

## Position statement

# The built environment and walking

The Heart Foundation's National Physical Activity Advisory Committee

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## Facts

- Physical inactivity is a modifiable risk factor for cardiovascular disease and a range of other chronic diseases, including diabetes mellitus, cancer (colon and breast), obesity, hypertension, bone and joint diseases and depression.<sup>1-3</sup>
- Physical activity is important in reducing risk factors for cardiovascular and other chronic diseases.<sup>4,5</sup>
- Promoting walking is recognised as a promising means of increasing population levels of physical activity.
- The built environment is directly associated with physical activity, particularly walking.
- The built environment can either facilitate or discourage walking.
- Walking for transport is associated with living in neighbourhoods that have good access to destinations (including public transport), connected street networks, and higher residential densities.<sup>6,7</sup>
- Neighbourhood aesthetics (including access to public open space) tend to be associated with increased walking for recreation.
- There is widespread agreement that there is sufficient evidence to warrant public health action on the role of the built environment in increasing physical activity.<sup>6-9</sup>
- A whole-of-government approach is crucial to the creation of 'walkable' communities in new and existing developments.



## Summary statement

Promoting walking is an effective way to increase population levels of physical activity.

To increase walking, a whole-of-community approach is required that combines multiple-level strategies: public education, changes to the built environment and strategies that create a positive social environment.

Walking for recreation and walking for transport are influenced by different features of the environment. Walking for transport is associated with living in neighbourhoods that have connected street networks, good access to destinations and public transport, and higher residential densities. Neighbourhood aesthetics and access to facilities, parks and beaches tend to be associated with increased walking for recreation.

There are considerable opportunities for the health and other sectors to collaborate to promote walking and improve the walkability of neighbourhoods. This includes advocating the need for healthy planning policies for new developments; educating state and local governments, developers and planners about the built environment features that facilitate walking; and promoting walking to the general public.

## Rationale

Three groups of factors appear to be associated with physical activity:

- individual factors (knowledge, attitudes, values, skill, self-efficacy)
- social environmental factors (social support, having someone to walk with, and social norms—i.e. broader peer-group or community beliefs about what is valuable or important)
- built environment factors (the presence of recreational facilities, neighbourhood design, safety, aesthetics, facilities, destinations to walk to, and policies that influence land use and transportation systems).

Although the built environment is the least understood, it is becoming apparent that these factors act together to motivate, support and provide opportunities to encourage physical activity.<sup>10</sup> Thus, multi-level interventions that target individuals, the social environment and the built environment are more likely to be effective than interventions that target only one of these factors.<sup>11</sup>

In Australia, approximately half of the population is sufficiently active to achieve health benefits.<sup>4,12</sup> Encouraging walking holds great promise as a means of increasing population levels of physical activity. Not only is it easily incorporated into daily activities, but Australian research consistently finds that walking is popular among adults, particularly among women and people in low socioeconomic groups.<sup>13,14</sup>

The built environment can either facilitate or discourage walking: land use systems, transportation systems and urban design coalesce to create a pedestrian environment that impacts upon people's decisions to walk. There are two key conduits for increasing walking: encouraging more walking for transport, and/or encouraging more walking for recreation. A Western Australian study found 63% of adults reported walking for recreation, while 32% reported walking for transport.<sup>14</sup> Various literature from public health, transportation and urban planning have investigated the factors that inhibit or encourage people to walk. Importantly, the evidence suggests that walking for recreational purposes and walking for transport are influenced by different features of the environment.<sup>10,15–17</sup> These features are detailed below.

## 1. The built environment and its impact on walking for transport

Compact, connected urban environments with a mixture of densities and land uses create shorter distances between desired destinations, thus encouraging people to walk for transport. This highlights the importance of considering the interrelated factors associated with transport-related walking, including spatial land-form patterns, population density and mixed land use.<sup>10,16,18–28</sup>

Walkability refers to how ‘friendly’ an area is for pedestrians. Transportation researchers and planners have created walkability indices that take into account three factors.

- **Mixed-use planning**—the variety and proximity of destinations (how close destinations are to walk to); access to key destinations is a critical factor influencing the choice to walk for transport.<sup>9</sup>
- **Density**—areas with higher residential densities are more likely to support the presence of shops and services; thus the density of an area is indirectly related to walking.<sup>9</sup>
- **Street connectivity**—the directness of travel routes between homes, shops, workplaces and other destinations. Neighbourhoods with grid-pattern street networks typically have greater connectivity than those with curvilinear layouts. Walking for transport is encouraged when the street network is more connected, obstacles are kept to a minimum, and there is no requirement to cross major roads.<sup>16,22</sup>

A walkability index developed by American researchers<sup>22</sup> has been adapted for use in Australia.<sup>29</sup> The tools which have been developed to measure walkability involve objective assessment (rather than perceptions) using a Geographic Information System that can measure density, connectedness, slope and hilliness, residential/retail mix and green space.<sup>29</sup> Methods of defining, weighting and scoring these elements of walkability are in the early stages of development.

The evidence on the impact of traffic on walking is mixed, depending upon the behaviour and the target group. In adults, perceiving traffic to be present and heavy has been shown to be both positively<sup>13</sup> and negatively<sup>30</sup> associated with walking for transport. There are two possible explanations for the counterintuitive finding that increased traffic is associated with increased walking for transport. While the presence of destinations encourages more walkers, destinations will also attract more drivers who access these same places by motor vehicle, thereby increasing traffic volume. Those who walk more, are often exposed to, and therefore more aware of, higher traffic volumes.<sup>31</sup> Parents of children are particularly concerned about traffic exposure and safety. These concerns are considered below.

## 2. The built environment and its impact on walking for recreation

Different elements of the built environment appear to be associated with recreational walking. Elements consistently found to be positively associated with walking for recreation or exercise include the attractiveness or aesthetics of the neighbourhood environment<sup>32</sup> and the convenience of facilities.<sup>15</sup> Access to beaches or large attractive public open space also appears to encourage recreational walking.<sup>10,13,33</sup> Conversely, perceiving traffic to be present appears to discourage walking for recreation.<sup>30</sup>



### 3. Environmental attributes that influence children's walking behaviour

The impact of the built environment on children's physical activity, especially their walking behaviour, is complex. Children's behaviour is largely influenced by their parents, especially in terms of transportation. Trend data show a decline in walking or cycling to school, and an increase in travel by car rather than public transport.<sup>34</sup> A range of factors have been shown or hypothesised to influence children's walking behaviour, but personal and traffic safety issues are key factors.

Given that motor vehicle accidents are the leading cause of death in Australian children aged 1–14 years,<sup>35</sup> parental concerns about traffic safety are somewhat justified. Protecting children from exposure to high traffic volume is clearly critical to reduce both their absolute and perceived risk of traffic injury. For example, one recent study<sup>36</sup> found a relationship between the construction and maintenance of footpaths, the installation of traffic lights on routes leading to schools, and increases in children's active commuting. Neighbourhoods with increased proximity between homes and a greater proportion of park area are associated with greater physical activity in young children.<sup>37</sup>

The published evidence on the association between street network connectivity and children's walking is inconsistent.<sup>38</sup> For younger children, living in cul-de-sacs may increase opportunities for active play,<sup>39</sup> however, the presence of cul-de-sacs may decrease walking for transport among adults and may reduce the potential for older children to walk to school.<sup>40</sup> Therefore, connected communities may have a differential impact on the walking behaviour of children depending upon their age and stage of development. Moreover, children's walking behaviour is influenced by factors other than the built environment alone.<sup>41,42</sup> Specifically, parents are the gatekeepers of children's behaviour and determine whether or not they are allowed to walk, irrespective of the quality and safety of the built environment.

### 4. Designing, retrofitting and rejuvenating neighbourhoods to encourage walking

Awareness of the macro-level and micro-level environmental features that influence walking is important when new residential subdivisions are being developed and established neighbourhoods are retrofitted. The macro environment encompasses state and local government policy initiatives, as well as urban planning guidelines (e.g. 'smart urban planning codes') that influence urban development and land use, transport systems, car usage and broader environmental and sustainability issues. Moreover, the macro environment dictates the neighbourhood-level characteristics of the built environment, including residential density, street connectivity and access to destinations that impact upon walking for transport.

Micro environments encompass small-scale local neighbourhood features. These micro-level characteristics—such as street lighting, signage, safety, lane use and traffic calming measures—can improve pedestrian use of streets.<sup>43,44</sup> High-quality local aesthetics, facilities, parks and local road networks may enhance the walkability of local neighbourhoods and contribute to social capital and community cohesion.<sup>45–47</sup> Attention to micro-level features can improve the aesthetic appeal and presentation of neighbourhoods, which influences residents' predilection to walk for recreation.



Creating a more walkable environment in established neighbourhoods provides additional challenges. Retrofitting and rejuvenating relates to redesigning or upgrading existing neighbourhoods to enhance their capacity for walking. Increasing land-use mix would considerably improve the walkability of an existing area by improving the proximity of facilities. However, increases to residential densities are a necessary prerequisite to make these additional shops and facilities economically viable. At this stage, although there is recognition of the need to retrofit existing suburbs, there is no published evidence from well-designed studies supporting the retrofitting of existing neighbourhoods.

There are potential barriers to implementing macro-level changes to existing development, including the formidable public and private sector costs of remodelling or retrofitting neighbourhoods, the slow pace of change in the urban landscape, zoning regulations that do not facilitate mixed land use and a lack of communication between different stakeholders.<sup>48</sup> While retrofitting the macro-level environment to promote walking is challenging, this should not deter action, particularly given the large amount of 1980s-style low-density development in Australian cities.

Improvements to the micro-level environment are easier to implement and also have the potential to promote walking. However, the impact of micro-level changes in isolation of a supportive macro environment (e.g. destinations to walk to) is unknown. Urban design features that can improve the amenity of a neighbourhood include street lighting, shade trees, and the installation and maintenance of footpaths and street-crossing aids. The introduction of walking and cycling infrastructure as well as traffic calming and other traffic diversions also have the potential to help to encourage local walking as well as cycling.<sup>43,49</sup>

In terms of walking, macro-level policies and the resulting residential development provide the preconditions essential to promoting walking for transport. Conversely, the micro-level environment is fundamental to the aesthetic presentation and appeal of a neighbourhood, and is necessary to encourage walking for recreation or exercise. Changes at both levels have the potential to target both walking outcomes and maximise benefits to public health.

A whole-of-government approach is crucial to the creation of walkable communities in new and existing developments. There are considerable opportunities for the health sector to collaborate with other sectors at all levels of government to work towards improving the walkability of neighbourhoods, including advocating the need for healthy planning policies for new developments; educating state and local government, developers and planners about the built environment features that facilitate walking; and promoting walking to the general public. Many micro-environment design features are the responsibility of local government, and local governments often work with developers who build new developments and retrofit existing areas. Consequently, local government policy plays a crucial role in enhancing the walkability of micro- and macro-environments.



## Recommendations

To increase walking, a whole-of-community approach is required that combines multiple-level strategies including public education, strategies that create a positive social environment (i.e. social and cultural norms) and changes to the built environment. The Heart Foundation makes the following recommendations.

### All adult Australians

To increase their own physical activity levels, and help to create physical environments conducive to walking, the Heart Foundation recommends all Australian adults:

- incorporate walking and cycling into their day through active transport and increased use of public transport
- become involved in the development and review of strategies designed to improve the walkability of local areas, and advocating change where it is needed; community members are important sources of local knowledge and their involvement in the planning process may increase acceptance of the strategies employed
- encourage their workplaces to replace subsidies that promote the use of private and company motor vehicles with inducements for employees to walk, cycle or take public transport to work via:
  - > fare rebates
  - > shower facilities and safe bicycle parking
  - > bicycle maintenance vouchers
  - > bonuses for use of alternative forms of transport.

### Health sector

The health sector should promote community, government and industry understanding of the need to create environments that are supportive of walking, cycling and public transport use. The Heart Foundation recommends that the health sector:

- advocate inter-sector collaboration between local and state government departments, non-government organisations and the land development industry to create environments supportive of walking, cycling and public transport use
- design public education campaigns and programs, and undertake media advocacy to encourage walking, cycling and public transport use
- lobby workplaces to replace subsidies that promote private and company motor vehicle use with inducements that encourage employees to walk, cycle or take public transport to work.

## Governments

The Heart Foundation encourages governments to prioritise the needs of pedestrians, cyclists, public transport users and recreational walkers in urban and regional planning by promoting land use, transport systems and urban design that support transport-related walking and cycling, public transport use and walking for recreation.

Consideration needs to be given to factors that influence macro- and micro-environments.

Methods for prioritising pedestrians and cyclists in the design and redesign of local neighbourhoods include:

- improving proximity and accessibility to shops, services, public transport and public open space by increasing residential densities around these destinations and providing connected street networks and footpaths
- designing and redesigning public open space to create attractive open space with good surveillance, safe pedestrian access, walking paths and trees, catering for the needs of multiple users
- reducing exposure to traffic for pedestrians and cyclists
- reallocating road-space to cyclists and pedestrians
- introducing traffic calming measures
- creating safe routes to school
- creating attractive, well-lit streetscapes with shade trees
- ensuring footpaths are an adequate width, with an even surface, minimal obstacles and curb cuts/pram ramps to provide a supportive walking environment for multiple users; consideration could be given to footpaths being on both sides of the street.

Methods for prioritising pedestrians and cyclists around shopping centres, workplaces and schools include:

- reducing exposure to traffic for people accessing the destinations by foot or bicycle
- reallocating road space to cyclists and pedestrians
- introducing traffic calming measures
- creating safe routes to major destinations including safe road crossings and walking and cycling paths
- designing shopping centres and workplaces with active frontages that promote the natural surveillance of adjacent streets and car parks, and ensuring these areas are well lit at night.

## Urban planners, transportation planners and the land development industry

The Heart Foundation encourages urban planners, transportation planners and the wider land development industry to prioritise the needs of pedestrians, cyclists, public transport users and recreational walkers when designing and redesigning residential environments. Planners and developers should consider implementing the above recommendations.



## Rating the evidence

The evidence in relation to walking and the built environment is drawn mainly from cross-sectional studies, expert committee reports and case studies. While this level of evidence limits causal inferences being drawn, evidence on correlates is sufficient to support policy advocacy and change.<sup>17</sup> This is further supported by agreement across a large number of expert committees that there is sufficient evidence to warrant public health action addressing the areas listed in Table 1.<sup>6-9</sup>

## Summary of evidence

Summary of the evidence	Key studies and reports
<b>Walking for transport is consistently associated with:</b>	
• proximity of destinations including shops and public transport	9, 50
• mixed-use planning	9
• street connectivity	16, 51
• population density	9
• greater walkability (generally a composite of the above attributes).	29
<b>Walking for recreation is consistently associated with:</b>	
• access to beaches, facilities and parks	10, 13
• pedestrian infrastructure	15
• aesthetics.	32, 45
<b>Children's walking is associated with:</b>	
• closer proximity to parks	37
• good pedestrian infrastructure	36
• traffic safety	35
• parental influence.	41, 42
<b>Designing neighbourhoods to encourage walking is associated with:</b>	
• community-scale urban design and land use policies and practices (zoning regulations, street connectivity, residential and employment density)	48
• street-scale design and land use policies and practices (lighting, safe street crossings, continuity of footpaths, traffic calming measures and aesthetic enhancements)	48
• federal, state and local government policy initiatives and urban planning guidelines.	48

Table 1: Summary of evidence



## Future research

There is a growing body of evidence supporting the association between features of the built environment and walking. However, gaps remain in the knowledge base. It is recommended that future research:

- distinguish between walking for transport and walking for recreation, and measure the different factors in the built environment associated with these different walking outcomes
- use reliable and valid environmental measures, and behavioural and context-specific walking outcomes
- use longitudinal study designs to assist in establishing causality and to examine the role of self-selection in behaviour
- involve evaluations of natural experiments that entail opportunistic or planned environmental changes (e.g. neighbourhood revitalisation programs) that might influence the physical activity of local residents; potential funding bodies should be responsive to the need to act quickly to ensure baseline measures can be collected
- further investigate the impact of transport policies (e.g. roadway design) and practices (e.g. path provision) on physical activity and walking for transport
- consider environmental attributes that may influence the walking behaviours of different subgroups (e.g. gender, age, stage of life, socioeconomic factors and other socio-demographic variables)
- examine environmental factors that influence recreational and transport-related walking in different settings (e.g. rural and regional environments)
- examine interrelationships between individual and social determinants of walking and the built environment; such associations may differ for different types of walking (e.g. for transport or recreation) and for people with different levels of self-efficacy or social support<sup>52,53</sup>
- examine the economic utility of creating more walkable neighbourhoods and the efficient provision of various environmental interventions
- further refine and develop conceptual models and theories to guide understanding and analysis of the relationship between the environment and walking.



## Terminology

**Built environment:** the neighbourhoods, roads, buildings, food sources and recreational facilities in which people live, work, are educated, eat and play.<sup>54</sup>

**Connectivity:** how directly a person can travel from one destination to another via existing transportation networks.<sup>51</sup>

**Density:** the concentration of people, objects or destinations within the built environment. Density influences proximity.<sup>51</sup>

**Macro environment:** the state and local government policy initiatives and urban planning guidelines that influence urban development and land use, transport systems, car usage and broader environmental and sustainability issues.

**Micro environment:** small-scale local neighbourhood features, including street lighting, signage, public transport stops, street furniture, street trees and traffic calming measures.

**Mixed-use planning:** land-use development wherein different types of uses (e.g. commercial and residential) are located within close proximity to one another.<sup>51</sup>

**Pedestrian friendly:** neighbourhoods that contain multiple features that encourage walking, including higher residential and commercial densities, connected street networks, public amenities such as squares, parks and other gathering places, as well as wide footpaths, street lighting, street furniture, street trees and traffic calming.

**Physical activity:** bodily movement produced by the contraction of skeletal muscle that increases energy expenditure above the basal (i.e. resting) level.<sup>9</sup>

**Public open space:** land used for recreational purposes by the public, including parks, public gardens, foreshore reserves, playgrounds and sports fields.<sup>55</sup>

**Walkability:** the extent to which an area or neighbourhood is pedestrian friendly. In relation to walking for transport, walkability is measured in terms of the connectivity of street networks, the level of mixed-use planning and higher residential densities.<sup>56</sup>

**Walking for recreation:** walking for exercise, health or recreation.

**Walking for transport:** walking to get to and from places, including walking for errands, to and from work, and to and from transport stops. Also referred to as 'utilitarian' walking.

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## About the Heart Foundation

The Heart Foundation is the leading organisation in the fight against cardiovascular disease (heart, stroke and blood vessel disease) in Australia. Our mission is to reduce suffering and death from cardiovascular disease in Australia.

Since our establishment in 1959, we have championed the hearts of Australians by promoting health in the community, supporting health professionals and funding world-class research. As a charity, we rely on donations and gifts in wills to continue our work. While our work has helped to reduce the number of deaths from cardiovascular disease, it remains one of Australia's most devastating health problems. It claims a life almost every 10 minutes. It also adversely affects the quality of life of nearly one in five Australians.

Our focus is to:

- help all Australians to achieve a healthy weight
- help all Australians to identify and understand the warning signs of a heart attack
- inform and educate women about their risk of heart disease and the steps they can take to prevent it
- help all Australians to have improved access to prevention and treatment
- increase our commitment to supporting research as well as using quality research in all of our work
- increase funds raised.



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