beyond the science-policy nexus and incorporates the views of the non-academic and community participants (Lawrence, 2022; Stokols et al., 2013). Inherent in transdisciplinary research practice is the integration of differing assumptions and ontological beliefs held by the participating partners (Pineo et al., 2021). Failing to effectively address these differences may lead to tensions during the development of transdisciplinary collaborations.

Therefore, developing meaningful transdisciplinary collaborations requires first establishing a shared understanding of the problems based on the recognition of the diverse disciplinary views (Lawrence, 2004; Pineo, Turnbull, et al., 2021; Ramadier, 2004). This recognition of diverse views lays the foundation for effective communication and collaboration. Collaborators need to remain open, respectful in their communications, actively listening and valuing different perspectives. Additionally, collaborators need to be open to new ideas and approaches that may be outside their disciplinary worldviews and willing to adjust their own perspectives and assumptions.
Therefore, in order to develop effective transdisciplinary collaborations, it is important to first identify and articulate differing ontological worldviews. This recognition of ontological diversity can serve as a tool for acknowledging and accommodating disciplinary differences in transdisciplinary collaborations. My research aims to serve this purpose.

1.2.2 Understanding of the urban health system

1.2.2.1 Starting from a ‘complicated’ view on urban health...

Urban health is an elusive concept and a complex phenomenon to define. There are various interpretations and levels of understandings about urban health (de Leeuw & Simos, 2017; Galea et al., 2019; Sclar & Volavka-Close, 2011). The term “urban” can refer to different population sizes, densities, social functions, administrative and political structures, and physical infrastructure forms (Brenner, 2019). Additionally, the idea of health is multidisciplinary, multifaceted, and has complex causal mechanisms and networks (Collyer, 2015; Rayner & Lang, 2012).

When discussing urban health issues, we often describe different aspects of the phenomenon without a comprehensive understanding of the whole. This observation always reminds me of the parable of the blind persons and an elephant, where each person feels a different part of the elephant’s body then describes the elephant based on their limited experience. Likewise, when discussing urban health, we must explicitly acknowledge which part of the phenomenon we are referring to, to avoid misunderstandings and conflicts.

Therefore, to provide clarity, I initially developed a heuristic framework for urban health to present the scope of this PhD research (Figure 1.3). This framework was meant to serve as a map, illustrating the main components and relationships of the urban health phenomenon that is addressed in this PhD research. It is important to emphasise, however, that urban health is considerably more complex and expansive than what is depicted in this heuristic framework. Urban health extends beyond the urban morphological and social aspects to the biological aspects that forms the urban ecosystem. The scope of urban health in this PhD research stems from the human decisions that design and create the urban form and
focuses on the interface between the urban built environment and its impact on human health outcomes.

This urban health heuristic framework is comprised of three interconnected components: the urban planning system, the urban form, and their effect on human health. Investigating the urban health phenomenon entails not only examining the cause-and-effect relationship between the urban form and human health, but also understanding the mechanisms that lead to the creation of the urban form. In this regard, the urban planning system plays a crucial role, as it produces urban planning policies through the functioning of its constituent elements. The configuration and dynamic interaction of actors, ideas, and institutions within the urban planning policy subsystem shape the policy outputs, which may take the form of regulations, policy changes, development proposals, master plans, and other procedures and structures. These policy outputs, in turn, shape the urban built environment, ultimately affecting health outcomes. It is important to note that the health impact of the urban built environment is not simply a product of the physical structures themselves but is fundamentally shaped by the complex interplay of actors, ideas, rules, structures, and power dynamics that operate within the urban planning policy process.
Figure 1.3 Heuristic framework of the urban health phenomenon
However, as the research progressed, it became evident that a complex perspective on the urban system is a more appropriate view on understanding the health impacts of urban environments and policymaking to foster urban health. Cities are complex systems that give rise to emergent outcomes, such as urban health outcomes, which are the result of complex urban processes (Gatzweiler et al., 2017, 2023; Rybski & González, 2022). The urban system is comprised of interactions among multiple components, such as physical infrastructures, social structures and networks, political and economic systems, and environmental factors. Moreover, the urban system is a human-dominated, socio-ecological system that is heavily influenced by human activities.

Complex systems are characterised by non-linear, dynamic, adaptive properties and exhibit emergent behaviours. This means that small changes to one component can have unpredictable effects on the entire urban system. Urban systems not only change over time in response to both internal and external factors, but also the outcomes of one set of interactions can affect future interactions in complex and unpredictable ways. The system as a whole exhibits behaviours or characteristics that are not directly attributable to any one component, but rather arise from the interactions between components. For example, the health outcomes of urban populations are an emergent property of the complex interactions between physical and social environments, political and economic systems, and individual behaviours, that cannot be fully measured, predicted or controlled (Bettencourt, 2019; Gatzweiler et al., 2023).

Therefore, urban health research and policymaking is not just a technical or mechanical issue but needs to be understood as a complex system that is heavily influenced by the decisions made by its agents. However, according to Mueller (2020), traditional approaches to public policymaking continue to fail as they have a flawed assumption that complex systems can be precisely determined, predicted, and controlled. This assumption oversimplifies the complexities of the system and leads to overconfidence and unrealistic expectations.

As a result, in this research, I assume the position that the urban system is a complex adaptive system, and that the urban health outcome is an emergent outcome. The urban
The health heuristic framework is merely a tool for simplifying some of the main components of the urban system, but it is not an attempt to identify all existing components and comprehensively understand the entire system.

In summary, the view of the urban system as a complex adaptive system means that it is impossible to predict with precision how the urban system will behave. Instead, we need to better understand the system, identify potential intervention points and learn to navigate the system. The research question provides ontological frameworks as tools to better fulfill these requirements.

1.2.3 Scope of research – a summary

As explained in the previous sections, my understanding of transdisciplinary collaborations and the complex systems perspective can be summarised as follows. Fostering transdisciplinary collaborations involves working in areas beyond shared ground, while acknowledging the foundational differences in addressing the issues of concern. Embracing a complex adaptive systems perspective within the urban context implies that a comprehensive understanding of all components, forces and causal pathways that generate the observable urban health outcomes is unattainable.

Therefore, I contend that the key principles supporting transdisciplinary and complex systems perspectives necessitates clarity and transparency regarding the definitions, scope and purpose of the chosen approach. Such transparency allows the reader to comprehend the assumptions and foundational principles that underpin the interpretation of the findings. Central to this viewpoint is that a) the complete knowledge about the system is unattainable; b) acknowledging and respecting divergent viewpoints fosters transdisciplinary collaborations; and c) articulating one’s assumptions, scope and intentions with precision enhances the understanding of the knowledge generated through the chosen approach.

Aligned with this notion, I aim to reaffirm the scope of this research and outline its parameters. This research focuses on the interface between the urban built environment and human health. While the scope of urban health extends beyond this interface, encompassing interactions within the ecological realm, it incorporates not only geographical
and institutional dimensions but also temporal and other considerations. However, the specific focus of this research pertains to the urban planning process as a critical conduit linking infrastructure development to the urban environment and emergent health outcomes.

Similarly, within the context of urban policymaking, this research is centred on exploring the evidence-policy gap. Despite the generation of factual evidence through robust scientific methodologies, which provide strong rationale for action and present optimal solutions, policy decisions often fall short of aligning with the most compelling evidence available. This interest in the science-policy nexus has remained one of the main domains in explaining the interplay of health considerations within policies, serving as one of the dominant paradigms in conventional policy process studies. However, it remains crucial to bear in mind that transdisciplinary and complex systems perspectives extends beyond the confines of the science-policy paradigm and advocates for the active involvement of nonacademic actors.

1.3 The philosophical approach: critical realism

I adopt critical realist perspectives in my exploration of the ontological perspectives on urban health. This entails applying critical realist principles to the formulation of the research question, the methodology employed, and the transformative potential of the study's outcomes.

1.3.1 The critical realist approach

Critical realism (CR) is a philosophical approach to social science research that seeks to understand the underlying structures and mechanisms that lead to observed phenomena (Bhaskar, 1975). According to CR ontology, the world is composed of stratified layers of three distinct but interconnected domains: the empirical, the actual and the real. The empirical domain refers to the world of observable and measureable events and objects, the actual encompassing those events and objects that exist independently of our perception of them. The real domain consists of the underlying structures, mechanisms and processes that generate the events and objects in the actual and empirical domains. Although these
structure, mechanisms and processes are not directly observable, they can be inferred through empirical observations and testing.

Many studies and investigations in urban health focus on observable aspects of the phenomenon, such as physical determinants that affect health (Cyril et al., 2013; Feng et al., 2010; Gong et al., 2016; Krefis et al., 2018; Salgado et al., 2020). Researchers seek to identify knowledge on the acceptable levels of environmental risk factors and urban design principles that promote or protect health. Policymakers are interested in applying a set of indicators that measure the progress of their urban policies. CR ontology views these observations to occur in the empirical and actual domains, which are only the surface-level symptoms of the underlying entities and structures that constitute the real domain (Bhaskar, 1975).

Critical realists argue that a healthy city is an ontological reality, regardless of whether we can observe or measure its dimensions (Næss, 2015). Knowledge on risk factors, urban design parameters, or indicators are a result of the transfactual mechanisms that are grounded in the real domain. These transfactual mechanisms refer to the structures and mechanisms that constitute the real domain of a healthy city, which exist independent of any specific context or situation. As such, epidemiological studies that seek to identify facilitators or inhibitors of the urban environment and policy interventions to promote health commit an ‘epistemic fallacy’ by reducing the reality of healthy cities to only those observable and measurable indicators (Bhaskar, 1975). Unfortunately, the prevailing positivist culture in urban health has dominated the research and policy field, resulting in an over-reliance on epidemiological studies.

Critical realists are interested in uncovering the transfactual mechanisms in the real world, even when they are not directly observable. However, this poses a challenge for demonstrating these mechanisms through observable or measurable means. Consequently, critical realist methodology remains relatively underdeveloped, and some view it as a metatheory (Bhaskar & Danermark, 2006; Melia, 2020). Nevertheless, some researchers have attempted to apply critical realism in practical research (Melia, 2020; Price, 2017; Price & Martin, 2018), with a pragmatic approach to methodology that is not opposed to empirical or positivist methods (Fletcher, 2017; Næss, 2015; Stigendal & Novy, 2018).
Furthermore, the critical realist ontology has recently gained attention in the field of public health, in the consideration of social determinants of health (Glenn et al., 2023; Haigh et al., 2019), in the analysis of health inequities (Yashadhana et al., 2021) and in understanding the generative mechanisms within healthy urban planning (Harris, 2022). These scholars argue that the observed health outcomes manifest as attributes of the empirical domain, thereby underscoring importance of the structures and processes that exist in the actual domain.

Critical realist methodology emphasises reflexivity and transparency and involves breaking down complex phenomena into components and using a stepwise process of redescription and selection to identify the best explanation for underlying structures and causal mechanisms (Danermark, 2019; Melia, 2020). This process is iterative and includes steps such as resolution, redescription, retroduction, elimination, identification, correction, and recommendation.

1.3.2 Alignment of this research to critical realist paradigm

My ontological commitment is to comprehend the underlying mechanisms that exist in the real domain. My aim is to seek beyond surface-level observations and uncover the deeper root processes in explaining the observed social phenomena. While these mechanisms may not be readily observable, they can be inferred using various methodologies and processes. I employ an iterative process that involves redescription and selection to identify the most appropriate explanation of the underlying mechanisms. Throughout the process, I prioritise reflexivity and transparency to ensure the validity and reliability of the findings. Ultimately, by revealing the underlying mechanisms that drive the observed events and objects, the insights from the findings have both theoretical and practical implications. Specifically, they can facilitate transdisciplinary collaborations for urban health research and policymaking, ultimately leading, it is hoped, to improved urban health outcomes.

Table 1.1 summarises the key study components of this PhD thesis and their alignment with critical realist principles.
Table 1.1 Alignment of thesis with the critical realist approach

<table>
<thead>
<tr>
<th>Study component</th>
<th>Alignment with critical realist principles</th>
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<tbody>
<tr>
<td>Purpose of study and research question</td>
<td>This thesis explores how actors’ ontological perspectives shape their approaches to urban health, seeking to uncover the fundamental principles which operate in the real domain. These underlying urban health ontologies shape the research questions, the epistemic value of knowledge, and the best methodological approaches. Furthermore, in policymaking aimed at improving urban health outcomes, the actions and decisions of policy actors are influenced by their ontological perspectives regarding urban health issues and solutions (Cairney, 2012; Melia, 2020). Consequently, research findings and policy outcomes are influenced by the ontological perspectives of actors and must be interpreted within this context.</td>
</tr>
<tr>
<td>Methodology and analytical approach</td>
<td>With the ontological commitment to understand the processes in the real domain that are not immediately visible, I apply methodological approaches that best seek answers to my research question. In addition to the overall study design, I apply the retroductive and abductive approaches to reasoning. These approaches make inferences based on an iterative process of hypothesising, identifying, eliminating and selecting through which we seek for the best explanation of the observations. I exercise reflexivity and transparency in my approaches, documenting the discovery process in detail in publications, communicating with peers to receive feedback, and publishing updated versions as the research evolves.</td>
</tr>
<tr>
<td>Findings and outcomes</td>
<td>This research ultimately pursues both theoretical and practical goals. By identifying the underlying mechanisms of how potential urban health actors participating in transdisciplinary collaborations work, there is an inherent focus on ‘what to do’ to improve transdisciplinary collaborations to generate better urban health policies. Therefore, in discussing the implications, I will both draw normative conclusions on what researchers and policymakers ‘ought to do’ in addition to explaining ‘how things work’.</td>
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1.4 Research design

The research methods employed in this thesis are not exemplars of transdisciplinary research methodologies. Rather, conventional social science research methods have been used to generate evidence that supports the rationale for transdisciplinary approaches in urban health. Additionally, the findings offer new knowledge that could support future researchers to advance transdisciplinary research and approaches. Specifically, two methods are applied in this thesis; a meta-narrative review aimed at identifying the different urban
health research paradigms in scientific literature and a case study design to unveil the coexistence of varied ontological perspectives on urban health in policymaking. These findings collectively underscore the need for acknowledging the differing views to advance transdisciplinary approaches for urban health research, practice and policymaking.

The meta-narrative review method is a type of systematic literature review that studies the kinds of questions that are asked on a common issue and the methods used to answer them rather than a synthesis or aggregate of research findings (Gough, 2013; Greenhalgh et al., 2005; Wong et al., 2013). In this thesis, the meta-narrative review design is adopted to systematically search, collect and analyse scholarly publications that address urban health issues and to identify research traditions and their approach to studying urban health. A total of 369 publications on urban health were identified and the cited references in these publications were analysed for co-citation patterns. By taking rigorous, transparent and accountable methods, the meta-narrative review provides a multi-level configuring of how different research traditions address the same topic (Gough, 2013).

I then apply a case study method to ascertain the different types of urban health policy ideas that coexist in the planning of Sydney’s Western Parkland City. The data is collected through interviews with policy actors involved in the policy process. The identified urban health policy ideas are subsequently analysed based on the different urban health paradigms and research traditions that were derived from a conceptual exercise and the meta-narrative review on urban health research traditions. The strengths of the case study method include its capacity for a holistic, in-depth and contextual examination of a specific real-world (Flyvbjerg, 2006; Yin, 2017). However, it is also important to note that a case study does not aim to achieve generalisation or replication. This methodology allows for a thorough understanding of the complexities and relevance to practical situations and decision making. Therefore, the selection of the case study methodology aligns effectively with the research question addressed in this thesis.

1.5 Outline of thesis

This thesis is comprised of seven chapters (Figure 1.4) that detail my discoveries in response to the research question. In Chapters Two, Three, and Four, I identify and articulate various
ontological perspectives on urban health. These perspectives are then applied in Chapter Five to examine the urban health policy ideas in planning Sydney’s Western Parkland City through a case study. In Chapter Six, I discuss the practical implications and significance of these findings, followed by the conclusion in Chapter Seven.

Chapters Two to Five of this thesis have either been published or submitted for publication and are presented in the same format and structure as in the original publications, without any edits. The publications in Chapters Two and Three are presented in their original published PDF format, maintaining the same layout and appearances as the published versions. In contrast, the publications in Chapters Four and Five are presented in text. Some of these Chapters contain their own appendices that relate to the publication. The references for Chapters Four and Five have been presented all together at the end of the thesis, rather than within each chapter. Each chapter is introduced with a chapter introduction and concluded with a summary and implications that link to the next chapter.

In Chapter Two, I employ the concept of paradigms to identify different urban health approaches based on their conceptual, theoretical, methodological and instrumental
dimensions. The four urban health paradigms are the 1) medical-industrial city; 2) urban health science; 3) healthy built environments; and 4) health social movement paradigms. The contents of this chapter have been published as an article in the peer-reviewed journal *Cities* and a summarised version is published in the *Palgrave Encyclopedia of Urban and Regional Futures*.

**Chapters Three and Four** together present a meta-narrative review of the urban health scholarship to identify the different scientific approaches to urban health. **Chapter Three** introduces the protocol that was developed to conduct the systematic review. The protocol has been published in *Systematic Reviews* and is registered in the Open Science Framework (OSC) (https://osf.io/tn8vk). In **Chapter Four**, I present the five urban health research traditions that were discovered from the meta-narrative review as 1) sustainable urban development; 2) urban ecosystem services; 3) urban resilience; 4) healthy urban planning; and 5) urban green spaces. A journal article on the findings is under review in a peer-reviewed journal.

In **Chapter Five**, I utilise the ontological perspectives identified in the previous chapters as frameworks to examine urban health policy ideas that appear in the planning of Sydney’s Western Parkland City. Through this analysis, I identify seven categories of urban health policy ideas that align with various combinations of urban health ontologies. Based on these findings, I argue for the need for transdisciplinary urban health policymaking. This chapter is in the form of a publication that has been submitted to a peer-reviewed journal.

**Chapter Six** summarises the key findings that respond to the research questions. The discussion explores the theoretical, practical and research implications of this PhD research and offers directions for future research. The final chapter, **Chapter Seven** presents the conclusion of this thesis.
**Chapter 2:**

**FOUR URBAN HEALTH PARADIGMS**

<table>
<thead>
<tr>
<th>Objective 1.</th>
<th>Identifying and articulating different ontological perspectives on urban health</th>
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<th>Objective 2.</th>
<th>Implications of differing urban health ontological perspectives</th>
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<table>
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<th>Chapter 1: Introduction</th>
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<tr>
<td>Chapter 2: Four Urban Health Paradigms</td>
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<tr>
<td>Chapter 3: Protocol for a Meta-Narrative Review</td>
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<tr>
<td>Chapter 4: Five Urban Health Research Traditions: A Meta-Narrative Review</td>
</tr>
<tr>
<td>Chapter 5: Ontological Foundations of Urban Health Policy Ideas: The Case of Planning Sydney’s Western Parkland City</td>
</tr>
<tr>
<td>Chapter 6: Discussion &amp; Conclusion</td>
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</table>
This chapter introduces four urban health ideas that I have categorised by applying the concept of paradigms. This categorisation is based on a critical reflection of the different urban health paradigms that I have observed in literature and have been exposed to in practice. This chapter makes a notable conceptual contribution to the field of urban health research. The urban health paradigms framework additionally serves as the conceptual basis for subsequent empirical work of this thesis. Building on this initial typology, I empirically examine urban health approaches in the scientific literature through a meta-narrative review (Chapters Three and Four), and in an urban planning policymaking case (Chapter Five).

In this chapter, I will first argue why using the concept of paradigms provides a meaningful framework to distinguish ontological perspectives and discuss the importance of articulating diverse urban health ontological perspectives in two key areas: facilitating transdisciplinary research and influencing policy change. I then illustrate the iterative and reflexive journey of discovering the four urban health paradigms. Finally, the four urban health paradigms will be presented, followed by a discussion of their implications.

This chapter is presented in the same format and structure, without any edits, as the following publication:


2.1 The publication
Four urban health paradigms: The search for coherence

Jinhee Kim, Evelyne de Leeuw, Ben Harris-Roxas, Peter Sainsbury

Abstract

Scholars, practitioners and policymakers view urban health based on their foundational ontologies, or paradigms, which provide a framework of norms that specifies the policy goals or research questions, the preferred policy instruments or research methodologies, and defines the nature of the urban health issue. This paper identifies four paradigms in current research and practice that influence the links between urban health environments and human health: the "medical industrial city", "urban health science", "healthy built environment" and "healthy social movement" paradigms. We argue that scholars, practitioners and policymakers must recognize their diverse and sometimes contradictory views in order to create an opportunity for coherence in understanding knowledge generated from different paradigms.

1. Introduction

The urban physical environment that humans have built creates both opportunities and risks for the health and health equity of city dwellers. Urban health thus not only with the complex causal relationships between the urban form and its influence on health outcomes but also with underlying processes and policies that influence the decision about the shape and qualities of cities. As such, the study and practice of urban health is ever-evolving and connects many disciplines, trades and traditions. Scholars, practitioners and policymakers address urban health issues based on their ontological foundations and work within a framework of standards that specifies the policy goals or research questions, the preferred policy instruments or research methodologies, and defines the nature of the urban health issue. This may lead to differences in interpreting the urban health field and in diverging practical, political and design solutions to urban health issues. A call for trans-disciplinary collaboration has been made (Lawrence & Guttmann, 2012), but thus far, different approaches may seem irreconcilable to the casual observer.

We argue there is utility in making differences in thinking around the concept clearer and more distinctive. Not only would this help appreciate the proliferation of the field across different disciplines, schools of thought, and emphases, but it would also help facilitate particular efforts and patterns of knowledge generation and utilisation at the interface between community, public and private sectors, and the nexus between research, policy and practice (de Leeuw et al., 2010). We have termed them as "four paradigms in current research and practice that influence the links between urban health environments and human health: the "medical industrial city", "urban health science", "healthy built environment" and "healthy social movement" paradigms. We argue that scholars, practitioners and policymakers must recognize their diverse and sometimes contradictory views in order to create an opportunity for coherence in understanding knowledge generated from different paradigms.

Keywords

Urban health
Healthy cities
Healthy urban planning
Health social movement

1.1. Diverse approaches to urban health

We begin by demonstrating the diversity of approaches in the field of urban health and explicitly presenting the scope of urban health we address in this paper. In recent decades, and the range of topics trans-disciplines, research practitioners, sectors and trades (Ma et al., 2014) reviewed...
a body of urban health scholarship from a search in PubMed/MEDLINE of MeSH. They identified the four most frequent categories of research in urban health: physical environments (such as air pollution, noise, housing, indoor air quality); health outcomes (disease and risk factors); social environmental (social isolation, social support, and social conditions); and interventions (health services and planning, health behaviour change, monitoring, urban planning).

In some traditions, urban health is regarded as a sub-discipline of international health or population health (Ylitalo & Galbraith, 2002). The determinants of morbidity and mortality in urban areas are the focus of study, and they are commonly addressed in terms of burden of disease and health issues in inner city dimensions, related to, e.g., poverty, strained, drug, and HIV/AIDS (Ylitalo & Galbraith, 2002). In other traditions, the study of urban health focuses on the features of the urban environment and urban living that affect human health (Redhead et al., 2017; Redhead & Nield, 2013; Redhead et al., 2013; Redhead et al., 2013). Here, the physical and social environments of cities are considered critical determinants of health in the multidisciplinary and sociological models of health. A third tradition takes a governance or healthy public policy perspective. In this, the issue of urban health is addressed as a complex of institutional processes that create healthy or unhealthy urban conditions (Page et al., 2008; Collins & Hayes, 2019; Corburn, 2017; de Lemus, 2017).

The Ottawa Charter for Health Promotion (World Health Organization, 1986) were supportive environments as encompassing social, cultural, ecological, and built realms. We accept this layering of environments as integral to the current understanding of cities and urban health (UHRISTAT & World Health Organizations, 2003). Moreover, cities or urban spaces are not merely bounded spatial units, they are dynamically evolving socio-spatial configurations embedded in broader networked, organisational and geographical scales (Geere, 2006).

In this paper, we focus on understanding the processes that shape the urban built environment and its interactions with human health. Urban built environments refer to the human-constructed infrastructure of cities, including buildings, transportation systems, and parks that are created according to the relevant institutions and planning systems. Research and practice on urban health include activities related to understanding the causes and effects of urban health issues and understanding the process of implementing solutions to create urban built environments that are conducive to health (Lawrence, 2013). While the broader understanding of urban health encompasses contributions from disciplines such as urban geography, urban ecology, governance, urban management and other social and applied sciences, however, in this paper, we focus on those that are at the interface of the urban built environment and human health.

Other attempts have been made to examine and identify typologies of healthy places. For example, Forsyth (2008) recognises these conceptually distinct but overlapping approaches to healthy places that are being proposed in nature planning, design and urban development at the city and neighbourhood scale. The three categories are basic healthy places, population-based issues and technology-focused places. This classification is broadly based on the main element that distinguishes the healthy place approach, i.e., building the physical structure, focusing on specific population groups such as children and older people in healthy planning, and harnessing innovative technology. By emphasising how the interventions differ, Forsyth provides a comprehensive illustration of the range of existing healthy placemaking activities. However, this classification is insufficient in understanding the underlying conceptual and theoretical assumptions that constitute the ideas behind the different types of interventions. Assumptions about what the ideal healthy place should be like, the preferred methods to investigating relevant issues or the nature of the causal mechanisms all construct the ideas behind why a specific intervention has been developed with that particular feature. Without acknowledging these underlying assumptions, we still cannot fully distinguish those understood the differences to healthy placemaking.

Therefore, our typology builds on Forsyth’s categorisation and suggests an alternative way to differentiate approaches to urban health. On the one hand, we search for approaches beyond the urban planning form, while on the other, we further explore the ontological differences in the basis for comparison to seek a broader transdisciplinary typology.

1.2. Paradigm and transdisciplinarity

In our proposed typology, we differentiate urban health approaches by adopting the concept of paradigms. The concept of paradigms has many definitions and is applied in multiple settings with varying degrees of generalisation (Mingers, 2017). According to Kuhn (1962), a paradigm is a coherent body of work that shares a common set of concepts, theories, methods and instruments that scientists within the paradigm take for granted. In other words, researchers who follow different paradigms have different views on which aspect of urban health is most important, which underlying determinants best explain urban health and its internal workings, which data collection or analytical method best address the research question, and which solutions most effectively solve a given problem.

In Kuhn’s original work, it was assumed that there is one dominant scientific paradigm, or normal science, in a discipline that can only be transcended by a new or different one. However, this epistemological notion has evolved, in particular to acknowledge developments in social science and transdisciplinary contributions. A transdisciplinary field such as urban health includes contributions across multiple disciplines and is a typical example of a multiple paradigm science that lacks a single overarching paradigm (Lawrence, 2013; Ritzer, 1975; White, 2013). In such a multi-disciplinary and multi-paradigmatic field, there are rarely dominant paradigms, nor should such a dominance setting being encouraged. More importantly, the diversity of urban health conceptualisations, theories and methodologies is easily confounded to be disciplinary traditions because disciplines generally have a dominant paradigm in addressing urban health issues. The diversity of approaches is the product of the underlying paradigms perspectives which may be embraced by multiple disciplines and transcend disciplinary boundaries.

The myriad of disciplines we see today were created as a product of the traditional linear development of science and the compartmentalisation of scientific activities (Lawrence, 2015; Rametsteiner, 2008). However, the multidirectional causal pathways between the urban physical environment and human health, coupled with the diversity of disciplines, policy actors and epistemic communities participating in the production of knowledge and action, essentially calls for different discilpines to engage with each other. Moreover, the multi-scale complexity and unpredictability of the urban health issues, constrained by the environmental and political context we face today, cannot be understood by conventional forms of disciplinary thinking. This is not merely because the current methodologies cannot embrace and predict all uncertainties (Lawrence & Gutensohn, 2017), but also because attempts to synthesise knowledge struggle to integrate what disciplinary analysis has previously separated (Gilian, 2002). Therefore, urban health issues require collaboration that transcends disciplinary boundaries and contributes from both the overlapping and non-overlapping aspects between disciplines. A transdisciplinary approach addresses the non-overlapping, marginal areas of the disciplinary approaches and seeks coherence of knowledge in these connecting areas, instead of looking for common between disciplinary approaches and knowledge. In contrast, a multidisciplinary approach occurs when researchers work in parallel but respect the different views of each discipline. A transdisciplinary approach focuses on the intersections of disciplines and constructs a standard model based on the overlapping aspects that are compatible with each other. Both multidisciplinary and transdisciplinary approaches remains fragmented because they seek collaboration in those areas that may bring consensus.
and unity and avoid dealing with those areas that conflict (Lawrence, 2012; Ramachand, 2009).

To us, a transdisciplinary approach enables researchers and practitioners to examine and interpret urban health through different disciplinary and paradigmatic lenses and occasionally step outside of the comfort zones of their disciplines. Addressing urban health issues involves multidimensional and interactive perspectives and a broad scope of the context cases of their disciplines. Through a multidisciplinary and participatory approach, knowledge can be generated and shared among different disciplines and contribute to the development of effective solutions (Lawrence & Gattellari, 2017). Moreover, the ultimate goal of transdisciplinary approaches is to achieve shared understanding and commitment to societal change by creating and applying knowledge about real-world problems and solutions (Borch et al., 2016; de Loose, 2012; O’Cain et al., 2013).

Transdisciplinary research and practice can be first attempted through the examination of the different approaches (Ramachand, 2009). Articulation is a process that holds at both the contradictions and the common aspects of the different approaches that address urban health. Through articulation, scientists and policy actors are able to tap knowledge produced by one discipline as paradigm or paradigmatic knowledge. The importance of paradigms is not exclusive to the philosophy of science. Hall (1995) introduced the concept of policy paradigms as a framework of ideas and standards that specifies the goals of policy, policy instruments to achieve them and the nature of the policy problems. Paradigms have a crucial role in the policy process, in which actors process complex information through cognitive shortcuts based on their beliefs. Policy actors aggregate into coalitions to influence and change policy with other who share policy core beliefs (Jenkins-Smith et al., 1989) or reframe problems according to the specific belief systems of others to generate support for their policy proposals (Kim & Williams, 2013). Here, paradigms dictate policy actors’ beliefs about how causal relationships occur and the ideas on what constitutes effective policy solutions (Hall, 1995; Stone, 1997). In the context of changing urban planning, the conceptual understanding and positioning of health in urban health varies among policy actors (Thompson et al., 2019; Wallis et al., 2015). For some, health in urban planning includes building world-class hospital precincts for global competitiveness, while for others, health is a holistic concept that drives urban planning (Thompson et al., 2019). Therefore, to understand and explain policy change for urban health, more attention should be given to understanding how the interface between educational and political paradigms influences the policies proposed and adopted (Sigwarth, 2014; Wensley et al., 2015). This could also serve as a starting point for bridging the gap between research and policy (Cutmore et al., 2014).

2. The four paradigms of urban health

In identifying and distinguishing paradigms, we build on Kahn’s definition of a paradigm, which is essentially a set of shared beliefs among scientists about how problems are to be understood (Kahn, 1962, p.186-7). Hall (1995) applies a similar approach to circumventing policy paradigms. A paradigm displays characteristics different to other paradigms regarding what it is to know about and assumptions about the phenomenon (ontology), the nature of knowledge and how it relates to the phenomenon (epistemology), and the best method to acquire knowledge (methodology). Paradigms also vary regarding the causation of the way things happen (ontology) and value systems (epistemology). Following Kahn’s approach, we applied the following parameters to distinguish the different types of urban health paradigms:

- Conceptual dimension: How is urban health defined? What are the main assumptions? Are the key concepts (e.g., health, urban built environment) defined?
- Theoretical dimension: What are the underlying beliefs in the problem definitions (e.g., causal pathways between urban physical environments and human health) and their solutions?
- Methodological dimension: What are the appropriate methods to acquire knowledge?
- Instrumental dimension: What are the appropriate solutions to promote health?

The four urban health paradigms were identified through an iterative journey of discovery, in which analysis of scholarly and grey literature was alternated with critical reflective practice among the authors and their peers. Over the years of experience in the field of urban health, the authors have encountered diverse approaches among colleagues and literature in the field. We initially recognized two broad disciplinary foundations – urban planning and public health. Within the public health discipline, there were two noticeable divergent approaches – one that focused on epidemiological studies and another that focused on the empowerment model. Based on this observation, we initially identified the three dominant urban health approaches that stem from the disciplines of urban planning, epidemiology, and the empowerment model and health promotion (Kim et al., 2009). As we progressed to compare the differences between the approaches against the conceptual, theoretical, methodological and instrumental dimensions, the typology hierarchically broadened in scope (Kim et al., 2015). The distinctions between paradigms become clearer in earlier versions and with the addition of the approach that is influenced by the healthcare and medical industry sector, the typology resulted in the four categories we present in this paper. We also acknowledge that this typology is based on a western-oriented worldview as most of the (English language) published research and practice come from high-income OECD societies where urbanization and urbanity patterns may differ from those in developing economies (Matthews, 2021).

A summary of the four paradigms is shown in Table 1. These paradigms are not mutually exclusive and are often interwoven in a “pure” or “Ideal” form in specific urban health research or activities. The paradigmatic positions do not always represent specific disciplinary traditions and norms and are not meant to be used to designate individual studies, researchers or policies to a particular paradigm. Instead, they are intended to serve as a heuristic (or “tool”) to explicate and distinguish the epistemological and methodological differences between the different approaches.

2.1. The ‘modern industrial city’ paradigm

The ‘modern industrial city’ paradigm is driven by the business and industry sectors (e.g., healthcare, construction, technology) and governments where healthcare infrastructure is considered as a major driver for urban economic growth and urban change. We apply the term “modern industrial” to represent the strong influence of the healthcare industry in shaping public policy (Elison, 1994). This paradigm is also a sub-category of the knowledge-based urban development (KURD) agenda that involves clustering of knowledge-intensive industries and businesses in an urban like setting with housing, business, education and leisure (Vignoles et al., 2008). Investment in global competitive healthcare infrastructure is believed to stimulate a prosperous urban economy by creating employment, housing and transportation. As such, key characteristics of this paradigm align with neoliberal principles and those development theories that support the idea of urban infrastructure development and technological advancements as the desired method to achieve progress. This paradigm is explained well by the urban growth machine theory (Goldblatt, 1995), which suggests that “the objective of growth is the realization of additional ‘placemaking’ interests in relation to a city” (Rodgers, 2005). A common discourse displayed by growth coalitions is the logic that growth creates jobs and that growth is conducive to wellbeing (Glahn & Wilson, 1969).

In this paradigm, the technologies and processes involved in the
Table 1
Summary of the four paradigms

<table>
<thead>
<tr>
<th>Paradigm</th>
<th>Urban health science</th>
<th>Healthy built environments</th>
<th>Health social movements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neoclassical</td>
<td>Focuses on the development of healthcare infrastructure or a key urban planning policy</td>
<td>Applies epidemiological and complex systems analyses to urban health science and emphasizes the role of medical professionals in the planning process</td>
<td>Emphasizes public policy that aims to create safe and healthy environments for all populations</td>
</tr>
<tr>
<td>Public health</td>
<td>Focuses on the prevention and control of disease</td>
<td>Applies epidemiological and complex systems analyses to urban health science and emphasizes the role of medical professionals in the planning process</td>
<td>Emphasizes public policy that aims to create safe and healthy environments for all populations</td>
</tr>
<tr>
<td>Ecological</td>
<td>Focuses on the prevention and control of disease</td>
<td>Applies epidemiological and complex systems analyses to urban health science and emphasizes the role of medical professionals in the planning process</td>
<td>Emphasizes public policy that aims to create safe and healthy environments for all populations</td>
</tr>
<tr>
<td>Urban design</td>
<td>Focuses on the prevention and control of disease</td>
<td>Applies epidemiological and complex systems analyses to urban health science and emphasizes the role of medical professionals in the planning process</td>
<td>Emphasizes public policy that aims to create safe and healthy environments for all populations</td>
</tr>
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</table>

2.2. The "urban health science" paradigm

This paradigm is based on the premise that dissecting the complex web of causal relationships produces a type of "scientific" evidence that can be translated into effective and actionable policy solutions (Giles-Corti et al., 2014; Pinhorn et al., 2014). Prominent features of the urban health science paradigm include the measurement and quantification of the urban condition, or urban morphologies, and the impact of the urban form on health outcomes (Martin et al., 2014; Sarkar et al., 2003). Urban settings are also complex systems that include the interplay of both physical and social environments which can both be an asset and an impediment for urban health (Armitage & Thomas, 2014). The urban health system is a non-linear network of multidirectional causal relationships, feedback loops, tensions between objectives, and unintended consequences (Lydon et al., 2012). Various elements of the urban environment (physical, social, and resource environments) are commonly studied as exogenous risk factors that influence health outcomes. For example, the urban social and physical environment is viewed as a "designer" environment leading to the obesity epidemic and increasing prevalence of noncommunicable diseases (Holt et al., 2004).

Research following this paradigm is concerned with obtaining precise information on urban form and how it is related to health outcomes. For example, research questions focus on measuring and highlighting the impact of urban form on health outcomes. Reliable, validated and policy-relevant indicators are used as an effective tool to set shared objectives, monitor progress, communicate across sectors.
and foster policy change (Badland et al., 2014; Lowe et al., 2015; Palee & Thompson, 2017; Pheon et al., 2015a; Zeng et al., 2014). A consequence of the deployment of the urban health science paradigm is, for example, the prescription of sets of ‘best buy’ interventions to prevent non-communicable diseases (NCDs) and injuries by the Partnership for Healthy Cities, a global action programme by Bloomberg Philanthropies (https://partnershipforhealthycities.bloomberg.org/) as shown in Box 1. These views are also found in the positivist approaches to global health in philanthropic capitals that consider health on investment of philanthropic goals (Bunn, 2014) (Hayton et al., 2021) and the dominance of metrics in ranking and best buys (World Health Organization, 2017).

2.3. The ‘healthy built environments’ paradigm

The ‘healthy built environments’ paradigm proposes the (re-)integration of health into the objectives of spatial planning of cities (Barton et al., 2015; Barton & Tomson, 2006; Odum, 2004; Kent et al., 2018). We include the term ‘built environments’ in the designation to represent the paradigm’s emphasis on the built environment and its planning process. The healthy built environments paradigm has an explicit focus on the urban and spatial planning system and strives to persuade planning institutions to adopt health as a primary goal for urban planning and design. Oftentimes, proponents of this paradigm produce sets of codes or guidelines to be used as guides or benchmarks in the review of development proposals (Callaway et al., 2009; Kooistra et al., 2013).

The development of the healthy built environments paradigm originated from the planning discipline and gained critical attention by the planning community as problems associated with urban planning (e.g., urban sprawl) and public health (e.g., obesity) converged (Chavez, 2008). While traditional urban planning infuses principles such as connectivity, mobility, accessibility and safety as key objectives for providing housing, transportation, employment, leisure, and services, the healthy built environments paradigm prioritizes population health as the main goal (Barton & Tomson, 2006). Hence, health is frequently linked with concepts such as sustainability, wellbeing, livability, walkability, sustainability, accessibility, connectivity, resilience and active lifestyle (Barton et al., 2015; Pheon, 2020; Townsend, 2008). Urban physical environments are conceptualised as human settlements that are considered in different scales ranging from buildings, streets, neighbourhoods to the whole city (Barton, 2015; Pheon, 2020). These urban environments are planned, designed and built by actors with the assistance of and constraints imposed by planning systems, sets of procedures, institutions and policy tools.

While acknowledging that the rigorous quantitative evidence produced under the strict methodological characteristics of traditional health and epidemiological disciplines presents compelling proof of the impacts of the built environment on health, proponents of the healthy built environments paradigm advocate for more comprehensive methods to explore and understand the complexity of the issues (Thompson et al., 2019). Methods include case studies, in-depth observations and participatory planning processes to provide a more comprehensive view and ensure the consideration of health in planning decisions.

Solutions advocated by the healthy built environments paradigm focus on the urban planning sector with the goal of influencing the planning system and processes. Policy instruments to influence the planning process are developed in the form of codes, guidelines and checklists that can be used as a guide or benchmark in the review of development proposals. Examples of these include the Healthy Urban Development Checklist (BSW Ministry of Health, 2020), and the Active Design Guidelines (The City of New York, 2010). The dimensions included in the UR-HHAT guideline for integrating health in urban and territorial planning (Box 2) are an example of the principles underpinning this paradigm (UR-HHAT & World Health Organization, 2020).

2.4. The ‘healthy social movements’ paradigm

The ‘healthy social movements’ paradigm takes a ‘value-based’ approach to promoting health through urban planning in cities (Bourn & Fice, 2015; de Leeuw & Simons, 2017; Brien et al., 2019) and aligns with the definition and principles of health promotion set forth by the Ottawa Charter for Health Promotion (World Health Organization, 1986). This view is also consistent with the ideas and work of Jane Jacobs and her perspective that the complexity, diversity and the identity of the community’s residents should be the fundamental drivers of urban design and not the academic principles of homogeneity (Jacobs, 1961). Principles such as solidarity, equity, sustainability and empowerment guide the identification of health issues associated with the urban physical environment and the solutions are ideally driven by the empowered community, focusing both inward (in community action) and outward (in seeking policy and systems change) (Ashton et al., 1986; de Leeuw & Simons, 2017; WHO Regional Office for Europe, 2018).

While proponents of this paradigm agree that a high health status should be the goal of all cities, a healthy city is not defined by its epidemiologically determined health status. Instead, a healthy city is one that commits to the healthy cities values and engages in creating environments and resources for health. Therefore, in contrast to the common practices associated with the urban health science and healthy built environments paradigms, a set of indicators or prescriptions that define the healthy city is not presented. Instead, a set of parameters that illustrate the values of a healthy city (Box 3) is proposed, which, if such a city were to exist, would surely have high health status (Eshel & Hancock, 1985).

**Box 1**

Fourteen proven interventions to prevent NCDs and injuries (Partnership for Healthy Cities, Bloomberg Philanthropies)

1. Create a bike-friendly city
2. Ban tobacco advertising
3. Raise tobacco taxes or levies/taxes
4. Tax sugary drinks
5. Set nutrition standards for foods served and sold in public institutions
6. Regulate food and drink marketing
7. Create healthier restaurant environments
8. Reduce speeding
9. Increasing motorcycle helmet use
10. Reduce drink driving
11. Increase seat belt use
12. Promote active mobility
13. Prevent opioid-associated overdose deaths
14. Enhance public health data and monitoring systems
Box 2
Guideline for integrating health in urban and territorial planning (UN-HABITAT & World Health Organization, 2013).

1. Basic planning and legislative standards to avoid risks to health
2. Policies that derive from healthy lifestyles or enhance health
3. Spatial frameworks to enable healthier lifestyles
4. Urban and territorial processes to capture multiple co-benefits of building in health

Box 3
The eleven parameters of a healthy city (Dahl & Hancock, 1989).

1. A clean, safe, high-quality physical environment (including housing quality)
2. An ecosystem which is stable now and sustainable in the long term
3. A strong, mutually supportive and non-exploitative community
4. A high degree of public participation in and control over the decisions affecting one’s life, health, and well-being
5. The meeting of basic needs (food, water, shelter, income, safety, and work) for all the city’s people
6. Access to a wide variety of experiences and resources with the possibility of multiple contacts, interaction, and communication
7. A diverse, vital, and innovative city economy
8. Encouragement of connections with the past, with the cultural and biological heritage, and with other groups and individuals
9. A city form that is compatible with and enhances the above parameters and behaviour
10. An optimal level of appropriate public health and sick-care services accessible to all
11. High health status (both high positive health status and low disease status)

The WHO Healthy Cities movement is an example of city action and research in this paradigm, along with other examples of community-based participatory research and action methods for urban transformation. Cities, in their unique context, apply evidence and information for decision-making that comply with their value base. Therefore, research in this paradigm calls for a realist synthesis approach in which outcomes are seen as a function of the mechanism plus the context (Evans et al., 1993), acknowledging that each urban environment is unique, but that certain principles apply to all. For example, the programme logic of the WHO European Healthy Cities and its evaluation assumes distinct and mechanisms to explain their impact on city health outcomes (de Leon et al., 2015). Because the data and information required for healthy cities research need to capture the values and the unique context of each city, a multi-method approach is needed. To evaluate the effectiveness of the actions that follow the health social movement paradigm, the first-generation evaluation model (Cubas & Linford, 1999) is recommended. In this model, the design and implementation of the evaluation is determined by intensive stakeholder participation.

3. Discussion

The four urban health paradigms that are identified and articulated in this paper provide one way to categorise and understand the different approaches that co-exist in the current research and practice of urban health. Our categorisation is based on the differences in how the approaches view and conceptualise priority issues of the phenomenon and the beliefs on the best methodologies and instruments to research and address these issues. In summary, the medical industrial city paradigm focuses on urban planning driven by the healthcare industry; urban health science emphasises the production of sound evidence to inform decision; healthy built environments aims to influence the spatial planning system and institutions; and health social movement advocates for a value- and community-driven approach to urban planning. However, the benefit of articulating the paradigms is not in highlighting the differences, but in seeking opportunities to communicate and collaborate across different paradigms effectively.

In reality, overlaps and hybrides between paradigms are common and necessary, and we often observe the influence of multiple paradigms. For example, in the planning and implementation of the Greater Sydney Regional Plan (Greater Sydney Commission, 2018), a long-term strategic plan that integrates land use, transport and infrastructure in the Greater Sydney area, we identify a dominance of the medical-industrial city paradigm, but also see influences of the other paradigms. The medical-industrial city paradigm supports the health and education precursors model for urban development and economic growth, but the plan’s key objectives of livability and sustainability, use of epidemiological evidence to inform decisions, and the participatory processes share characteristics of the urban health sciences and healthy built environments paradigms. While the overarching values and principles of the WHO Healthy Cities movement represent characteristics of the health social movement paradigm, individual programmes and projects include initiatives that follow the urban health sciences and healthy built environments paradigm (WHO Regional Office for Europe, 2019). This illustrates the complexity and diversity of urban health and the value of multiple views in dealing with the different areas of the phenomenon and strengthening cross-sectoral action. We contend that there cannot be one dominant, overarching paradigm on urban health. It is by harnessing the strengths of each paradigm that we can seek intersectional collaboration.

With the diversity of the co-existing paradigms, research and practice activities sometimes misinterpret or appropriate the concepts and methodologies of other paradigms (Judge et al., 2011). Some studies claim to adopt the socio-ecological systems framework to understand urban health, which requires a multi-dimensional, multi-directional, non-linear dynamic methodological approach, but apply methodologies that do not support this theoretical approach. They continue to apply traditional analytical methodologies that take reductionist, linear approaches that study the determinants of the phenomenon in a multifaceted framework, but not necessarily in a socio-ecological framework (Bickford et al., 2015). Similarly, some activities position their approach as a systems model, but the adopted solutions target behaviour at the individual level and ignore the elements of the urban built environment (Collins et al., 2011). In other cases, methodologies developed for community empowerment and social transformation, such as the photovoice methodology, are hampered by
3.1. Urban health paradigms and the policy process

Contrary to the beliefs of the urban health science paradigms, strong statistical associations between urban environments and health do not always guarantee policy change. Ironically, the more factors that are scientifically proven to be involved in the causal network, the less power the evidence has in bringing policy change (Bates, 1997). A complex relationship with many confirmed contributing elements diffuse responsibilities across sectors, making it easier to place the responsibility for health on the individual, as in the view of the medical-industrial city paradigm. Even if a robust, valid and reliable association is confirmed, there are often multiple potential entry points for intervention within the web of relationships even if there is a single responsible sector. In this sense, the healthy built environment paradigms may have work, as it places responsibility on a specific subsystem, the urban planning sector. The health social movement paradigm, on the other hand, acknowledges the potential of causal evidence to mobilise people to form alliances for policy change. There are different levels of policy change ranging from, for instance, a minor, incremental change to a policy that maximises the outcomes of the overarching goals, to a major change involving a radical shift in policy goals, priorities and policy instruments. If one paradigm remains in control of the policy subsystem, a major policy shift is unlikely to occur without a significant policy failure (Kilby, 1995; Jenkins-Smith et al., 2018). Therefore, in many cases, targeting incremental change may be an effective strategy for bringing urban policy change for better health. This can be achieved by appealing to the belief systems of the policy actors involved in the policy subsystem. To do so, policy actors need to be aware of not only their own foundational beliefs and worldviews on urban health but also those of others.

The four urban health paradigms described in this paper offer a framework to identify and understand the foundational positions of policy actors. Each of these urban health paradigms supports a set of policy ideas. However, the specific ideas on their own do not have the power to influence change; rather, they need to be framed within the conceptual understanding of others to gain support (Bates, 1997). Our description of the urban health paradigms can be used to identify policy actors who share the same deep core beliefs and search for opportunities for transdisciplinary collaboration across the different methodological and instrumental beliefs.

3.2. Transdisciplinary research

One element all paradigms seem to agree on is that urban health requires cross-disciplinary collaborations. The issues and solutions concerning urban health go beyond the scope of a singular field or sector, but transdisciplinary collaboration is seen more as a vision than an actual practice. Many have referred to the lack of common understanding as a barrier to enabling collaboration along with the disciplinary silos and boundaries, institutional and organisational arrangements, and lack of common goals, vision and political will (Lipp et al., 2013). Sharing a common understanding or language cannot be achieved without first respecting the differences of other paradigms and traditions. Articulating paradigms would help bridge some of this gap. By understanding the underlying conceptual differences, researchers and practitioners can see more clearly the similarities and differences in the definition, scope and vision of an issue of common interest. This understanding leads to being able to speak others' language or at least being able to relate other languages to one's own. Moreover, when researchers and practitioners understand the underlying paradigmatic assumptions, they can interpret objectives and their research produced under different paradigmatic frameworks. This further enables researchers and practitioners to link knowledge and information across paradigms. Without this, urban health will continue to resort to multidisciplinary or interdisciplinary approaches where collaboration is based only on commonalities.

4. Strengths, limitations and future research directions

Although this work builds on the previous work by Forsyth (2020) and her classification of healthy places, to our knowledge, this is the first attempt to articulate contrasting paradigms that appear in the research and practice of the interface between urban environments and human health. More importantly, this paradigmatic framework is a direct response to a critical challenge of cross-disciplinary collaboration that researchers and practitioners face. Working with actors from diverse traditions and sectors inevitably involves encountering a diverse range of ideas on what a healthy city would look like and the way to get there. This framework is an attempt to articulate these multiple views. This paradigmatic framework assists scholars and experts who are already in the field to position their work within the framework, reconsider their paradigmatic orientation and critically reflect on views from other paradigms to strengthen their practice. It can also serve as a compass to students, researchers and practitioners who are new to this topic area.

As previously argued in this paper, research and practice concerning urban health should strive to be a transdisciplinary field of research and practice. Articulating different paradigms allows participants to learn the languages, norms and cultures of other disciplines and traditions, rather than be an opportunity to哧ulte consensus on a universal, unifying or a fundamental language. Nonetheless, this typology raises the risk of over-simplifying the complexity of urban health and its research and practice. Because our search for the paradigms started from the urban planning and public health disciplines, we are aware that we may have overlooked paradigms in other disciplines including urban governance and politics, development studies, community studies, sociology, political studies and geography. In our typology, the processes and mechanisms through which the four paradigms interact and translate to policy ideas and beliefs in policy making remain unclear. A political lens to examine the beliefs regarding the locus of power, mechanisms for policy change, equity, the broader external and global forces such as neoliberalism, climate crisis and pandemics would contribute to further understanding the paradigmatic positions concerning the policy process.

As this paper introduces an initial conceptual framework to identify different paradigms applied to urban health, subsequent studies to validate or challenge our typology are critical. We invite scholars and practitioners in the field to verify, correct errors, contest, strengthen, identify missing gaps and correct the inaccuracies in our typology. Furthermore, empirical and systematic reviews that investigate how each of the core concepts is defined and applied in each paradigm would provide detailed information on the commonalities and conflicts between the paradigms. For example, a comprehensive meta-narrative review is one such study methodology that can be applied to articulate the marginal differences of the paradigms and may help to resolve any conflicts (Kim et al., 2021).
methodological belief systems. In this paper, we identify four paradigms – medical-industrial, urban health science, healthy built environments and health social movement – that are observed in the current research and practice in the field of urban health. Because these paradigms comprise different assumptions about urban health and subsequently ask different questions, an attempt to find the 'best’ approach to seek consensus among the paradigms would be invalid. In a trans-disciplinary field such as urban health, instead of searching for unity and consensus with a focus on the overlapping commonalities among the paradigms, researchers and practitioners should seek to understand the paradigms that occur in the non-overlapping aspects of the paradigms. Articulating the conflicts would assist researchers and practitioners to seek coherence in the interpretation and application of the knowledge, methodologies, and solutions produced by different paradigms to improve urban health.

Author statement

We confirm that this manuscript is original, has not been published before and is not currently being considered for publication elsewhere.

We confirm that the manuscript has been read and approved by all named authors and that there are no other persons who satisfied the criteria for authorship but are not listed.

Conflict of interest statement

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References


2.2 Summary and implications

2.2.1 Contribution to overall research aims and questions

The findings from this Chapter respond to the first objective of this thesis, to identify and articulate differing ontological perspectives on urban health. I have identified four urban health paradigms – the medical-industrial city, urban health science, healthy built environments, health social movement paradigms.

2.2.2 Implications for theory and practice

Using the concept of paradigms and differentiating differing ontological perspectives based on their conceptual, theoretical, methodological and instrumental dimensions is a valuable tool for categorising the differing approaches to urban health. The subsequently identified four urban health paradigms can be used to seek opportunities for communication and collaboration among actors from different backgrounds.

Over the course of my PhD, I have applied this framework on multiple occasions to not only identify the varying perspectives on urban health held by participants, but also to explore ways in which we can establish connections and bridge the gaps between these different viewpoints. The presentations and workshops where I have utilised this framework are listed in Appendix A of this thesis. Utilising this framework as a means of facilitating communication among collaborators shows promise as a practical application of this conceptual framework.

2.2.3 Remaining questions and link to next publication

The findings presented in this Chapter were the result of an iterative process of discovery, in which I engaged in critical and reflexive analysis through discussions with my supervisors and numerous peers who are experts in urban health. One limitation of this framework is that the scope of the urban health paradigms remains confined within the fields of urban planning and public health.
While the work demonstrates conceptual rigor in categorising urban health paradigms, empirical validation is still necessary. In Chapters Three and Four, I apply an empirical method to identifying and articulating ontological perspectives on urban health, namely by applying a meta-narrative approach to systematic literature review. To expand the scope of the literature beyond urban planning and public health, I conducted the search for urban health literature using a multidisciplinary database. The search terms were developed iteratively, and subsequent search terms were informed by the results of the previous search.

The insights obtained from this chapter, in conjunction with the findings from Chapter Four, served as the basis for the analysis conducted in the case study presented in Chapter Five.
Chapter 3: Protocol for a Meta-Narrative Review on Urban Health Research Traditions

Objective 1. Identifying and articulating different ontological perspectives on urban health

Objective 2. Implications of differing urban health ontological perspectives

Chapter 1: Introduction

Chapter 2: Four Urban Health Paradigms

Chapter 3: Protocol for a Meta-Narrative Review

Chapter 4: Five Urban Health Research Traditions: A Meta-Narrative Review

Chapter 5: Ontological Foundations of Urban Health Policy Ideas: The Case of Planning Sydney's Western Parkland City

Chapter 6: Discussion & Conclusion
Chapters Three and Four present the protocol (Chapter Three) and report (Chapter Four) of the meta-narrative review of the urban health scholarship. The meta-narrative review component of this thesis is an empirical examination of the heterogeneity of research traditions that study urban health. In this meta-narrative review, I aim to identify the different contemporary urban health paradigms that academics apply in research and articulate the characteristics in the conceptualisation, theoretical frameworks, methodological approaches and instrumental solutions to urban health issues. The unit of analysis is the different approaches, or paradigms, adopted by authors to urban health research and the data source for investigation is the scholarly body of literature.

In this chapter, I present the protocol for conducting the meta-narrative review of the urban health scholarly literature, which was also registered in Open Science Framework and published in a peer-reviewed journal. These efforts were made not only to establish transparency and rigour of the methods, but also to record the review process, to promote collaboration, and to improve visibility of the research.

The protocol of the meta-narrative review in this chapter is presented in the format and structure, without any edits, of the following publication:


### 3.1 The publication
Protocol for a meta-narrative review on research paradigms addressing the urban built environment and human health

Jinhee Kim1,2, Ben Harris-Roxas1, Evelyne de Leeuw1,2, David Lilley1,2, Alana Crimeen1,2 and Peter Sainsbury3

Abstract

Background: Urban health is a field of research and practice that has attracted the interest of various disciplines. While it is encouraged for diverse disciplines to contribute to a multidisciplinary field of study such as urban health, this often results in tensions, conflicts or competition between the different traditions that stem from different epistemological backgrounds. This meta-narrative review aims to identify and describe the multiple paradigms and articulate the underlying epistemological, ontological, methodological, and aetiological differences in their approaches. Articulating the paradigms not only contributes to the advancement of research, but also provides a framework for understanding the different policy beliefs and ideas policy actors hold and apply in the policy process.

Methods: We apply the meta-narrative method to systematic literature review which includes the following six iterative phases. The planning phase includes the finalisation of the review protocol and assembly of review team. The search phase includes a comprehensive literature search in key databases and a double-sided systematic snowballing method. We will search multidisciplinary databases including Web of Science, Scopus and ProQuest, and topic-specific databases including Urban Studies Abstracts (BSRSO), MEDLINE, and EMBASE from their inception onwards. Bibliometric analyses of this literature will be used to triangulate the mapping of the paradigms. The mapping phase includes identifying the dominant paradigms and landmark publications through agreement with the review team. In the appraisal phase, the literature will be assessed by their respective quality standards, followed by data extraction to identify the individual narratives in the conceptual, theoretical, methodological, and instrumental dimensions of each paradigm. The synthesis phase will review the data to compare and contrast and identify the overarching meta-narratives. The recommendation phase will include dissemination of the findings from the review.

Discussion: The meta-narrative review will reveal the how the different paradigms conceptualise, frame and prioritise urban health issues; their preferred methodologies to study the phenomenon, and the nature of the solutions to improve human health. This review will assist researchers and practitioners in understanding and interpreting evidence produced by other traditions that study urban health. Through this, urban health researchers and practitioners will be able to seek coherence in understanding, explaining, and exploring the urban health phenomenon.
Background
The research and practice of urban health involves contributions from multiple disciplines, sectors, and trades that represent different aspects of urban health phenomena. Each discipline, sector or trade has a role in the complex interplay between the urban built environment and its relationship to health and health equity impacts. While it is encouraged for actors from diverse backgrounds to contribute to a multidisciplinary field of study such as urban health, collaboration efforts sometimes result in tensions, conflicts, and competition. This is because disciplines and sectors have historically evolved in silos and branched out as specialisations that have developed different standards of ‘normal science’, or practices or empirical approaches that members of a certain discipline or sector take for granted [1]. The different standards are strongly rooted in the epistemological, ontological, methodological, and axiological definitions of urban health of the diverse disciplines that often act as barriers to meaningful interdisciplinary or intersectoral collaboration [2–4].
These positions are defined as paradigms, or particular frameworks that researchers apply to understand the complexity of the real world. In a given paradigm, a distinct set of concepts and practices provide a common framework for addressing problems and solutions [1]. The set of concepts of a paradigm defines what is regarded as important issues that require attention in urban health and which study designs and methods are the best ways to produce the required knowledge. Therefore, a group of researchers and practitioners that belong to a paradigm share a set of rules and standards that are self-evident but are incommensurable with other paradigms. That is, empirical findings that were produced using one set of concepts, theories, methods, and instruments may not only be inapplicable to issues seen important in other paradigms but unacceptable to the followers of a different paradigmatic lens.
In our preliminary review of the literature, we identify four prominent paradigms in the study and policies that address the impact of the urban built environment on human health. The approaches of the ‘medical-industrial city’ paradigm focus on the development of healthcare facilities as a key urban planning project in the city or the application of technology to the urban infrastructure to monitor or change disease, risk factors, and behaviours of individuals. The ‘urban health science’ paradigm applies epidemiological and complex systems analyses to urban health issues. Here, conclusive empirical data and analyses that confirm the causal relationships between the urban built environment and human health outcomes is prioritised and is used as evidence to develop effective interventions and policies. The ‘healthy built environment’ paradigm originates from the urban planning discipline and advocates for the integration of health in the practice of spatial planning of cities. The ‘health social movement’ paradigm seeks to integrate health considerations into all aspects of urban governance, with an emphasis on operationalising values such as health equity and empowerment. This typology has been developed from an earlier version in which we had identified the latter three paradigms [5].
Other studies have similarly confirmed the co-existence of multiple approaches in this field. From the articles retrieved via a search in PubMed/MEDLINE of the MeSH term “urban health”, Jia et al. [6] identified four distinct categories of urban health research as physical environment, health impacts, social environments and interventions. Forsyth [7] identified three conceptually distinct categories of healthy places approaches, i.e. basic, healthy places (developing a physical and/or institutional structure supportive of health), population-based lenses (focus on population groups with health vulnerabilities and wide relevance), and technology-focused places (harnessing innovative technology to create a healthy economy and/or assist in health monitoring and promotion).
In contrast to the distinctions in subject matter made by the above authors, our emphasis is on identifying and describing the multiple paradigms and articulating the underlying epistemological, ontological, methodological, and axiological differences in their approaches. This is particularly important for the field of urban health because maximising health gains cannot be effectively achieved by merely working within the common intersecting areas of specific disciplines and sectors. Urban health is a multidisciplinary field of research and practice that requires more attention and understanding in the non-overlapping areas. This meta-narrative review attempts to study how the topic of the urban built environment and human health has been differently conceptualised and researched by different traditions.
Articulating the paradigms not only contributes to the advancement of research, but also provides a framework for understanding the different policy beliefs and ideas.
policy actors hold and apply in the policy process. Ideas are organised into policy paradigms which sometimes have the power to induce changes to the institutional routines [4]. Moreover, understanding the key dimensions of the different urban health paradigms can help to prevent answering the research question correctly but forming a wrong interpretation or response [9].

For the purpose of this study, we limit the scope of the urban health phenomenon to approaches in research and practice that address the issues concerned with the impact of the urban built environment on human health in cities or urban areas. In this meta-narrative review, we aim to identify the different contemporary urban health paradigms and articulate the characteristics in their conceptualisation, theoretical framework, methodological approaches and instrumental solutions to urban health issues. The units of analysis are the different urban health paradigms and publications are the data source to examine their characteristics.

The primary research question of this review is: What are the dominant paradigms in research and practice on the issue of the urban physical environment and its impact on human health? Secondary research questions involve identifying the characteristics typical of each paradigm, such as (a) What are the important objects of study in each paradigm? (b) How are urban built environments and their impact on human health conceptualised? (c) Which methodological approaches are preferred? (d) What is the nature of the policy solutions?

Methods/design
To understand the heterogeneity of research traditions that study urban health, we apply the meta-narrative approach to systematic literature review. A meta-narrative review is a type of systematic literature review that is designed for topic areas that are researched by diverse research traditions, with different conceptualisations and methodologies [10–13]. Through an explicit, rigorous, and transparent process, meta-narrative reviews identify, articulate, synthesise, and interpret a diverse body of literature in a topic area [11, 14, 15]. In this review, we will systematically collect and analyse the literature that addresses the issues concerning the impact of urban built environments on human health and seek to make sense of the complex and contested knowledge in this topic area.

The protocol for this review was developed in accordance with the RAMESES (Realist And MEta-narrative Evidence Syntheses: Evolving Standards) publication standards [15] and quality criteria suggested in the associated meta-narrative review training materials [14]. Because meta-narrative reviews are different from traditional systematic literature reviews that they are designed to reflect the heterogeneity of the research methodologies, the protocol is not fully compatible with the Preferred Reporting Items for Systematic Review and Meta-Analysis Protocol (PRISMA-P) guidelines. Nevertheless, we have populated the PRISMA-P checklist as it still provides critical value to the systematic review process (Additional file 1). This study protocol has been registered within the Open Science Framework (registration number: https://osf.io/nnnyv).

The six guiding principles of the meta-narrative review [15] are integrated into the review process as articulated below (Table 1).

The methods section of this protocol is presented according to the six phases of a meta-narrative review recommended by the RAMESES publication guideline [15].

Planning phase
A review team, consisting of the authors of this protocol, developed the research questions and drafted the protocol. Knowledge users, defined as the broader network of researchers and practitioners in the field of urban health, will be approached to serve as external expert panel members for the review and will be consulted if additional assistance is needed.

Information sources and search strategy
Search strategy
The main objective of the search is to collect a comprehensive list of the literature on the topic area to capture the diversity of the urban health research traditions and paradigms. The publications will serve as the primary data source to analyse the meta-narratives of each paradigm. The balance between comprehensiveness and precision of the search is resolved by applying the concept of saturation as the criterion, a concept borrowed from qualitative research methods. Saturation is achieved when no new insights are generated by collecting additional data. Because this review is a ‘knowledge-building and theory-generating’ type of systematic review, there is no intrinsic value in continuing the search unless there is additional theoretical contribution [16]. This is in contrast to those reviews which study the aggregation or summation of concepts, where ‘the more the better’ approach is preferred. The attainment of saturation will be determined at the appraisal or synthesis phase when the review team observes a conceptual saturation of the findings from the identified literature, and decides that the addition of unidentified studies will only contribute to marginal changes to the findings [17–19].

The search will take three main strategies—(a) a double-sided snowballing search, (b) a search in electronic
Table 1: Meta-narrative review principles and applications

<table>
<thead>
<tr>
<th>Principle</th>
<th>Definition</th>
<th>Application in this review</th>
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<tr>
<td>Pragmatism</td>
<td>The review should address what will be most useful to the intended audience</td>
<td>The objective of this review is to understand the main paradigms in urban health, in a transdisciplinary field of research and practice, articulating the non-developing characteristics of different paradigms to attain coherence and collaboration across disciplines, sectors, and paradigms.</td>
</tr>
<tr>
<td>Pluralism</td>
<td>The topic should be illuminated from multiple angles and perspectives</td>
<td>We explore the current knowledge base in various disciplines, including public health, urban planning, local/broad governance, and urban studies. A list of relevant disciplines and journals will be drafted to utilize for the hand selecting of literature to avoid any exclusion of disciplines.</td>
</tr>
<tr>
<td>Historicity</td>
<td>The deepest understanding of a topic comes from studying its evolution over time</td>
<td>The genealogy and clusters of the literature will be analyzed using bibliometric methods. Map the documents will be recorded and traced to study the evolution of the paradigms.</td>
</tr>
<tr>
<td>Contestation</td>
<td>Conflicting data from different research traditions should be examined to generate higher-order insights</td>
<td>Differences between the conceptualization of urban health, causal pathways, methodological approaches, and policy solutions will be highlighted. Details on the application of this principle will be explored further in the data extraction, analysis, and synthesis phases.</td>
</tr>
<tr>
<td>Reflexivity</td>
<td>Reviewers should continually reflect on the emerging findings</td>
<td>The protocol will be updated to reflect the changes to the process as findings emerge. Any changes made to the review that were initially planned will be described and justified in the final report.</td>
</tr>
<tr>
<td>Peer review</td>
<td>Emerging findings should be presented and discussed within an external audience</td>
<td>The emerging findings will be communicated with peers via individual consultations with experts and presentations at conferences and meetings. A website will be developed as a platform for the wider community to engage in the process as well as for dissemination of the findings.</td>
</tr>
</tbody>
</table>

... continues below...

... databases using search terms, and (c) an additional hand search. The double-sided snowballing search will include a forward search of all papers that cite the landmark works identified in the mapping phase, and a backward search that collects the literature included in the reference lists of these papers [30]. A search using keyword search terms will be conducted in relevant multidisciplinary scientific databases (e.g., Web of Science (Science and Social Sciences Citation Index), Scopus, ProQuest) and topic-specific databases (e.g., Urban Studies Abstracts—EBSCO, Medline—Ovid, Embase Ovid). The search terms will include those related to city (city) OR cities (city) OR urban (urban) OR local (local) OR local (municipal) combined with concepts on the built environment (built environment) OR physical environment OR infrastructure OR planning OR design) and search terms related to health and health equity. A draft search strategy for Web of Science that has been reviewed by an information specialist is available in Additional file 2. However, because we aim to perform a precise search that captures the diversity of the approaches on urban health rather than a sensitive or comprehensive one, the search terms and inclusion criteria need to remain flexible and porous. An additional hand search of key journals and publications by key organizations will be conducted to maximize comprehensiveness.

Selection process
The publications identified from these three strategies will be compiled in EndNote and exported to Covidence to be screened for inclusion in the review. Two reviewers will screen the title and abstract of each publication to decide inclusion in the review. Any disagreement will be resolved by consensus. Details of the inclusion criteria will be added and refined as the reviewers proceed with the screening. It is also expected that the search strategy will be iteratively revised by the paradigms identified in the mapping phase.

Eligibility criteria
Publications to be included in the review will be limited by language (English) and publication types (journal articles, reviews, books, book chapters, editorial and opinion pieces, and reports). All study designs, including empirical (e.g., observational studies, quantitative studies, mixed methods) and non-empirical studies (e.g., reviews, conceptual papers) in all publication years will be considered for inclusion. The topic of the paper must explicitly focus on urban human-constructed physical environments and human health at the city or urban scale and must address one or more of the conceptual, theoretical, methodological or instrumental dimensions on this topic. To be eligible for inclusion, a publication must address all three concepts—urban, built environment, and health. The
topic of the publication must address the interface of the built environment and human health at the "urban" scale that includes cities in terms of size, population, density, level of government, administration, and urban morphological features. "Built environment" includes the physical human-made morphological features of urban areas such as infrastructure, buildings, streets, and the systems processes that shape the decision-making such as urban planning policies and processes. The concept of "human health" not only includes the health behaviours and health outcomes of individuals and communities, but broader concepts such as health equity, livability, resilience, and sustainability at the urban scale.

Mapping phase
Mapping urban health paradigms and defining parameters
As mentioned earlier, we start with four paradigms on urban health—the medical-industrial city, urban health science, healthy built environments and health social movement—as the initial paradigms for this review (Table 2). These four paradigms explicitly address the relationship between the urban built environment and human health, and each has a set of conceptual, theoretical, methodological, and instrumental dimensions. Findings from the search and discussions with the wider expert community may introduce additional paradigms to the review. For example, there may be additional paradigms in the fields of environmental health, spatial justice, or civil engineering which were not covered in our initial mapping. Alternatively, the initial paradigms may merge or subdivide as more information is added from the review process.

In the mapping phase, we will develop a set of parameters for each paradigm. For example, we will define the characteristics of each paradigm based on their definitions of urban health, the theoretical frameworks that explain the relationship between urban physical environments and health, the methodologies to research (e.g., what is counted as knowledge, evidence) and the solutions such as the policies, strategies, and practices to improve urban health. In particular, we will include the concepts of health equity and the consideration of power in decision-making in reviewing the parameters. These parameters will be used as a guide to search for data on the dimensions of the multiple paradigms in each publication. We will apply the set of parameters to assign each piece of an included publication to its corresponding paradigm(s). To ensure high inter-coder reliability, the review team will first code a small sample of the publications and any conflicts or disagreement will be examined and discussed. Any disagreement will be resolved by consensus within the review team.

Bibliometric analysis to visualise network and clusters
A supplementary bibliometric analysis using the dataset of the final set of articles will be conducted to map the genealogy of citations and conduct a social network analysis of the authors [21]. Co-authorship and document co-citation network analysis will visualise clusters of researchers and relationships between publications that provide information on research groups, themes, and the overall scientific landscape. Co-authorship networks are based on the frequency of authors who co-author a publication while a document co-citation relationship occurs when two publications are cited by a third publication. Clusters of a close co-citation relationship can be interpreted as belonging to the same "research front" [22]. These visualisation data will provide information to triangulate the different paradigms and research traditions.

Identifying landmark works
The mapping phase includes identifying landmark works that formed the foundation for the paradigms and are recognised by scholars in the field as highly influential in shaping subsequent research and practice [11]. They can be conceptual papers or reports, or empirical studies that formed a model for future work in the paradigm. We will triangulate this with the citation metrics data and the findings from the bibliometric network analysis.

The following inclusion criteria will be applied to identify the landmark sources [11]:

1. Is the paper part of a recognised paradigm, that is, does it draw critically and comprehensively upon an existing body of scientific knowledge and attempt to further that body of knowledge?

<table>
<thead>
<tr>
<th>Table 2 Four initial urban health paradigms</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Medical-industrial city</strong></td>
</tr>
<tr>
<td>Main concept and scope</td>
</tr>
<tr>
<td>The healthcare industry is a major driver for urban growth and development.</td>
</tr>
<tr>
<td>Related disciplines and fields</td>
</tr>
<tr>
<td>Urban, planning, development, economics</td>
</tr>
</tbody>
</table>
2. Does the paper make an original and scholarly contribution to research and practice into the topic area?
3. Has the paper subsequently been cited as a landmark contribution (conceptual, theoretical, methodological or instrumental) by competent research and practice in that tradition?
4. Is the paper an exemplar of a recognised paradigm and its parameters?

The review team will independently score and nominate landmark sources according to the above criteria. Discussions will be held with external experts to attain consensus.

**Appraisal phase**
In the appraisal phase, we will extract data from selected publications by coding the conceptual, theoretical, methodological and instrumental concepts. The main outputs from this phase include a codebook with the descriptions of the codes, an NVivo project with coded data of the included literature, development of the quality assessment criteria for each paradigm and the quality assessment of the literature.

**Data extraction**
First, a code system (or a data extraction template) will be developed based on the parameters of the paradigms developed in the mapping phase. The code system and data extraction template will include the following:

- Bibliometric meta data (e.g. author, publication year, title, type of publication)
- Research questions and how they were framed, and conceptual and theoretical issues;
- Preferred methodologies, study designs, and quality criteria;
- Key actors (e.g. leading scientists or commentators) and events (e.g. conferences) in the unfolding of the tradition;
- Landmark empirical or theoretical studies;
- Significant findings and how they shaped subsequent work;
- Key debates and areas of dispute within the tradition, including links with or breaches from other traditions;
- Characteristics in cross-disciplinary approaches (interdisciplinary, multidisciplinary or transdisciplinary).

Details of the coding system will be determined by the review team. Whether data extraction will be based on the abstract or the full-text will be determined at a later time, after the review team learns more about the body of literature. We will use the NVivo qualitative data analysis software to efficiently organise the data. Using NVivo software for qualitative coding will also allow us to refer back to the original data and transparently track the collaborative process. The reviewers will independently extract data and the coded data will be examined to ensure inter-coder reliability. All data will be stored in the approved research data storage system provided by the lead author’s institution and handled in accordance with the institution’s data management standards and guidelines.

**Quality and risk assessment**
It is an inherent property of paradigms that each will endorse a different set of standards for assessing the quality and risk of bias of studies. Criteria to assess the quality and risk of bias will be taken from the paradigms included in the review, particularly from the landmark papers that have been accepted by the paradigm as authoritative. The publications, now classified to one or more paradigm, will be assessed against the corresponding quality criteria. The included publications will be critically appraised for methodological quality using the Mixed Methods Appraisal Tool (MMAT) [23] for peer-reviewed journal articles and the AACODS (Authorship, Accuracy, Coverage, Objectivity, Date, Significance) Checklist [24] for grey literature. To ensure consistency, all reviewers will discuss the applicability of MMAT and AACODS tools and assess a sample of full-text publications. Publications not included in the sample will be independently assessed by two reviewers. If all reviewers agree, publications that have been assessed as low quality may be excluded from the analysis.

**Synthesis phase**

**Building the meta-narratives of each paradigm**
Synthesis involves comparing and contrasting the meta-narratives among the different paradigms to identify and compare how they have conceptualised the topic, how they have theorised it, and the methodological approaches and study designs used. To achieve this, each publication will be coded for the urban health sub-topics that the study addresses, concepts and theories the study is grounded in, methodologies, and key findings. The coded data will be checked by a second reviewer to attain consistency. The reviewers will iteratively search for patterns in the analysis, based on the four urban health paradigms that were identified in the preliminary literature review. The data will be analysed and categorised into thematic groups to present the individual accounts of the urban health issue, terminologies, definition of key concepts, theories on the causal pathways, preferred methods and key empirical findings of each group. This
categorisation will be compared with the bibliometric network patterns. The findings will be discussed and agreed by all reviewers.

**Comparing meta-narratives across paradigms**

The purpose of comparing the meta-narratives across paradigms is not intended to develop a single theory, but rather, to highlight the diversity and articulate the commonalities and differences. Therefore, synthesis across paradigms may occur at a high level of abstraction and may involve one or more of the following [15]:

- Paradigm bridging (seeking commonalities in conceptual and theoretical assumptions)
- Paradigm bracketing (highlighting differences in these assumptions)
- Interplay (exploring tensions)
- Meta-theorizing (exploring patterns that span conflicting understandings)

Through a series of workshops, reviewers will iteratively compare the meta-narrative developed for each paradigm against the conceptual, theoretical, methodological and instrumental dimensions that define a paradigm. The key questions we will ask in this phase include:

1. What is the range of questions the paradigms address across the four dimensions?
2. What are the commonalities and conflicts of research findings across the paradigms and how can the discrepancies be explained?
3. What are the overall key findings and implications?
4. What are the main gaps and where should future research be directed?

**Recommendation phase**

The final phase of the review includes drafting the final report with key messages and recommendations for practice, policy, and further research. The final report will be developed through reflection and discussions with the review team and feedback from the wider urban health epistemological community. Reporting will be in compliance with the RAMESES publication standards [15]. Any changes made to the protocol will be documented in the final review report.

**Discussion**

To our knowledge, there has not been a comprehensive search of the literature that identifies the different approaches to urban health issues and their solutions. By systematically reviewing the literature, we will be able to identify the different paradigms within which researchers and policy actors address urban health issues and develop a comprehensive map of the field. Paradigms are not only relevant in research and science, but also have a fundamental role in forming the policy ideas and beliefs of the actors involved in the policy process [8, 25–28]. The findings from this review will contribute to highlighting conflicting evidence between the paradigms and finding gaps in the approaches. Detailed articulation of the paradigms will facilitate communication and knowledge transfer between previously incommensurable paradigms.

Since this meta-narrative review is iterative by nature, we expect the protocol to continually evolve and reflect the emerging findings and feedback from the wider epistemological community. Any amendments made to this protocol when conducting the study will be outlined and justified in the final report of this meta-narrative review.

A dissemination strategy will be developed to further communicate with the broader knowledge user community. Components of the review (e.g., the protocol, methodology, meta-narrative review findings) will be reported through publications in peer-reviewed academic journal publications, conference presentations, interactions with potential knowledge users. Presenting the findings of the review over the various stages will provide a form of triangulation to ensure the validity of the review and address some of the issues occurring from meta-biases such as publication bias or selective reporting. The team will further identify a broad range of potential knowledge users and stakeholders and develop innovative strategies to effectively communicate with them.

In the development of this protocol, we adhered to the RAMESES publication guideline and its quality standards [15]. However, in some cases, we found that the meta-narrative approach that we apply in our review is not completely compatible with the required reporting templates for systematic reviews such as PRISMEP, the International Prospective Register of Systematic Reviews, or the Preferred Reporting Items for Systematic Review and Meta-Analysis Protocol (PRISMA-P). For example, because the units of analysis of a meta-narrative review are paradigms, it is not appropriate to identify the PICO elements—Participants, Intervention, Comparison, Outcomes—which are elements typical of systematic reviews that study the effectiveness of interventions often in clinical settings. Also, because the execution of meta-narrative reviews is iterative by nature, that is, findings from a subsequent phase will often provide information about or for a previous phase, these processes are often challenging to describe in the templates that were designed for a more linear process. Similarly, as we plan to take a reflective and interpretive approach by presenting our preliminary findings to other colleagues within the broader urban health research community for their feedback throughout the different stages of the review, these iterative and interpretive characteristics were not
effectively captured in the PROSPERO or PRISMA-P reporting guidelines. Lastly, because meta-narrative reviews include studies across different paradigms and study designs, the criteria applied to assess the studies must inevitably be selected according to the standards of each paradigm and research tradition.

In summary, this meta-narrative review will reveal how the different paradigms conceptualise, frame and prioritise urban health issues, their preferred methodologies to study the phenomenon, and the nature of the solutions to improve human health. The findings from the review will assist researchers and practitioners in understanding and interpreting evidence produced by paradigms other than their own that study urban health. Through this, urban health researchers and practitioners will be able to seek coherence in understanding, explaining, and exploring the urban health phenomenon.

References


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3.2 Summary and implications

3.2.1 Contribution to overall research aims and questions

In this Chapter, I have established why the meta-narrative review was the appropriate method for mapping urban health research paradigms in scholarly literature and how I conducted the review. This Chapter responds in part to the first objective of identifying and articulating urban health ontological perspectives.

3.2.2 Implications for theory and practice

Meta-narrative reviews have a potential to broaden our understanding of research topics that attract multidisciplinary participation, but they are currently underutilised or sometimes misused. Meta-narrative reviews can offer insights on the non-overlapping areas between disciplines and traditions, enabling us to embrace evidence produced by multiple paradigms rather than excluding them because they are incompatible with a certain perspective. The interest in meta-narrative reviews is growing, spurred by the proliferation of publications and technological advancements that facilitate meta-narrative reviews. Researchers can utilise a wide range of search tools and strategies, bibliometric analysis methods, and other data management and process tools to conduct meta-narrative reviews.

In particular, this study's approach to meta-narrative review contributes to methodological advancement by employing co-citation network analysis as the core component to map research traditions in urban health studies and select publications for comparing different traditions. Researchers designing meta-narrative reviews can follow and expand on the process outlined in this thesis as a guideline for using bibliometric analytical methods.

3.2.3 Remaining questions and link to next publication

The findings of the meta-narrative review on urban health research traditions, which was conducted according to the protocol in this Chapter, is reported in Chapter Four. All amendments made during the study to the protocol are documented in Chapter Four.
Chapter 4:
FIVE URBAN HEALTH RESEARCH TRADITIONS: A META-NARRATIVE REVIEW
Chapter Four presents the findings from the meta-narrative review of the urban health scholarship. Five urban health research traditions were identified as: 1) sustainable urban development; 2) urban ecosystem services; 3) urban resilience; 4) healthy urban planning; and 5) urban green spaces.

This chapter adheres to the RAMESES guidelines for reporting a meta-narrative review (Wong et al., 2013). It begins with an introduction that outlines the purpose and rationale for the review. The methods used in the review, along with any modifications to the protocol, are then presented. The findings of the bibliometric analysis are described in detail, with a focus on the five urban health research traditions that were identified. In addition, I analyse these traditions from the perspective of system complicatedness-complexity, the preferred locus of change in structure or agency, and the individual to planetary scale of study. The chapter concludes with a discussion of the implications of this review.

Sections 4.1-4.6 and 4.8-4.9 of this chapter are presented in the same format and structure, without any edits, as the following publication which has been submitted to a peer-reviewed journal:

• Kim J, Harris-Roxas, B, de Leeuw E & Sainsbury P. “Five urban health research paradigms: a meta-narrative review”, which is under review for publication in a peer-reviewed journal (Social Science & Medicine, under review).
Five urban health research traditions: a meta-narrative review

Jinhee Kim, Evelyne de Leeuw, Ben Harris-Roxas, Peter Sainsbury

4.1 Abstract

Urban health scholars explore the connection between the urban space and health through ontological perspectives that are shaped by their disciplinary traditions. Without explicit recognition of the different approaches, there are barriers to collaboration. This paper maps the terrain of the urban health scholarship to identify key urban health research traditions; and to articulate the main features distinguishing these different traditions. We apply a meta-narrative review guided by a bibliometric co-citation network analysis to the body of research on urban health retrieved from the Web of Science Core Collection. Five urban health research traditions were identified: (1) sustainable urban development, (2) urban ecosystem services, (3) urban resilience, (4) healthy urban planning, and (5) urban green spaces. Each research tradition has a different conceptual and thematic perspective to addressing urban health. These include perspectives on the scale of the urban health issue of interest, and on the conceptualisation of the urban context and health. Additionally, we developed a framework to allow for better differentiation between the differing research traditions based on (1) perspectives of the urban system as complicated or complex, (2) the preferred locus of change as a function of structure and agency and (3) the geographic scale of the urban health issue that is addressed. These dimensions have even deeper implications for transdisciplinary collaboration as they are underpinned by paradigmatic differences, rather than disciplinary differences. We conclude that it is essential for urban health researchers to reflect on the different urban health approaches and seek coherence by understanding their similarities and differences. Such endeavours are required to produce and interpret transdisciplinary knowledge for the goal of improving health by transforming urban systems.

4.2 Introduction

The modern city has evolved from a mere setting of health and disease analysis and intervention into a complex ecosystem of planning, development, and health service
delivery and the realisation of individual and community wellbeing aspirations (Corburn, 2009; de Leeuw, 2017a; Freestone & Wheeler, 2015; Lopez, 2017). ‘Urban health’ has become a discipline for scholars, activism for residents, a challenge for planners, and a policy domain for politicians.

The range of disciplines and sectors involved in urban health is vast, encompassing medicine and public health, planning and design, environmental studies, technology and engineering, governance and politics, among others. And despite the prevailing recognition that urban health research and practice requires collaboration across multiple sectors and levels (World Health Organization & UN-Habitat, 2016), actions seldom transcend disciplinary or sectoral boundaries. While intersectoral efforts are repeatedly proposed at global, national, and local levels, attaining effective collaboration for urban health remains an aspiration rather than a reality (de Leeuw, 2017b; Rantala et al., 2014; Siri & Geddes, 2022).

One fundamental reason why scholars and practitioners find it difficult to collaborate is because unique disciplinary and practice domain positions are based on deeper paradigmatic foundations (Kim et al., 2022; Lawrence, 2015, 2020). What is considered an important urban health issue from the view of one paradigm is different from what is regarded important in another. Also, preferred methodologies and the appreciation of particular types of data in investigating urban health issues are different depending on paradigmatic positions.

As a result, intersectoral collaborations in urban health research and actions remain in those intersections of shared paradigmatic positions (Lawrence & Gatzweiler, 2017; Ramadier, 2004). Rather than actively seeking to understand the differences of views that occur in the non-overlapping areas, intersectoral actions tend to focus more on the commonalities between different approaches. This intersectoral approach to urban health research and practice is not appropriate to fully address the comprehensive and complex nature of urban health issues. What is needed is a transdisciplinary approach through which scholars and practitioners need to find coherence in the production and interpretation of knowledge produced from multiple paradigms.
Transdisciplinary urban health scholars argue that one of the first steps to successful transdisciplinary research is through the explicit articulation of the multiple approaches (Ramadier, 2004). Articulation involves the unambiguous recognition of the different perspectives and understanding specifically how the perspectives are different. It is only then that researchers can start to make sense of the information that is generated by disciplines different to their own.

Previous studies have tried to identify and categorise different urban health approaches, definitions, methodologies, and solutions. Most of these typologies have remained within a subset of disciplinary sectors, mainly in public health and urban planning (Forsyth, 2020; Jia et al., 2014; Kim et al., 2022). These two disciplinary fields focus on the planning process and form of urban environments and their individual and community-level health impacts.

But the scope of urban health is broader than these two disciplines and involves other disciplines in natural and social sciences, and professional techniques and practices such as engineering, geography, environmental studies, governance, and public administration. Moreover, urban health issues connect to broader ecological and planetary levels, and these have reciprocal impacts. While it may be impossible to comprehensively map all of the existing approaches to urban health, there is considerable need to scope the inquiry more broadly and explore a wide range of relevant disciplines. For example, in the broader planning literature, concepts such as sustainability, resilience and other ecological concepts are considered in relation to the urban health discourse.

This review attempts to include those views beyond the scope of traditional public health and urban planning realms, and venture into other disciplines involved in urban health scholarship. The objectives of this review are to identify - a) which research traditions study urban health; and b) how the topic of urban health is conceptualised and researched similarly and differently across these urban health research traditions.

4.3 Methods

This study is a meta-narrative review of the urban health literature and applies bibliometric network analysis as a tool for mapping the key research clusters and selecting the
publications for inclusion in the review. The meta-narrative review style was developed by Greenhalgh et al. (2005) as a method of systematic literature review to investigate how different scientific communities research a common field of study. It has been applied to multidisciplinary topics mostly in the field of public health (Chughtai & Blanchet, 2017; Collins & Hayes, 2010; Jackson, 2003; MacLure et al., 2014; Masuda et al., 2008).

Mapping the research traditions of the study topic is an integral process of the meta-narrative review and can be executed in various ways. Among those different methods, bibliometric network analysis is an efficient and effective way to process a large body of literature and map the relationship between publications on a given topic area, identify its key research traditions and retrieve publications that have significant influence for each tradition (Boyack & Klavans, 2010; Linnenluecke et al., 2020; Small, 2003). Although guidelines and protocols have been developed for meta-narrative review (Greenhalgh et al., 2011; Wong et al., 2013), adaptations to the process have been encouraged provided that they are appropriately justified and explained (Greenhalgh et al., 2005; Wong et al., 2013).

For this review, we used document co-citation analysis, a type of bibliometric analysis, to map the landscape of urban health research. A co-citation relationship occurs when two papers are cited in the same publication. In other words, all papers that have been cited in a single publication have co-citation relationships with all the other citations. Of the co-cited pairs, some pairs are co-cited in other publications more frequently than other pairs. In this case, we can assume these papers belong to a similar ‘research front’, or research tradition, a concept that reflects the core developments in a particular area of study (Boyack & Klavans, 2010). Co-citation behaviour indicates that these references are recognised by peers within the same research front as important pieces of work (Small, 2003). Therefore, document co-citation network patterns allow us to not only identify clusters of publications that form a common research tradition, but also retrieve those publications that are recognised as significant pieces of work within those clusters.

A rigorous meta-narrative review is predicated on solid justifications and boundaries in the protocol that drives the research. Protocol registration and open access assure transparency and accountability. The protocol of this review was developed in accordance with the standard 6-phase (planning-searching-mapping-appraisal-synthesis-recommendation)
sequence that was introduced by Greenhalgh et al. (2005). The original protocol for this study is registered within the Open Science Framework (OSF) (registration number: https://osf.io/tn8vk) and is published in a peer-reviewed journal (Kim et al., 2021).

4.3.1 Changes in the review process

As the review progressed, we became increasingly convinced of the potential of the bibliometric analysis as a powerful tool to map research traditions. However, we also became aware of the need to modify the overall design of the processes for searching, mapping and selecting publications:

- The relevant publications were selected based on the results from the document co-citation network analysis instead of screening for inclusion in a stepwise manner.
- The search of source material was conducted in a single database (Web of Science Core Collection) instead of in multiple databases (the rationale for this is further explained in the Searching the literature section).

4.3.2 Evidence of adherence to guiding principles of meta-narrative review

With these modifications, this review retains or, in most cases, strengthens the six principles of meta-narrative review. We have discussed compliance with the six principles previously in the protocol (Kim et al., 2021), and here we add some of the key features of each principle:

The 6 principles

- **Pragmatism**: The decisions on how to search, map and analyse the publications were made based on “what will be most useful to the intended audience”. The focus of this review was to provide the audience with an overview of the ontological perspectives of the different urban health approaches. This purpose guided the decisions made throughout all stages of the review.
- **Pluralism**: To capture publications that come from broader urban health perspectives, we developed and applied search terms that reflect multiple
views on urban health. Moreover, to reflect the diversity of the studies in their conceptualisation of urban health and their methodologies, we did not impose an a priori coding framework in analysing the publications and applied an iterative analytical method that was guided by the emerging data.

- **Historicity:** By using the document co-citation analysis method, we were able to examine the network of cited references which reflect the citing behaviour of later researchers.

- **Contestation:** In the analysis, our main goal was to determine how different research traditions framed urban health issues differently and made different assumptions about the concepts and methods of urban health.

- **Reflexivity:** The authors accept the influence of their own perspectives in making decisions on the review process and in the interpretation of the findings. Additionally, as the authors come from a public health background, we acknowledge that our disciplinary background may introduce bias in the interpretation of the results. We made efforts to counter this bias by referring to the source material in data extraction and analysis and confirming our preliminary findings with peers within and beyond public health.

- **Peer review:** At various stages of the review, findings were presented and shared with peers, including international conferences such as the 5th World Planning Schools Congress, the 18th International Conference on Urban Health 2022 and the 24th IUHPE World Conference on Health Promotion.

### 4.3.3 Searching the literature

The search was conducted in a single multi-disciplinary database, Web of Science Core Collection (WoSCC). The maximum utility of the software of our choice, VOSviewer, is achieved when the records are collected from a single database, and in particular, the WoSCC (van Eck & Waltman, 2017). From our understanding, limiting the search to the WoSCC will not have a significant influence on the overall research findings, as the Web of Science is one of the largest and most comprehensive multi-disciplinary academic databases.
that produces a comprehensive body of literature on urban health (Gusenbauer & Haddaway, 2020). Additionally, limiting the search to a single database is justifiable as this search strategy is sufficient to fulfil the purpose of applying bibliometric analysis to categorise and identify key research traditions (Linnenluecke et al., 2020).

For systematic literature reviews that generate theory-building knowledge such as meta-narrative reviews, a precise search strategy can be adopted. A precise search strategy identifies a sufficient and appropriate range of studies that includes fewer relevant publications in the retrieved corpus (Gough et al., 2012; Lefebvre et al., 2022). This is in contrast with the exhaustive (or comprehensive) search strategy preferred in meta-analytic style systematic reviews that attempts to retrieve all relevant studies to minimise selection bias.

One strategy to conduct a precise search strategy is to limit the search parameters and apply as many exclusions to the search terms as possible to exclude irrelevant publications. The three concepts that were pertinent for our review were urban, built environment, and health. We restricted the search fields to title and author keywords and used Boolean operators AND, OR, NEAR/3 to link synonyms and NOT to exclude non-relevant topics. We limited the publication type (journal articles), year (1900-2021), and language (English).

To develop and refine the search terms, we conducted a series of author keyword co-occurrence analyses. Once a round of search was completed, we performed a keyword co-occurrence analysis on the retrieved publications to generate a map of the publications’ keywords. These maps presented an overview of the key concepts that were addressed in the retrieved publications. We were able to identify additional relevant terms which were subsequently added to the search strategy. For example, in the earlier iterations, sustainability and resilience appeared as relevant terms for health and were subsequently added to the search strategy. The combination of the search terms we applied inevitably captured large collections of other publications that apply similar terms, such as family planning and local health services planning. We used the Boolean operator NOT/ to exclude these publications from the search strategy. By iteratively building the search strategy, we were able to collect a body of urban health literature with minimal irrelevant publications. The final search term set is included in Supplement 1.
4.3.4 Mapping the field

The collected body of literature on urban health using the search strategy presented above was then analysed to map the co-citation relationship of its cited references. The metadata and the list of references of the retrieved publications were imported into VOSviewer software. A document co-citation analysis was conducted with the parameters set to those references that were cited by at least 20 publications. This limit allowed the appropriate number of publications (n=369) that provided a balance between theoretical saturation and practical analysis. The document co-citation analysis then generated five co-citation clusters.

4.3.5 Selection and appraisal of documents

The next step of the review involved selecting the publications that were included in the document co-citation clusters to analyse how each cluster studied urban health. Because document co-citation analysis uses all the cited references, some highly cited publications included methodology or conceptual papers that are not urban health specific. We subsequently excluded these from the review by applying the same selection criteria that were used to guide the literature search. To maintain consistency of data extraction for analysis, we included only articles in peer-reviewed journals.

The selected publications covered a very wide range of methodologies, populations, phenomena, scale and analytical ambition. This vast spectrum naturally posed a great challenge in developing a standard data extraction framework for analysis. We proceeded by reviewing each full text, extracting data on the purpose of study, the urban health sub-topic(s) addressed, interpretation of key urban health concepts, main findings and author’s key arguments. The data extraction process was iteratively conducted as new patterns and themes were discovered from the emerging data.

4.3.6 Analysis and synthesis processes

The data extraction, analysis, and synthesis occurred in an iterative manner. As a main principle, the extracted data were examined for between-cluster comparison, and also for identifying cross-cutting patterns and themes. While reviewing the initially extracted data
from the publications, we identified newly emerging patterns and themes. To further explore and confirm these themes, we would re-visit the publications to add new items to the data extraction table. Throughout different stages of the review, preliminary findings were continuously validated not only by the review team but also by other colleagues. This process included joint presentations and discussions at international conferences.

4.4 Results

4.4.1 Document flow diagram and characteristics

The process of document selection for the meta-narrative review is illustrated in Figure 4.1. The initial search for urban health publications in the Web of Science yielded 5,926 publications that cited a total of 217,740 references. Among these cited references, we selected those publications that were cited by at least 20 publications (N=369) for document co-citation analysis. We then screened the 369 highly cited references against the eligibility criteria. This resulted in 167 publications to be included in the final review.

![Figure 4.1 Document selection flow diagram](image-url)
The documents were published between 1991 and 2019 in 85 journals. The geographical distribution based on the first author’s affiliation included USA (N=62), UK (N=28), Canada (N=15), Australia (N=12), The Netherlands (N=12), and Sweden (N=12). Because the scope and definition of the three concepts in the cited references were varied, an open approach to data extraction and analysis was required to capture the varying definitions and dimensions on urban health. The full data extraction can be found in Supplement 2.

4.4.2 Five urban health research traditions

The document co-citation network analysis generated five distinct clusters of closely co-cited references, each representing a different research tradition (Figure 4.2). We have named the five clusters: sustainable urban development, urban ecosystem services, urban resilience, healthy urban planning, and urban green spaces. Each cluster has a different viewpoint on how the studies conceptualise the urban environment and its health implications. The network visualisation also shows varying network densities among the clusters and varying strength of connections between different pairs. In the following sections, we first present a comprehensive comparison based on their conceptual, theoretical, methodological and instrumental viewpoints, then discuss how each cluster addresses urban health in detail.

![Figure 4.2 Document co-citation network analysis showing five distinct clusters](image)
A summary of the five research traditions is presented in Table 4.1. The overview is based on how each research tradition conceptualises urban health issues and the urban system, prioritises research questions and methods to produce knowledge and proposes solutions to improve urban health. The following analysis and synthesis of the five urban health research traditions support the view that the scholarship of urban health is siloed with few scholars spanning the boundaries.

Additionally, the scale at which urban health is addressed differs across the five research traditions, ranging across global, regional, urban, neighbourhood and individual levels. Generally, the sustainable urban development, urban ecosystem services, and urban resilience clusters consider urban health issues from a city, regional or global level. These clusters conceive the whole city as the unit of analysis (e.g., urban development, urban landscape, urban system) and address its impact on the health of the overall urban system (e.g., environmental and ecological impacts, resilience). This view contrasts with the other two clusters, which study the sub-components of cities (e.g., urban planning system, urban form, green infrastructure) and their impacts on population health (e.g., physical and mental health).
Table 4.1 Summary of the five urban health research traditions

<table>
<thead>
<tr>
<th>Sustainable urban development</th>
<th>Urban ecosystem services</th>
<th>Urban resilience</th>
<th>Healthy urban planning</th>
<th>Urban green spaces</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Key urban health concept</strong></td>
<td>Urban development policies that balance environmental, social and economic goals.</td>
<td>Health benefits generated by ecosystem services provided by urban green and blue landscape patterns.</td>
<td>Ability of the urban system to adapt and transform to absorb disruptions, reorganise and maintain desired functions.</td>
<td>Attributes of the urban environment as a determinant of health.</td>
</tr>
<tr>
<td><strong>View on the urban system and its health implications</strong></td>
<td>Urban development policies influence how cities are built. Urban development patterns have planetary health implications.</td>
<td>Urban landscape pattern is a key component of the urban socio-ecological system. Human actions determine land-use decisions that shape landscape patterns and ecosystem services.</td>
<td>The city is a complex adaptive system that is chaotic, complex, uncertain and unpredictable. Resilience emphasises the qualities of the system as prerequisites to attain desired goals such as sustainability.</td>
<td>Attributes of the urban environment influence population health through multilevel causal chains.</td>
</tr>
<tr>
<td><strong>Knowledge production and research questions</strong></td>
<td>Comparisons between cities and against indicators and benchmarks. Factors influencing development of sustainable urban policies.</td>
<td>Applying hierarchical patch dynamics framework to landscape planning, monitoring and modelling of land-use change.</td>
<td>The knowledge production processes that are co-produced by scholars and practitioners is more important than a particular research method or approach.</td>
<td>Epidemiological models and statistical analysis identify urban environmental attributes that influence population health outcomes.</td>
</tr>
<tr>
<td><strong>Solutions to improve urban health</strong></td>
<td>Indicators, benchmarks and assessment tools to evaluate cities’ sustainability policies.</td>
<td>Model the identification and valuation of ecosystem services to influence land-use planning decisions.</td>
<td>Create “safe-to-fail” adaptive urban systems through better understanding the urban socio-ecological system and human-dominated systems.</td>
<td>Statistical associations between urban environment attributes and health inform policies and interventions.</td>
</tr>
</tbody>
</table>
At the core of this cluster is the landmark publication by Campbell (1996) on a concept of sustainability that holistically harmonises the three priorities for planning – economic growth, environmental protection and social equity. Conceptually, the ‘city’ is generally considered as a politically bounded administrative unit that has decision making functions to develop and implement policies. This research tradition is strongly represented by environmental studies and urban planning disciplines.

The goal of sustainable urban development is balancing the three principles of environmental quality, economic prosperity and social justice, sometimes expressed as the “3 Es” – economic, environmental (or ecological), and equity. The sustainable urban development discourse is based on the assumption that urban governance prioritises economic gains and growth-focused development to the detriment of environmental and social principles (While et al., 2004). In reality, the mainstream debate in sustainable urban development has been focused more heavily on the ecological and environmental aspects than the social sustainability aspects of social equity and community (Saha & Paterson, 2008). However, social sustainability is increasingly being considered (Ahvenniemi et al., 2017; Dempsey et al., 2011).

Sustainable development is a global agenda that calls for action in all levels and sectors of policymaking including local governments. The concept of sustainable urban development was first recognised as a global agenda at the UN Conference on Environment and Development in Rio de Janeiro in 1992 and is the underlying principle of the Sustainable Development Goals (SDGs) (United Nations, 2015). Consequently, many types of urban sustainability indicator frameworks have been developed to measure how ‘sustainable’ cities are (Ahvenniemi et al., 2017; Hiremath et al., 2013; Li et al., 2009; Mori & Christodoulou, 2012; Satterthwaite, 2016; Shen et al., 2011; Tanguay et al., 2010). These indicators are used as goals or benchmarks to monitor and evaluate cities’ progress and provide input for prospective decision-making endeavours.

Urban policies are key instruments to operationalise the goal of sustainable urban development but, unfortunately, sustainability is not well represented in many local plans
and/or has been included in an ad hoc manner (Saha & Paterson, 2008) or as a ‘sustainability fix’, a selective incorporation of sustainability goals (While et al., 2004). Researchers not only evaluate local plans and policies against sustainability indicators and principles (Berke, 2002; M. M. Conroy & Berke, 2004; Lubell et al., 2009; Reckien et al., 2014; Saha & Paterson, 2008), but also emphasise the governance setting and politics as important areas of inquiry in sustainable urban development. Studies on why cities adopt sustainable policies or the politics of sustainable policies implementation highlight the policy-focused nature of sustainable urban development research (Broto & Bulkeley, 2013; Bulkeley & Betsill, 2005; M. M. Conroy & Berke, 2004; Lubell et al., 2009).

Additionally, research in this cluster is concerned with the technical challenges planners face in developing and implementing policies. To address these challenges, researchers suggest instrumental knowledge to planners, such as principles or frameworks, to resolve the conflicts between the different sustainability policy goals (Berke, 2002; Godschalk, 2004) or procedural knowledge on how to bring about urban transformation and change (Nevens et al., 2013; Newman, 1999).

4.4.2.2 2. Urban ecosystem services

The second cluster of urban health research discusses spatial and land coverage patterns through the lens of the urban landscape, a spatially heterogeneous system that humans manipulate and manage (Bolund & Hunhammar, 1999; Wu, 2013). The built infrastructure and urban green and blue spaces create a variety of urban ecosystems including street trees, parks, urban forests, wetlands, lakes, and streams. The ‘multifunctionality’ of these urban ecosystems includes the generation of ecosystem services, climate change mitigation effects, and increased biodiversity that ultimately contribute to human well-being (Bowler et al., 2010; Chiesura, 2004; Niemelä et al., 2010; Tzoulas et al., 2007).

The influence of the urban ecosystem on human health is centred around the ecosystem services that are generated from the green and blue infrastructure. Ecosystem services are “the benefits human populations derive, directly or indirectly, from ecosystem functions”
The types of ecosystem services that are generated from urban green infrastructure are grouped into four categories: (1) supporting services (e.g., soil formation, primary productions and nutrient cycling); (2) regulating services (e.g., microclimate regulation at the street and city level, carbon sequestration and storage, noise reduction, air purification, rain water absorption); (3) cultural services (e.g., recreation, physical and mental health benefits, social benefits); and (4) provisioning services (e.g., food supply, fresh water, timber products) (Ernstson, 2013; Niemelä et al., 2010).

The urban ecosystem is viewed in a hierarchal patch dynamics perspective that considers the multi-scalar nature of the different types of patches of land cover (e.g., parks, buildings, roads, etc) and their interactions influence the structure and function of the urban ecosystem (Wu, 2014). In addition to this spatially defined perspective, the urban ecosystem is also considered as a socio-ecological system, which reflects the core involvement of the human and social aspects with the biogeochemical and techno-mechanical components of the urban ecosystem. The view of the socio-ecological system in this research cluster emphasises human actions as a key factor in shaping the urban environment (Wu, 2014). Human actions such as land use decisions shape the urban ecosystem and influence changes in the environment such as climate change which, in turn, affect human societies. Moreover, these decisions are politically influenced and the distribution of the benefits and costs resulting from these decisions are influenced by social practices (Ernstson, 2013; Heynen et al., 2006; Wolch et al., 2014). Therefore, according to the socio-ecological systems view of urban ecosystem services scholars, the human, social, and political processes in ecosystem services and planning should be considered, and the integration of social sciences with ecological approaches is essential (Grimm et al., 2000).

The types of knowledge and methodologies that are valued in this research cluster involve the measurement and quantification of the benefits and costs of urban green spaces and modelling techniques to predict optimal land-use or urban planning decisions. Many studies identify the types of ecosystem services provided by the different forms and patterns of urban green and blue spaces at different scales and study their benefits on the urban ecosystem and human health. For example, studies investigate the effects of individual components of green infrastructure such as green walls and roofs (Alexandri & Jones, 2008;
Solutions to improve urban health focus heavily on decision support tools with models that generate information on what to do and procedures on how to use the information in the planning process. Geographic Information System (GIS)-based methods and modelling techniques are frequently applied to obtain information on the spatial distribution of urban green areas (Fuller & Gaston, 2009; Kabisch & Haase, 2014; Van Herzele & Wiedemann, 2003). Evidence generated through these types of methods ideally inform spatial planning (Meerow & Newell, 2017).

4.4.2.3 Urban resilience

The publications forming this cluster see urban health through the lens of resilience theory. At the core of the cluster sits Holling’s landmark publication on the concept of resilience in ecological systems (Holling, 1973). In this research tradition, the resilience of the urban system is necessary to achieve the city’s health-related goals and outcomes. Disciplines that are involved in the urban resilience research cluster include environmental studies, public administration, housing and urban planning and geography.

Inherent to the concept of urban resilience is the explicit recognition of the city as a social-ecological system that is composed of overlapping physical, social and technological systems and their components, interactions, networks and feedback loops (Desouza & Flanery, 2013). This view is similar to the view on social-ecological systems discussed in the urban ecosystem services cluster in recognising the interactions between the social and natural systems. The urban ecosystems services cluster views the urban system as a hierarchal patch dynamics framework and a human-environment system that can be reduced to its components and the interactions between them can be measured and identified. However,
urban resilience scholars view the urban system as a complex adaptive system that is non-linear, self-organising and unpredictable. Moreover, because the system is perpetually dynamic and continues to adapt, no actor can have full knowledge or full control of the urban system (Ernstson et al., 2010; Evans, 2011).

The concept of health in this research tradition is understood within the broader concept of resilience which refers to the capacity of the urban system to maintain or quickly return to its desired function and to adapt and transform in the face of disruptions (Meerow & Newell, 2019). Attaining urban resilience is not the end goal for improving urban health. Rather, a city that is resilient has the capacity to achieve sustainability and other desired health impacts. Disruptions to the urban systems caused by, e.g., disasters, terrorism, economic crisis, or climate change, not only have direct impacts on the safety and wellbeing of urban residents, but also create failures within the system designed to manage or adapt to these stressors. Both the direct effects and the system failures have significant health impacts. In concrete terms, categories of the external and internal disruptions that the city wants to be resilient to can be identified as natural, technological, economic, and human stressors (Desouza & Flanery, 2013).

Within the urban resilience scholarship, there are two disparate views on urban systems and urban resilience. One takes a mechanical view of urban systems emphasising static “engineering” resilience, referring to a system’s ability to bounce back to its previous state or maintain equilibrium. The other view conceives urban systems as un-plannable and supports dynamic “ecological” resilience, which focuses on the system’s ability to deal with the uncertainties and maintain key functions when perturbed (Evans, 2011; Meerow & Newell, 2019; Pickett et al., 2004). The mechanical view to urban resilience aligns with reductionist and technocratic approaches to addressing urban systems where actors strive to identify the components, links and loops that compose the system. Meanwhile, from the contemporary socio-ecological systems perspective, such managing, planning, and regulating of urban systems is regarded as not realistic (Evans, 2011). Therefore, instead of proposing a specific urban form or development that is resilient, scholars suggest principles or characteristics of systems – such as redundancy, diversity, efficiency, autonomy, strength, interdependence, adaptability and collaboration – that promote resilience (Godschalk, 2003). Scholars suggest that embedding such characteristics within urban governance
structures creates ‘safe-to-fail’ cities that absorb the impacts of external stressors. This, it is proposed, is preferable to building city structures or systems that are ‘fail-safe’ (Ahern, 2011; Evans, 2011; Jabareen, 2013).

4.4.2.4 4. Healthy urban planning

The study of urban health in this cluster focuses on “the determinants of health and diseases in urban areas and with the urban context itself as the exposure of interest” (Galea & Vlahov, 2005). This approach to urban health recognises but tends to adopt a somewhat reductionist approach to the multiple pathways and networks between planning practice, the resulting urban environmental features, and the influence of the two on the determinants of health and health outcomes (Badland et al., 2014). This cluster appears in the fields of medical sciences and public health, urban planning and transportation studies.

Unlike the first three clusters that view health from an ecological and systems perspective, health in this research cluster is conceived as having physical, mental and social aspects at the individual and population level (Galea & Vlahov, 2005; Giles-Corti et al., 2016). Studies view the urban environment broadly as a determinant of health, generally without an explicit definition of the scope or boundary of the urban area or city. A biomedical and epidemiological causal pathway model that places the multiple dimensions of urban planning and the urban environment as independent variables is adopted and the strength of association and causation is of key concern. Scholars study the urban system by identifying its individual components and analysing their relationships to gain insights on the system, which is aligned with the reductionist approach. For example, research seeks to generate evidence about which features of the built environment have beneficial or negative population health impacts, the pathways through which urban environments impact health, and the distribution of the urban environmental determinants and their impacts.

These scientific findings then provide evidence for policymakers, who are assumed to make urban planning decisions that are conducive to improving the health of urban residents at individual and population levels. Research findings provide information on when and where the intervention should occur without much consideration of the institutional and political dimensions of policy change. There is an assumption that the more ‘compelling’ the
scientific evidence is, the better is the chance that policy change will occur. Researchers in this cluster call for research to use rigorous methods to “delve further into the exact causal mechanism by which one affects the other” (Ewing et al., 2003).

4.4.2.5 5. Urban green spaces

Applying similar reductionist methodologies as the previous cluster, this research cluster addresses the population and individual-level health benefits of urban green spaces. The main research topic of this cluster focuses on how urban green spaces provide urban residents with restorative effects on psychological and mental health through, for instance contact with nature and biodiversity, in addition to physical health impacts such as increased physical activity. Disciplines such as medical sciences, public health, psychology, urban planning, and environmental studies are involved in this research cluster.

This research cluster shares a thematic focus with the urban ecosystem services cluster in addressing the urban green infrastructure. However, the two clusters are ontologically and methodologically different in their conceptual frameworks for understanding the nature of the relationship between green infrastructure and health. The urban ecosystem services cluster conceptualises the green infrastructure and its health impacts at the urban landscape and socio-ecological systems scale, while this research cluster addresses urban green spaces and health at community and individual scales. This research cluster focuses on various types of urban green spaces, their accessibility and design features, and the impact they have on individual and community health. For example, the health benefits of urban green spaces on physical activity and obesity (Coombes et al., 2010; de Vries et al., 2013; Hillsdon et al., 2006), stress management (Grahn & Stigsdotter, 2010; Ulrich et al., 1991), psychological health (Fuller et al., 2007), mental health (Gascon et al, 2015), and longevity (Takano et al., 2002) are often discussed.

4.5  Discussion

This review identifies five prominent research traditions in urban health scholarship. These five research traditions can be distinguished by their topic areas: sustainable urban development, urban ecology and ecosystem services, urban resilience, healthy urban
planning, and health benefits of green spaces. The scale and conceptualisation of the urban system varies amongst the traditions, as well as their understandings of the concept of health. These differences are reflected in how each research tradition explains the relationship between the urban environment and its health impact, the types of research questions and the methods for producing knowledge, and solutions that are perceived effective to improve urban health.

4.5.1 Developing a tool to enable transdisciplinary urban health collaborations

The significance of this meta-narrative review is that the findings inspire the development of a framework that can be used to identify the ontological differences between research traditions. This framework facilitates mutual understanding between research traditions, which is a precursor in developing transdisciplinary collaborations, by placing where and how the research traditions differ in their approaches to urban health. As mentioned earlier, transdisciplinary collaborations involve developing shared interests in the knowledge and evidence that exists in the non-overlapping areas between the different research traditions.

While the five research traditions differed in the conceptual, theoretical, methodological and instrumental approaches to urban health, we observed some common ontological dimensions across these approaches. These dimensions include the perspective of the system, the locus of change and the scale of which the urban health issues are discussed. The three dimensions are also areas where transdisciplinary collaborations can be sought.

4.5.1.1 Perspective on the urban system – complicated or complex

The first area of transdisciplinary collaboration is in the perspective on the urban system (Table 4.2). There is strong consensus among the five traditions that the urban system is multi-scalar and multi-dimensional with multi-directional interactions and feedback loops between the social and natural systems. However, across the five research traditions, we observe two fundamentally different approaches to understanding the urban system – one that views the urban system as a complicated system and another that takes a complex systems perspective. The main difference lies in the assumption of whether the system can be fully understood and predicted. A complicated system perspective identifies the
components of the urban system and their relationships in order to recommend precise intervention points. For example, a complicated view of the concept of urban metabolism might involve the precise definition, measurement, documentation, management and control of energy flows and engineering systems (water supplies, waste management, transport, power grids, etc.). This approach seems to us to be overly reductionist and mechanistic in that the elements of an urban system and their connections can never be fully described, understood and controlled and a definitive comprehensive systems map that might enable technocratic solutions to be found can never be developed (Kennedy et al., 2011; Newman, 1999).

On the other hand, the complex perspective to systems embraces the characteristics of emergence, non-linearity, feedback loops, hierarchy and adaptability of systems which leads to the notion that one cannot fully understand or control the systems or predict outcomes. While the components of a complex system must be simplified for analytical purposes, a systems-thinking perspective applies the multiple theories and tools derived from different disciplines to better understand the characteristics and behaviours of the urban system as a whole rather than develop a comprehensive synthesis of its individual components.

In summary, proponents of the complicated approach to urban systems believe that mapping the system components and their connections is necessary and methodologically possible and provides answers. Proponents of the complex systems approach, however, recognise that trying to construct a comprehensive map of the system is ontologically flawed. Systems thinking sometimes uses mapping to gain a better understanding of parts of a system, but such maps always have boundaries and the insights they generate are always contingent. Across the five urban health research traditions discovered in this review, we observe a mix of differing assumptions on the view on the urban system with research traditions exhibiting a stronger tendency towards either one.
Table 4.2 Perspective on the urban systems - complicated versus complex

<table>
<thead>
<tr>
<th>Perspective on the urban system</th>
<th>Complicated systems</th>
<th>Complex systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Understands the urban system by identifying its individual components and their interconnected relationships.</td>
<td>Understands the urban system as a complex adaptive system and believes that no actor can have full knowledge or full control over the system.</td>
</tr>
<tr>
<td>Examples in urban health research</td>
<td>Hierarchical patch analysis, urban metabolism, causal pathways, engineering and mechanical solutions</td>
<td>Evolutionary urban resilience, human-dominated urban socio-ecological systems, urban political ecology</td>
</tr>
</tbody>
</table>

4.5.1.2 Locus of change – structure and agency

A second area of transdisciplinary collaboration can be found in the locus of change (Table 4.3). Across the urban health research traditions, we observed differing views on the strategies to bring change for urban health. These views range from identifying the features of the urban form and structure that contribute most to health to influencing the decision-making processes and/or transforming the urban governance system. Here, we can apply the structure-agency relationship to better understand the different views on the locus of change. In urban health, the structure-agency relationship presents in two ways – a) the urban spatial structures influence the daily actions of the city’s inhabitants and their health; and b) the social structures and agents in urban planning influence decisions that shape the spatial structures (Næss, 2015). The perspective that focuses on the structure would target the urban form or the planning system as the locus for change. Whereas the focus on agency would emphasise the critical role of the actors in influencing and transforming the structure.

Similar to how the perspective on the urban systems manifests, there is a combination of both constructs across the five research traditions, with some research traditions having stronger tendency towards one construct than the other.
Table 4.3 Locus of change - structure and agency

<table>
<thead>
<tr>
<th>Locus of change</th>
<th>Structure</th>
<th>↔</th>
<th>Agency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Focus on the urban spatial and social structures that influence the behaviour and decisions of urban residents or policy actors.</td>
<td></td>
<td>Focus on the behaviour and actions of residents and policy actors to influence changes to the urban spatial and social structures.</td>
</tr>
<tr>
<td>Examples in urban health research</td>
<td>Identifying the best urban form and land-use patterns for health</td>
<td></td>
<td>Understanding the underlying political processes in urban planning and identifying transformative actions.</td>
</tr>
</tbody>
</table>

4.5.1.3 Scale of urban health - individual to planetary

A final area of transdisciplinary collaboration can be found in the scale at which the urban health phenomenon is addressed (Table 4.4). The scope of urban health research encompasses all scales, ranging from individual health behaviour through street, city and regional environments to the impact of international and global factors. Although the hierarchical nature of the impacts and inter-relationships are acknowledged by most urban health research traditions, each research tradition would focus on a particular combination within the multi-scalar scope.

Table 4.4 Differing scales in urban health research

<table>
<thead>
<tr>
<th>Scale</th>
<th>Individual/community</th>
<th>City/regional</th>
<th>Global/planetary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>The scope of urban health focuses on neighbourhood characteristics and their impact on health of individuals.</td>
<td>The scope of urban health is concerned with the urban landscape, urban and regional planning and its implications on urban ecological and social health.</td>
<td>The scope of urban health encompasses global issues such as increasing urbanisation and its impact on planetary health.</td>
</tr>
<tr>
<td>Examples in urban health research</td>
<td>The association between street design and individual active transport behaviour. The effect of urban green spaces on mental health.</td>
<td>Landscape patterns and ecosystem services. Sustainable principles in local comprehensive planning.</td>
<td>Urbanisation impacts on planetary health. Climate change and urban mitigation and adaptation efforts.</td>
</tr>
</tbody>
</table>
4.5.2 Applying the three dimensions to the five urban health research traditions

Using these three dimensions, we have developed a framework to better understand the five urban health research traditions (Table 4.5).

| Table 4.5 Applying the dimensions to the five urban health research clusters |
|--------------------------------------------------|------------------|------------------|------------------|------------------|
| **System**                                       | **Change**       | **Structure**    | **Scale**        |
| Complicated                                     | Agency           | Individual/      | Sustainable      |
| Complex                                         | Change           | City/            | local policies   |
|                                                 | Change           | Global/          | contributing to  |
|                                                 | Structure        | Regional         | the sustainability |
|                                                 |                  | Planetary        | of the planet    |
| Sustainable urban development                  | Local governments| Focus on the    | Landscape        |
| Urban development policies influence how        | develop policies | constructing    | patterns at the  |
| cities are built.                               | policies that    | landscape        | regional urban   |
| The urban landscape pattern is a key component | shape the urban  | patterns that    | planning scale   |
| of the urban socio-ecological system.          | environment.     | are beneficial   |                  |
| The city is a complex adaptive system that is  |                  | to health.       |                  |
| the urban environment influences population    |                  | Values the       |                  |
| health through multilevel and complex causal    |                  | processes of    |                  |
| chains.                                        |                  | human agents     |                  |
| The attributes of the urban environment        |                  | over             |                  |
| influences population health through            |                  | technological    |                  |
| multilevel and complex causal chains.          |                  | interventions    |                  |
| The amount, access to, quality and features of |                  | Identifies       |                  |
| urban green spaces impact various human health |                  | causation and    |                  |
| benefits.                                      |                  | policy interventions |                  |
|                                                 |                  | to improve the   |                  |
|                                                 |                  | urban environment|                  |
|                                                 |                  | Identifies the   |                  |
|                                                 |                  | type of urban    |                  |
|                                                 |                  | green spaces,    |                  |
|                                                 |                  | accessibility,   |                  |
|                                                 |                  | design features  |                  |
|                                                 |                  | that contribute  |                  |
|                                                 |                  | to health        |                  |
|                                                 |                  | Access to        |                  |
|                                                 |                  | green spaces in  |                  |
|                                                 |                  | communities and  |                  |
|                                                 |                  | its individual   |                  |
|                                                 |                  | health outcomes  |                  |
|                                                 |                  | and its          |                  |
|                                                 |                  | individual health |                  |
|                                                 |                  | outcomes         |                  |

4.5.3 Implications for public health practitioners

For researchers and practitioners who come from a public health standpoint, the findings from this review reveal that the public health approach to urban health research is but one of the many different approaches that address urban health. The traditional public health
approach to urban health takes a complicated systems perspective that emphasizes the structure of the urban form and the planning system with less focus on agency for transformation. The scope of urban health remains at the city or sub-city scale, with attention on how different urban environmental elements function as social determinants of health.

Generally, public health researchers and practitioners take a determinant-based model in developing intersectoral collaboration for urban health. The central argument for intersectoral participation suggests that the disciplines and sectors that have responsibility for those social determinants should consider health in their research and policies. However, researchers and practitioners can benefit by applying a transdisciplinary lens using the findings from this review. For example, in current views and operations such as healthy cities and Health in All Policies (HiAP), current practice focuses on identifying the determinants of health and their relevant sectors to develop intersectoral planning mechanisms and actions. This approach has many pitfalls as the actors and actions of the various sectors operate at different scales with different sets of ideas and conceptualisations. We suggest our framework can add value to these collaborative endeavours by articulating how the actors and actions in the different sectors address the perspectives on systems, locus of change and scale of urban health.

In addition, by understanding how the approaches to urban health differ, researchers can learn from each other and bridge methodological or conceptual gaps. One research tradition may have the conceptual framework and tools to address an issue that another research tradition does not. And in applying methodologies, the research traditions can share a coherent understanding about the ontological and epistemological views on collaborative urban health research projects.

4.5.4 Strengths, limitations, and insights for further studies

This review presents a framework to understand the different approaches to understanding urban health research and practice which, to our knowledge, has not been presented before. We not only describe the prominent research traditions that we identified from a bibliometric analysis, but also critically analyse and synthesise how these traditions address
urban health research through a paradigmatic lens. Generally, within a particular research tradition, assumptions about key urban health concepts are not explicitly expressed because these ideas are agreed upon by its participants and are taken for granted. Therefore, by critically analysing the conceptual, theoretical, methodological and instrumental approaches of each research tradition, this review uncovers some of these assumptions.

Moreover, this review demonstrated that bibliometric analysis is an effective method in mapping research traditions and identifying publications for a meta-narrative review. With the growing interest and technology development in bibliometric analysis, we urge more researchers to use these methods in conducting literature reviews especially when the aim is to capture a snapshot of the scholarship on their topic of study. We also suggest updates to be made in the meta-narrative protocols and guidance documents and inclusion of bibliometric analysis as a method to map research traditions and identify the key publications.

However, there remain a few limitations of this review that should be considered when interpreting the findings. This review presents a high-level analysis of the main research traditions that are involved in the broader complex landscape of urban health research. There may be other sub-areas that have not been identified. Identifying these sub-areas may be topics for additional research. Additionally, because a document co-citation network uses publications that have been cited in later publications, more recent views that have not had time to be cited are not reflected in the review.

We encourage future research to investigate further into the transdisciplinary domain. We do not regard the five traditions we have identified in this review as the final word on this topic. Rather, we offer them as a preliminary framework to better understand the different ontological approaches to urban health. The next stages of transdisciplinary urban health scholarship require a stronger focus on actions and strategies that inform how researchers can seek coherence in the conceptualisations and approaches to urban health research. We need to develop the kinds of transdisciplinary research questions that can be asked to effectively address some of the critical urban health issues we are faced with today. We would also need to find methodological strategies to find coherence between the different urban health approaches.
4.6 Conclusion

This paper presents an analysis of the different urban health research traditions through a meta-narrative review guided by a bibliometric analysis. The findings show that the urban health approaches range in topic, scale, focus of intervention and conceptualisation of the urban system. The review highlights how urban health researchers take for granted the disciplinary assumptions that have been established as the ‘normal science’ of their own research paradigm. However, it is becoming increasingly crucial that researchers become more aware of their own and others’ ontological viewpoints to participate in transdisciplinary research endeavours.

We do not suggest that developing a comprehensive knowledge map for urban health is necessary. In fact, the existence of multiple views on urban health highlighted by this review mirrors the complex nature of urban systems. What is needed is for researchers to be more flexible in applying different views that facilitate a systems approach to addressing urban health research and practice. More importantly, the findings from this review provide a framework that researchers and policymakers can use to interpret evidence according to diverse ontological viewpoints and subsequently frame them into appropriate policy ideas to influence transformative policy change.

4.7 Summary and implications

4.7.1 Contribution to overall research aims and questions

This Chapter’s findings address the first objective of this thesis, which is to identify and articulate diverse ontological perspectives on urban health. Using a meta-narrative review of literature on urban health, I have uncovered five distinct urban health research traditions: sustainable urban development, urban ecosystem services, urban resilience, healthy urban planning, and urban green spaces. Each of these traditions offers a unique conceptual and thematic perspective on urban health and, more significantly, together they present varying viewpoints on the system, structure-agency relationship, and scale of urban health. These dimensions carry profound implications for promoting transdisciplinary collaborations.
because they form the fundamental ontological positions that form the basis for the epistemological and methodological approaches applied to urban health research.

4.7.2 Implications for theory and practice

The meta-narrative investigation revealed that differences in addressing urban health issues thematically do not necessarily reflect ontological differences. For instance, researchers who study the health impacts of the green infrastructure and natural landscapes in urban environments can be further categorised by their ontological stances, namely the distinction between the urban ecosystem services and urban green space research traditions.

By utilising this ontological lens to understand the different approaches to urban health, researchers and scientists can improve communication and collaboration across different research traditions. This framework for the expression of one’s own ontological position and clarification of areas of commonality and difference with others enhances mutual understanding and coherence among the traditions. Researchers can leverage this framework to identify potential collaboration with experts in other fields or locate academic journals or conferences where they can connect with such experts. Additionally, academic journals, conferences, and grants can apply this framework to map the distribution of their activities, identify strengths and weaknesses, and foster the further development of their urban health research directions.

It is also worth re-emphasising that these classifications and findings are not exhaustive and important dimensions have not been captured in this meta-narrative review. For example, the temporal dimension is another critical dimension that different research traditions address differently. Research traditions can be assumed to have varying perspectives on the temporal scope of urban health outcomes, ranging from immediate short-term impacts to prospective long-term impacts. However, the temporal dimension did not appear prominently in the review of the publications included in this study.
4.7.3 Remaining questions and link to next publication

In addition to the urban health paradigms that were presented in Chapter Two, the discovery of urban health research traditions in this Chapter is one of the many ways to identify and articulate ontological perspectives to urban health. Although these ontological frameworks have theoretical implications, their practical application in real-world policymaking requires analysis of urban health policy ideas held by policy actors. Chapter Five examines the planning for Sydney’s Western Parkland City as a case study where these ontological frameworks serve as a basis for analysing urban health policy ideas and examining potential transdisciplinary collaborations.
## 4.8 Supplement 1. Search terms

<table>
<thead>
<tr>
<th>Concept</th>
<th>Search terms</th>
</tr>
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<tbody>
<tr>
<td>URBAN/CITY</td>
<td>(city OR cities OR local government OR municipal OR municipality OR megacity OR megacities OR urban OR urbanity OR urbanicity OR metropolitan OR metropolis OR urbanisation* OR urbanization*) NOT rural</td>
</tr>
<tr>
<td>BUILT ENVIRONMENT</td>
<td>(“built NEAR/3 environment*” OR “urban NEAR/3 plan*” OR “infrastructure*” OR “physical environment*” OR “morphology” OR “morphologies” OR “urban NEAR/3 form” OR architecture OR design OR space OR place OR plan OR plans OR policy OR policies) NOT (“family planning” OR “health planning”)</td>
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<tr>
<td>HEALTH</td>
<td>(health OR healthy OR unhealthy OR “ill-health” OR “ill health” OR wellbeing OR “well being” OR well-being OR liveable OR liveability OR resilient OR resilience OR sustainable OR sustainability) NOT (“healthcare” OR “health care” OR “health-care” OR medical OR medicine OR “health service*” OR “health center*” OR “health centre*” OR sexual)</td>
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## 4.9 Supplement 2. Summary of publications

**Total number of publications = 167**

1. **Sustainable urban development (N=34)**

<table>
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<tr>
<th>No.</th>
<th>Author, year</th>
<th>Title</th>
<th>Source</th>
<th>Field</th>
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<th>Type of study</th>
<th>Focus of paper</th>
<th>Main topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Berke, 2002</td>
<td>Does Sustainable Development Offer a New Direction for Planning? Challenges for the Twenty-First Century</td>
<td><em>Journal of Planning Literature</em></td>
<td>Housing and urban planning</td>
<td>USA</td>
<td>Non-empirical</td>
<td>planning goal</td>
<td>Addresses the value of the sustainable development concept for planning – integrates multiple society values and enhances local imagination, understanding, and commitment to defining solutions for the common good.</td>
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<td>2</td>
<td>Dempsey, 2011</td>
<td>The social dimension of sustainable development: defining urban social sustainability</td>
<td><em>Sustainable Development</em></td>
<td>Environmental studies</td>
<td>UK</td>
<td>Non-empirical</td>
<td>urban social sustainability</td>
<td>Examines how the urban form contributes to social sustainability and presents dimensions of social sustainability</td>
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<td>3</td>
<td>Neumann, 2005</td>
<td>The compact city fallacy</td>
<td><em>Journal of Planning Education and Research</em></td>
<td>Housing and urban planning</td>
<td>USA</td>
<td>Non-empirical</td>
<td>planning process</td>
<td>Argues that conceiving the city in terms of process holds more promise in attaining the elusive goal of a sustainable city than focusing on the urban form (e.g., compactness).</td>
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<td>4</td>
<td>Kennedy, 2011</td>
<td>The study of urban metabolism and its applications to urban planning and design</td>
<td><em>Environmental Pollution</em></td>
<td>Environmental studies</td>
<td>Canada</td>
<td>Non-empirical</td>
<td>urban metabolism concept</td>
<td>Reviews the development of the urban metabolism concept and application – urban sustainability indicators; inputs to urban greenhouse gas emissions calculation; mathematical models of urban metabolism for policy analysis; and as a basis for sustainable urban design</td>
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<td>5</td>
<td>Newman, 1999</td>
<td>Sustainability and cities: extending the metabolism model</td>
<td><em>Landscape and Urban Planning</em></td>
<td>Environmental studies</td>
<td>Australia</td>
<td>Empirical</td>
<td>urban metabolism concept</td>
<td>Expands the urban metabolism framework to include human liveability dimension (social amenity and health)</td>
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<td>Ahvenniemi, 2017</td>
<td>What are the differences between sustainable and smart cities?</td>
<td><em>Cities</em></td>
<td>Public administration – municipal governments</td>
<td>Finland</td>
<td>Comparing assessment frameworks</td>
<td>urban sustainability indicators (smart sustainable cities)</td>
<td>Assesses whether sustainable and smart city indicators reflect the environmental, economic and social sustainability principles.</td>
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<td>Country</td>
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<td>Alberti, 1996</td>
<td>Measuring urban sustainability</td>
<td>Environmental Impact Assessment Review</td>
<td>USA</td>
<td>Non-empirical</td>
<td>urban sustainability indicators (principles for selecting indicators)</td>
<td>Develops a set of principles in selecting urban sustainability indicators</td>
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<td>Indicator-based urban sustainability—A review</td>
<td>Energy for Sustainable Development</td>
<td>India</td>
<td>Non-empirical</td>
<td>urban sustainability indicators (measuring progress)</td>
<td>Reviews the role of indicators in measuring progress towards urban sustainability</td>
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<td>Li, 2009</td>
<td>Measurement indicators and an evaluation approach for assessing urban sustainable development: A case study for China’s Jining City</td>
<td>Landscape and Urban Planning</td>
<td>China</td>
<td>Empirical</td>
<td>urban sustainability indicators (evaluating city’s capacity)</td>
<td>Develops a set of urban sustainable development indicators to evaluate Jining City’s capacity for urban sustainable development.</td>
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<td>Mori, 2012</td>
<td>Review of sustainability indices and indicators: Towards a new City Sustainability Index (CSI)</td>
<td>Environmental Impact Assessment Review</td>
<td>Japan</td>
<td>Non-empirical</td>
<td>city sustainability index (principles for selecting indicators)</td>
<td>Reviews existing major sustainability indices/indicators and presents principles for creating a new City Sustainability Index (CSI).</td>
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<td>Sahely, 2005</td>
<td>Developing sustainability criteria for urban infrastructure systems</td>
<td>Canadian Journal of Civil Engineering</td>
<td>Canada</td>
<td>Case study</td>
<td>assessment framework (urban infrastructure systems)</td>
<td>Proposes a sustainability framework for urban infrastructure systems and applies in a case study of the urban water system in Toronto</td>
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<td>13</td>
<td>Satterthwait e, 1997</td>
<td>Sustainable Cities or Cities that Contribute to Sustainable Development?</td>
<td>Urban Studies</td>
<td>UK</td>
<td>Non-empirical</td>
<td>assessment framework (city’s environmental performance)</td>
<td>Presents a framework for more comprehensive accounting of cities’ environmental performance, within a commitment to other sustainable development goals.</td>
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<td>Shen, 2011</td>
<td>The application of urban sustainability indicators</td>
<td>Habitat International</td>
<td>China</td>
<td>Non-empirical</td>
<td>urban sustainability indicators (evaluate city plans)</td>
<td>Develops a set of indicators and evaluates compliance to these dimensions (environmental, economic, social, governance) of 9 sustainable development plans.</td>
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<td>Title</td>
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<td>Tanguay, 2010</td>
<td>Measuring the sustainability of cities: An analysis of the use of local indicators</td>
<td><em>Ecological Indicators</em></td>
<td>Canada</td>
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<td>Reviews existing urban sustainable development indicators and proposes a method of selecting indicators (SuBSelec)</td>
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<td>16</td>
<td>de Jong, 2015</td>
<td>Sustainable–smart–resilient–low carbon–eco–knowledge cities; making sense of a multitude of concepts promoting sustainable urbanization</td>
<td><em>Journal of Cleaner Production</em></td>
<td>The Netherlands</td>
<td>Non-empirical</td>
<td>Reviews and compares the different categories of ‘cities (approaches)’ for sustainable development</td>
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<td>McCormick, 2013</td>
<td>Advancing sustainable urban transformation</td>
<td><em>Journal of Cleaner Production</em></td>
<td>Sweden</td>
<td>Non-empirical</td>
<td>Explores sustainable urban transformation focusing on structural transformation processes – multi-dimensional and radical change – that can effectively direct urban development towards ambitious sustainability goals.</td>
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<td>Berke, 2000</td>
<td>Are we planning for sustainable development?</td>
<td><em>Journal of the American Planning Association</em></td>
<td>USA</td>
<td>Evaluation of plans</td>
<td>Evaluates 30 comprehensive local plans to determine how well their policies support sustainable development.</td>
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<td>Carter, 2015</td>
<td>Climate change and the city: Building capacity for urban adaptation</td>
<td><em>Progress in Planning</em></td>
<td>UK</td>
<td>Case study</td>
<td>Presents learning from a detailed case study of climate change impacts and adaptation in Greater Manchester, undertaken within the EcoCities project.</td>
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<td>Conroy, 2004</td>
<td>What Makes a Good Sustainable Development Plan? An Analysis of Factors That Influence Principles of Sustainable Development</td>
<td><em>Environment and Planning A: Economy and Space</em></td>
<td>USA</td>
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<td>Evaluates 42 community plans to determine how the sustainable concepts were considered and factors that contribute to high sustainability score.</td>
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<td>Godschalk, 2004</td>
<td>Land Use Planning Challenges: Coping with Conflicts in Visions of Sustainable Development and Liveable Communities</td>
<td><em>Journal of the American Planning Association</em></td>
<td>USA</td>
<td>Non-empirical</td>
<td>Presents the sustainability/liveability prism as a tool for understanding conflicts in land-use planning.</td>
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<td>Kenworthy, 2006</td>
<td>The eco-city: ten key transport and planning dimensions for sustainable city development</td>
<td>Environment and Urbanization</td>
<td>Environmental studies</td>
<td>Australia</td>
<td>Non-empirical</td>
<td>planning principles</td>
<td>Presents a conceptual model for eco-cities based on urban planning, urban transport and urban design considerations – four critical “Sustainable urban form and transport” factors, four essential factors under the heading of ‘sustainable technologies, economics and urban design’ and two ‘overarching process’ dimensions related to planning and decision making for sustainable cities.</td>
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<td>Lubell, 2009</td>
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<td>Housing and urban planning</td>
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<td>Empirical</td>
<td>sustainable policies (contributing factors)</td>
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<td>Reckien, 2014</td>
<td>Climate change response in Europe: what’s the reality? Analysis of adaptation and mitigation plans from 200 urban areas in 11 countries</td>
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<td>Meteorology</td>
<td>USA</td>
<td>Empirical</td>
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<td>Saha, 2008</td>
<td>Local Government Efforts to Promote the “Three Es” of Sustainable Development: Survey in Medium to Large Cities in the United States</td>
<td>Journal of Planning Education and Research</td>
<td>Housing and urban planning</td>
<td>USA</td>
<td>Evaluation of plans</td>
<td>evaluation of local plans</td>
<td>Evaluates local governments’ sustainable development plans</td>
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<td>A survey of urban climate change experiments in 100 cities</td>
<td>Global Environmental Change</td>
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<td>climate change experimentation</td>
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<td>Environmental Politics</td>
<td>Environmental studies</td>
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<td>Case study</td>
<td>politics of climate change protection</td>
<td>Examines the politics of implementing climate change protection in urban planning in Manchester</td>
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<td>No.</td>
<td>Author, Year</td>
<td>Title</td>
<td>Journal</td>
<td>Country</td>
<td>Methodology</td>
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<td>While, 2004</td>
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<td>UK</td>
<td>Empirical</td>
<td>City governance</td>
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<td>Housing and urban planning</td>
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<td>Urban sustainability fix: selective incorporation of environmental goals, determined by the balance of pressures for and against environmental policy within and across the city.</td>
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<td>Burton, 2000</td>
<td>The Compact City: Just or Just Compact? A Preliminary Analysis</td>
<td>Urban Studies</td>
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<td>Cross-sectional study design</td>
<td>City form (urban density and social equity)</td>
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<td>Housing and urban planning, Sociology</td>
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<td>Examines the association between density and social equity.</td>
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<td>Handy, 1996</td>
<td>Methodologies for exploring the link between urban form and travel behaviour</td>
<td>Transportation Research Part D: Transport and Environment</td>
<td>USA</td>
<td>Non-empirical</td>
<td>City form (urban form and travel patterns)</td>
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<td>Environmental studies Transportation</td>
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<td>Presents alternate methods to better examine the association between urban form and travel patterns.</td>
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<td>Jabareen, 2006</td>
<td>Sustainable Urban Forms: Their Typologies, Models, and Concepts</td>
<td>Journal of Planning Education and Research</td>
<td>USA</td>
<td>Non-empirical</td>
<td>City form (urban forms and sustainability)</td>
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<td></td>
<td></td>
<td></td>
<td>Housing and urban planning</td>
<td></td>
<td></td>
<td>Compares different urban forms and their contribution to sustainability.</td>
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<td></td>
<td></td>
<td></td>
<td>Housing and urban planning</td>
<td></td>
<td></td>
<td>Presents multiple views on sustainable cities solutions.</td>
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### 2. Urban ecosystem services (N=43)

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<td>1</td>
<td>Andersson, 2014</td>
<td>Reconnecting Cities to the Biosphere: Stewardship of Green Infrastructure and Urban Ecosystem Services</td>
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<td>Wu, 2014</td>
<td>Urban ecology and sustainability: The state-of-the-science and future directions</td>
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<td>3</td>
<td>Tzoulas, 2007</td>
<td>Promoting ecosystem and human health in urban areas using Green Infrastructure: A literature review</td>
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<td>Grimm, 2008</td>
<td>Global change and the ecology of cities</td>
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<td>6</td>
<td>McPhearson, 2016</td>
<td>Advancing Urban Ecology toward a Science of Cities</td>
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<td>7</td>
<td>James, 2009</td>
<td>Towards an integrated understanding of green space in the European built environment</td>
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<td>8</td>
<td>Wu, 2013</td>
<td>Landscape sustainability science: ecosystem services and human well-being in changing landscapes</td>
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<td>9</td>
<td>Bolund, 1999</td>
<td>Ecosystem services in urban areas</td>
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<td>10</td>
<td>Gomez-Baggethun, 2013</td>
<td>Classifying and valuing ecosystem services for urban planning</td>
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<td>van Kamp, 2003</td>
<td>Urban environmental quality and human well-being – Towards a conceptual framework and demarcation of concepts; a literature study</td>
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<td>12</td>
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<td>Haaland, 2015</td>
<td>Challenges and strategies for urban green-space planning in cities undergoing densification: A review</td>
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<td>From Multifunctionality to Multiple Ecosystem Services? A Conceptual Framework for Multifunctionality in Green Infrastructure Planning for Urban Areas</td>
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<td>Temperature decreases in an urban canyon due to green walls and green roofs in diverse climates</td>
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<td>Urban greening to cool towns and cities: A systematic review of the empirical evidence</td>
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<td>The role of urban parks for the sustainable city</td>
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<td>Demuzere, 2014</td>
<td>Mitigating and adapting to climate change: Multifunctional and multi-scale assessment of</td>
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<td>20</td>
<td>Escobedo, 2011</td>
<td>Urban forests and pollution mitigation: Analyzing ecosystem services and disservices</td>
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<td>21</td>
<td>Oberndorfer, 2007</td>
<td>Green Roofs as Urban Ecosystems: Ecological Structures, Functions, and Services</td>
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<td>22</td>
<td>Peters, 2010</td>
<td>Social interactions in urban parks: Stimulating social cohesion?</td>
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<td>23</td>
<td>Roy, 2012</td>
<td>A systematic quantitative review of urban tree benefits, costs, and assessment methods across cities in different climatic zones</td>
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<td>24</td>
<td>Santamouris, 2014</td>
<td>Cooling the cities – A review of reflective and green roof mitigation technologies to fight heat island and improve comfort in urban environments</td>
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<td>25</td>
<td>Norton, 2015</td>
<td>Planning for cooler cities: A framework to prioritise green infrastructure to mitigate high temperatures in urban landscapes</td>
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<td>26</td>
<td>Pataki, 2011</td>
<td>Coupling biogeochemical cycles in urban environments: ecosystem services,</td>
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Identifies some pollution mitigation ecosystem services provided by urban forests.

Examines the ecosystem services benefits of green roofs.

Establishes the extent to which urban parks facilitate social cohesion.

Reviews the evidence on the benefits, costs and ecosystem services of urban trees.

Compares the mitigation potential of different green roof mitigation technologies.

Presents a framework for prioritising and selecting urban green infrastructure for temperature mitigation based on a quantifying cooling benefits of four types of urban green infrastructure.

Presents a framework to integrate biogeochemical processes into planning of green infrastructure.
<table>
<thead>
<tr>
<th>Page</th>
<th>Author</th>
<th>Year</th>
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<td>Neighborhood microclimates and vulnerability to heat stress</td>
<td>Social Science &amp; Medicine</td>
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<td>Simulation model</td>
<td>Uses a simulation model to compare heat stress between different neighbourhoods in Phoenix, USA.</td>
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<td>28</td>
<td>Gill</td>
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<td>Adapting Cities for Climate Change: The Role of the Green Infrastructure</td>
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<td>Architecture Housing and urban planning</td>
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<td>Kabisch</td>
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<td>Nature-based solutions to climate change mitigation and adaptation in urban areas: perspectives on indicators, knowledge gaps, barriers, and opportunities for action</td>
<td>Ecology and Society</td>
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<td>The concept of ecosystem services in adaptive urban planning and design: A framework for supporting innovation</td>
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<td>Supplying urban ecosystem services through multifunctional green infrastructure in the United States</td>
<td>Landscape Ecology in Review</td>
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<td>ecosystem services (participatory planning tools)</td>
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<td>Impervious Surface Coverage: The Emergence of a Key Environmental Indicator</td>
<td>Journal of the American Planning Association</td>
<td>Housing and urban planning</td>
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<td>Colding</td>
<td>2013</td>
<td>The potential of ‘Urban Green Commons’ in the resilience building of cities</td>
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<td>Environmental studies</td>
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<td>34</td>
<td>van Herzele, 2003</td>
<td>A monitoring tool for the provision of accessible and attractive urban green spaces</td>
<td>Landscape and Urban Planning</td>
<td>Environmental studies</td>
<td>Belgium</td>
<td>Indicator development and testing</td>
<td>monitoring tool for urban green spaces Presents an integrated indicator on urban green spaces based on five principles - “citizen based”, “functional levels”, “preconditions for use”, “variety of qualities”, and “multiple use”</td>
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<td>35</td>
<td>Li, 2005</td>
<td>Comprehensive concept planning of urban greening based on ecological principles: a case study in Beijing, China</td>
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<td>Environmental studies</td>
<td>Canada</td>
<td>Case study</td>
<td>urban greening (planning principles) Introduces a comprehensive urban greening plan in Beijing City at three levels – urban greening planning based on landscape ecological principles</td>
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<td>36</td>
<td>Meerow, 2017</td>
<td>Spatial planning for multifunctional green infrastructure: Growing resilience in Detroit</td>
<td>Landscape and Urban Planning</td>
<td>Environmental studies</td>
<td>USA</td>
<td>Case study</td>
<td>green infrastructure planning Introduces the Green Infrastructure and Spatial Planning (GISP) model as a participatory planning approach that uses GIS-based multi-criteria of six benefits.</td>
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<td>37</td>
<td>Checker, 2011</td>
<td>Wiped Out by the &quot;Greenwave&quot;: Environmental Gentrification and the Paradoxical Politics of Urban Sustainability</td>
<td>City &amp; Society</td>
<td>Housing and urban planning</td>
<td>USA</td>
<td>Ethnographic study</td>
<td>urban sustainability politics A rubric of sustainability then becomes part of a post-political project that sidelines questions of real political inclusion and justice in the name of technocratic, community-based deliberation.</td>
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<tr>
<td>38</td>
<td>Fuller, 2009</td>
<td>The scaling of green space coverage in European cities</td>
<td>Biology Letters</td>
<td>Biology</td>
<td>Australia</td>
<td>Cross-sectional study design</td>
<td>green space coverage Greenspace coverage distribution in European cities and correlations with city size and density.</td>
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<td>39</td>
<td>Ernstson, 2013</td>
<td>The social production of ecosystem services: A framework for studying environmental justice and ecological complexity in urbanized landscapes</td>
<td>Landscape and Urban Planning</td>
<td>Environmental studies</td>
<td>Sweden</td>
<td>Non-empirical</td>
<td>environmental justice Ecosystem services are treated not just as the outcome of (non-human) biophysical processes, nor simply as outcomes of “trade-offs” or managerial and consensus-based “navigation” of social–ecological systems, but inherently also as a result of value articulation, discourse, and political struggle.</td>
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| 40  | Heynen, 2006 | The Political Ecology of Uneven Urban Green Space: The Impact of Political Economy on Race and Ethnicity in Producing Environmental Inequality in Milwaukee | Urban Affairs Review | Housing and urban planning Social sciences | USA | Case study | urban canopy cover Investigates the role of urban political economy, private-public property relations, and race and ethnicity in the social production of Milwaukee’s urban forest.
<table>
<thead>
<tr>
<th></th>
<th>Author, Year</th>
<th>Title</th>
<th>Journal</th>
<th>Country</th>
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<tr>
<td>41</td>
<td>Kabisch, 2014</td>
<td>Green justice or just green? Provision of urban green spaces in Berlin, Germany</td>
<td>Landscape and Urban Planning</td>
<td>Germany</td>
<td>Cross-sectional study design</td>
<td>urban green space (inequal distribution)</td>
<td>Some of the inner city sub-districts with relatively high percentages of immigrants and high population density have disproportionate less access to urban green spaces. Based on this study and referring to the initially proposed framework of socio-environmental justice, we highlight some design and management recommendations for Tempelhof.</td>
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<tr>
<td>42</td>
<td>Wolch, 2014</td>
<td>Urban green space, public health, and environmental justice: The challenge of making cities ‘just green enough’</td>
<td>Landscape and Urban Planning</td>
<td>USA</td>
<td>Literature review</td>
<td>urban green space (environmental justice)</td>
<td>Compares efforts to green US and Chinese cities and find the distribution disproportionately benefits affluent communities. Both cities have urban green space strategies targeted to poor neighbourhoods but they may be paradoxical – gentrification and displacement. Urban green strategies need to be ‘just green enough’.</td>
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<td>43</td>
<td>Cohen, 2006</td>
<td>Urbanization in developing countries: Current trends, future projections, and key challenges for sustainability</td>
<td>Technology in Society</td>
<td>USA</td>
<td>Non-empirical</td>
<td>urban growth</td>
<td>Argues that more attention is required on African urban settlements.</td>
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### 3. Urban resilience (N=22)

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<th>Research group</th>
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<th>Geographical region (First author affiliation)</th>
<th>Type of study</th>
<th>Focus of paper</th>
<th>Main topic</th>
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<tr>
<td>1</td>
<td>Ahern, 2011</td>
<td>From fail-safe to safe-to-fail: Sustainability and resilience in the new urban world</td>
<td>Landscape and Urban Planning</td>
<td>Environmental studies</td>
<td>USA</td>
<td>Non-empirical</td>
<td>building “safe-to-fail” systems</td>
<td>Offers strategies to build urban resilience – multifunctionality, redundancy and modularization, (bio and social) diversity, multi-scale networks and connectivity, and adaptive planning and design</td>
</tr>
<tr>
<td>3</td>
<td>Bruneau, 2003</td>
<td>A Framework to Quantitatively Assess and Enhance the Seismic Resilience of Communities</td>
<td>Earthquake Spectra</td>
<td>Earth sciences – geophysics</td>
<td>USA</td>
<td>Non-empirical</td>
<td>community resiliency analysis</td>
<td>Presents four dimensions of community resiliency – technical, organizational, social, and economic— to quantify measures of resilience for various types of physical and organizational systems.</td>
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<td>4</td>
<td>Chelleri, 2015</td>
<td>Resilience trade-offs: addressing multiple scales and temporal aspects of urban resilience</td>
<td>Environment and Urbanization</td>
<td>Environmental studies; Business and economics – international; Development and assistance</td>
<td>Italy</td>
<td>Case study</td>
<td>shifting resilience paradigm</td>
<td>Argues to shift the mainstream resilience-building paradigm to wider sustainability challenges (cf. climate change adaptation and disaster management).</td>
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<td>5</td>
<td>Collier, 2013</td>
<td>Transitioning to resilience and sustainability in urban communities</td>
<td>Cities</td>
<td>Public administration – municipal governments</td>
<td>Ireland</td>
<td>Non-empirical</td>
<td>Urban transition strategies</td>
<td>Key issues in transitioning to resilience in urban areas while ensuring communities are at the centre of the process.</td>
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<td>6</td>
<td>Davoudi, 2012</td>
<td>Resilience: A Bridging Concept or a Dead End? &quot;Reframing&quot; Resilience: Challenges for Planning Theory and Practice Interacting Traps: Resilience Assessment of a Pasture Management System in Northern Afghanistan Urban</td>
<td>Planning Theory &amp; Practice</td>
<td>Housing and urban planning</td>
<td>UK</td>
<td>Case study</td>
<td>evolutionary resilience</td>
<td>Argues for a reframing of resilience in planning towards a socio-ecological resilience or evolutionary resilience (chaotic, complex, uncertain, unpredictable) concept.</td>
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<td>Resilience: What Does it Mean in Planning Practice? Resilience as a Useful Concept for Climate Change Adaptation? The Politics of Resilience for Planning: A Cautionary Note</td>
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<td>Strategies to build urban resilience</td>
<td>Provides a framework for understanding urban resilience and strategies to build urban resilience</td>
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<td>Designing, planning, and managing resilient cities: A conceptual framework</td>
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<td>Public administration – municipal governments</td>
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<td>Strategies to build urban resilience</td>
<td>Provides a framework for understanding urban resilience and strategies to build urban resilience</td>
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<td>Sustainability and resilience for transformation in the urban century</td>
<td>Nature Sustainability</td>
<td>Sciences: comprehensive works</td>
<td>Sweden</td>
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<td>clarifying sustainability and resilience</td>
<td>Clarifies the current contradiction between urban sustainability and urban resilience to facilitate the transformation process</td>
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<td>Urban Transitions: On Urban Resilience and Human-Dominated Ecosystems</td>
<td>Ambio</td>
<td>Environmental studies</td>
<td>Sweden</td>
<td>Case study</td>
<td>transitions in urban governance</td>
<td>Discusses how cities can navigate change, build capacity to stand shocks, and use experimentation, learning and innovation in face of uncertainties.</td>
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<td>Resilience, ecology and adaptation in the experimental city</td>
<td>Transactions of the Institute of British Geographers</td>
<td>Geography</td>
<td>UK</td>
<td>Case study</td>
<td>adaptive experiments (socio-ecological system framework)</td>
<td>Highlights the socio-ecological system framework in embedding adaptive experiments into urban governance – role of ‘place’, political implications, casting planning, administrative functions and actors as part of the socio-ecological system.</td>
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<td>Urban Hazard Mitigation: Creating Resilient Cities</td>
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<td>applying resilience</td>
<td>Putting urban resilience as a goal for hazard mitigation strategies</td>
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<td>Planning the resilient city: Concepts and strategies for coping with climate change and environmental risk</td>
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<td>Resilience to natural hazards: How useful is this concept?</td>
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<td>Leichenko, 2011</td>
<td>Climate change and urban resilience</td>
<td>Current Opinion in Environmental Sustainability</td>
<td>The Netherlands</td>
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<td>clarifying resilience</td>
<td>Review of urban resilience in different sets of literature and emerging questions</td>
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<td>Lu, 2013</td>
<td>Understanding the notion of resilience in spatial planning: A case study of Rotterdam, The Netherlands</td>
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<td>The Netherlands</td>
<td>Case study</td>
<td>application of resilience</td>
<td>Examines the awareness and understanding of the concept of resilience in Rotterdam’s planning policy</td>
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<td>16</td>
<td>Meerow, 2016</td>
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<td>Landscape and Urban Planning</td>
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<td>Discusses six conceptual tensions of urban resilience and introduces a new definition</td>
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<td>Meerow, 2019</td>
<td>Urban resilience for whom, what, when, where, and why?</td>
<td>Urban Geography</td>
<td>USA</td>
<td>Non-empirical</td>
<td>politics of resilience</td>
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<td>Norris, 2008</td>
<td>Community resilience as a metaphor, theory, set of capacities, and strategy for disaster readiness</td>
<td>American Journal of Community Psychology; Sociology</td>
<td>USA</td>
<td>Non-empirical</td>
<td>building resilience</td>
<td>Four primary sets of adaptive capacities to build community resilience</td>
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<td>Pickett, 2004</td>
<td>Resilient cities: meaning, models, and metaphor for integrating the ecological, socio-economic, and planning realms</td>
<td>Landscape and Urban Planning</td>
<td>USA</td>
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<td>Principles and criteria for assessing urban energy resilience: A literature review</td>
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<td>Literature review</td>
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<td>Tyler, 2012</td>
<td>A framework for urban climate resilience</td>
<td>Climate and Development</td>
<td>Canada</td>
<td>Non-empirical</td>
<td>operationalising resilience</td>
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### 4. Healthy urban planning (N=37)

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<th>Source</th>
<th>Field</th>
<th>Geographical region (First author affiliation)</th>
<th>Type of study</th>
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<td>Badland, 2014</td>
<td>Urban liveability: emerging lessons from Australia for exploring the potential for indicators to measure the social determinants of health</td>
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<td>Medical sciences</td>
<td>Australia</td>
<td>Literature review</td>
<td>Livability indicators</td>
<td>Eleven domains of urban liveability indicators</td>
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<td>Banister, 2008</td>
<td>The sustainable mobility paradigm</td>
<td>Transport Policy</td>
<td>Transportation</td>
<td>UK</td>
<td>Non-empirical</td>
<td>Sustainable transport policy</td>
<td>Principles to promote public acceptability of the sustainable mobility paradigm</td>
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<td>Corburn, 2004</td>
<td>Confronting the Challenges in Reconnecting Urban Planning and Public Health</td>
<td>American Journal of Public Health</td>
<td>Public health and safety</td>
<td>USA</td>
<td>Non-empirical</td>
<td>Reconnecting urban planning and public health</td>
<td>Reconnecting urban planning and public health through ecosocial epidemiology and environmental justice frameworks</td>
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<td>Dannenberg, 2003</td>
<td>The Impact of Community Design and Land-Use Choices on Public Health: A Scientific Research Agenda</td>
<td>American Journal of Public Health</td>
<td>Public health and safety</td>
<td>USA</td>
<td>Non-empirical</td>
<td>Reconnecting urban planning and public health</td>
<td>37 research questions designed to extend scientific knowledge of the relationship between public health and urban planning</td>
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<td>Durand, 2011</td>
<td>A systematic review of built environment factors related to physical activity and obesity risk: implications for smart growth urban planning</td>
<td>Obesity Reviews</td>
<td>Nutrition and dietetics; Physical fitness and hygiene</td>
<td>USA</td>
<td>Systematic review</td>
<td>Obesity (urban environment attributes)</td>
<td>Association between smart growth urban planning and obesity risk – diverse housing types, mixed land use, housing density, compact development patterns, levels of open space</td>
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<td>Ewing, 2003</td>
<td>Relationship between Urban Sprawl and Physical Activity, Obesity, and Morbidity</td>
<td>Health &amp; Place</td>
<td>Medical sciences, Geography, Public health and safety</td>
<td>USA</td>
<td>Multi-level analysis</td>
<td>Urban sprawl</td>
<td>County compactness/sprawl measures and health outcomes</td>
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<td>Title</td>
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<td>7</td>
<td>Ewing, 2009</td>
<td>Measuring the Unmeasurable: Urban Design Qualities Related to Walkability</td>
<td>Journal of Urban Design</td>
<td>Architecture; Housing and urban planning</td>
<td>USA</td>
<td>Non-empirical</td>
<td>Operationalising 5 street design qualities that are associated with walkability</td>
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<td>Ewing, 2010</td>
<td>Travel and the Built Environment</td>
<td>Journal of the American Planning Association</td>
<td>Housing and urban planning</td>
<td>USA</td>
<td>Meta-analysis</td>
<td>Summarise empirical results on associations between the built environment and (nonwork) travel</td>
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<td>Frank, 2004</td>
<td>Obesity relationships with community design, physical activity, and time spent in cars</td>
<td>American Journal of Preventive Medicine</td>
<td>Medical sciences, public health and safety</td>
<td>Canada</td>
<td>Cross-sectional design study</td>
<td>The relationship between the built environment around each participant’s place of residence and self-reported travel patterns (walking and time in a car), body mass index (BMI), and obesity</td>
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<tr>
<td>10</td>
<td>Frank, 2005</td>
<td>Linking objectively measured physical activity with objectively measured urban form: findings from SMARTRAQ</td>
<td>American Journal of Preventive Medicine</td>
<td>Medical sciences, public health and safety</td>
<td>Canada</td>
<td>Cross-sectional design study</td>
<td>Association between physical activity and aspects of the physical environment around each participant’s home</td>
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<td>11</td>
<td>Frank, 2005</td>
<td>Multiple Impacts of the Built Environment on Public Health: Walkable Places and the Exposure to Air Pollution</td>
<td>International Regional Science Review</td>
<td>Social sciences</td>
<td>Canada</td>
<td>Non-empirical</td>
<td>The impacts of the built environment on health – air quality, physical activity</td>
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<td>12</td>
<td>Frank, 2006</td>
<td>Many Pathways from Land Use to Health: Associations between Neighborhood Walkability and Active Transportation, Body Mass Index, and Air Quality</td>
<td>Journal of the American Planning Association</td>
<td>Housing and urban planning</td>
<td>Canada</td>
<td>Cross-sectional design study</td>
<td>Associations between neighbourhood walkability and active transportation, Body Mass Index, and air quality</td>
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<td>13</td>
<td>Frank, 2010</td>
<td>The development of a walkability index: application to the Neighborhood Quality of Life Study</td>
<td>British Journal of Sports Medicine</td>
<td>Medical sciences: sports medicine</td>
<td>Canada</td>
<td>(Index development and testing)</td>
<td>Develop, test and apply a method of neighbourhood selection for environment and health studies combining walkability and sociodemographic factors</td>
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<tr>
<td>14</td>
<td>Frumkin, 2003</td>
<td>Healthy Places: Exploring the Evidence</td>
<td>American Journal of Public Health</td>
<td>Public health and safety</td>
<td>USA</td>
<td>Non-empirical</td>
<td>Four aspects of the built environment that makes a good place – nature contact, buildings, public spaces, and urban for.)</td>
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<td>15</td>
<td>Galea, 2005</td>
<td>Urban health: evidence, challenges, and directions</td>
<td>Annual Review of Public Health</td>
<td>Public health and safety</td>
<td>USA</td>
<td>Non-empirical</td>
<td>urban health determinants and causation pathways</td>
<td>Complex causation pathways of how cities shape population health (e.g., physical environment, the social environment, and access to health and social services)</td>
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<td>16</td>
<td>Giles-Corti, 2016</td>
<td>City planning and population health: a global challenge</td>
<td>The Lancet</td>
<td>Medical sciences</td>
<td>Australia</td>
<td>Non-empirical</td>
<td>travel behaviour (interventions)</td>
<td>Eight interventions that encourage walking, cycling and public transport use - destination accessibility, equitable distribution of employment across cities, managing demand by reducing the availability and increasing the cost of parking, designing pedestrian-friendly and cycling-friendly movement networks, achieving optimum levels of residential density, reducing distance to public transport, and enhancing the desirability of active travel modes</td>
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<tr>
<td>17</td>
<td>Handy, 2002</td>
<td>How the built environment affects physical activity: Views from urban planning</td>
<td>American Journal of Preventive Medicine</td>
<td>Medical sciences, public health and safety</td>
<td>USA</td>
<td>Non-empirical</td>
<td>travel behaviour</td>
<td>Review on the studies addressing the built environment and travel behaviour.</td>
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<tr>
<td>18</td>
<td>Heath, 2006</td>
<td>The Effectiveness of Urban Design and Land Use and Transport Policies and Practices to Increase Physical Activity: A Systematic Review</td>
<td>Journal of Physical Activity and Health</td>
<td>Physical fitness and hygiene</td>
<td>USA</td>
<td>Systematic review</td>
<td>physical activity (urban environment attributes and policies)</td>
<td>Most effective population-wide environmental and policy interventions to promote physical activity</td>
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<td>19</td>
<td>Humpel, 2002</td>
<td>Environmental factors associated with adults’ participation in physical activity: a review</td>
<td>American Journal of Preventive Medicine</td>
<td>Medical sciences, public health and safety</td>
<td>Australia</td>
<td>Systematic review</td>
<td>physical activity (urban environment attributes)</td>
<td>Physical environment factors (e.g., accessibility, opportunities for activity, weather, safety, aesthetic attributes) that are associated with physical activity behaviour</td>
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<td>20</td>
<td>Jackson, 2003</td>
<td>The relationship of urban design to human health and condition</td>
<td>Landscape and Urban Planning</td>
<td>Housing and urban planning</td>
<td>USA</td>
<td>Non-empirical</td>
<td>urban design</td>
<td>Relationship of urban design (at three spatial scales) to human health and wellbeing (physical and mental health, social and cultural vibrancy)</td>
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<td>21</td>
<td>Krieger, 2002</td>
<td>Housing and Health: Time Again for Public Health Action</td>
<td>American Journal of Public Health</td>
<td>Public health and safety</td>
<td>USA</td>
<td>Non-empirical</td>
<td>housing</td>
<td>Housing as a determinant of public health and strategies to improve housing conditions (housing guidelines and codes, implementing ‘Healthy Homes’ programs)</td>
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<td>Leyden,</td>
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<td>Social Capital and the Built Environment: The Importance of Walkable</td>
<td>American Journal of Public</td>
<td>USA</td>
<td>Cross-sectional design study</td>
<td>Relationship between neighbourhood design (e.g., mixed-use, pedestrian-oriented design, car-dependent suburbs) and individual levels of social capital</td>
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<td>Neighborhoods</td>
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<td>Lowe,</td>
<td>2015</td>
<td>Planning Healthy, Liveable and Sustainable Cities: How Can Indicators</td>
<td>Urban Policy and Research</td>
<td>Australia</td>
<td>Literature review</td>
<td>Overview of liveability indicators and strategies to increase their utility</td>
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<td>Canada</td>
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<td>Relationship between the built environment and physical activity</td>
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<td>Sorting out the connections between the built environment and</td>
<td>Journal of Urban Health</td>
<td>USA</td>
<td>Non-empirical</td>
<td>Reconnecting urban planning and public health</td>
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<td>health: A conceptual framework for navigating pathways and planning</td>
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<td>Pucher,</td>
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<td>Promoting Safe Walking and Cycling to Improve Public Health:</td>
<td>American Journal of Public</td>
<td>USA</td>
<td>Secondary data analysis</td>
<td>Analysis of fatality and injury and measures to improve safety of walking and cycling in American cities</td>
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<td>Lessons From The Netherlands and Germany</td>
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<td>2008</td>
<td>Making Cycling Irresistible: Lessons from The Netherlands, Denmark</td>
<td>Transport Reviews</td>
<td>USA</td>
<td>Case studies</td>
<td>Policies to achieve high levels of cycling</td>
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<td>2010</td>
<td>Infrastructure, programs, and policies to increase bicycling: An</td>
<td>Preventive Medicine</td>
<td>USA</td>
<td>Systematic review</td>
<td>Associations between specific interventions and levels of bicycling</td>
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<td>2012</td>
<td>Shaping cities for health: complexity and the planning of urban</td>
<td>The Lancet</td>
<td>UK</td>
<td>Case studies</td>
<td>New approach to planning for urban health that is based on complexity thinking</td>
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<td>Saelens, 2003</td>
<td>Neighborhood-Based Differences in Physical Activity: An Environment Scale Evaluation</td>
<td>American Journal of Public Health</td>
<td>USA</td>
<td>Cross-sectional design study</td>
<td>Physical activity (urban environment attributes)</td>
<td>Neighbourhood walkability characteristics and physical activity</td>
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<td>31</td>
<td>Saelens, 2003</td>
<td>Environmental correlates of walking and cycling: Findings from the transportation, urban design, and planning literatures</td>
<td>Annals of Behavioral Medicine</td>
<td>USA</td>
<td>Literature review</td>
<td>Walking and cycling (urban environment attributes)</td>
<td>Evidence on the associations between physical environment and walking and cycling.</td>
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<td>32</td>
<td>Saelens, 2008</td>
<td>Built environment correlates of walking: a review</td>
<td>Medicine &amp; Science in Sports &amp; Exercise</td>
<td>USA</td>
<td>Literature review</td>
<td>Walking (urban environment attributes)</td>
<td>Evidence on the associations between physical environment and walking.</td>
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<td>33</td>
<td>Sallis, 2012</td>
<td>Role of Built Environments in Physical Activity, Obesity, and Cardiovascular Disease</td>
<td>Circulation</td>
<td>USA</td>
<td>Literature review</td>
<td>Physical activity (urban environment attributes)</td>
<td>Describe multilevel ecological models of behaviour as they apply to physical activity.</td>
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<td>34</td>
<td>Sallis, 2016</td>
<td>Physical activity in relation to urban environments in 14 cities worldwide: a cross-sectional study</td>
<td>The Lancet</td>
<td>USA</td>
<td>Cross-sectional design study</td>
<td>Physical activity (urban environment attributes)</td>
<td>Evidence on the association between the urban environment and physical activity.</td>
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<td>35</td>
<td>Stevenson, 2016</td>
<td>Land use, transport, and population health: estimating the health benefits of compact cities</td>
<td>The Lancet</td>
<td>Australia</td>
<td>Modelling</td>
<td>Walking, cycling and public transport (compact city)</td>
<td>Land use, transport and population health</td>
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<td>36</td>
<td>Vlahov, 2007</td>
<td>Urban as a Determinant of Health</td>
<td>Journal of Urban Health</td>
<td>USA</td>
<td>Non-empirical</td>
<td>Slums</td>
<td>Addressing the social determinants of health in slums to reduce inequities</td>
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5. Urban green spaces (N=31)

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<tr>
<th>Research group</th>
<th>Author, year</th>
<th>Title</th>
<th>Source</th>
<th>Field</th>
<th>Geographical region (First author affiliation)</th>
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<tr>
<td>1</td>
<td>Barbosa, 2007</td>
<td>Who benefits from access to green space? A case study from Sheffield, UK</td>
<td>Landscape and Urban Planning</td>
<td>Housing and urban planning</td>
<td>UK</td>
<td>Empirical</td>
<td>public green space accessibility</td>
<td>Measuring the distribution of access to public green space in Sheffield</td>
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<td>2</td>
<td>Bedimo-Rung, 2005</td>
<td>The significance of parks to physical activity and public health: a conceptual model</td>
<td>American Journal of Preventive Medicine</td>
<td>Medical sciences; Public health and safety</td>
<td>USA</td>
<td>Non-empirical</td>
<td>park-based physical activity</td>
<td>Park environmental characteristics that contribute to physical activity – park features, condition, access, aesthetics, safety and policies</td>
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<td>Bowler, 2010</td>
<td>A systematic review of evidence for the added benefits to health of exposure to natural environments</td>
<td>BMC Public Health</td>
<td>Public health and safety</td>
<td>UK</td>
<td>Systematic review</td>
<td>natural environments</td>
<td>Synthesizing evidence on the added benefits of activities in natural environments over and above activities in synthetic environments</td>
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<td>4</td>
<td>Carrus, 2015</td>
<td>Go greener, feel better? The positive effects of biodiversity on the well-being of individuals visiting urban and peri-urban green areas</td>
<td>Landscape and Urban Planning</td>
<td>Housing and urban planning</td>
<td>Italy</td>
<td>Cross-sectional design study</td>
<td>restorative properties and benefits (urban green space attributes)</td>
<td>Testing the positive role of biodiversity offered by different types of green environments on subjective wellbeing</td>
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<td>5</td>
<td>Coombes, 2010</td>
<td>The relationship of physical activity and overweight to objectively measured green space accessibility and use</td>
<td>Social Science &amp; Medicine</td>
<td>Medical sciences</td>
<td>UK</td>
<td>Cross-sectional design study (aggregate, GIS)</td>
<td>obesity, physical activity (access, use of green space)</td>
<td>The association between objectively measured access to green space, frequency of green space use, physical activity, and the probability of being overweight or obese</td>
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<td>6</td>
<td>de Vries, 2003</td>
<td>Natural Environments—Healthy Environments? An Exploratory Analysis of the Relationship between Greenspace and Health</td>
<td>Environment and Planning A: Economy and Space</td>
<td>Environmental studies; Housing and urban planning; Geography</td>
<td>The Netherlands</td>
<td>Cross-sectional design study</td>
<td>self-reported health (greenspace availability)</td>
<td>Testing the positive association between living in green environment to health</td>
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<td>de Vries, 2013</td>
<td>Streetscape greenery and health: stress, social cohesion and physical activity as mediators</td>
<td>Social Science &amp; Medicine</td>
<td>Medical sciences</td>
<td>The Netherlands</td>
<td>Cross-sectional design study</td>
<td>stress reduction, physical activity, social cohesion</td>
<td>Testing the positive effect of greenspace availability on health (stress reduction, physical activity, social cohesion)</td>
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<td>Fuller, 2007</td>
<td>Psychological benefits of greenspace increase with biodiversity</td>
<td>Biology Letters</td>
<td>UK</td>
<td>Cross-sectional design study</td>
<td>Psychological benefits (urban green space biodiversity)</td>
<td>Urban public greenspaces and psychological benefits increase with biodiversity</td>
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<td>Giles-corti, 2005</td>
<td>Increasing walking: how important is distance to, attractiveness, and size of public open space?</td>
<td>American Journal of Preventive Medicine</td>
<td>Australia</td>
<td>Cross-sectional design study</td>
<td>walking (public open space attributes)</td>
<td>Association between public open space and physical activity – access, attractiveness, size</td>
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<td>Grahn, 2010</td>
<td>The relation between perceived sensory dimensions of urban green space and stress restoration</td>
<td>Landscape and Urban Planning</td>
<td>Sweden</td>
<td>Cross-sectional study design</td>
<td>stress reduction (perceived sensory dimensions of natural environments)</td>
<td>Identify perceived sensory dimensions of natural environments that are associated with stress reduction (Serene, Space, Nature, Rich in Species, Refuge, Culture, Prospect and Social)</td>
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<td>Grahn, 2003</td>
<td>Landscape planning and stress</td>
<td>Urban Forestry &amp; Urban Greening</td>
<td>Sweden</td>
<td>Cross-sectional study design</td>
<td>health (urban open green spaces)</td>
<td>Examines the association between urban open green spaces and self-reported health in nine Swedish cities</td>
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<td>Hartig, 2003</td>
<td>Tracking restoration in natural and urban field settings</td>
<td>Journal of Environmental Psychology</td>
<td>Sweden</td>
<td>Experimental study</td>
<td>Stress reduction effects of natural surroundings</td>
<td>Comparing psychophysiological stress recovery and restorative effects in natural and urban surroundings</td>
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<td>Hartig, 2014</td>
<td>Nature and Health</td>
<td>Annual Review of Public Health</td>
<td>Sweden</td>
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<td>review on research</td>
<td>Reviews the current research on the association between natural environment and health</td>
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<td>The relationship between access and quality of urban green space with population physical activity</td>
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<td>Kaczynski, 2008</td>
<td>Association of Park Size, Distance, and Features With Physical Activity in Neighborhood Parks</td>
<td><em>American Journal of Public Health</em></td>
<td>Canada</td>
<td>Cross-sectional study design</td>
<td>physical activity (park size, features, distance)</td>
<td>Studies whether park size, number of features in the park, and distance to a park is related to a park being used for physical activity.</td>
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<td>Lachowycz, 2011</td>
<td>Greenspace and obesity; a systematic review of the evidence</td>
<td><em>Obesity Reviews</em></td>
<td>UK</td>
<td>Systematic review</td>
<td>physical activity, weight, health conditions (access to greenspace)</td>
<td>Examines the association between objectively measured access to greenspace and (i) Physical activity, (ii) Weight status and (iii) Health conditions related to elevated weight.</td>
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<td>Laforteza, 2009</td>
<td>Benefits and well-being perceived by people visiting green spaces in periods of heat stress</td>
<td><em>Urban Forestry &amp; Urban Greening</em></td>
<td>Italy</td>
<td>Cross-sectional study design</td>
<td>Health benefits during heat stress (Use of green space)</td>
<td>Examines the physical and psychological benefits and the general well-being associated with the use of green spaces on people when heat stress episodes are more likely to occur</td>
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<td>Lee, 2011</td>
<td>The health benefits of urban green spaces: a review of the evidence</td>
<td><em>Journal of Public Health</em></td>
<td>UK</td>
<td>Systematic review</td>
<td>physical and non-physical health benefits</td>
<td>Studies the causal relationship of urban green spaces on health</td>
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<td>Maas, 2006</td>
<td>Green space, urbanity, and health: how strong is the relation?</td>
<td><em>Journal of Epidemiology and Community Health</em></td>
<td>The Netherlands</td>
<td>Cross-sectional study design</td>
<td>health benefits (amount of green space in living environment)</td>
<td>Studies the relation between the amount of green space in people’s living environment and their perceived general health.</td>
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<td>Maas, 2009</td>
<td>Social contacts as a possible mechanism behind the relation between green space and health</td>
<td><em>Health &amp; Place</em></td>
<td>The Netherlands</td>
<td>Cross-sectional study design</td>
<td>social contacts</td>
<td>Explores whether social contacts are an underlying mechanism behind the relationship between green space and health.</td>
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<td>23</td>
<td>Maas, 2009</td>
<td>Morbidity is related to a green living environment</td>
<td><em>Journal of Epidemiology and Community Health</em></td>
<td>The Netherlands</td>
<td>Cross-sectional study design</td>
<td>Morbidity (amount of green space in living environment)</td>
<td>Investigates whether physician-assessed morbidity is also related to green space in people’s living environment.</td>
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<td>24</td>
<td>McCormack, 2010</td>
<td>Characteristics of urban parks associated with park use and physical activity</td>
<td><em>Health &amp; Place</em></td>
<td>Canada</td>
<td>Systematic review</td>
<td>Physical activity (urban parks)</td>
<td>Reviews qualitative evidence that explores the association between urban parks (features, conditions, access, aesthetics, safety) and physical activity patterns.</td>
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<tr>
<td>Activity</td>
<td>Study Title</td>
<td>Authors, Year</td>
<td>Methodology</td>
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<td>Country</td>
<td>Design</td>
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<td>113</td>
<td>Activity: a review of qualitative research</td>
<td>Public health and safety</td>
<td>Cross-sectional study design</td>
<td>Physical activity (urban green space attributes)</td>
<td>Analyses the association between physical activity and urban green spaces (distance, size, features, amount of nearest urban green space)</td>
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<td>25</td>
<td>Associations between physical activity and characteristics of urban green space</td>
<td>Urban Forestry &amp; Urban Greening</td>
<td>Denmark</td>
<td>Cross-sectional study design</td>
<td>Forests and forestry</td>
<td>Physical activity (urban green space attributes)</td>
<td>Analyses the association between physical activity and urban green spaces (distance, size, features, amount of nearest urban green space)</td>
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<td>Associations of neighbourhood greenness with physical and mental health: do walking, social coherence and local social interaction explain the relationships?</td>
<td>Journal of Epidemiology and Community Health</td>
<td>Australia</td>
<td>Cross-sectional study design</td>
<td>Medical sciences, public health and safety</td>
<td>Walking, social coherence, social interaction</td>
<td>Examines associations of perceived neighbourhood “greenness” with perceived physical and mental health and to investigate whether walking and social factors account for the relationships</td>
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<td>27</td>
<td>Urban residential environments and senior citizens’ longevity in megacity areas: the importance of walkable green spaces</td>
<td>Journal of Epidemiology and Community Health</td>
<td>Japan</td>
<td>Longitudinal study design</td>
<td>Medical sciences, public health and safety</td>
<td>Longevity (access and quality of urban green space)</td>
<td>Studies the association between greenery filled public areas that are nearby a residence and easy to walk in and the longevity of senior citizens</td>
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<td>28</td>
<td>Stress recovery during exposure to natural and urban environments</td>
<td>Journal of Environmental Psychology</td>
<td>USA</td>
<td>Experimental study</td>
<td>Psychology</td>
<td>Restorative effects of urban green spaces</td>
<td>Tests the emotional, attentional and physiological aspects of stress reducing influences of nature</td>
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<td>29</td>
<td>Green space as a buffer between stressful life events and health</td>
<td>Social Science &amp; Medicine</td>
<td>The Netherlands</td>
<td>Cross-sectional study design</td>
<td>Medical sciences</td>
<td>Moderating effects of urban green space (amount of green space)</td>
<td>Investigates whether the presence of green space can attenuate negative health impacts of stressful life events.</td>
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<td>30</td>
<td>A cohort study relating urban green space with mortality in Ontario, Canada</td>
<td>Environmental Research</td>
<td>Canada</td>
<td>Cohort study</td>
<td>Environmental studies</td>
<td>Mortality (Access to green space)</td>
<td>Studies the association between access to green space and mortality</td>
<td></td>
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<tr>
<td>31</td>
<td>Would You Be Happier Living in a Greener Urban Area? A Fixed-Effects Analysis of Panel Data</td>
<td>Psychological Science</td>
<td>UK</td>
<td>Longitudinal study design</td>
<td>Psychology</td>
<td>Wellbeing and mental health (Living closer to urban green spaces)</td>
<td>Explores the relation between urban green space and well-being and between urban green space and mental distress for the same people over time.</td>
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Chapter 5:

**Ontological Foundations of Urban Health Policy Ideas: The Case of Planning Sydney’s Western Parkland City**

Objective 1.
Identifying and articulating different ontological perspectives on urban health

Objective 2.
Implications of differing urban health ontological perspectives

CHAPTER 1: INTRODUCTION

CHAPTER 2: Four Urban Health Paradigms

CHAPTER 3: Protocol for a Meta-Narrative Review

CHAPTER 4: Five Urban Health Research Traditions: A Meta-Narrative Review

CHAPTER 5: Ontological Foundations of Urban Health Policy Ideas: The Case of Planning Sydney’s Western Parkland City

CHAPTER 6: Discussion & Conclusion
Chapter Five presents a case study that applies the urban health ontological frameworks presented in Chapters Two and Four to examine the nature of urban health policy ideas in the planning of the Western Parkland City (WPC) in Sydney, Australia.

For this Chapter, I collected data from interviews with stakeholders who are involved in the planning of WPC and identified key urban health policy ideas through a thematic analytical approach. By using the four urban health paradigms and the urban five urban health traditions as frameworks, I examined the urban health policy ideas to present the complexity and diversity in real-world policymaking. The chapter concludes with a discussion on the implications for transdisciplinary policymaking, and by inference, research and practice.

Sections 5.1-5.6 of this chapter are presented in the same format and structure, without any edits, as the following publication which has been submitted to a peer-reviewed journal:

- **Kim J**, Harris-Roxas, B, de Leeuw E & Sainsbury P. “Examining the ontological foundations of urban health policy ideas in planning Sydney’s Western Parkland City: a call for transdisciplinary policymaking”, which is under review for publication in a peer-reviewed journal (Cities & Health, under review).
Examining the ontological foundations of urban health policy ideas in planning Sydney’s Western Parkland City: a call for transdisciplinary policymaking

Jinhee Kim, Evelyne de Leeuw, Ben Harris-Roxas, Peter Sainsbury

5.1 Abstract

This case study examines the ontological backgrounds of urban health policy ideas in planning the Western Parkland City, a large-scale regional development project in Sydney, Australia. Using an empirical approach, the study identifies seven key urban health policy ideas and analyses the nature of these ideas using urban health ontological frameworks. The dominant ontological paradigms appear as the medical-industrial and urban health science paradigms with strong alignment with the sustainable urban development and healthy urban planning research traditions. Additionally, the dominant ideas adopt a view of systems that is complicated more than complex, favour change driven by structure rather than agency, and involve perspectives that transcend across multiple scales. These findings highlight the importance of recognising the influence of paradigms in shaping policies and the need for transdisciplinary approach to policymaking.

5.2 Introduction

In recent years, health has been recognised as a global priority for urban development (United Nations General Assembly, 2016; World Health Organization, 2016) and is a fundamental aspect of the Sustainable Development Goals (United Nations, 2015). There is an abundance of compelling evidence that health is influenced by urban spatial structures (Ewing & Cervero, 2010; Giles-Corti et al., 2016; McCormack & Shiell, 2011; Rydin et al., 2012; Stevenson et al., 2016; World Health Organization & UN-Habitat, 2016) and as a result, many planning guidelines have been developed (NSW Ministry of Health, 2020; Pineo, 2020; The City of New York, 2010; UN-HABITAT and World Health Organization, 2020). Despite this global recognition of the relationship between urban planning and health, the goal of improving health remains a low priority in urban planning policymaking in most contexts.
To address the gap between scientific evidence and the lack of policy implementation, one possible solution is to analyse the urban planning policymaking process from a political science perspective (de Leeuw et al., 2021). Urban planning decisions are not based solely on the scientific evidence that confirms the strength of causal relationships or on compliance to planning guidelines. In fact, political science scholars argue that evidence alone is insufficient for transformative change – it is the evidence-informed ideas, not the evidence itself, that travel between research and policy (Cairney et al., 2023; Cairney & Oliver, 2017; Smith, 2014). Ideas are depicted as values or causal beliefs, similar to the concept of policy paradigms; used as policy frames to define policy problems; and as policy proposals for responding to policy problems (Smith, 2014).

The focus on ideas in policymaking is the key principle in the ‘ideational approach’ to policymaking which is important in addressing a complex issue such as urban health. Complex issues involve a broad range of policy actors representing different levels of government and sectors, diverse disciplinary fields, and the community. Such diversity of policy actors naturally leads to a wide range of (possibly competing or contradictory) policy ideas in policymaking. Policy actors rarely question the underlying assumptions about their own policy ideas nor recognise that these views may not be shared with others. Without engaging in such reflexivity, this lack of awareness can lead to reinforcement of implicit biases (Béland & Cox, 2016; Hall, 1993; Jenkins-Smith et al., 2018). This particularly focused worldview results in missed opportunities to develop effective policies and the generation of incoherent policy ideas, lack of collaboration, confusion, and mistrust. To resolve such issues, one strategy to improve effective policymaking is to analyse some existing urban policy ideas and try to understand their underlying differences and their expressions in policy actors’ beliefs and positions.

Recognition of the ontological differences among urban health policy ideas is essential in developing transdisciplinary collaborations to urban planning policymaking. Transdisciplinary approaches require actors to collaborate in areas outside their own disciplines’ or sectors’ traditional areas of interest; areas that may be grounded in different ontological understandings (Lawrence, 2015; Ramadier, 2004). Thus, unlike interdisciplinary approaches where disciplines seek collaborations in the areas of overlap between their ontological positions, in transdisciplinary approaches participants need to be open to new methodologies and frameworks and be willing to learn from other participants even if the views are outside of their own ontological understandings.
Therefore, the aim of this study is to examine the ontological perspectives of the urban health policy ideas to provide evidence for adopting transdisciplinary approaches to urban policymaking. We take a case study approach to examine such urban health policy ideas that appear in the planning of the Western Parkland City in the Greater Sydney metropolitan region of Australia (www.greatercities.au). This currently operational strategic regional plan involves multiple institutional and personal stakeholders across various sectors and levels of government, and its formal policy discourse includes references to health-related goals such as sustainability and liveability. The selection of this large-scale urban planning case study provides an excellent opportunity to explore a broad spectrum of urban health policy ideas. Additionally, the involvement of the co-authors in prior research in studying healthy urban planning in this region (Authors, 2020; 2022) provided valuable insights that enhanced the feasibility of collecting data for this study. The findings of this case study highlight the co-existence of multiple urban health policy ideas and the diversity of their ontological perspectives.

5.3 Methods

5.3.1 Case study methodology

We adopted a case study methodology to test two conceptual frameworks in identifying the ontological perspectives of urban health policy ideas (Flyvbjerg, 2006). Case study methodology involves conducting an in-depth examination of a specific case within a particular real-world context, allowing for a thorough understanding of its complexities (Yin, 2017). We utilised interviews and documents as data sources, applied thematic analysis and adopted abductive reasoning to explain the emerging observations. The research question and the methods were guided by the critical realist approach (Danermark, 2019; Melia, 2020), with the overall aim to generate insights that would facilitate the development of effective transdisciplinary collaborations. The critical realist perspective allows us to better understand the underlying mechanisms and structures that shape urban health policymaking that are not readily apparent or measurable. This approach integrates empirical observations with theoretical reasoning and critical reflection.

5.3.2 Collecting data

The data for this case study were collected from two main sources, in-depth interviews with key informants (n=12); and key policy documents (n=5). The recruitment of interviewees was guided by
snowball sampling within the authors’ practice and research networks in the region. Informants were individuals associated with organisations that have an institutional, formal, or functional interest in the development of the Western Parkland City. Organisations that have an institutional interest refer to those organisations that have a statutory role in the planning process, functional interests refer to participants that are officially involved in the planning process, and functional interest include those organisations that represent various urban health interests of the region but not involved at the core of the planning process.

The Interviews were conducted between March and November 2022. The interviewees represented the following: state level planning agency (n=4), local council (n=4), network of local councils (n=2), local level health agency (n=1), and community organisation (n=1). Initial interviewees were identified using purposive sampling and subsequent interviewees were recruited through snowballing strategies. We stopped recruitment when the interviewees ceased to provide new potential interviewees. We confirmed during analysis that data saturation was also reached. JK conducted the interviews online via MS Teams using a list of semi-structured approach focusing on open-ended questions (Supplement 1). The questions were structured around the conceptual (e.g., key urban health issues), theoretical (e.g., underlying causes and explanations), methodological (e.g., preferred knowledge and research) and instrumental (e.g., policy solutions and action) dimensions on how health is or should be being considered in the planning of the Western Parkland City. We also asked about the participants’ knowledge, opinion and experience on the planning process. The interviews were conducted between March and November 2022 and the sessions ranged between 45 and 90 minutes. With the interviewees’ consent, the interview sessions were recorded and transcribed. Human research ethics approval for conducting the interviews was obtained (Author’s institution/HC210524).

The Interviewees referred to five key policy documents were reviewed for triangulation and additional details rather than as primary sources for data collection. The five policy documents were the: Western Sydney City Deal (Australian Government & NSW Government, 2018); Western Sydney District Plan (Greater Sydney Commission, 2018b); A Metropolis of Three Cities (Greater Sydney Commission, 2018a); Western Parkland City Blueprint (Western Parkland City Authority, 2022a); and Economic Development Roadmap (Western Parkland City Authority, 2022b).
5.3.3 Identifying urban health policy ideas

We developed the operational definition of an urban health policy idea based on the concept of policy actors’ beliefs about the description of the world, causal relationships and justified actions, which are expressed as policy problems, goals or solutions in the policy process (Béland & Cox, 2010; Mehta, 2010). We define an urban health policy idea as a coherent set of ideas expressed by policy actors on the policy problem, policy goal, and policy solutions to foster health through urban planning policies.

The urban health policy ideas were identified through a thematic analysis of the interviews. The interview transcripts were first coded to capture the urban health policy problems, policy goals and policy solutions expressed regarding the planning and development of the Western Parkland City. Iteratively, while coding additional interviews, the emerging codes were grouped and categorised into a coherent narrative of urban health policy ideas on the policy goal, defining the problem, the understanding of the underlying causal mechanisms and effective interventions, the types of methods and data to gain more information on the problem and drivers of change. JK conducted the thematic analysis and the recurring patterns of urban health policy ideas that emerged were discussed and confirmed by discussions amongst all the authors. The health policy ideas emerging from the thematic analysis of the interviews were confirmed and examined by policy objectives and strategies presented in the selected five policy documents.

5.3.4 Examining the policy ideas against health ontological frameworks

We examined the urban health policy ideas by applying two pre-existing ontological frameworks, namely the four urban health paradigms (Kim et al., 2022) and the five urban health research traditions (de Leeuw et al., 2023). These frameworks serve as conceptual models that elucidate diverse perspectives regarding the relationship between the urban environment and human health. By utilising these frameworks as analytical tools, we were able to compare and contrast the policy ideas and draw conclusions on establishing transdisciplinary collaborations.

5.3.4.1 Urban health ontological frameworks

The first framework, four urban health paradigms, was developed using the conceptual, theoretical, methodological and instrumental dimensions that constitute a paradigm to distinguish four different
approaches to urban health (Kim et al., 2022). The four paradigms differ in their understanding of which urban health issue is important, the nature of the issue, its underlying causes, and its appropriate solutions, and the paradigm’s preferred knowledge and research methods. A detailed version of how these views compare can be found in Supplement 2 of this publication. In summary:

- The **medical-industrial paradigm** takes an economic-driven approach to promoting urban growth and liveability;
- The **urban health science paradigm** utilises epidemiological approaches to empirically analyse the causal associations between the urban environment and health;
- The **healthy built environment paradigm** calls for a re-integration of health as a main goal for urban planning; and
- The **health social movement paradigm** supports a value-based, community-driven approach to systems change.

The second framework we used was based on the five distinct urban health research traditions that was identified through a meta-narrative review of the urban health scholarship (de Leeuw et al., 2023). Each research tradition has a different conceptual and thematic perspective to studying urban health. Again, a detailed version of how these views compare can be found in Supplement 2 of this publication. In summary:

- The **sustainable urban development** research tradition studies urban health with a lens that urban development policies focus on the balance of environmental, social and economic goals;
- The **urban ecosystem services** research tradition investigates how urban green and blue landscape patterns generate health benefits;
- The **urban resilience** research tradition focuses on the ability of the urban system to absorb disruptions and maintain desired functions;
- The **healthy urban planning** research tradition examines the attributes of the urban environment that are determinants of health; and

The **urban green spaces** research tradition studies the physical, mental and social health benefits of urban green spaces. Furthermore, we also incorporated the three dimensions employed by de Leeuw et al., (2023) to further distinguish the characteristics of the urban health research traditions, adding another component to our analysis. These three dimensions are: the perspective of the
system (complicated or complex), the locus of change (structure or agency) and the scale of at which the urban health issues are discussed (individual, city, global scales).

- Adopting a complex systems perspective entails acknowledging emergent features, non-linearities, feedback loops, hierarchy, and adaptability inherent in systems. This perspective suggests that comprehending or fully managing systems, as well as predicting outcomes, is not entirely attainable. Conversely, a complicated system perspective involves identifying the constituents of the urban system and their interconnections to pinpoint precise intervention points.

- In the domain of urban health, the interplay between structure and manifests in two primary manners, the spatial structures of urban areas influence the day-to-day behaviours of urban residents and their well-being and the social structures and actors within urban planning affect decisions that shape these spatial structures. An approach concentrated on urban structure directs attention to urban form or the planning system as the locus for initiating change. Conversely, an agency-focused approach underscores the pivotal role of individuals influencing and reshaping the urban structure.

- The scope of urban health research encompasses a wide range of scales, spanning from individual health behaviours, street-level influences, city and regional environments to the broader impact of global and international factors.

5.3.4.2 Analysing alignment with ontological perspectives

These categories, along with their descriptions, exemplify the Weberian ideal types, portraying the idealised version of each perspective, rather than a representation of an individual study or a case (Hekman, 1983). These frameworks operate as a heuristic tool to effectively contrast and compare the different categories. In reality, however, there are overlaps across categories, and individual research and practice cases may not neatly fit under one exclusive category. Moreover, the categories represented in these two frameworks are not exhaustive of the entire spectrum of urban health approaches. Developed through a systematic approach and being overarching in nature, these categorisations do not necessarily offer in-depth explorations of how they address critical concerns such as the issue of race, poverty, equity and justice. Nevertheless, the value of these frameworks lies in their capacity to serve as an efficient and effective tool to capture the similarities and differences in the presented urban health policy ideas.
Using the descriptions of the urban health ontological perspectives, we conducted a comparative analysis between the urban health policy ideas that were mentioned by the interviewees and each perspective. Following the initial analysis, which yielded the prominent urban health policy ideas and their explanations, JK constructed a matrix for cross-referencing to ascertain alignment between each policy idea and the types of urban health ontological perspectives. Alignment was established when there was a shared view in their conceptual, theoretical, methodological and instrumental approach to the policy idea. That is, we examined how the urban health problem is defined, the nature of the root causes and what are recommended as effective solutions to address the problem.

For example, consider the case of “Creating economic and education opportunities”. This policy idea frames the urban health problem as lack of resources in the urban area and proposes the creation of local opportunities for jobs and education as an effective solution. Within this key idea, interviewees conveyed perspectives on the nature of the urban system, defining health, root causes and pathways and other information that collectively compose a coherent narrative of this policy idea. Interviewees responses under this theme were juxtaposed against each urban health ontological perspective and alignment was ascertained when shared understandings were discernible.

The outcomes of the cross-tabulation were further challenged and questioned in discussion among JK, EdL, BHR and PS. Ultimately, consensus was reach among all co-authors on the final conclusions. While certain ideas occasionally strongly aligned with specific perspectives, the tendency was not quantified in the form of weights. Our assessment solely indicated whether commonalities were observable between the policy idea and the ontological perspective.

5.4 Findings

We begin with an introduction to the Western Parkland City. We then provide an explanation of the characteristics of the seven prominent urban health policy ideas extracted from the interview data. Lastly, we present an examination of how these policy ideas align with the two ontological frameworks of urban health.

5.4.1 Overview of the Western Parkland City

The planning of the Western Parkland City is a regional-scale urban development that will build a third city centre in the Greater Sydney metropolitan area. The region includes eight local councils
and two local health districts (Figure 1). The vision is to create a city where most residents live within 30 minutes of their jobs, education, health and social services, and other amenities (Greater Sydney Commission, 2018a). With the population of the region expected to grow from 1 million in 2016 to 1.5 million in 2036, the local, state and national levels of government are investing over $20 billion to create jobs, housing, road and rail networks, education and training opportunities, open green spaces and other infrastructure and services. The Western Sydney International Airport, which will begin its operations in 2026, and its surrounding ‘aerotropolis’ is one of the major infrastructure projects that is expected to serve as a catalyst for economic growth in the region.

The development of the Western Parkland City is underpinned by the Western Sydney City Deal (Australian Government & NSW Government, 2018), a 20-year partnership agreement between the federal, state and eight local governments in the region. At the Greater Sydney metropolitan level, the Greater Sydney Commission was established in 2015 to coordinate the Greater Sydney metropolitan strategic planning. This strategic plan is guided by four principles: Infrastructure, Sustainability, Productivity, and Liveability (Greater Sydney Commission, 2018a, 2018b). At the Western Parkland City level, the Western Parkland City Authority, a state-level planning agency, was established to deliver the infrastructure, coordinate plans and attract investment to the Western Parkland City. The Western Parkland City Authority states its vision as delivering “Australia’s greenest, most connected and technologically advanced city while maintaining our unique environment, culture and diversity” (Western Parkland City Authority, 2022a, 2022b).
In the planning and execution of the Western Parkland City, involving the community is a crucial step. This involves seeking input from local governments, community groups, and residents at various stages of the process (Greater Sydney Commission, 2018a; Western Parkland City Authority, 2022a). The community is given the opportunity to provide feedback on draft plans, and the actual implementation is carried out in partnership with the community. However, there may be differences in how much the community feels included compared to the viewpoints held by policymakers (Hirono et al., 2017).

The economic, cultural, and social development of Greater Sydney has historically focused on the central business district and the Eastern Suburbs, hence the colloquial reference to the Western Parkland City region as the 'fringe' of Sydney. Currently, the Western Parkland City is peri-urban region that relies heavily on personal automobility and freight trucking, rather than dense public transport network. The region is home to a demographically diverse population, with a significant proportion of residents from culturally and linguistically diverse backgrounds and is home to a large
population of migrants and refugees. According to the 2021 Australian Census, close to 40% of the residents speak a language that is not English in their homes, which is similar to the national average (.id (informed decisions), n.d.).

There also exists a significant variation in relative socio-economic disadvantage among the eight local councils included in the Western Parkland City (.id (informed decisions), n.d.). Notably, four of these local councils are above the national average, whereas the remaining four lag behind. In particular, three councils are in the lowest quintile, with one of them ranking as one of the most disadvantaged local councils in the entire country.

The lack of quality jobs and education opportunities, poor housing and public infrastructure and other harmful social determinants of health has led to health problems and inequities (South Western Sydney Local Health District & South Western Sydney Primary Health Network, 2019). Additionally, the natural geography makes the region particularly vulnerable to climate hazards such as extreme heat events, flooding, bushfires and droughts which have become more frequent and intense due to climate change (The Australia Institute, 2022). The loss of agricultural land and climate change is challenging food security in the region.

5.4.2 Urban health policy ideas in the planning of the Western Parkland City

We identified seven urban health policy ideas in the interviewees’ responses. Each label was chosen to reflect the main components and strategies formally expressed in policy documents and reflected by the interviewees. Inevitably, there are overlaps between the ideas as the policy goals and strategies are interconnected. Nevertheless, each policy idea represents a set of views expressed by the interviewees that are cohesive in the problem definition, policy goals and solutions.

5.4.2.1 A. Creating economic and education opportunities

Interviewees share beliefs and ideas that the root cause of poor health outcomes in this region is attributed to the dearth of economic and educational opportunities compared to the other regions of the Great Sydney metropolitan area. Residents of this region are forced to spend long commuting times to access employment and educational opportunities. The vision of establishing a healthy city is to create a city where residents can secure high-quality jobs and education locally. The financial benefits derived from securing these jobs, combined with shorter commutes, are expected to
facilitate engagement in health-promoting activities, such as spending time with families, engaging in physical activity and participating in community-based cultural events.

For example, in one interviewee’s depiction of a healthy city: “if you have people’s jobs closer to where if there’s a university, if you live in Miller and there’s a high-quality university in Liverpool, well, suddenly you don’t have to catch a bus all the way to Parramatta or all the way down to Wollongong or all the way into the city. You can just catch a bus and to Liverpool so there’s, you know you can improve how people have taken the journey and then you can reduce the journey by any mode.”

One of the strategies to achieve this policy goal is to attract investment and businesses to the region. Several existing policies, such as the Western Parkland City Economic Development Roadmap (Western Parkland City Authority, 2022b), support this policy idea. The construction of new infrastructure, such as the Western Sydney International Airport and the Advanced Manufacture Research Facility, is viewed as a catalyst for building an economic centre for the region (Western Parkland City Authority, 2022b).

5.4.2.2 B. Improving access to amenities and services

Interviewees also identify another goal for fostering health in the Western Parkland City: building a connected and liveable city. A main component for liveability, according to the views in this policy idea, is improving access to amenities and services, which encompasses not only augmenting the quantity and quality of social and community infrastructure but also improving access through better connectivity (Greater Sydney Commission, 2018a; Western Parkland City Authority, 2022a). The 30-minute city vision to improve connectivity and accessibility aligns with this urban health policy idea.

This policy ideas supports “the day-to-day function of what do people need to be able to get places safely and easily, what services and amenities do they need access to close by, how are they going to get there”. Achieving this goal necessitates urban planning based on high-density living and robust transportation networks. Amenities and services refer to a range of both public and private infrastructure and resources such as parks, gardens, sports fields, plazas, libraries, museum, galleries, shopping centres and more. Additionally, it is believed that such a liveable city will attract
investors, businesses and skilled workers as investors “want to also make sure that they have the amenity around them to locate in those locations”.

5.4.2.3 C. Investing in health infrastructure

When asked about initiatives that address health in urban planning, several interviewees swiftly pointed out the establishment of health and education precincts as a major urban health policy idea. This idea entails constructing state-of-the-art hospital infrastructure and services and promoting cutting-edge medical research centres as crucial activities that intersect with healthy urban planning. The Liverpool Innovation District, which encompasses upgrades to Liverpool Hospital and concentrating medical research facilities, serves as an example of this policy idea (Western Parkland City Authority, 2022b, 2022a). This is captured well in a statement from one of the interviewees that “leveraging the government unprecedented level of investment in health infrastructure would bring greater not just social but also economic benefits for the broader community”.

Although many of the interviewees acknowledged this idea to be one of the prominent urban health policy ideas in the implementation of the Western Parkland City such as in Objective number 21 in the Regional Plan (Greater Sydney Commission, 2018a), a few explicitly stated that it does not align with their vision of a healthy city. They felt that there is no direct indication of how upgrading hospitals will contribute to the health and wellbeing of the community, except that the investment will act as a catalyst for economic development in the region and will offer training opportunities and jobs for Western Parkland City residents. In the views of interviewees’ who lean towards the social determinant of health, “it was really satisfying to see that their idea of health wasn’t health infrastructure or health services”.

5.4.2.4 D. Creating and designing healthy spaces

This policy idea places emphasis on providing public areas like parks, open spaces and streets, with a focus on designing them in a way that promotes health and social benefits. These public spaces serve crucial social functions and allow residents to engage in health-promoting activities like walking, cycling, sports and cultural events. This view is encapsulated in one interviewee’s view on creating streets and spaces that have “things to see and do, places to rest. So, it kind of gives the street animation. I mean, there's people there, there's social connection. Everyone's feeling welcome.
It’s easy to cross the street. And those things attached to so many different health issue and outcomes.”

Therefore, it is important that they are an integral part of urban infrastructure planning, and designed in a way that caters to the needs of the community of the Western Parkland City, ideally with their involvement. However, the interviewees did not specify the nature of the needs of the community as they believe these needs are addressed through engagement of the community in their contextual settings. Several initiatives, such as the use of the Healthy Streets Framework (www.healthystreets.com) and creation of cycling networks are initiatives that are aligned with this policy idea.

5.4.2.5  E. Conserving the natural environment

When asked how health is being considered in the Western Parkland City, interviewees pointed out the distinction between human health and the health of the environment. One interviewee states that “in our plan, there are these two different ways we talk about health. We talk about human health and then we talk about natural health, so, you know, the health of waterways, the health of biodiversity”.

The Western Parkland City, which spans 800,000 hectares, features protected natural areas that encompass world heritage and nature reserves that comprise 63% of the total area. This region boasts significant biodiversity values and serves as the home of Greater Sydney’s drinking water catchment. Adopting an integrated "blue-green grid" approach can accomplish several objectives, such as safeguarding the natural environment and its ecosystems while simultaneously providing recreational opportunities for residents in the form of parks and waterways (Greater Sydney Commission, 2018b; Western Parkland City Authority, 2022a). The interviewees also pointed out that the health of the environment contributes directly to human health by providing cooling effects and reducing air pollution, represented in the statement that “increased risk of all the health conditions that can come from being in a hot environment without access to cool water, access to cool air and all those things...the reason we’re really interested in it is because of human health, human wellbeing.”
5.4.2.6   F. Building resilience to climate hazards

Interviewees emphasised “the need to ensure resilience to natural hazards like flooding and bushfire” as another health-related urban planning goal. The Western Parkland City is susceptible to severe weather events, not only due to its natural terrain, but also because of its inadequate infrastructure and the demographics of its population. The region has recently witnessed several noteworthy natural disasters, including floods, bushfires, and prolonged periods of extreme heat. Climate change prediction modelling is used to continuously monitor these risks, and policies are being developed to manage flooding and increase canopy cover in the area. These policy objectives are reflected in the planning of the Western Parkland City in the Regional Land Use Planning Framework for the Hawkesbury-Nepean Valley floodplain (Western Parkland City Authority, 2022a), the Turn Down the Heat project (Western Sydney Regional Organisation of Councils, 2018) and as planning priorities in the Western District Plan (Greater Sydney Commission, 2018b).

5.4.2.7   G. Promoting healthy food environments

Food security has been identified as a critical urban health issue in the region by policy actors at the local level, yet the interviewees remarked this concern is not given sufficient emphasis in regional planning. The loss of agricultural land is cited by local actors as a leading cause of poor food security in the area, with limited access to healthy and fresh food being linked to negative health outcomes such as obesity and diabetes. The Western District Plan aims to promote local access to healthy fresh food and support local fresh food production (Greater Sydney Commission, 2018b). Local councils are required to develop strategies to achieve this objective in their local plans. However, this goal has been difficult to achieve and has even been at risk of being omitted from the plans as councils struggle to meet its targets. One interviewee recalled, “We want people to have access to healthy, fresh foods, to supermarkets, to fruit, vegetables, fresh water, drinking water. It was just the very basics. And the councils were struggling with it. The planners at the state level were going, ‘I don’t know what we put in here. It’s too hard. Let’s just get rid of it.’” Nevertheless, this policy idea is featured as a critical policy goal in the strategic plan of the Western Sydney Health Alliance (Western Sydney Health Alliance, 2022), a partnership between local councils, local health districts and primary health networks in the region.
5.4.2.8  Summary of the key urban health policy ideas in the Western Parkland City

A summary of the key urban health policy ideas is presented in Table 5.1.
Table 5.1 Summary of the key urban health policy ideas in the Western Parkland City

<table>
<thead>
<tr>
<th>Summary</th>
<th>Creating jobs and education opportunities</th>
<th>Improving access to amenities and services</th>
<th>Investing in health infrastructure</th>
<th>Creating and designing healthy spaces</th>
<th>Conserving the natural environment</th>
<th>Managing and building resilience to impacts of climate change</th>
<th>Promoting healthy food environments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attracting investment and businesses to the region.</td>
<td>Creating jobs and education opportunities</td>
<td>Improving access to amenities and services</td>
<td>Investing in health infrastructure</td>
<td>Creating and designing healthy spaces</td>
<td>Conserving the natural environment</td>
<td>Managing and building resilience to impacts of climate change</td>
<td>Promoting healthy food environments</td>
</tr>
<tr>
<td>30-minute city, improving connectivity, high density planning, jobs and services closer to home.</td>
<td>30-minute city, improving connectivity, high density planning, jobs and services closer to home.</td>
<td>Building, upgrading hospitals and health services.</td>
<td>Investing in public spaces, healthy streets, walkability, cycle paths, urban design, shared spaces</td>
<td>Open spaces and parklands, green grid, protecting the environment</td>
<td>Dealing with urban heat, strengthening resilience against hazards (floods, fires), environmental sustainability, carbon neutral</td>
<td>Improving access to healthy food and food security</td>
<td></td>
</tr>
<tr>
<td>Living close to home saves commute time for other ‘healthy’ activities (e.g., time spent with family)</td>
<td>Jobs and skills training opportunities, income, catalyst for economic growth of the region</td>
<td>Investing in the ‘health’ sector, improving healthcare services, advancing the healthcare industry</td>
<td>Social functions of public spaces, health benefits of active lifestyles, recreation</td>
<td>Health of the ‘environment’ and biodiversity influence human health</td>
<td>Protecting the community from hazards</td>
<td>Providing the community with healthier nutrition and preventing obesity</td>
<td></td>
</tr>
<tr>
<td>Economic Development Roadmap, Advanced Manufacturing Research Facility</td>
<td>Delivering a connected City policy goal, cultural and community facilities</td>
<td>Liverpool Innovation Precinct, Multiversity, Objective 21, Health and Education Precincts</td>
<td>Objective 7, Healthy Streets Framework, Healthy Built Environment Framework</td>
<td>Cumberland Plain Conservation Plan, 50-year vision for Greater Sydney’s open space and parklands, Objective 27</td>
<td>Hawkesbury-Nepean flooding modelling, Turn down the heat plan, Net zero by 2050</td>
<td>Western Sydney Health Alliance Strategic Plan 2022-25</td>
<td></td>
</tr>
</tbody>
</table>
5.4.3 Ontological perspectives of the urban health policy ideas

The seven identified urban health policy ideas that appear in the Western Parkland City planning are associated with various ontological perspectives on urban health. In this section, we demonstrate how these policy ideas correspond to the four urban health paradigms and the five urban health research traditions. The variety of urban health paradigms and research traditions highlights the ontological diversity among the various urban health policy ideas, forming the foundation for transdisciplinary policymaking and research.

5.4.3.1 Alignment with the four urban health paradigms

Table 5.2 presents how the seven urban health policy ideas align with the four urban health paradigms (Kim et al., 2022), which are differentiated according to their conceptual, theoretical, methodological, and instrumental perspectives. While all policy ideas share some commonalities with the urban health science and healthy built environments paradigms, the ‘Creating jobs and education opportunities,’ ‘Improving access to amenities and services,’ and ‘Investing in health infrastructure’ policy ideas are predominantly associated with the medical-industrial city paradigm, which prioritises an economic and business-oriented approach to promoting healthy cities. On the other hand, the health social movement paradigm is less represented, with only ‘Creating and designing healthy spaces’ and ‘Promoting healthy food environments’ having some elements that correspond with this paradigm.
Table 5.2 Alignment of policy ideas with the four urban health paradigms

<table>
<thead>
<tr>
<th>Urban health policy idea</th>
<th>Four urban health paradigms</th>
<th>Medical-industrial city</th>
<th>Urban health science</th>
<th>Healthy built environment</th>
<th>Health social movements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creating jobs and education opportunities</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Improving access to amenities and services</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Investing in health infrastructure</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Creating and designing healthy spaces</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Conserving the natural environment</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Building resilience to climate hazards</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Promoting healthy food environments</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td></td>
</tr>
</tbody>
</table>

* indicates alignment of views is present; - no alignment of views

Food security has been identified as a critical urban health issue in the region by policy actors at the local level, yet the interviewees remarked this concern is not given sufficient emphasis in regional planning. The loss of agricultural land is cited by local actors as a leading cause of poor food security in the area, with limited access to healthy and fresh food being linked to negative health outcomes such as obesity and diabetes. The Western District Plan aims to promote local access to healthy fresh food and support local fresh food production (Greater Sydney Commission, 2018b). Local councils are required to develop strategies to achieve this objective in their local plans. However, this goal has been difficult to achieve and has even been at risk of being omitted from the plans as councils struggle to meet its targets. One interviewee recalled, “*We want people to have access to healthy, fresh foods, to supermarkets, to fruit, vegetables, fresh water, drinking water. It was just the very basics. And the councils were struggling with it. The planners at the state level were going, 'I don't know what we put in here. It's too hard. Let's just get rid of it.'*” Nevertheless, this policy idea is featured as a critical policy goal in the strategic plan of the Western Sydney Health Alliance (Western Sydney Health Alliance, 2022), a partnership between local councils, local health districts and primary health networks in the region.
5.4.4 Summary of the key urban health policy ideas in the Western Parkland City

A summary of the key urban health policy ideas is presented in Table 3.
Table 3. Summary of the key urban health policy ideas in the Western Parkland City

<table>
<thead>
<tr>
<th>Creating jobs and education opportunities</th>
<th>Improving access to amenities and services</th>
<th>Investing in health infrastructure</th>
<th>Creating and designing healthy spaces</th>
<th>Conserving the natural environment</th>
<th>Managing and building resilience to impacts of climate change</th>
<th>Promoting healthy food environments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Summary</strong></td>
<td>Attracting investment and businesses to the region.</td>
<td>30-minute city, improving connectivity, high density planning, jobs and services closer to home.</td>
<td>Building, upgrading hospitals and health services.</td>
<td>Investing in public spaces, healthy streets, walkability, cycle paths, urban design, shared spaces</td>
<td>Open spaces and parklands, green grid, protecting the environment</td>
<td>Dealing with urban heat, strengthening resilience against hazards (floods, fires), environmental sustainability, carbon neutral</td>
</tr>
<tr>
<td><strong>Link with health</strong></td>
<td>Jobs and skills training opportunities,</td>
<td>Living close to home saves commute time for other ‘healthy’</td>
<td>Investing in the ‘health’ sector, improving healthcare services,</td>
<td>Social functions of public spaces, health benefits of</td>
<td>Health of the ‘environment’ and biodiversity</td>
<td>Protecting the community from hazards</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Providing the community with healthier nutrition and</td>
</tr>
</tbody>
</table>

136
<table>
<thead>
<tr>
<th>Income, catalyst for economic growth of the region</th>
<th>Activities (e.g., time spent with family)</th>
<th>Advancing the healthcare industry</th>
<th>Active lifestyles, recreation</th>
<th>Influence human health</th>
<th>Preventing obesity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic Development Roadmap, Advanced Manufacturing Research Facility</td>
<td>Delivering a connected City policy goal, cultural and community facilities</td>
<td>Liverpool Innovation Precinct, Multiversity, Objective 21, Health and Education Precincts</td>
<td>Objective 7, Healthy Streets Framework, Healthy Built Environment Checklist</td>
<td>Cumberland Plain Conservation Plan, 50-year vision for Greater Sydney’s open space and parklands, Objective 27</td>
<td>Hawkesbury-Nepean flooding modelling, Turn down the heat plan, Net zero by 2050</td>
</tr>
</tbody>
</table>
5.5 Ontological perspectives of the urban health policy ideas

The seven identified urban health policy ideas that appear in the Western Parkland City planning are associated with various ontological perspectives on urban health. In this section, we demonstrate how these policy ideas correspond to the four urban health paradigms and the five urban health research traditions. The variety of urban health paradigms and research traditions highlights the ontological diversity among the various urban health policy ideas, forming the foundation for transdisciplinary policymaking and research.

5.5.1 Alignment with the four urban health paradigms

Table 2 presents how the seven urban health policy ideas align with the four urban health paradigms (Kim et al., 2022), which are differentiated according to their conceptual, theoretical, methodological, and instrumental perspectives. While all policy ideas share some commonalities with the urban health science and healthy built environments paradigms, the ‘Creating jobs and education opportunities,’ ‘Improving access to amenities and services,’ and ‘Investing in health infrastructure’ policy ideas are predominantly associated with the medical-industrial city paradigm, which prioritises an economic and business-oriented approach to promoting healthy cities. On the other hand, the health social movement paradigm is less represented, with only ‘Creating and designing healthy spaces’ and ‘Promoting healthy food environments’ having some elements that correspond with this paradigm.

Table 4 Alignment of policy ideas with the four urban health paradigms

<table>
<thead>
<tr>
<th>Urban health policy idea</th>
<th>Four urban health paradigms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Medical-industrial city</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Creating jobs and education opportunities</td>
<td>+</td>
</tr>
<tr>
<td>Improving access to amenities and services</td>
<td>+</td>
</tr>
<tr>
<td>Investing in health infrastructure</td>
<td>+</td>
</tr>
<tr>
<td>Creating and designing healthy spaces</td>
<td>-</td>
</tr>
<tr>
<td>Conserving the natural environment</td>
<td>-</td>
</tr>
<tr>
<td>Building resilience to climate hazards</td>
<td>-</td>
</tr>
<tr>
<td>Promoting healthy food environments</td>
<td>-</td>
</tr>
</tbody>
</table>

+ indicates alignment of views is present; - No alignment of views

With reference to the four urban health paradigms, the urban health science and healthy built environments paradigms were seen in all seven policy ideas. The medical industrial city paradigm appeared in three of the policy ideas, while the health social movements paradigm was seen in two of the policy ideas.
5.5.1.1 Alignment with the five urban health research traditions

Table 5.5 displays the alignment between the urban health policy ideas and the five urban health research traditions (de Leeuw et al., 2023). The majority of policy ideas exhibit a connection to the healthy urban planning and sustainable urban development research traditions, with healthy urban planning demonstrating a slightly more prominent presence. Interestingly, the ‘Investing in health infrastructure’ policy idea does not align with any of the five urban health research traditions, while the ‘Conserving the natural environment’ policy idea associates with elements of all five. Additionally, the ‘Creating jobs and education opportunities,’ ‘Improving access to amenities and services,’ and ‘Investing in health infrastructure,’ policy ideas demonstrate less overlap across the five urban health research traditions compared with the other four policy ideas.

Table 5.5 Alignment of policy ideas with the five urban health research traditions

<table>
<thead>
<tr>
<th>Urban health policy idea</th>
<th>Sustainable urban development</th>
<th>Urban ecosystem services</th>
<th>Urban resilience</th>
<th>Healthy urban planning</th>
<th>Urban green spaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creating jobs and education opportunities</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Improving access to amenities and services</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Investing in health infrastructure</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Creating and designing healthy spaces</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Conserving the natural environment</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Building resilience to climate hazards</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Promoting healthy food environments</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
</tbody>
</table>

+ indicates alignment of views is present; - no alignment of views

With reference to the five urban health research traditions, the sustainable urban development and healthy urban planning traditions were each seen in six of the seven policy ideas. We assessed that the views of the urban ecosystem services research tradition were
aligned with three of the policy ideas, and the urban resilience and urban green spaces can be found in two.

5.5.1.2 Outlook on systems, locus of change and scale of the policy ideas

Lastly, we observed a diverse range of differences in the outlook on systems as either complicated or complex, the relationship between structure and agency regarding the locus of change, and the scale at which the policy idea addresses the urban health issue (Table 5.6). For each policy idea, there is a mix of views on each dimension.

Table 5.6 Alignment with the outlook on systems, locus of change and scale

<table>
<thead>
<tr>
<th></th>
<th>Systems</th>
<th>Change</th>
<th>Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Complicated</td>
<td>Complex</td>
<td>Structure</td>
</tr>
<tr>
<td>Creating jobs and education opportunities</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Improving access to amenities and services</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Investing in health infrastructure</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Creating healthy public spaces</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Conserving natural environments</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Building resilience to climate hazards</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Promoting healthy food environments</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

+ indicates alignment of views is present; - no alignment of views

The seven policy ideas adopt a view of systems that is complicated more than complex, favour change driven by structure rather than agency, and involve many activities at all of the individual, community and regional scales.
5.6 Discussion

While the need to apply health political science and transdisciplinary approaches to urban health research and policymaking has been widely acknowledged, previous discussions were primarily conceptual (de Leeuw et al., 2021; Kim et al., 2022; Lawrence & Gatzweiler, 2017). This study builds on those conceptual arguments by applying a health political science lens to understanding urban health policy ideas in a current major urban planning program in Sydney, Australia. We believe that the findings of our empirical examination of the ontological backgrounds of current urban health policy ideas make a novel contribution to the literature.

This case study identified seven urban health policy ideas embedded in the planning of Sydney’s Western Parkland City and examined the nature of these ideas using urban health ontological frameworks. The urban health policy ideas may appear to be based on the domains of different sectors such as transportation, housing, public health, urban planning, however, they are, in fact, a blend of ontological perspectives, reflecting different paradigmatic views on the conceptualisation of the urban health issue.

One notable observation from the study is that the dominant ontological paradigms in the Western Parkland City are the medical-industrial and urban health science paradigms. Similarly, the urban health policy ideas showed strong alignment with the sustainable urban development and healthy urban planning research traditions. These prevailing ontological perspectives lean towards rather positivist and technocratic approaches, relying on science-driven evidence and economic valuation to define problems and justify action. They tend to adopt a complicated view of the urban system emphasising transformation of physical and social structures rather than mobilising agency. Consequently, there is a belief that the policy problems are informed through analysing the causal mechanisms, and in developing policy solutions, quantitative and measurable outputs are considered drivers of change. These views fundamentally contrast with ontological frameworks that perceive the urban system as dynamic entities capable of self-organisation and adaptation to internal and external change. Here, leveraging agent behaviours and the system itself are of key importance.
Although significant progress has been made in recognising urban health as a policy priority in planning the Western Parkland City, a lack of social justice and health equity values remains lacking. This disparity becomes particularly relevant in the context of this region, where interviewees mentioned disadvantage as a fundamental driver behind this large-scale regional plan. This discrepancy can be partially understood within the context of prevailing urban health ontological perspectives steering the urban health policy ideas. When policy ideas do not align with the views of the dominating paradigms, they often face rejection. The policy idea of addressing healthy food environments is an example of this observation. The interviewees mentioned this policy idea to require a health equity value-driven health social movement or a social justice approach. And despite being recognised as a long-standing priority issue in the region (Lawton & Morrison, 2022; Nolan et al., 2006), this policy idea has repeatedly failed effective policy action due to misalignment between the principles underpinning this policy idea and the positivist and technocratic views of the dominant urban health paradigm. This finding underscores the importance of recognising the influence of dominant paradigms in shaping urban health policy and the need for a more inclusive and diverse approach to policymaking.

Another key observation revolves around the prevalence of the health infrastructure policy idea in the Western Parkland City, which does not appear to align with any of the urban health research traditions. This observation can be interpreted in several ways. Firstly, it may stem from the nature of the urban health research tradition framework that was applied, which was developed through a meta-narrative review of urban health scientific literature grounded in the disciplines of planning and health. Meanwhile, the health infrastructure policy idea leans toward business-driven approach, often associated with more business-oriented disciplines. Alternatively, these views may not be extensively documented in scientific literature but rather confined to practice and policy domains. Lastly, this observation implies that in the real world, the interests of the private sector such as the construction sector, developers, landowners and health industries exert greater influence in policymaking compared to science-generated evidence. These interpretations collectively underscore the greater involvement of nonacademic actors in transdisciplinary approaches in urban health research, practice and policymaking.
5.6.1 Implications for transdisciplinary urban health policymaking

The finding that urban health policy ideas tackle diverse aspects of urban health and draw on different ontological perspectives highlights the complex nature of fostering health in real-world urban planning policymaking and planning. Meaningful collaborations cannot and should not be confined to intersecting areas (Lawrence, 2021; Ramadier, 2004), and the discovery of various ontological perspectives underpinning urban health policy ideas underscores the need for a transdisciplinary approach. Transdisciplinary approaches address ‘real-world’ problems, are impact-focused, integrate knowledge and problem definition, recognise the diversity of ontologies perspectives of relevant knowledge, and achieve effectiveness through contextualizing the project within science and society.

However, transdisciplinary action remain challenging to implement as they often require additional time and resources require stakeholders to be open to new ways of working and willing to learn from others (Black et al., 2019). Moreover, current institutional practices do not often cultivate these types of collaborations. Despite this, some efforts are being made, such as the experimentation of “living labs” (Boonstra & Rauws, 2021; Laborgne et al., 2021). These spaces foster transdisciplinary collaboration by bringing together researchers, policymakers and other stakeholders to address real-world problems and generate practical solutions.

This case study, while not intended to be taken as an illustration of a transdisciplinary research, demonstrates the utility of using urban health ontological frameworks in gaining a deeper understanding of the perspectives that for the foundation of urban health policy ideas. By identifying the underpinning assumptions and articulating similarities and differences, stakeholders can find opportunities for collaboration.

5.6.2 Limitations and directions for future research

While this study sheds light on the ontological foundations of urban health policy ideas, there are still unanswered questions that could inform transdisciplinary policymaking. The ontological frameworks utilised in this study are primarily from a public health perspective and are not exhaustive. As the urban planning literature evolves (Haghani et al., 2023), new
perspectives may need to be added to the urban health ontological frameworks. Future research could benefit from critically reviewing and revising these frameworks to reflect emerging knowledge and paradigms. Further research could also explore the acceptance of certain policy ideas among policy actors and how and why these certain ideas gain power. Understanding these factors could be useful in influencing informing and guiding transformative policy change.

5.7 Conclusion

In conclusion, we identified seven prominent urban health policy ideas that coexist in the planning of the Western Parkland City and that the ontological perspectives we found aligned with the medical-industrial city and urban health science paradigms, sustainable urban development and healthy urban planning research traditions. The finding of this case study highlights the complexity and diversity of ontological perspectives that underpin urban health policy ideas in real-world urban planning policymaking. The findings suggest that urban health policy ideas draw upon different ontological perspectives and are not limited to the knowledge or expertise of specific sectors. This observation underscores the need for a transdisciplinary approach to policymaking, which requires collaboration across different stakeholders, disciplines, sectors, and communities. By integrating knowledge and collaborative problem definition, policymakers and planners can address the complexity and achieve effective urban and health outcomes.

The study offers a framework for fostering transdisciplinary collaborations in policymaking and emphasises the importance of recognising the influence of ontological perspectives and paradigms in shaping urban health policy. The empirical evidence of the ontological backgrounds of urban health policy ideas provides valuable insights for policymakers seeking to promote health through urban planning. Ultimately, this research highlights the need for coherent transdisciplinary problem definition, goal setting, and solution identification and implementation to ensure transformative actions that promote health in urban areas.
5.8 Summary and implications

5.8.1 Contribution to overall research aims and questions

This Chapter responds to the second objective of this thesis, to examine the implications of the differing ontological perspectives in advancing transdisciplinary approaches to urban health. To respond to this question, I applied the four urban health paradigms and the five urban health research traditions to examine the nature of the urban health policy ideas that appear in the planning of the Western Parkland City. The findings highlight the complexity and diversity of urban health policy ideas in real-world urban planning policymaking. This observation underscores the need for a transdisciplinary approach to policymaking that allows policymakers to address the complexity by integrating knowledge and developing collaborative problem definitions and solutions.

5.8.2 Implications for theory and practice

The study provides a framework for policymakers to foster transdisciplinary collaborations in policymaking and stresses the importance of acknowledging the influence of ontological perspectives and paradigms in shaping urban health policy. The empirical evidence of the ontological backgrounds of urban health policy ideas offers valuable insights for policymakers seeking to promote health through urban planning. This research highlights the importance of coherent problem definition, goals, and proposed solutions to for the development of transformative policy decisions that promote health in urban areas.

Practically, the process of identifying urban health policy ideas and applying urban health ontological frameworks to analyse them can be used as a tool to identify and engage stakeholders. This process can also be replicated in other cases to map the ontological characteristics of urban health policy ideas in planning projects and policies.

5.8.3 Remaining questions

While this study sheds light on the ontological foundations of urban health policy ideas, there are still unanswered questions, the answers to which could inform transdisciplinary
policymaking. The ultimate goal of transdisciplinary policymaking is to bring about action-oriented system transformation. However, this study was not designed to provide insight into which policy ideas are most effective in addressing the urban health issues prioritized in the Western Parkland City. Nor was it designed to evaluate whether the proposed policy ideas align with those priorities.

Moreover, the ontological frameworks utilised in this study are primarily from a public health perspective and are not exhaustive. Particularly, as urban planning literature evolves (Haghani et al., 2023), new perspectives may gain importance in policymaking. Future research could benefit from critically reviewing and revising these frameworks to reflect emerging knowledge and paradigms.

Further research could also explore the acceptance of certain policy ideas among policy actors and how and why these ideas gain power. Understanding these factors could be useful in influencing transformative policy change.
5.9 Supplement 1. Interview questions

Q1. Could you tell me the story of how you first got involved, personally, in the Western Parkland City planning and implementation?

- When? What was the context? How did it happen? Any other actors involved?
- What was/is the nature of your involvement in the development of the Western Parkland City?
  - How long have you been involved?
  - How is your work/position related to the project? What roles did you have in the planning of the Western Parkland City?
  - Did the nature of your involvement change since then? If yes, how and why?
  - What were your first thoughts about the Western Parkland City?

Q2. In your own words, could you give me an overview of what the “Western Parkland City” is?

- What is it?
- What do you think about the development of the Western Parkland City in general?
- Why is it important to you?
- What do you think the most important goal of the Western Parkland City is?
  - What is your/your organisation’s main agenda for the Western Parkland City?
  - What do you hope the Western Parkland City achieves for the region?

Q3. What does the concept of ‘health’ in the development of the Western Parkland City mean to you?

- Are there any specific projects in the Western Parkland City that you think will contribute to health?
- [Probing questions]
  - Can you explain more?
  - What does it mean to you that...?
  - Why is it important that...?
- Do you think health is considered in the Western Parkland City?
- How do you think health should be considered in the Western Parkland City?
- What do you think is the most important aspect of health that needs to be addressed in the Western Parkland City?
  - Health equity (disadvantage)
  - Population groups, regions, areas
  - Social determinants of health, policy areas
  - Health risks and outcomes
• What do you think about the underlying causes of the health and health equity issues in Western Sydney?
  o How can they be addressed through the Western Parkland City?
• [If health equity isn’t mentioned at all] What about disadvantages to health?

[If the interviewee presented a strong agenda on health and health equity]

• To what extent do/did you and/or your organisation discuss health in relation to the Western Parkland City?
  o [If they did] How did this happen? Did you formulate any policy or goals for the Western Parkland City planning?
• To what extent are/were health or health equity discussed either informally with other organisations involved with developing the Western Parkland City plans or formally during the actual development of plans?
  o [If they were] How? Who initiated this?

Q4. In your view, does/did anyone else have a specific agenda for health?

• What do/did you think of their health and health equity agenda?
• Which aspects do you agree/disagree with?
• Are there any other organisations or groups that you think have a specific health agenda?

Q5. What would you say your version of the healthiest Western Parkland City look like?

• Is there a particular model or global city that you think would work for Western Sydney?
• Would this be feasible in Western Sydney?

Q6. Is there anything you’d like to add that I haven’t given you the chance to talk about?

Q7. Do you have any suggestions of people I should speak to next?

• People you mentioned during the interview?
• People inside your organisation?
• People outside your organisation?
Table 1. Summary of the four urban health paradigms (Kim et al., 2021)

<table>
<thead>
<tr>
<th>Medical-industrial city</th>
<th>Urban health science</th>
<th>Healthy built environments</th>
<th>Health social movement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focuses on the development of healthcare facilities as a key urban planning project in the city or the application of technology to the urban infrastructure to monitor or change disease, risk factors and behaviour of individuals.</td>
<td>Applies epidemiological and complex systems analyses to urban health issues and emphasises the role of hard evidence on the causal relationships between the urban environment and human health outcomes to develop effective interventions and policies.</td>
<td>Originates from the urban planning discipline and advocates for the integration of health in the practice of spatial planning of cities. Spatial planning encompasses all aspects of human habitat and settlements that impinge on physical space.</td>
<td>Seeks to integrate health considerations into all aspects of urban governance (including decisions about the urban built environment), with an emphasis on operationalising values such as health equity and empowerment.</td>
</tr>
<tr>
<td>The processes involved in the promotion of health and management of illnesses are viewed as commodities. Takes a biomedical and individualistic approach to health and illness.</td>
<td>Health is generally viewed in terms of risk factors for disease outcomes.</td>
<td>Health is often described as health-promoting lifestyles, wellbeing, quality of life, or flourishing.</td>
<td>Socio-ecological view on health, an explicit focus on health equity and empowerment.</td>
</tr>
<tr>
<td>Healthcare infrastructure and health-related technologies are regarded as drivers for a thriving economy.</td>
<td>The urban built environment is regarded as a determinant of health, exhibiting risk factors or facilitators for health outcomes.</td>
<td>Focus on urban planning elements (e.g., housing, transportation, etc.) and their impact on health-promoting lifestyles.</td>
<td>Focus on sociopolitical factors of urban governance and system outcomes. Interventions are often viewed as outcomes of the sociopolitical factors.</td>
</tr>
<tr>
<td>Business logic and economic modelling (e.g., return on investment) (Social) epidemiological analyses to explain causality and evaluate effectiveness.</td>
<td>Interdisciplinary interpretation of health in architectural and urban planning</td>
<td>Fourth generation evaluation of urban planning realism synthesis</td>
<td>Value-driven community empowerment approach to transform the urban environment.</td>
</tr>
<tr>
<td>Investment in healthcare infrastructure as drivers of economic growth (e.g., jobs, income, education, etc.) Expert-led empirical evidence-based interventions and technological solutions.</td>
<td>Influencing the planning system and urban planning regulations and processes.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health and innovation precincts models for urban development</td>
<td>Urban health indicators Partnership for Healthy Cities (Bloomberg Foundation)</td>
<td>Healthy urban planning principles and guidelines</td>
<td>WHO Healthy Cities movement</td>
</tr>
<tr>
<td>Key urban health concept</td>
<td>Sustainable urban development</td>
<td>Urban ecosystem services</td>
<td>Urban resilience</td>
</tr>
<tr>
<td>--------------------------</td>
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</tr>
<tr>
<td><strong>View on the urban system and its health implications</strong></td>
<td>Urban development policies that balance environmental, social and economic goals.</td>
<td>Health benefits generated by ecosystem services provided by urban green and blue landscape patterns.</td>
<td>Ability of the urban system to adapt and transform to absorb disruptions, reorganise and maintain desired functions.</td>
</tr>
<tr>
<td>The urban governance structures and processes develop policies that have environmental, ecological and social consequences.</td>
<td>The urban landscape pattern is a key component of the urban socio-ecological system. Human actions determine land-use decisions that shape landscape patterns and ecosystem services.</td>
<td>The city is a complex adaptive system that is chaotic, complex, uncertain and unpredictable. A city that is resilient has the capacity to achieve desired goals such as sustainability.</td>
<td>The multiplex networks resulting from urban planning processes and their determinants inform pathways to improve urban health outcomes.</td>
</tr>
<tr>
<td><strong>Knowledge production and research questions</strong></td>
<td>Comparisons between cities and against indicators and benchmarks. Factors influencing development of sustainable urban policies.</td>
<td>Applying hierarchical patch dynamics framework to landscape planning, monitoring and modelling of land-use change.</td>
<td>The knowledge production processes that are co-produced by scholars and practitioners is more important than a particular research method or approach.</td>
</tr>
<tr>
<td><strong>Solutions to improve urban health</strong></td>
<td>Indicators, benchmarks and assessment tools to evaluate cities’ sustainability policies.</td>
<td>Model the identification and valuation of ecosystem services to influence land-use planning decisions.</td>
<td>Create “safe-to-fail” adaptive urban systems through better understanding the urban socio-ecological system and human-dominated systems.</td>
</tr>
</tbody>
</table>
Chapter 6:

DISCUSSION & CONCLUSION
This thesis critically examined the various ontological frameworks within the field of urban health and identified a range of differing frameworks that exist in current urban health research and practice. This work is unique because previous studies have primarily focused on descriptive differences between urban health approaches, often overlooking the significance of understanding the underlying similarities and differences. The overall argument of this thesis leads to a call for the recognition and respect of the diversity of urban health approaches. Rather than seeking a comprehensive framework that achieves consensus from all involved participants, I argue for the acknowledgement of diversity and the inclusion of the differing ontological perspectives.

Another significant contribution of this study is the advancement of knowledge on transdisciplinary urban health research and policymaking, which has not been sufficiently explored and developed. Transdisciplinary approaches to urban health are especially significant as they connect different approaches to urban health and reside in an area that challenges conventional disciplinary boundaries.

In this Chapter, I provide a summary of the findings in relation to the research questions in Section 6.1. I then discuss the implications for theory and practice by interpreting how these findings can advance transdisciplinary urban health research and policymaking in Section 6.2. Finally, in Section 6.3, I address some of the remaining gaps and directions for future research.
6.1 Summary of findings against the research question

This thesis aimed to seek answers to the following research question:

**What are the diverse ontological perspectives on urban health and what implications do they have in advancing transdisciplinary approaches to urban health thinking?**

To address this question, two objectives were set:

- Objective 1. To identify and articulate differing ontological perspectives on urban health.
- Objective 2. To examine the implications of these differing perspectives in advancing transdisciplinary approaches to urban health.

Through three main research components, the research objectives have been addressed. The findings against the research objectives are summarised in Table 6.1.

In summary, four urban health paradigms (Chapter Two) and five urban health research traditions (Chapter Four) were found, which were further analysed to identify the dimensions that characterise their ontological viewpoints. These viewpoints were applied to examine the ontological backgrounds behind urban health policy ideas in a real-world urban planning context. It was found that policy ideas stem from diverse ontological understandings where some views are more dominant than others (Chapter Five). It is worth reemphasising that these diverse views are characteristic not only of their disciplinary origins or the specific urban health issues they address. The differences represent differences in the worldview of which areas of the urban health issue are important and worth addressing, the views on the causal mechanisms, and which methodologies and solutions are appropriate to better understand and address these issues.
Table 6.1 Summary of research findings

<table>
<thead>
<tr>
<th>Research objective</th>
<th>Chapters</th>
<th>Key findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>To identify and articulate differing urban health ontological perspectives</td>
<td>2</td>
<td>Four urban health paradigms have been identified as: medical-industrial city, urban health science, healthy built environments, and health social movement. These four urban health paradigms each have characteristic conceptual, theoretical, methodological and instrumental understandings towards urban health issues.</td>
</tr>
<tr>
<td></td>
<td>3-4</td>
<td>Five urban health research traditions have been identified using a meta-narrative review of the scientific literature that studies urban health. The five urban health research traditions are: sustainable urban development, urban ecosystem services, urban resilience, healthy urban planning, and urban green spaces. These five urban health research traditions were not only characteristic in their topic areas, but also have differing views on the perspective of the urban system as complicated or complex, the agent and structure relationship, and on the scale.</td>
</tr>
<tr>
<td>To examine the implications of differing urban health ontological perspectives</td>
<td>5</td>
<td>In a case study of planning the Western Parkland City in Sydney, Australia, a range of urban health policy ideas was identified. The ontological backgrounds of these policy ideas were examined using the ontological perspectives identified in the previous sections. The findings revealed a mix of different ontological backgrounds behind the policy ideas, with some ontological views being more dominant than others. These findings underscore the complexity of ontological perspectives that coexist in real-world urban planning policymaking and suggest policy actors consider the coherence of multiple ontologies when developing transdisciplinary collaborations.</td>
</tr>
</tbody>
</table>

6.2 Reflection of findings

In this section, I offer a reflective analysis of the findings from my personal paradigmatic standpoint. The conclusions drawn from this thesis underscore the prominence of the
medical-industrial city and urban health science paradigms within contemporary urban health research, practice and policy. Meanwhile, the influence of the health social paradigm is less pronounced. The prevalence of this expert-led, rigorous, scientific evidence and economic valuation is also strongly reflected in the findings of the meta-narrative review of the urban health literature and in the case study of planning Sydney’s Western Parkland City.

In the Introduction of this thesis, I have already introduced critical realist ontology as my philosophical background. To reiterate, this ontology focuses on the underlying social structures and mechanisms that may not be immediately apparent but significantly shape emergent properties such as population health and especially the inequitable distribution of these outcomes. Considering this ontological understanding, it becomes essential to interpret these findings in the context of understanding the ‘real realm’.

My personal urban health ontology aligns with a transdisciplinary perspective, which doesn’t favour one particular viewpoint over another but rather embraces various ontological perspectives of collaborators. This approach seeks to leverage the synergies that emerge from each paradigm. Therefore, in my view, the observation of certain paradigms that are more widespread than others reflects the emergent properties that are rooted in the underlying structures of our world. Without this critical perspective, we risk perpetuating the disproportionate structure that initially led to these disparate outcomes.

Admittedly, I do acknowledge that my personal urban health ontology leans more towards the health social movement paradigm. I also believe that the views of the health social movement are not as prominent in contemporary urban health discourse as it should be. However, this does not imply that the health social movement paradigm should assert dominance. A more accurate characterisation of my position on urban health ontological perspectives might be that while I appreciate the views of all paradigms, it is crucial to understand why certain paradigms exert more power over others.

This is particularly pertinent because I firmly believe that the ultimate driver of urban health decisions should be based on equity and social justice. Without a critical understanding of the structures and mechanisms that have generated growing inequities, addressing the root causes becomes an insurmountable challenge. Moreover, there’s a significant risk of
inadvertently perpetuating the very disproportionate structure that we seek to change. The prevailing emphasis on ‘hard’ evidence neglects contextual and community concerns and unless critically examined, we risk amplifying the viewpoints of prevailing paradigms.

Moving forward, the focus needs to shift from merely identifying the best available evidence to considering how that evidence was generated. The production of evidence inherently mirrors prevailing power structures. Exploring the strengths of underrepresented paradigms may offer a path forward. Notably, the health social movement paradigm offers a valuable perspective that enriches the interplay among multiple urban health paradigms and the practice of evidence-based policymaking.

6.3 Implications for advancing transdisciplinary urban health

The findings from this thesis include the following implications for both theory and practice to advance transdisciplinary approaches to complex urban health issues.

6.3.1 Implications for theory

6.3.1.1 Embracing complexity and diversity in urban health

From a theoretical perspective, this study highlights the importance of embracing complexity and diversity in understanding urban health. It calls for the acknowledgment of methods and knowledge outside of one’s own discipline or sector, and the necessity to work in a transdisciplinary manner that actively embraces the diversity of urban health approaches. Not only should actors acknowledge that views different to theirs co-exist, but they should actively seek to understand and interpret knowledge and methodologies that emerge from these different ontological foundations. This thesis contributes to advancing transdisciplinary approaches to urban health, by identifying the multiple ontological frameworks that appear in current urban health research and practice and articulating their characteristics.

While transdisciplinary scholars have advocated for embracing complexity and diversity of disciplinary approaches, previous efforts have often remained as visionary concepts rather
than practical applications. Many focused on normative and theoretical reasoning (Lawrence & Gatzweiler, 2017; Ramadier, 2004; Wickson et al., 2006), lacking the presentation of empirical evidence that can facilitate transdisciplinary collaborations. In this sense, the identification and articulation of ontological perspectives within the field of urban health, as undertaken in this thesis, make a significant contribution. Articulating the multiple ontological views is the first step towards interpreting knowledge and information generated under different paradigmatic frameworks.

Complex systems thinking and transdisciplinary approaches are closely aligned in their perspective. Both recognise the value of diversity and emphasise the need to navigate through the complexity of urban health rather than seeking a unified, overarching model (Gatzweiler et al., 2017; Mueller, 2020; Simon & Schiemer, 2015). They acknowledge that comprehensive understanding and control of the urban system are unattainable. Instead, actions and strategies to promote health in the urban system are based on achieving coherence among diverse knowledge bases and methodologies that study different facets of the urban system and its connection to health, each with its own ontological lens. This view stands in contrast to a complicated view of the urban system that aims to develop a single, overarching framework based on a synthesis of the systems’ individual components and determinants of health that shows the exact points for intervention (Galea et al., 2019; Rydin et al., 2012; Tonne et al., 2021). Therefore, complex systems thinking and transdisciplinary approaches both extend beyond the exploration of shared similarities among multiple ontologies; they focus on how well the actors embrace and navigate the ontological differences.

Furthermore, in addressing policymaking and the policy process, we need to move beyond the evidence-based policymaking paradigm. While this science-policy nexus offers valuable insight into the relationship between scientific evidence and policy transfer, it does not fully explain the complex policymaking mechanism. Moving forward, it is crucial to recognise the role of non-academic actors in the policy process and the broader complexities of policymaking.

This approach also aligns well with transdisciplinarity and complex systems perspectives. Embracing this perspective means accepting that the policymaking process cannot be
comprehended as a single overarching framework with clear and measurable pathways. Instead, it is a human-driven, dynamic system involving diverse actors that are capable of self-organisation. As a result, this complexity makes it challenging to exert control or accurately predict outcomes.

6.3.1.2 Shifting from reductionism to a complex systems perspective

The findings of this thesis reveal a prevailing acceptance of a data-driven, positivist and technocratic approach in the field of urban health research and practice. There is a dominant influence of reductionist and positivist ontological views, as evidenced by the medical-industrial city, urban health science, and the healthy built environment paradigms, as well as the sustainable urban development, urban ecosystem services, healthy urban planning, and urban green space traditions. These perspectives are grounded in the belief that empirical evidence, measuring and confirming associations between specific urban forms and processes and their health impacts, will inform policies and guide interventions. However, this dominant perspective falls short in fully embracing the complexity of urban health and neglects the intrinsic characteristics of complex systems (Gatzweiler et al., 2023; Kennedy et al., 2011; Newman, 1999). In a complex system, agents are linked in networks governed by simple rules and without centralised control. This leads to the emergence of unpredictable patterns of behaviour and structures. The system does not have a fixed equilibrium, instead it constantly learns, adapts and evolves.

Urban health is best understood from the perspective of a human-dominated socio-ecological system, characterised by complexity, non-linearity, and emergent properties (Frank et al., 2017; Gatzweiler et al., 2023; Lawrence et al., 2019; Siri & Geddes, 2022). It is not a complicated system that can be fully understood, predicted, or manipulated. The characteristics of a complex system, such as self-organisation and panarchy, underscore the need to approach urban health as a complex system rather than as a complicated one. This view requires a shift in mindset and a recognition that the urban system is constantly changing, influenced by a multitude of agents, and exhibits emergent variables that cannot be fully captured through reductionist approaches.
Regrettably, within current urban health scholarship and policymaking, there is a lack of appreciation for the urban system as a complex system (Ernstson et al., 2010; Siri & Geddes, 2022; Wu, 2014). The future of urban health research, practice, and policymaking must embrace a complex perspective and a transdisciplinary approach, as advocated by scholars within the health social movement paradigm and traditions that embrace the socio-ecological perspective. Scholars promoting complex adaptive systems thinking urge us to develop a deeper awareness of the characteristics of the urban system and to avoid ontological errors that arise from attempting to fully understand the urban system.

This viewpoint aligns with the critical realist ontology, emphasising the need to focus on the structures and institutions that reside in the underlying stratified layers of the real domain (Bhaskar, 1975; Næss, 2015). It is within these underlying structures that the events and observations that we experience emerge. Urban health research and policies should focus on these underlying structures, the characteristics of the urban system, instead of analysing what is observed. Focusing on the observations can provide information of the situation. However, the fundamental complexity of the urban health problem remains (Mueller, 2020). To address the complexity of urban health issues more effectively, one approach is to encourage transdisciplinary contributions that traverses various fields of knowledge and practice, political action, and other formal and informal sectors of the urban community (Lawrence, 2022).

6.3.1.3 Bridging ontological perspectives through shared values

Achieving transformation in a complex systems thinking perspective requires researchers and policymakers to shift from achieving consensus to seeking coherence, acknowledging and embracing the diversity of ontological perspectives, and engaging with non-academic experts. The findings from this thesis provide further insights into navigating through the complexities of urban health by analysing the values that are shared among the identified ontological perspectives.

For instance, the prevailing sustainable urban development research tradition and the medical-industrial complex paradigm share a common theme of considering economic growth as a significant driving force and goal for urban development. Within this
perspective, health is often seen as a competing goal or a by-product of urban economic development. The emphasis is primarily placed on maximising economic productivity and efficiency, with the assumption that improvements in health will naturally follow as a secondary outcome. On the other hand, the urban resilience research tradition and the health social movement paradigm offer a contrasting, value-driven perspective on urban transformation and its relationship with health. Both of these perspectives recognise the urban system itself as the object of change and emphasise in the importance of building resilient and healthy urban systems.

From this analysis, we can infer an alternative approach to bridging disparate ontologies, which involves establishing agreement on key social values. Ontological perspectives are best aligned when shared values align. In the case of health promotion, health equity underpins the overarching goal of urban health research and policy. By anchoring collaborations in shared values, it becomes possible to align efforts and bridge disparate perspectives.

To explore further, we can draw upon theories about the ideas and beliefs of policy actors, as elucidated in theories of the policy process such as the Advocacy Coalition Framework (ACF) or the Narrative Policy Framework (NPF), among others (Weible & Sabatier, 2017). According to the Advocacy Coalition Framework (ACF), policy actors operate at different belief levels, each with varying degrees of malleability, and utilise strategies that tap into these beliefs to forge stronger coalitions (Jenkins-Smith et al., 2018). By understanding and leveraging these beliefs, policy actors can strategically employ persuasive techniques, framing strategies, and information-sharing to engage with actors at different belief levels. This approach allows for the development of stronger coalitions among diverse stakeholders who may hold disparate ontological perspectives.

Similarly, the Narrative Policy Framework (NPF) offers a narrative lens through which shared values and beliefs can play a significant role in bridging ontological divides (Radaelli, 2018). Drawing on this theory, urban health researchers and policy actors can craft narratives that resonate with multiple ontological perspectives, foster a sense of common value and mobilise support for transdisciplinary urban health collaborations. As illustrated by de Leeuw (de Leeuw, 2022), forging transdisciplinary collaborations can be achieved even in the
absence of institutional change. Shifting the narrative and creating resonance provides a means to act on the nexus between research, policy and practice by aligning knowledge with the belief systems of actors involved.

By integrating these theories into our understanding of ontological perspectives, we can develop shared values through strategic communication, and urban health researchers and policy actors can engage together in research projects, dialogue, mutual learning, and collaborative problem-solving processes. Through such processes, shared beliefs can be identified and influenced, and used as a basis for forging transdisciplinary collaboration across multiple urban health ontological worldviews.

6.3.2 Implications for practice

The implications of this research extend beyond theoretical considerations. They have practical implications for facilitating transdisciplinary urban health efforts. The need for transdisciplinary approaches to yield more effective outcomes to complex social problems such as urban health have been supported by numerous scholars (Haire-Joshu & McBride, 2013; Lawrence, 2022; Pineo, Turnbull, et al., 2021; Stokols et al., 2013). However, this approach still remains more rhetoric than a reality in practice, despite some recent efforts (Pineo, Audia, et al., 2021).

The findings from this thesis further underscore the urgency for adopting transdisciplinary approaches and adds value to the advancement of transdisciplinary practice. Transdisciplinary urban health approaches call for engagement beyond the science-policy nexus to bridge the gap between evidence and action (Lawrence, 2022). Urban health problems are not merely presented as results of scientific studies but defined collectively by the participants across diverse fields and from nonacademic actors and the community. Addressing those problems require methodologies and solutions that may not always align neatly with the collaborators’ individual worldviews. A fundamental principle is the mutual acknowledgement and acceptance of multiple paradigms among the collaborators.

Several tools and methods have been developed to facilitate transdisciplinary approaches in addressing complex social problems. For example, the Swiss Academies of Arts and Sciences
publishes an online toolbox for developing projects and conducting research with heterogenous groups (https://naturalsciences.ch/co-producing-knowledge-explained/methods/td-net_toolbox). Many of these tools serve to make the underlying assumptions or participants in transdisciplinary collaborations explicit.

The identified ontological perspectives from this thesis can serve as a basis for collaboration, stakeholder engagement, and mapping topics and identifying representation in various urban health contexts. For example, during workshops or meetings on developing research or policies to promote health in the urban context, a tool to identify the diversity of urban health ontological perspectives can be used to gain an understanding of the worldviews of the participants. This knowledge can facilitate meaningful discussions, promote diverse perspectives, and foster more inclusive decision-making processes. Throughout the course of this PhD research, I have implemented such exercises as listed in Appendix A. An example of the presentation slides of one such workshop is provided in the Appendix B.

The identified frameworks can also be utilised to monitor and map topics within conferences, academic journals, research projects, and other programs and projects that seek to include a diversity of approaches in the field of urban health. By examining the representation of different ontological perspectives, we can identify gaps or areas where certain perspectives are over or underrepresented. This awareness can guide efforts to ensure a more balanced and comprehensive approach to urban health research and practice and promote inclusivity and sharing of diverse ideas.

Furthermore, the findings emphasise the role of ontological perspectives in the policy process. Policy ideas and formulation are influenced by different ontological backgrounds, which can shape the framing and implementation of urban health policies. Policymakers, therefore, need to actively consider and engage with diverse ontologies to develop contextually relevant and effective interventions that address the needs and aspirations of various stakeholders. This requires creating spaces for dialogue and collaboration among stakeholders with different ontological perspectives, allowing for the co-creation of policies that reflect the complexity of urban health issues.
To support transdisciplinary urban health thinking, institutional and system changes are necessary (Holzer et al., 2018; Pineo, Turnbull, et al., 2021). The traditional disciplinary boundaries and silos that often hinder collaboration need to be addressed. This frequently requires re-examining institutional structures to encourage and facilitate interdisciplinary and transdisciplinary research and practice. Funding agencies, academic institutions, and policy organisations play a crucial role in promoting the integration of diverse ontological perspectives into urban health research and policymaking. By supporting collaborative initiatives, providing resources for transdisciplinary research, and recognising the value of diverse knowledge systems, these institutions can foster a more inclusive and transformative approach to urban health.

6.4 Remaining gaps and directions for future research

While these findings have made significant contributions to understanding the ontological frameworks within the field of urban health, several avenues for future research can be pursued.

Firstly, it is important to acknowledge that the ontological frameworks identified in this thesis represent the paradigms and views that are currently prevalent in research and practice. There may be other frameworks that are currently under-represented or have not yet emerged but hold value in research and policymaking. Evaluating and identifying the significance of such frameworks, as well as providing recommendations on their inclusion and representation, could be an important direction for future research. This would require a contextual evaluation that recognizes the diversity of perspectives and avoids imposing a singular standard.

Another area that is worthy of further study is the exploration of the role and mechanisms through which ontological perspectives can be used as a framework to design and frame policy ideas and knowledge in order to better influence urban health policies. While this thesis has suggested frameworks that identify different perspectives, further research is needed to understand how these perspectives shape and inform the policymaking process. This would involve drawing on theories from policy process studies to examine the
mechanisms through which ontological perspectives can be effectively utilised in policymaking.

Furthermore, it is crucial to consider the underlying value of health equity in urban health policymaking. Although health equity is a fundamental value in health promotion, including urban health, it was not extensively observed within the ontological frameworks studied in this thesis. While sustainable urban development recognises the principle of social equity in the distribution of costs and benefits, further exploration of health equity within the ontological perspectives is warranted. Understanding how different frameworks align with and promote health equity can enhance our ability to develop policies that address social disparities and promote equitable urban health outcomes.

Lastly, we need to consider the ontological perspectives of the community. The members of the community are not just affected by urban planning decisions but who live in those physical and social structures created by those urban planning decisions. The community is also consisted with different groups who have different views and values. Ultimately, it is these values that need to be prioritised to achieve transformation for health.

These suggestions represent opportunities for future development of research and policies for better urban health outcomes. By further exploring under-represented frameworks, understanding the mechanisms of incorporating ontological perspectives into policymaking, and promoting health equity as a core value, we can continue to advance transdisciplinary approaches to urban health and contribute to the health and wellbeing of urban systems and urban populations.

6.5 Conclusion – towards transdisciplinary urban health research and practice

Urban health is a complex field that requires a socio-ecological systems perspective and a transdisciplinary approach to knowledge production and policymaking. However, current practice often falls short of this ideal, with a positivist mechanistic approach dominating the discourse. Multidisciplinary collaboration within this positivist approach aspires to develop a comprehensive framework that has been achieved through consensus among all
participating actors. This is not only methodologically impossible but also ontologically flawed when dealing with the complexity of real-world urban health issues.

This PhD thesis contributes to advancing transdisciplinary approaches to addressing complex urban health issues by identifying some of the different ontological frameworks that currently exist among researchers and practitioners and showing that diverse urban health policy ideas can and do co-exist. The thesis identifies four urban health paradigms and five urban health research traditions which are employed to examine existing urban health policy ideas within a real urban planning context. These urban health paradigms, research traditions and policy ideas are not only characteristic in the specific topic area of urban health they are interested in but also, more fundamentally, they represent diversity in their ontological origins. The findings from this thesis provide an opportunity to understand and interpret the knowledge that emerges from across multiple urban health ontological frameworks and provide insights for developing transdisciplinary activities.

Ultimately, the goal for transdisciplinary urban health research and policymaking is to effectively navigate the complex adaptive system that we call urban health, rather than attempting to predict or control it. To achieve this goal, actors involved in urban health should move beyond the mere acknowledgement of differences and actively remain open to new ways of working and making sense of knowledge that is generated from across the multiple ontological perspectives. By embracing this approach, we can harness the full potential of transdisciplinary collaboration and generate insights and solutions that address the complexity of urban health challenges.
EPILOGUE

In the final stages of completing my PhD thesis, I met a new acquaintance, a fellow public health researcher, who asked about my thesis topic. I replied, “urban health paradigms”, to which a follow-up question was promptly asked. “So, which variables are you looking at?”

At the start of my PhD journey, I would have answered that I am studying the physical urban environment (the independent variable) and its impact on human health (the dependent variable). In many respects, my answer remains the same. However, my understanding of the question has fundamentally shifted. Now, I can see clearly that the assumptions underlying this follow-up question were grounded in the urban health science paradigm and the healthy urban planning research tradition.

My PhD journey has been replete with eye-opening discoveries and numerous challenges, including the unprecedented global pandemic. Many have cautioned against regarding one’s PhD thesis as the pinnacle of their scholarly work. They make a valid point. I concur that the thesis itself may not be the zenith of my accomplishments, and I hope that the best is yet to come. Nonetheless, this perspective somewhat diminishes the significance of the PhD journey. In my personal experience, I can assert with confidence that I have sought and discovered my research identity, or ontology, in comprehending urban health policymaking. Skilfully guided by my insightful supervisors, this PhD journey led me to uncharted territories and compelled me to interrogate and confront my long-held assumptions. While the outcome may not be my magnum opus, the journey itself has been an unparalleled experience.

On embarking on this PhD journey, I first ventured into the disciplines of political science, urban planning and public health to search for the journey’s significance. In these relatively unfamiliar territories, I was introduced to new ideas and many interesting characters which has allowed me to find theoretical foundations in the ideational approach to the policy process and in a transdisciplinary approach to studying complex urban health issues. I also found the philosophical grounding to my PhD journey in critical realism. Furthermore, through a critical reflexive process, I developed my own conceptualisation and
interpretation of the different views on urban health by utilising the concept of paradigm and its components.

My approach to urban health research and policymaking has undergone a complete transformation, from a reductionist or mechanistic view on mapping casual pathways to a view that incorporates complex systems and values the role of diverse ontological perspectives. Admittedly, I initially anticipated exploring the mechanisms through which policy ideas influence the policy process. However, early on in my journey, I realised I had brought the wrong set of lenses to my quest. And since, my perspective on viewing urban systems have fundamentally transformed.

This point of view stands true for the transdisciplinary urban health approach for which I argue throughout my thesis. Even if the output of a transdisciplinary research, practice, or policy in itself might not achieve its maximum potential, if the collaboration was meaningful, that needs to be acknowledged and continuously harnessed. I reflect on my past experiences in urban health research and policymaking and even when the intended outcome was not achieved at the time, the process was meaningful and generated other important values.

Now, I return from this enlightening adventure to the present world of urban health policymaking and practice. I plan to apply the knowledge and perspective I have gained to my future endeavours. I am committed to actively seeking collaborations and engaging in conversations with experts from diverse fields. My lens on ontological perspectives will aid me in establishing meaningful connections across disciplines and sectors, as I embark on this next phase of my academic and professional journey.
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APPENDIX A.

LIST OF PUBLICATIONS AND PRESENTATIONS DURING PHD CANDIDATURE
A-1. List of publications and presentations from PhD research

**Academic journal articles**


**Conference presentations**

1. de Leeuw E, **Kim J**, Harris-Roxas & Sainsbury P. Different approaches to research on urban health: a meta-narrative review, Oral presentation, 17th World Congress on Public Health, 2-6 May 2023, Rome, Italy. https://doi.org/10.18332/popmed/163892
2. **Kim J**. Which urban health paradigm is yours? Identifying the different approaches to urban health research and practice. UNSW School of Population Health Lunchtime Seminar, 23 Nov 2022
4. **Kim J**. Research on urban health: a bibliometric analysis guided meta-narrative review, oral presentation at the 24th IUHPE World Conference on Health Promotion, 15-19 May 2022, Montreal, Canada (virtual)
5. **Kim J**. Which paradigm is yours? Different ways of understanding and addressing urban health, oral presentation at the 24th IUHPE World Conference on Health Promotion, 15-19 May 2022, Montreal, Canada (virtual)
6. **Kim J** Visualising bibliometric networks: a tool for understanding the landscape of health promotion, poster presentation at the 24th IUHPE World Conference on Health Promotion, 15-19 May 2022, Montreal, Canada (virtual)
7. **Kim J** Urban health paradigms, Keynote speaker, Inaugural seminar for the Academy of Urban Health, 7 Jan 2022, Seoul, Korea

9. **Kim J**. Healthy cities: health equity in Sydney’s fastest growth area, Public Health @ UNSW Symposium, 27 Nov 2019, Sydney, Australia

10. **Kim J**. What’s equity got to do with it? Where urban planning, public health and political science meet, Health Beyond Research and Innovation Showcase, 5-6 May 2019, Sydney, Australia

11. **Kim J**. What’s equity got to do with it? Where urban planning, public health and political science meet, 23rd IUHPE World Conference on Health Promotion, 7-11 April 2019, Rotorua, Australia


13. **Kim J**. Healthy cities: health equity in Sydney’s fastest growth area, UNSW School of Public Health and Community Medicine Student Seminar, 27 Feb 2019, Sydney, Australia

**Workshops**

1. **Kim J**, Crimeen A, de Leeuw E. Which urban health paradigm is yours? Workshop, International Conference on Urban Health, 24-27 Oct 2022, Valencia, Spain


**Other publications**

A-2. List of publications and presentations from other research

Academic journal articles

2. Kim J & Haigh F (2021). HIA and EIA are different, but maybe not in the way we thought they were: a bibliometric analysis, International Journal of Environmental Research and Public Health, 18(17), 9101. doi: 10.3390/ijerph18179101

Conference presentations

3. Kim J & Reid A. Advancing discourse analysis: Video is worth more than a thousand words, Health Beyond Research and Innovation Showcase, 5-6 May 2019, Sydney, Australia
4. Kim J. Healthy Airports – health equity frame analysis, Health Beyond Research and Innovation Showcase, 5-6 May 2019, Sydney, Australia
5. Kim J & Harris-Roxas B. Equity-focused HIA (EFHIA): case of a place-based approach, 39th Annual Conference of the International Association for Impact Assessment, 29 April-2May 2019, Brisbane, Australia
6. Kim J. Healthy Airports – health equity frame analysis, 23rd IUHPE World Conference on Health Promotion, 7-11 April 2019, Rotorua, New Zealand
7. Kim J. Locational disadvantage in South Korea - the other face of the Gangnam style, 23rd IUHPE World Conference on Health Promotion, 7-11 April 2019, Rotorua, New Zealand
Workshops


2. Haigh F, Kim J, Jaques K, Crimeen A, Beer M, Zapart S & Reid A. Top tips for working with local government to promote community health, 23rd IUHPE World Conference on Health Promotion, 7-11 April 2019, Rotorua, New Zealand


Other publications

1. Kim J. (2020) South Korea flattening the curve – testing is vital, but so is tracing and tracking, 25 Mar 2020, Croakey https://www.croakey.org/south-korea-flattening-the-curve-testing-is-vital-but-so-is-tracing-and-tracking/

APPENDIX B.

PRESENTATION FOR A WORKSHOP ON URBAN HEALTH PARADIGMS
Which urban health paradigm is yours?

Identifying the different approaches to urban health research and practice

Jinhee Kim

PhD Candidate
Centre for Primary Health Care and Equity (CPHCE)
School of Population Health

Supervisors:
Evelyn de Leeuw, Ben Harris-Roxas, Peter Sainsbury

Outline of presentation

- Why do we need to understand multiple views on urban health?
- Four urban health paradigms (conceptual framework)
- Different approaches in urban health research (empirical findings)
Join at
slido.com
#urbanhealth

Welcome to my presentation on urban health paradigms!

Type anything to say hello.

⁽⁽¹⁾⁾ Start presenting to display the poll results on this slide.
What are some keywords of your work? (multiple answers)

Would your work be strengthened through a multidisciplinary approach?

1: Start presenting to display the poll results on this slide.
Do you sometimes find you and your multidisciplinary partners not quite on the same page?

Do you think urban health requires a multidisciplinary approach?
When you think of urban health, what is the first thing that comes to your mind?

A healthy city has...

1. Start presenting to display the poll results on this slide.
Which do you see as the key determinant of urban health?

The most important thing to do to create a healthy city is...
Which did you answer most?

Four urban health paradigms:
- Medical-Industrial City
- Urban Health Science
- Healthy Built Environment
- Health Social Movement
Recognising urban health paradigms is essential in **two key areas** to promote urban health:

- **To facilitate transdisciplinary research**
- **To influence the policy process**

Transdisciplinary approach to urban health

Urban health issues require collaboration that **transcend disciplinary boundaries** and contributions from both the overlapping and non-overlapping aspects between disciplines.

Transdisciplinary research and practice can be first attempted through the **articulation** of the different approaches [Ramadier, 2004].
Influencing the policy process

Paradigms have a crucial role in the policy process, in which actors process complex information by making cognitive shortcuts based on their beliefs.

- Policy actors aggregate into coalitions to influence and change policy with others who share policy core beliefs (Jenkins-Smith et al., 2018).
- Reframe problems according to the specific belief systems of others to generate support for their policy proposals (Cox & Béland, 2013).
- Paradigms dictate policy actors’ beliefs about how causal relationships occur and the ideas on what constitutes effective policy solutions (Hall, 1993; Shaw, 1997).

Paradigm

A paradigm is a coherent body of work that shares a common set of concepts, theories, methods and instruments that scientists within the paradigm take for granted (Kuhn, 1962).

- Worldview, perspective, frame, idea, belief, ontology, epistemic traditions….
- Reflected in the languages and terminologies
- Shape underlying beliefs about which issues are important and how to study them
Four dimensions of a paradigm

- **Conceptual** gaze – which urban health issues are considered more important;
- **Theoretical** frameworks – what causes these urban health issues;
- **Methodologies** – which data collection or analytical method would best measure and seek information;
- **Instrumental** dimensions – which solutions effectively resolve the prioritized issues.

The scope of “urban health” in this review

We limit the scope of urban health to the issues concerned with the impact of the **urban built environment** on **human health** in cities or urban areas.
Medical-Industrial City

Health and Education Innovation Precincts
<table>
<thead>
<tr>
<th>View on urban health</th>
<th>Biomedical and individualistic approach to health and illness.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Causes, drivers of health</td>
<td>Healthcare infrastructure and health-related technologies influence health outcomes.</td>
</tr>
<tr>
<td>Urban health solutions</td>
<td>Investment in healthcare infrastructure as drivers of economic growth</td>
</tr>
<tr>
<td>Examples</td>
<td>Health and innovation precincts models for urban development</td>
</tr>
</tbody>
</table>
14 proven interventions to prevent NCDs and injuries

1. Create a smoke-free city
2. Ban tobacco advertising
3. Raise tobacco taxes or levies/fees
4. Tax sugary drinks
5. Set nutrition standards for foods served and sold in public institutions
6. Regulate food and drink marketing
7. Create healthier restaurant environments
8. Reduce speeding
9. Increasing motorcycle helmet use
10. Reduce drink driving
11. Increase seat belt use
12. Promote active mobility
13. Prevent opioid-associated overdose deaths
14. Enhance public health data and monitoring systems
<table>
<thead>
<tr>
<th>View on urban health</th>
<th>Focus on risk factors that lead to illness or disease outcomes.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Causes, drivers of health</td>
<td>The urban built environment is a critical layer in the multi-determinant model.</td>
</tr>
<tr>
<td>Urban health solutions</td>
<td>Expert-led empirical evidence-based interventions and technological solutions</td>
</tr>
<tr>
<td>Examples</td>
<td>Urban health indicators, Partnership for Healthy Cities (Bloomberg Foundation)</td>
</tr>
</tbody>
</table>

**Healthy Built Environment**
**Healthy Built Environment Checklist (2020)**

**The Healthy Development Measurement Tool (HDMT), San Francisco**

**UN-Habitat & WHO Integrating health in urban and territorial planning (2020)**

---

### Table: Healthy Urban Studies and Solutions

<table>
<thead>
<tr>
<th>View on urban health</th>
<th>Focus on health promotion, lifestyles, wellbeing, quality of life, or flourishing.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Causes, drivers of health</td>
<td>Elements of urban planning process and governance structure impact these health outcomes.</td>
</tr>
<tr>
<td>Urban health solutions</td>
<td>Influencing the planning system and urban planning regulations and processes</td>
</tr>
<tr>
<td>Examples</td>
<td>Healthy urban planning principles and guidelines</td>
</tr>
</tbody>
</table>

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*UN-Habitat and WHO (2020). Integrating health in urban and territorial planning: A sourcebook. (Accessed online: https://www.un.org/.*
WHO Healthy Cities Movement

Copenhagen Consensus of Mayors (2018) 11 qualities of a healthy city
<table>
<thead>
<tr>
<th>View on urban health</th>
<th>Biomedical and individualistic approach to health and illness.</th>
<th>Focus on risk factors that lead to illness or disease outcomes.</th>
<th>Focus on health promoting lifestyles, wellbeing, quality of life, or flourishing.</th>
<th>Socio-ecological view on health and an explicit focus on health equity.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Causes, drivers of health</td>
<td>Healthcare infrastructure and health-related technologies influence health outcomes.</td>
<td>The urban built environment is a critical layer in the multi-determinant model.</td>
<td>Elements of urban planning process and governance structure impact these health outcomes.</td>
<td>The socio-political factors underlying the urban governance systems are the main drivers of urban health.</td>
</tr>
<tr>
<td>Urban health solutions</td>
<td>Investment in healthcare infrastructure as drivers of economic growth</td>
<td>Expert-led empirical evidence-based interventions and technological solutions</td>
<td>Influencing the planning system and urban planning regulations and processes</td>
<td>Value-driven community empowerment approach to transform the urban environment</td>
</tr>
<tr>
<td>Examples</td>
<td>Health and innovation precincts models for urban development</td>
<td>Urban health indicators, Partnership for Healthy Cities (Bloomberg Foundation)</td>
<td>Healthy urban planning principles and guidelines</td>
<td>WHO Healthy Cities movement</td>
</tr>
</tbody>
</table>
Which urban health paradigm do you most relate with?

Scan for YouTube Video (Length 9:33)
Scan for link to article (Open Access)
Research traditions on urban health

Meta-narrative review

A type of systematic literature review.

A meta-narrative review highlights the contrasting and complementary ways in which researchers have studied a similar topic. (Greenhalgh et al., 2005; Wong et al., 2013)
Key findings - Five urban health research traditions

Document co-citation network analysis showing five distinct clusters:
- Size of circle: # of citations
- Lines: strength of co-citation relationship
- Colour: closely related cluster

Research on urban health – 5 major research traditions

<table>
<thead>
<tr>
<th>Sustainable urban development</th>
<th>Urban ecosystem services</th>
<th>Urban resilience</th>
<th>Healthy urban planning</th>
<th>Urban green spaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systems-level (city planning)</td>
<td>Environmental, social, economic sustainability</td>
<td>Urban ecosystem services, sustainability</td>
<td>External stressors, resilience</td>
<td>Livability, walkability, health behaviour, morbidity</td>
</tr>
<tr>
<td>Community, individual-level</td>
<td>City, urban governance</td>
<td>Landscape, urban ecosystems</td>
<td>Urban socio-ecological systems</td>
<td>Urban form, determinant of health</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(Accessibility) urban green spaces</td>
</tr>
</tbody>
</table>
Five urban health research traditions – summary and comparison

<table>
<thead>
<tr>
<th>Key urban health concept (conceptual dimension)</th>
<th>Sustainable urban development</th>
<th>Urban ecosystem services</th>
<th>Urban resilience</th>
<th>Healthy urban planning</th>
<th>Urban green spaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban development policies (that balances environmental, social and economic goals)</td>
<td>Health benefits generated by ecosystem services provided by urban green and blue landscape patterns.</td>
<td>Ability of the urban system to adapt and transform to absorb disturbances, reorganise and maintain desired functions.</td>
<td>Attributes of the urban environment as a determinant of health.</td>
<td>Attributes of urban green spaces and their impact on health.</td>
<td></td>
</tr>
<tr>
<td>Urban development policies (that balances environmental, social and economic goals)</td>
<td>Urban landscape pattern is a key component of the urban socio-ecological system. Human actions determine land-use decisions that shape landscape patterns and ecosystem services.</td>
<td>City is a complex adaptive system that is chaotic, complex, uncertain and unpredictable. Resilience emphasises the qualities of the system as principles to attain-defined goals such as sustainability.</td>
<td>Attributes of the urban environment influence population health through multi-level and complex causal chains.</td>
<td>Amount of, access to, quality and features of urban green spaces impact various human health measures and outcomes.</td>
<td></td>
</tr>
<tr>
<td>Urban development policies (that balances environmental, social and economic goals)</td>
<td>Comparisons between cities and against indicators and benchmarks.</td>
<td>Applying hierarchical patch dynamics framework to landscape planning, monitoring and modelling of land-use changes.</td>
<td>Shift in knowledge production and application – value processes and methodologies over technological fluxes. Knowledge is co-created by scholars and practitioners.</td>
<td>Epidemiological models and statistical analysis identify urban environmental attributes that influence population health outcomes.</td>
<td>Understanding the mechanisms through which green space affects health using epidemiological models and statistical analysis.</td>
</tr>
<tr>
<td>Urban development policies (that balances environmental, social and economic goals)</td>
<td>Indicators, benchmarks and assessment tools to evaluate cities’ sustainability policies.</td>
<td>Model the identification and valuation of ecosystem services to influence land-use planning decisions.</td>
<td>Create “safe-to-fail” adaptive urban systems through better understanding the urban socio-ecological system and human-nature systems.</td>
<td>Statistical associations between urban environment attributes and health urban policies and interventions.</td>
<td>Strong evidence on the benefits of urban green spaces and their attributes inform policies and interventions.</td>
</tr>
</tbody>
</table>

The five urban health research traditions also have different views on...

Sustainable urban development

Urban ecosystem services

Urban resilience

Healthy urban planning

Urban green spaces

Complicated view of the urban system ---- Complex system

Focus on changing the structure ---- Focus on agency

Individual/community scale --- City/regional --- Global/planetary
Five urban health traditions – differences in their approach to systems, change and scale

<table>
<thead>
<tr>
<th>System</th>
<th>Sustainable urban development</th>
<th>Urban ecosystem services</th>
<th>Urban resilience</th>
<th>Healthy urban planning</th>
<th>Urban green spaces</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Urban development policies influence how cities are built.</td>
<td>The urban landscape pattern is a key component of the urban socio-ecological system.</td>
<td>The city is a complex adaptive system that is chaotic, complex, uncertain and unpredictable.</td>
<td>The attributes of the urban environment influences population health through multilevel and complex causal chains.</td>
<td>The amount, access to, quality and features of urban green spaces impact various human health benefits.</td>
</tr>
<tr>
<td>Change</td>
<td>Local governments develop policies that shape the urban environment.</td>
<td>Focus on the constructing landscape patterns that are beneficial to health.</td>
<td>Values the processes of human agents over technological interventions.</td>
<td>Identifies causation and policy interventions to improve the urban environment.</td>
<td>Identifies the type of urban green spaces, accessibility, design features that contribute to health.</td>
</tr>
<tr>
<td>Scale</td>
<td>Sustainable local policies contributing to the sustainability of the planet.</td>
<td>Landscape patterns at the regional urban planning scale.</td>
<td>Urban system, socio-ecological systems at the city, regional and global levels.</td>
<td>Urban forms at the city or community level and its individual health outcomes.</td>
<td>Access to green spaces in communities and its individual health outcomes.</td>
</tr>
</tbody>
</table>

Summary and conclusion

- Co-citation analysis of research publications shows five distinct urban health research traditions
- The scholarship of urban health is siloed with few scholars spanning boundaries
- Each research tradition has a different ontological perspective to urban health
- Articulating distinctiveness of approaches may foster transdisciplinary research
Which urban health research tradition best describes your approach?

“If you know the enemy and know yourself, you need not fear the result of a hundred battles.”

The Art of War (Sun Tzu), 5th century BC
“If you know your partners and know yourself, you need not fear the result of a hundred collaborations.”

Jinhee Kim quoting The Art of War (Sun Tzu), 2022