

# 1           **Urban design and health: Progress to date and future challenges**

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## 4   **Abstract**

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

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

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

## 23 **Introduction**

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

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

42 The view that urban design impacts on health is consistent with the ‘social-ecological model of  
43 health’. This model recognises that there are multiple levels of influence on health, with many  
44 of these located outside of the health sector.<sup>10</sup> The physical, social, economic and political  
45 factors that shape health outcomes have been termed ‘social determinants of health’, and  
46 contribute to creating health inequities.<sup>11</sup> In cities, the various social determinants of health  
47 interact in multi-directional ways to create a complex system.<sup>12</sup>

48 This article begins with a brief narrative review of the evidence of the association between  
49 urban design and health. The focus is on the impact of urban design on key chronic disease risk  
50 factors – physical activity, social connectedness, diets, alcohol consumption and air quality.  
51 The article also considers health promotion achievements to date, and highlights future  
52 challenges and opportunities for closer collaboration between urban planning and health  
53 promotion practitioners and researchers, and more consistent translation of research evidence  
54 into urban planning policy and practice.

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

56 Recently, significant progress has been made in understanding how specific characteristics of  
57 the built environment directly and indirectly affect population health.<sup>13</sup> In Australia, physical  
58 inactivity is the fifth leading contributor to the disease burden,<sup>6</sup> with almost 60 per cent of  
59 Australians aged 15 years or older being insufficiently active to benefit health.<sup>5</sup> The literature  
60 establishes strong links between neighbourhood design and levels of physical activity,  
61 particularly walking for transport.<sup>14</sup> Higher residential densities, good street connectivity based  
62 on grid networks, mixed land use and high-quality active transport infrastructure are associated  
63 with higher levels of walking and cycling for transport. This type of urban form creates shorter  
64 and more convenient walking and cycling routes between homes and jobs, retail and essential  
65 infrastructure and services.<sup>9, 15, 16</sup> The literature also indicates that shorter distances to public  
66 transport stops are associated with higher levels of walking, especially among people on lower  
67 incomes who are more reliant on public transportation.<sup>17</sup> Furthermore, having accessible and  
68 attractive public open space and recreation facilities is associated with higher levels of  
69 recreational physical activity, particularly walking.<sup>9, 15</sup> Traffic volumes and perceived traffic  
70 safety are also associated with children walking and cycling to school.<sup>18</sup> For example, children  
71 attending schools located in neighbourhoods with both low traffic volumes and highly-  
72 connected street networks are significantly more likely to walk to school than other children.<sup>18</sup>

73 In this context, urban design is increasingly seen as an important intervention for promoting  
74 physical activity and health.

75 The literature indicates a number of other associations between chronic disease risk factors and  
76 urban design attributes. In addition to increasing physical activity, good access to attractive and  
77 safe streets and public open and green spaces can also have mental health benefits. It is thought  
78 to do so by fostering formal and informal social interactions and exposing people to nature.<sup>9</sup>  
79 For mental health, the quality rather than the quantity of public open and green space appears  
80 to be important.<sup>19</sup>

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

88 The design of urban areas can also affect air quality, particularly from traffic, with poorer air  
89 quality contributing to respiratory disease and exacerbating other chronic illnesses such as  
90 cardiovascular disease.<sup>24</sup> For example, poorly designed higher density housing located on  
91 heavily trafficked roads, increases exposure to traffic-related pollution with concomitant  
92 impacts on respiratory illness.<sup>16</sup>

93 Despite the rapidly growing evidence-base, there is still much to be understood about the  
94 complex processes that shape urban population health and, in particular, health inequities.<sup>25</sup>

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## 97 **Challenges for healthy urban design**

98 Amongst health promotion practitioners there is a growing understanding of the links between  
99 the built environment and health, and increasingly urban planners in Australia recognise the  
100 role their profession plays in creating healthier communities.<sup>26</sup> Indeed, a growing number of  
101 planning policies and guidelines in Australia encourage the creation of healthier urban  
102 environments. Leading examples include Victoria's *Environments for Health* state-wide  
103 framework for Municipal Public Health Plans. Introduced in 2001, this framework encourages  
104 the integration of urban planning and health planning at the local government level.<sup>27</sup> The  
105 National Heart Foundation of Australia has also developed guidelines such as *Healthy Spaces*  
106 *and Places* (developed in collaboration with the Planning Institute of Australia and the  
107 Australian Local Government Association)<sup>28</sup> and *Healthy by Design* for South Australia and  
108 Tasmania,<sup>29,30</sup> all of which aim to assist urban planners to design healthier urban environments.  
109 In addition, there is increasing consideration of factors that influence health in state planning  
110 strategies such as Western Australia's sustainable cities initiative, *Liveable Neighbourhoods*,<sup>31</sup>  
111 state legislation such as Victoria's *Transport Integration Act 2010*,<sup>32</sup> and draft metropolitan  
112 planning strategies such as those for Melbourne<sup>33</sup> and Sydney.<sup>34</sup>

113 Despite this progress, the principles of healthy urban design are not being consistently  
114 incorporated into planning policies in Australia. Moreover, there remains a gap between the  
115 evidence and urban planning practice. A study conducted in Victoria in 2007 found that only  
116 26 per cent of the urban planners surveyed frequently considered health issues in their day to  
117 day planning work.<sup>26</sup> Meanwhile, low density neighbourhoods continue to be developed at a  
118 rapid rate on the fringes of Australia's major cities. Typically, these new suburbs have  
119 segregated land uses and are car-dependent, with poor access to shops, jobs and services and  
120 public transport.<sup>1, 3</sup> While inner city areas generally have better access to employment,  
121 education, jobs and services by public transport, walking or cycling, these areas suffer from

122 problems associated with housing affordability and traffic congestion. Importantly, urban  
123 design differences between neighbourhoods may be contributing to health inequities within  
124 cities.<sup>2</sup>

## 125 **Planning healthy urban environments**

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

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

143 There are a number of other conditions that are critical for effective policymaking and planning,  
144 including planning that promotes health. First, community participation in the planning process  
145 is important,<sup>44</sup> as it ensures that community concerns are considered and assists policy  
146 implementation by giving community members a sense of ownership of the policy or program.<sup>45</sup>

147 For community participation to be effective, the process should be transparent with frequent  
148 communication between all parties.<sup>46</sup> Second, it is essential for policies to include a  
149 comprehensive implementation plan, with clear actions, targets and delegation of  
150 responsibility.<sup>28, 47</sup> This ensures that policies are clear statements of intent, rather than just  
151 aspirational documents. Third, it is vital to evaluate the implementation and effectiveness of  
152 policies and plans, to measure progress against targets, and keep the urban planning process  
153 open and transparent.<sup>48</sup> Finally, mechanisms are required to ensure timely translation of  
154 research evidence on healthy urban design attributes into planning decisions, in keeping with  
155 the idea of evidence-based practice.<sup>49</sup>

### 156 **Research approaches to facilitate evidence-based healthy urban design**

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

169 Nevertheless, more policy-relevant research is required. 'Natural experiments' are now being  
170 used in a range of research disciplines, including public health, behavioural economics and  
171 education, to study the impacts and outcomes of policies.<sup>55</sup> Natural experiments allow

172 researchers to observe and study the direct and indirect health effects of changes in the built  
173 environment (e.g. provision of cycling or walking paths, or a new planning policy) that are  
174 implemented by policymakers or practitioners.<sup>56</sup> Australian capital cities are growing and  
175 changing rapidly through housing redevelopment and renewal programs, the construction of  
176 new residential estates and transport networks. These urban transformations are all  
177 opportunities to conduct natural experiments in collaboration with policymakers and  
178 practitioners. The outcomes of built environment interventions may take some time to manifest.  
179 By monitoring progress over time, natural experiments can act as an early warning system,  
180 should there be unintended negative consequences of decision-making, and provide evidence  
181 to guide timely adjustments to policies.<sup>52</sup>

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



197 **What role for health promotion researchers and practitioners?**

198 To help advance this field, health promotion researchers and practitioners need to be more  
199 closely engaged with urban planning practitioners, policymakers and researchers. Although not  
200 without challenge, there has been a recognition of the need to reconnect the planning and health  
201 disciplines for more than a decade.<sup>35, 36</sup> Working in partnership with planners and urban  
202 designers will assist in health outcomes being considered as communities are planned and could  
203 facilitate the translation of research evidence into planning practice. However, to be effective  
204 in this role, health promotion practitioners and researchers require training in healthy  
205 community planning to ensure that they have the requisite knowledge and skills.<sup>59</sup> Hence,  
206 during this period a number of built environment and health training programs have emerged  
207 in North America,<sup>60</sup> the UK<sup>61</sup> and Australia.<sup>62</sup> Helpfully, Botchwey and colleagues<sup>60</sup> provide  
208 an overview of US programs, including a suggested curriculum for built environment and health  
209 course work programs. To progress this work, health promotion academics could work in  
210 partnership with planning academics to develop healthy community planning programs within  
211 universities across Australia, and to deliver professional development short courses for those  
212 already in the field. This has already commenced in Australia with a number of planning<sup>62</sup> and  
213 transport (Carey Curtis, Curtin University; Matthew Burke, Griffith University) academics  
214 leading the way within their own disciplines, supported by the work of leading public health  
215 and planning agencies (e.g. the Heart Foundation<sup>63, 64</sup> and the Planning Institute of Australia<sup>28</sup>).  
216 However, the number of interdisciplinary programs in Australia is limited<sup>62</sup> and this represents  
217 a major opportunity for Australian academics to contribute to reconnecting health promotion  
218 and planning researchers, policymakers and practitioners.

219

220 **Conclusion**

221 A substantial body of literature demonstrates that specific features of the built environment are  
222 associated with risk factors for major chronic diseases. Whilst there is still much to be  
223 understood about the complex causal processes that shape urban population health and health  
224 inequities at local, regional and national scales,<sup>25</sup> the research to date is consistent and sufficient  
225 to inform many health-promoting urban design choices.<sup>56</sup> The challenge is to effectively  
226 translate research evidence into policy and practice. Integrated planning utilising collaborative  
227 approaches across the public and private sectors and levels of government, could assist  
228 policymakers to create healthier urban environments. Innovative policy-relevant research  
229 approaches and closer engagement between urban planners and health promotion practitioners  
230 and researchers could assist in encouraging integrated transport, land use and infrastructure  
231 planning, based on the urban health research evidence. There needs to be greater emphasis in  
232 public health and planning degrees and professional development on re-connecting the two  
233 disciplines, building upon emerging efforts to enhance knowledge and skills in planning healthy  
234 communities.<sup>35, 36</sup>

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