Urban design and health: Progress to date and future challenges

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Abstract

Over the last 15 years, a growing body of Australian and international evidence has demonstrated that urban design attributes are associated with a range of health outcomes. For example, the location of employment, shops and services, provision of public and active transport infrastructure and access to open space and recreational opportunities are associated with chronic disease risk factors such as physical activity levels, access to healthy food, social connectedness, and air quality.

Despite the growing knowledge base, this evidence is not being consistently translated into urban planning policy and practice in Australia. Low density neighbourhoods with poor access to public transport, shops and services continue to be developed at a rapid rate in the sprawling outer suburbs of Australian cities.

This paper provides an overview of the evidence of the association between the built environment and chronic diseases, highlighting progress and future challenges for health promotion. It argues that health promotion practitioners and researchers need to more closely engage with urban planning practitioners, policymakers and researchers, to encourage the creation of healthy urban environments through integrated transport, land use and infrastructure planning. There is also a need for innovative research to evaluate the effectiveness of policy options. This would help evidence to be more effectively translated into policy and practice, making Australia a leader in planning healthy communities.
Introduction

The impact of city planning on health was clearly demonstrated during the 19th century, when it was successfully used to reduce the spread of infectious diseases in European cities by improving sanitation, housing and separating polluting industrial land uses from residential areas.\textsuperscript{1} The urban planning and public health disciplines were born out of these efforts.\textsuperscript{1,2} Once basic living conditions improved, concern about the influence of city planning on health became somewhat dormant. However, this interest has been reignited, with the recognition that car dependence and continued separation of land uses in ever-expanding residential suburbs is having unintended negative consequences for human health and wellbeing.\textsuperscript{1,3}

Chronic diseases such as cardiovascular disease, cancer, mental illnesses and Type 2 diabetes have now overtaken infectious diseases as the leading cause of death and disability amongst urban populations,\textsuperscript{1,4-6} creating a large healthcare and financial burden.\textsuperscript{7} These diseases share a number of common lifestyle risk factors, including physical inactivity, unhealthy diets, smoking and excessive alcohol consumption.\textsuperscript{4,5} Many inter-related features of the built environment, such as levels of housing density, the layout of streets, and the location of employment and essential infrastructure and services directly or indirectly contribute to chronic diseases and their risk factors.\textsuperscript{8,9} With over 90 per cent of Australians now living in urban areas,\textsuperscript{3} it is vital that we create built environments that support, rather than undermine health and wellbeing.

The view that urban design impacts on health is consistent with the ‘social-ecological model of health’. This model recognises that there are multiple levels of influence on health, with many of these located outside of the health sector.\textsuperscript{10} The physical, social, economic and political factors that shape health outcomes have been termed ‘social determinants of health’, and contribute to creating health inequities.\textsuperscript{11} In cities, the various social determinants of health interact in multi-directional ways to create a complex system.\textsuperscript{12}
This article begins with a brief narrative review of the evidence of the association between urban design and health. The focus is on the impact of urban design on key chronic disease risk factors – physical activity, social connectedness, diets, alcohol consumption and air quality. The article also considers health promotion achievements to date, and highlights future challenges and opportunities for closer collaboration between urban planning and health promotion practitioners and researchers, and more consistent translation of research evidence into urban planning policy and practice.

**Evidence of the impact of urban design on chronic disease risk factors and outcomes**

Recently, significant progress has been made in understanding how specific characteristics of the built environment directly and indirectly affect population health. In Australia, physical inactivity is the fifth leading contributor to the disease burden, with almost 60 per cent of Australians aged 15 years or older being insufficiently active to benefit health. The literature establishes strong links between neighbourhood design and levels of physical activity, particularly walking for transport. Higher residential densities, good street connectivity based on grid networks, mixed land use and high-quality active transport infrastructure are associated with higher levels of walking and cycling for transport. This type of urban form creates shorter and more convenient walking and cycling routes between homes and jobs, retail and essential infrastructure and services. The literature also indicates that shorter distances to public transport stops are associated with higher levels of walking, especially among people on lower incomes who are more reliant on public transportation. Furthermore, having accessible and attractive public open space and recreation facilities is associated with higher levels of recreational physical activity, particularly walking. Traffic volumes and perceived traffic safety are also associated with children walking and cycling to school. For example, children attending schools located in neighbourhoods with both low traffic volumes and highly-connected street networks are significantly more likely to walk to school than other children.
In this context, urban design is increasingly seen as an important intervention for promoting physical activity and health.

The literature indicates a number of other associations between chronic disease risk factors and urban design attributes. In addition to increasing physical activity, good access to attractive and safe streets and public open and green spaces can also have mental health benefits. It is thought to do so by fostering formal and informal social interactions and exposing people to nature.\(^9\)

For mental health, the quality rather than the quantity of public open and green space appears to be important.\(^19\)

Unhealthy diets are the leading cause of the chronic disease burden in Australia.\(^6\) Poor access to healthy food outlets has been shown to be associated with poor diets and higher levels of obesity.\(^20\) Conversely, having a source of healthy food such as a supermarket nearby is associated with healthier diets.\(^9\) A number of studies have also found positive relationships between alcohol outlet density and domestic violence,\(^21\) assault,\(^22\) and harmful consumption of alcohol,\(^23\) with some support for a modest effect on hospital contacts for anxiety, stress, and depression.\(^23\)

The design of urban areas can also affect air quality, particularly from traffic, with poorer air quality contributing to respiratory disease and exacerbating other chronic illnesses such as cardiovascular disease.\(^24\) For example, poorly designed higher density housing located on heavily trafficked roads, increases exposure to traffic-related pollution with concomitant impacts on respiratory illness.\(^16\)

Despite the rapidly growing evidence-base, there is still much to be understood about the complex processes that shape urban population health and, in particular, health inequities.\(^25\)
Challenges for healthy urban design

Amongst health promotion practitioners there is a growing understanding of the links between the built environment and health, and increasingly urban planners in Australia recognise the role their profession plays in creating healthier communities.\textsuperscript{26} Indeed, a growing number of planning policies and guidelines in Australia encourage the creation of healthier urban environments. Leading examples include Victoria’s *Environments for Health* state-wide framework for Municipal Public Health Plans. Introduced in 2001, this framework encourages the integration of urban planning and health planning at the local government level.\textsuperscript{27} The National Heart Foundation of Australia has also developed guidelines such as *Healthy Spaces and Places* (developed in collaboration with the Planning Institute of Australia and the Australian Local Government Association)\textsuperscript{28} and *Healthy by Design* for South Australia and Tasmania,\textsuperscript{29,30} all of which aim to assist urban planners to design healthier urban environments.

In addition, there is increasing consideration of factors that influence health in state planning strategies such as Western Australia’s sustainable cities initiative, *Liveable Neighbourhoods*,\textsuperscript{31} state legislation such as Victoria’s *Transport Integration Act 2010*,\textsuperscript{32} and draft metropolitan planning strategies such as those for Melbourne\textsuperscript{33} and Sydney.\textsuperscript{34}

Despite this progress, the principles of healthy urban design are not being consistently incorporated into planning policies in Australia. Moreover, there remains a gap between the evidence and urban planning practice. A study conducted in Victoria in 2007 found that only 26 per cent of the urban planners surveyed frequently considered health issues in their day to day planning work.\textsuperscript{26} Meanwhile, low density neighbourhoods continue to be developed at a rapid rate on the fringes of Australia’s major cities. Typically, these new suburbs have segregated land uses and are car-dependent, with poor access to shops, jobs and services and public transport.\textsuperscript{1,3} While inner city areas generally have better access to employment, education, jobs and services by public transport, walking or cycling, these areas suffer from
problems associated with housing affordability and traffic congestion. Importantly, urban
design differences between neighbourhoods may be contributing to health inequities within
cities.\(^2\)

**Planning healthy urban environments**

So what approaches could assist policymakers and planners to create healthier urban
environments? Importantly, there is a need for greater alignment between health promotion and
urban planning.\(^35,36\) To deliver health enhancing communities, integrated planning involving
collaboration across sectors and levels of government is required to achieve coherence and
consistency of policy goals and policy instruments.\(^37\) Integrated planning seeks to overcome the
problems associated with governments operating within traditional sectoral silos, resulting in
fragmented governance, inefficiencies, and/or sub-optimal outcomes.\(^37,38\) In Australia, there
has been increasing interest in integrated planning that promotes positive health and wellbeing
outcomes, particularly at the state level in South Australia where there is a whole-of-
government mandate for utilising a Health in All Policies approach.\(^39\) However, there remains
a need for well-integrated land use, transport and infrastructure planning in many jurisdictions.

Health impact assessment is a methodology that can assist with promoting health through
integrated planning. It allows policymakers to accept, reject or amend policies or plans in any
sector based upon their potential or current effects on population health.\(^40-42\) Whilst health
impact assessment activity in Australia has increased since the 1990s, more widespread and
consistent use of health impact assessment could increase consideration of health in planning
decision-making.\(^43\)

There are a number of other conditions that are critical for effective policymaking and planning,
including planning that promotes health. First, community participation in the planning process
is important,\(^44\) as it ensures that community concerns are considered and assists policy
implementation by giving community members a sense of ownership of the policy or program.\(^45\)
For community participation to be effective, the process should be transparent with frequent communication between all parties.\textsuperscript{46} Second, it is essential for policies to include a comprehensive implementation plan, with clear actions, targets and delegation of responsibility.\textsuperscript{28, 47} This ensures that policies are clear statements of intent, rather than just aspirational documents. Third, it is vital to evaluate the implementation and effectiveness of policies and plans, to measure progress against targets, and keep the urban planning process open and transparent.\textsuperscript{48} Finally, mechanisms are required to ensure timely translation of research evidence on healthy urban design attributes into planning decisions, in keeping with the idea of evidence-based practice.\textsuperscript{49}

\textbf{Research approaches to facilitate evidence-based healthy urban design}

While there is a mounting body of evidence supporting the association between the built environment and health outcomes, to date this has mostly been examined using cross-sectional study designs.\textsuperscript{50} These are descriptive studies in which data are collected to provide a snapshot of a population at a single point in time. As these studies assess environmental characteristics and health outcomes simultaneously, it is difficult to establish causation. More recently a number of longitudinal studies have commenced,\textsuperscript{51-54} which are better able to establish causation. These studies follow individuals over time and measure changes in both environmental variables and health outcomes. In so doing, they are able to assess whether the environment changes people’s behaviour, or whether people pre-disposed to certain behaviours choose environments that match their preferences. Preliminary longitudinal evidence supports cross-sectional findings suggesting that increasing access to supportive environments positively changes behaviour and that the impact of the built environment may be causal.\textsuperscript{52}

Nevertheless, more policy-relevant research is required. ‘Natural experiments’ are now being used in a range of research disciplines, including public health, behavioural economics and education, to study the impacts and outcomes of policies.\textsuperscript{55} Natural experiments allow
researchers to observe and study the direct and indirect health effects of changes in the built environment (e.g. provision of cycling or walking paths, or a new planning policy) that are implemented by policymakers or practitioners.\textsuperscript{56} Australian capital cities are growing and changing rapidly through housing redevelopment and renewal programs, the construction of new residential estates and transport networks. These urban transformations are all opportunities to conduct natural experiments in collaboration with policymakers and practitioners. The outcomes of built environment interventions may take some time to manifest. By monitoring progress over time, natural experiments can act as an early warning system, should there be unintended negative consequences of decision-making, and provide evidence to guide timely adjustments to policies.\textsuperscript{52}

Complex-system modelling could also inform urban design decision-making. There is a growing recognition that cities are complex systems, with networks of inter-related urban design features interacting in complex, non-linear ways to determine health outcomes.\textsuperscript{12} It is challenging for researchers and urban planners to account for this complexity. Complex-system modelling assists with this by simplifying reality into a conceptual model,\textsuperscript{57} which can then be used to predict the potential effects of a policy or plan on a range of inter-related health risk factors. Even though the real world is considerably more complex than any model could be, a well-designed complex-system model can make explicit the dynamics that underlie a problem and reveal potential unintended consequences. A well-defined model that incorporates the most significant aspects of a problem can thus be an invaluable tool in decision-making. The Foresight report \textit{Tackling Obesities: Future Choices} diagrammatically represents the very complex system created by the various social, environmental and economic determinants of obesity, and the multi-directional interactions between them.\textsuperscript{58} While this level of complexity would be difficult to model, simplified models of the sub-systems, may nevertheless help advance research, policy and practice.
What role for health promotion researchers and practitioners?

To help advance this field, health promotion researchers and practitioners need to be more closely engaged with urban planning practitioners, policymakers and researchers. Although not without challenge, there has been a recognition of the need to reconnect the planning and health disciplines for more than a decade. Working in partnership with planners and urban designers will assist in health outcomes being considered as communities are planned and could facilitate the translation of research evidence into planning practice. However, to be effective in this role, health promotion practitioners and researchers require training in healthy community planning to ensure that they have the requisite knowledge and skills. Hence, during this period a number of built environment and health training programs have emerged in North America, the UK and Australia. Helpfully, Botchwey and colleagues provide an overview of US programs, including a suggested curriculum for built environment and health course work programs. To progress this work, health promotion academics could work in partnership with planning academics to develop healthy community planning programs within universities across Australia, and to deliver professional development short courses for those already in the field. This has already commenced in Australia with a number of planning and transport (Carey Curtis, Curtin University; Matthew Burke, Griffith University) academics leading the way within their own disciplines, supported by the work of leading public health and planning agencies (e.g. the Heart Foundation and the Planning Institute of Australia). However, the number of interdisciplinary programs in Australia is limited and this represents a major opportunity for Australian academics to contribute to reconnecting health promotion and planning researchers, policymakers and practitioners.

Conclusion
A substantial body of literature demonstrates that specific features of the built environment are associated with risk factors for major chronic diseases. Whilst there is still much to be understood about the complex causal processes that shape urban population health and health inequities at local, regional and national scales, the research to date is consistent and sufficient to inform many health-promoting urban design choices. The challenge is to effectively translate research evidence into policy and practice. Integrated planning utilising collaborative approaches across the public and private sectors and levels of government, could assist policymakers to create healthier urban environments. Innovative policy-relevant research approaches and closer engagement between urban planners and health promotion practitioners and researchers could assist in encouraging integrated transport, land use and infrastructure planning, based on the urban health research evidence. There needs to be greater emphasis in public health and planning degrees and professional development on re-connecting the two disciplines, building upon emerging efforts to enhance knowledge and skills in planning healthy communities.

**References**


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