Planning healthy neighbourhoods: Addressing the links between health, wellbeing, health equity and neighbourhood built form

Abstract: The social determinants of health (SDH) are recommended as a policy focus for governments seeking to increase wellbeing and health equity, and maintain control of health care budgets. Urban planning influences the SDH by shaping the physical and social aspects of neighbourhoods, creating conditions that can either support or detract from the promotion of physical activity, social connectedness and mental wellbeing. This paper draws on selected findings from a three year ARC funded project, which is examining Australian urban planning policies. The paper examines one aspect of urban planning: the extent to which policies encourage neighbourhood built form that will promote health and wellbeing.

The research findings indicate that many of the policies recognise the importance of neighbourhood form in fostering active transport and mandate it primarily on environmental and traffic decongestion grounds (e.g. reducing VKT and associated emissions), with supplementary validation coming from the health benefits of increased physical activity. However, in regard to other aspects of neighbourhood design, potential synergies between physical and mental wellbeing and urban planning could be developed further through attention to promoting city wide accessibility, safety and social connectedness at the level of the walkable neighbourhood. This can be achieved through planning policies that facilitate autonomy and self-reliance at the neighbourhood level to enable opportunities for greater social and recreational activities, including impromptu interactions between neighbours, in public places such as neighbourhood parks, streets and activity centres.

Background

The findings and analysis presented in this paper have been developed during a broader research project, funded by the Australian Research Council (ARC) between 2016 and 2019. The research is examining how the policies of Australian governments in four sectors other than the health sector (urban planning, justice, natural environment and industry) influence population health, wellbeing and health equity. The aim of the research is to better understand how whole-of-government action can be progressed to promote health while still addressing other sector-specific goals. This paper reports selected findings from the component of the broader research that has involved analysing urban planning policies.

This paper focusses on an analysis of urban planning public policy in all Australian states and territories to explore how neighbourhood design is approached to consider the extent to which policies encourage neighbourhood built form that will promote health and wellbeing. The term neighbourhood is defined in many ways within the existing literature (Galster, 2001). Within this paper the 'home area' definition of the neighbourhood is applied. This relates to the area within walking distance of a person's home that might include and be identified by physical, social and civic elements or all three (Kearns and Parkinson, 2001). These elements have the potential to satisfy instrumental and existential needs, and the degree they do so can affect the health and wellbeing of residents (Kearns and Parkinson, 2001, Mehta, 2009). In the Australian context, the notion of neighbourhood is commonly associated with the suburb and the two words are often used interchangeably (reference). However, individual suburbs are geographically bounded and named entities and can have residential populations ranging from a few hundred to tens of thousands. Neighbourhoods, on the other hand, are flexibly related to home areas and not usually named.

From the middle of the 20th century, metropolitan areas went from a state where they were "*coherent, bound, mixed and settled to ones that were fragmented, diffused, unbounded and stretched"* (Arefi 1999, pp 179-80). A consequence of this was a major change to the form and function of the Australian suburb. Whereas pre-1950s streetcar and rail suburbs derived their viability by pedestrian connection to the stop, station and the large and diverse agglomerated parades of uses established around them, the post-1950s automobile suburb gained its commercial and development viability via connection to the street, arterial road, freeway and privatised places such as shopping centres.

This change dissipated the previously agglomerated mix of uses found along the local high street or within the town centre, creating a form of discrete separated premises connected into the road network by the sign and carpark. In addition, residential suburbs became car oriented dormitories where the requirements of the pedestrian were often ignored and rarely designed for. The disaggregation of the high street or town centre as the organising model for the distribution of goods, services recreation and entertainment, diminished the self-reliance of the neighbourhood as provider of these (Carmona, 2010, Duany et al., 2000, Madanipour, 1999, Mehta, 2009).

The effect of this change on the Australian metropolis has been a metropolitan form comprised of remnant compact, mixed use and walkable pre-1950s streetcar and rail suburbs such as Newtown in Sydney, Carlton in Melbourne or Norwood in Adelaide, and post 1950s automobile suburbs such as Elizabeth in Adelaide and Broadmeadows in Melbourne. The former have become a highly desired place to live and work, particularly amongst the 'new middle classes', forcing up their value, both commercially and as places worthy of preservation and emulation (Ley, 1997, p 1-12).

Amongst this metropolitan form, Childs (2006) argues there are three basic types of public gathering places or commons each with different forms and functions. The first are the neighbourhood commons. These are small scale publicly owned parks and activity centres open to all but frequented on a regular basis by a community of place whose routine use defines both its function and character. They are small and intimate and there are often ties of acquaintance between regular users. Then there are the civic commons. These are also publicly owned gathering places open to all and controlled by a myriad diversity of stakeholders and users. However, they are much larger than the neighbourhood commons and include bustling city, regional or district centres where one can be anonymous in the crowd and at liberty to test limits. Finally, there are the membership commons. These are usually privately owned and open to all, but shared by a limited group willing to pay the price of entry and/or able to conform to the rules of entry. They include restaurants, bars and theatres but also privatised public places such as shopping malls (Childs 2006).

Furthermore, Oldenburg (1999) argues that one of the most important components of neighbourhoods are third places. He described these as destinations outside the private world of the first place of home and the second place of work, where a person can go alone but be assured of informally encountering friends and acquaintances on arrival. They are places where a person can mingle freely and informally and develop friendships on their own terms. Such relationships, he argues, are vital for balancing private and public lives in order to live as fully engaged human beings.

The dominance of the automobile suburb and the subsequent loss of walkable neighbourhoods, neighbourhood and civic commons and third places, it is argued, has had a detrimental effect on both physical and mental health and well-being (Cole et al., 2015, Frank et al., 2004, Frumkin, 2004, Garden and Jalaludin, 2009). Over the past 20 years, the inefficiencies and problems associated with the automobile suburb and urban sprawl, of which poorer health is one, have given rise to neo-traditional planning approaches, such as new urbanism and smart growth (reference). These approaches to planning see the traditional pedestrian oriented form and high streets of the streetcar and railway suburbs as vastly superior forms to the disconnected form of the automobile suburb. Therefore, they advocate that the traditional precinct be preserved and become the model for the 21st century suburb in the form of urban villages or transit oriented developments (TOD) (Calthorpe, 1993, Duany et al., 2000). These forms have become influential in the formation of planning policy in North America and Australia over the past 20 years (Bertolli et al., 2016).

The importance of walking

A healthy neighbourhood is one where residents walk often, routinely and in significant numbers. Regular incidental walking is recognised as the easiest, cheapest and most applicable means of gaining recommended levels of physical exercise for the broadest cross section of social demographics and personal circumstances (Frumkin, 2004, Heart-Foundation, 2014, Manson et al., 2002, Pikora et al., 2003, Zapata-Diomedi et al., 2016). Furthermore, walking regularly and predictably places people into public places that can have mental health and wellbeing benefits.

Neighbourhood pedestrian activity is highly influenced by the physical public realm. Table 1 compiles the physical public realm elements that research shows either encourages or discourages routine walking. Permeability, path quality, safety and aesthetics are all determinants of average propensity to walk, as is having a diversity of destinations within close proximity to one's home (reference). Important neighbourhood destinations include shops, schools, kindergartens and child care facilities, parks, shared (Woonerf) streets, and agglomerated uses within public gathering places (reference).

Drawing people to gathering places regularly and predictably can increase public interaction and walking, and the more activity in these places the greater their drawing power (Ewing and Cervero, 2010). In parks this includes opportunities for diverse activities for many age groups (Timperio et al., 2008). In activity centres it includes opportunities for diverse necessary, social, recreational and resultant activities (Gehl, 2013). In addition, walkability is not just about public spaces, it is contingent on the relationships between private spaces and places, and the public realm. Private spaces (dwellings, businesses, shops etc.) provide neighbourhood destinations, and also form the visual framing of the public sphere, providing its human scale, legibility, pleasures, comfort, and interesting features (Zacharias, 2001).

Table 1: Summary of Neighbourhood features that encourage and discourage walking

	Encourage walking	Discourage walking
Footpaths	On both sides of the road Adequate width Well maintained Connected Free from obstructions Permeable, short routes Tree lined & Green verges Lighting Seating	None On one side only Poorly maintained Obstructed Impermeable lengthened routes Disconnected Unmaintained verges Wide verges (association with arterials)
Adjacent land uses	Pedestrian scale and legibility Building setbacks under 5 metres Sensually interesting pleasant Complexity Human scale buildings: (2-6 stories)	building setbacks over 6 metres Obtrusive off street car parks Barriers Long high and impervious walls and fences Car scale & legibility Ugly, boring and/or unpleasant
Safety & perceptions of safety	Sense of enclosure Passive surveillance Overlooking porches, balconies & windows Well maintained & useful open space Lighting Small well maintained front yards pedestrian activity Human activity in public spaces	Poorly maintained yards Long featureless walls, fences and facades Derelict or rundown buildings Unmaintained or useless public spaces large or isolated open space Poor lighting Absence of pedestrians Poor lines of sight Concealed spaces
Traffic	Slow, obstructed and calm Narrow streets On street parking Stop signs speed humps shared streets etc.	High speed, free flowing and busy Major free flowing arterials to cross Wide road lanes Multiple road lanes No on street parking Kerb cuts/slip lanes Traffic lights (association with major arterials) Marked crosswalks (association with arterials)
Integration	Seamless integration with adjacent suburbs/neighbourhoods Connected to metropolitan whole by public transport and cycling.	Isolated from adjacent suburbs by freeways, busy aerials, open space, rail corridors, and expansive commercial and industrial zones. Connection to metropolitan whole via private motor vehicles only. Gated or semi gated communities
Destinations	Multiple, diverse, useful and eclectic Short distances Parks/playgrounds (<5 min/400m) *Schools (<10min/800m)* Bus stops (<400m)	Instrumental poorly maintained or ugly useless Long distances None or few within 800m

	Rapid transit (<800m) Activity centre/ commons (<800m) Third places (<800m) Shared streets (<100m)	Automobile oriented retail etc. Drive throughs Unattractive

(Adkins et al., 2012, Alexander et al., 1977, Appleyard, 1980, Biddulph, 2012, Brownson et al., 2009, Cattell et al., 2008, Ewing and Handy, 2009, Frumkin et al., 2004, Gehl, 2013, Giles-Corti et al., 2016, Heart-Foundation, 2014, Hooper et al., 2015, Jacobs, 2016, Oldenburg, 1999, Pikora et al., 2003, Saelens et al., 2003, Timperio et al., 2006, van Dillen et al., 2012, Wood et al., 2010)

Walking is a compounding activity; people who are able to walk to quality destinations, not only substitute it for motorised transport, they also, on average, undertake necessary activities such as shopping far more frequently and access the local commons more regularly for social and recreational activities (Greenwald, 2003, Stead et al., 2000). In addition, dense pedestrian activity encourages emulation. In the simple but important practice of getting children to walk to school or the local park, parents are much more likely to perceive it as safe and a norm if the observe many other children doing so (Carver et al., 2008, Frumkin et al., 2004, Timperio et al., 2008).

The positive effects of being able a to walk to places and spend time in public is pronounced for people who spend a lot of time at home and/or who may not have individual access to private motor vehicles, such as older people, children, disabled people, stay-at-home parents, and people who are unemployed or underemployed (Frumkin et al., 2004, Gardner, 2011). For many of these groups the ability to access most of what they need locally on foot allows for greater self-reliance and autonomy enhancing feelings of wellbeing. It gives them the opportunity to regularly and easily engage and connect with others even if it is simply enjoying the company of strangers and/or phatic acknowledgement from familiar faces. This can help alleviate feelings of loneliness and isolation (Frumkin et al., 2004, Strawbridge and Wallhagen, 1999). In addition, easy proximity to diverse public gathering places helps satisfy wellbeing requirements for relaxation, comfort, excitement, passive and active engagement, discovery, belonging and pleasure (Cattell et al., 2008, Lund, 2003, Scitovsky, 1992, Wood et al., 2010).

Important destinations in any neighbourhood are local neighbourhood and civic commons. Both are made up of diverse agglomerated uses connected to one another by public space and symbiotic relationships. They regularly and predictably draw a diversity of people to a single connected location for a diversity of reasons, from which emergent social and resultant activity can arise (Childs, 2009, Gehl, 2013) . In the modern metropolis the civic and neighbourhood commons provide for different sized residential catchments. The civic commons provides for large district or regional sized catchments with over 25,000 residents, while the neighbourhood commons typically provides for local catchments of 10,000 residents or less. Being smaller, neighbourhood commons' satisfy fewer instrumental needs than civic commons (reference). However, by being smaller and therefore more intimate, they are more likely to provide psycho-social benefits based upon weak ties such as social connection and feelings of belonging (Francis et al., 2012, Granovetter, 1983, Putnam, 2000, Scitovsky, 1992).

In a metropolitan area the ability to walk to a neighbourhood or civic commons or both is determined by both design and residential density, as walking is constrained by distance far more than other transport modes. In general, under 800m (10 minutes) is viewed as walking distance for most destinations and 400m (5 minutes) for destinations such as parks and bus stops. Willingness to walk is also influenced by the quality of the pedestrian environment and destination, as shown in Table 1 (Adkins et al., 2012, Calthorpe, 1993, Ewing and Cervero, 2010, Gunn et al., 2017, Hillsdon et al., 2006).

The restrictions placed upon the neighbourhood by walking distance make minimum residential densities necessary for the viability of destinations such as schools, and uses within the commons. Residential density also determines the viability and frequency of public transport, the number of people on the streets and in parks and public places at any one time, as well the number of ratepayers who contribute to the maintenance of parks, streets and the commons. The large geographic footprints and low densities of Australian cities means only a small fraction of their populations are ever likely to live within walking distance of a civic commons (Newman & Kenworthy

2006). However, it is broadly achievable at the level of the neighbourhood commons with moderate levels of infill at the densities advocated for neighbourhood level transit oriented development by Calthorpe of 15-20 dwellings per hectare (1993, p 64). This density produces average neighbourhood populations in the vicinity of 2500 households or 6000 people, around the minimum required to support a comprehensive supermarket, the basic component of a viable 21st century neighbourhood commons. As well as a supermarket 6000 residents can potentially support 40 or more retail premises (McGreevy, 2017). It is also enough to support at least one primary school, kindergarten and child care centre (McDonald, 2008).

This review highlighted the interconnections that exist between neighbourhood design and health and wellbeing. In particular, the influence of neighbourhood design on facilitating or impeding walking has been highlighted. The main focus of the forthcoming analysis is to examine the extent to which the principles of walkable neighbourhoods and the health benefits they engender are integrated within and promoted by Australian urban planning policy.

Methods

Document sample

This paper focusses specifically on a subset of Australian urban planning policies that influence neighbourhood design: state/territory government land use strategies. These strategies are implemented primarily to instruct government agencies, planning practitioners and local governments about the long term urban development agenda within each jurisdiction. As such, government land use strategies have an important role in influencing neighbourhood design. All 10 land use strategies that were current in Australia at September 2016 were collected and analysed (see Table 2 for details).

Document analysis

Qualitative document analysis techniques were employed to analyse the land use strategies. Qualitative document analysis provides a systematic procedure for reviewing and evaluating documents. Like other qualitative methods, document analysis requires data to be examined and interpreted by researchers to elicit meaning and develop understanding about what is present and not present in the data, and to what effect (Liamputtong & Ezzy, 2006, Corbin & Strauss, 2008). Document analysis involves coding, synthesing and theorising research data to develop empirical knowledge about a subject area (Liamputtong & Ezzy, 2006, Corbin & Strauss, 2008). All authors were directly involved in the document analysis, and all possess training in the areas of urban planning and/or public health.

During the document analysis, each land use strategy was read at least twice by one of the coders (MM, TD and ER). The first read was relatively superficial, allowing the researcher to become familiar with the topics covered. The researcher then read each document a second time, more closely, with a focus on coding (or categorising) the content of each document. During the coding process the framing of each strategy was examined and the goals, objectives, strategies, and values articulated throughout the policy were assessed to determine how and whether these aligned with the intent of progressing health, wellbeing and equity.

Table 2: Detail of the analysed documents

Jurisdiction	Policy document title	Year
Australian Capital Territory	ACT Planning Strategy: Planning for a Sustainable City (EPSD, 2012)	2012
New South Wales	A Plan for growing Sydney (DPE, 2014)	2014
Northern Territory	Darwin regional land use plan (DLPE, 2015)	2015
Queensland	State Planning Policy (DILGP, 2016) South East Queensland Regional Plan 2009-2031(DPI, 2009)	2016 2009
South Australia	The 30 year Plan for Metropolitan Adelaide (DPTI, 2017)	2017
Tasmania	Southern Tasmania Regional Land Use Strategy 2010-2035 (STCA, 2016)	2016
Victoria	Plan Melbourne: Metropolitan Planning Strategy (DELWP, 2014)	2014

Western Australia	State Planning Strategy 2050 (WAPC, 2016) Directions 2031 and beyond (WAPC, 2010)	2014 2010

Following the coding process, a document summary was developed by the researcher responsible for coding each document (MM, TD or ER). At this point, the researchers also considered silences within each land use strategy. Silences were identified through the finding that no aspect of a strategy could be coded into a particular category within the framework. Silences were also identified through the finding that the framing and goals of a land use strategy were inconsistent with the strategic intent expressed in the objectives and/or recommended actions of the document, leaving some aspects under-addressed or completely ignored within the proposed actions.

The coding results and document summaries underwent peer-checking during regular team meetings where the authors would discuss the findings produced through the coding process, including the silences identified. Some of these meetings involved the collaborative re-coding of segments of the documents between MM, TD and ER to check for coding consistency, as well as higher level discussions, involving the investigators overseeing the research (FB, PH, PS and MF), about the meaning of the policy directions articulated in the documents, and the potential implications of these in terms of health, wellbeing and equity. During such discussions, the analytical approach of Carol Bacchi (1999, 2007) was applied to question how the framing of the documents may influence urban planning practice, including neighbourhood design, and how responses to urban planning problems may differ if the intent and goals articulated in the document were framed differently.

The coding process, identification of silences, peer-checking and theoretical discussions have produced empirically informed insights about the alignment that exists between current neighbourhood design approaches and health and wellbeing in Australian land use policy. The ideas developed during the research have been organised thematically below, with the findings grouped to reflect the patterns that have been observed in the data. These findings are presented next.

Findings

The findings are presented in three sections. The first section considers the intent of the policies, how policy problems are constructedthe evidence cited and the means advocated to address policy problems. The second section examines the relationship between specific goals and objectives related to the physical form of neighbourhoods with implications for physical and mental wellbeing. The third section analyses the links between health, walkability, and the quality and accessibility of destinations presented in policies. Quotes to support the findings are presented in Appendix 1.

Policy framework

The overriding intent of all of the documents is planning for housing and the infrastructure required to accommodate projected population growth and to do it in a ‘sustainable’ manner. A theme that runs through all of the documents, other than that from the small city of Darwin, is that urban planning approaches that privilege car use are not environmentally, socially or economically sustainable and an alternative model is required.

The automobile oriented form and the car dependency it spawns, is argued to have created a number of problems requiring amelioration. Problems commonly cited in all documents include traffic congestion, lengthy and growing commutes, excessive greenhouse gas emissions, and poor access to social services and employment in outer suburbs. The inefficiencies of the car in relation to fuel use and infrastructure requirements such as roads, bridges car parks etc. are also universally mentioned as problems, as is the loss of valuable agricultural land and natural environments on the urban fringe.

All of the documents also acknowledge a link between the design of cities, suburbs and neighbourhoods and the health of residents. In particular, evidence is provided of the health effects sedentary lifestyles and poor diet are having on Australians. However, psycho-social negatives often associated with car dependence and sprawl, such as isolation, boredom, loneliness etc. and their potential impacts upon mental health and wellbeing are not mentioned. However, the South East Queensland, ACT, and Sydney plans acknowledge the importance of public places in providing mental wellbeing related requirements such as feelings of belonging and a sense of community.

The urban development approach articulated in all plans is a preference for intensive rather than extensive growth of the urban footprint, in particular, the targeted redevelopment of strategic locations following smart growth (TOD) principles (Appendix 1). However, the policy targets for the balance between infill and greenfield varies considerably, from an infill high of 85% in metropolitan Adelaide to lows of 50% in Hobart, Perth and South East Queensland.

TOD principles advocate that the activity centre of any urban development be a mixed use civic or neighbourhood commons integrated with transit, and connected to a surrounding pedestrian catchment of pedestrian oriented streets and paths. TOD principles also advocate that pedestrian catchments include major destinations such as parks and schools, and that residential density is high enough to provide the threshold density required for destination viability including transit (Calthorpe, 1993, Dittmar and Ohland, 2012).

In all jurisdictions the goal is to increasingly target new urban development in infill locations such as:

- transit corridors, i.e. arterial roads, light and heavy rail and busways
- brownfield industrial sites in strategic locations like inner suburbs or along rail routes
- older public housing estates and surplus government land, and
- the redevelopment of major activity centres and their immediate residential surrounds.

Goals and objectives related to physical form and health and wellbeing

In all documents, there is a positive relationship drawn between the design of urban environments and health and wellbeing. In particular, they refer to the benefits walking and cycling (for both recreation and active transport) can have on improving fitness, and reducing the growing numbers of overweight and obese Australians. To this end, and in line with TOD principles, objectives and strategies in all documents emphasise a need for new infill and greenfield developments to be transit oriented, mixed use, higher density, and pedestrian oriented, with varying levels of design detail outlining what this requires (Appendix 2). Other than in the South East Queensland plan, where TOD principles are provided in detail, the fine grained design details required of these objectives are left to existing or proposed guidelines, and policy documents. In the Perth metropolitan plan, design is delegated to the comprehensive Liveable Neighbourhoods Policy; in Melbourne, to an updated State Planning Framework; and in South Australia the yet to be released Residential Design Guidelines; while the Sydney plan includes the production of healthy design guidelines as a strategy. In regard to the groups often most confined to their neighbourhoods, the ACT plan has the objective of making neighbourhoods, streets and parks child and age friendly, and delegates detailed strategies to this end to the *ACT Strategic Plan for Positive Ageing 2010 -2014* and the *ACT Children's Plan 2010 - 2014*. One broad and definable design principle notably absent from all the documents is that of human scale in adjoining built from. The closest principles to this are objectives such as retaining neighbourhood character, or in the case of the Adelaide plan suburban height limits of five stories (Appendix 2).

The relationship between urban form and function, walkability and mental health and wellbeing is a less well articulated objective. The idea that urban form can facilitate activities that help provide happiness and pleasure or alleviate isolation and loneliness are not directly referred to or seen as having design causes and solutions. Nevertheless, a common goal or objective in all jurisdictions is that cities and their neighbourhoods, suburbs and/or communities should be 'liveable', an aspiration with wellbeing as well as instrumental connotations (Appleyard, 1980, Hooper et al., 2015).

Destinations

All of the documents provide evidence of the health benefits of easy access to open space where people can undertake formal and informal recreational activities such as sport, walking, cycling etc. In the Adelaide, ACT and Perth plans, the importance of having open spaces as neighbourhood destinations within a five minute walk in order to encourage regular use is acknowledged and advocated in objectives and strategies (Appendix 1).

Activity centres are an integral foci of new urban development in all documents, as they are within the TOD principles. In all jurisdictions it is an objective that new and redeveloped activity centres are

spaced to form an activity centre network across metropolitan areas. The intent is for major existing and new centres to become diverse, mixed use gathering places and to greatly expand their regional commercial, service and social roles (Appendix 2). The goal/objective is to make suburban regions more commercially and socially self-reliant, and by doing so improve access to services for suburban residents and create significant suburban employment hubs, reducing the need for commuting into employment dense regions such as the CBD and inner suburbs. While this is an objective of all jurisdictions, the policy commitment is greater the larger the metropolitan area, the Sydney plan is particularly committed to decentralisation and moving services and employment west.

The expectation in all jurisdictions is that a network of comprehensive activity centres spaced across metropolitan areas will reduce average journey lengths to employment and services. In addition, it is an objective that this be increasingly done on foot for residents living near centres, and by bike or public transport rather than car for those further afield (Appendix 2). Thus, redevelopment is considered to be linked with a networked rather than radial public transport systems, and networked cycling routes. Accessibility is explained in different ways, including through use of the terms ‘reasonable’, ‘convenient’ or ‘better’. In Melbourne, it is defined as twenty minutes on foot, by public transport or bike, and in Adelaide 20 minutes by bike to a major centre and 10 minutes on foot to a neighbourhood centre (Appendix 1). However, in all jurisdictions the activity centres network strategy does not include an objective to place all, or even most existing housing, within walking distance of a neighbourhood level activity centre. The emphasis is instead on access to a civic commons at the level of a district or regional activity centre.

Discussion

While improved health is expressed as either a goal or objective in all plans, the major intent of all plans is facilitating a shift by design, infrastructure reorganisation, and investments, of transport trips from private motor vehicles to public transport and active transport in order to alleviate congestion and reduce greenhouse gas emissions. In making this shift the importance of the physical infrastructure of walking at the neighbourhood level is acknowledged as both a means of replacing private motor vehicles with active transport for short trips, and encouraging people to walk to public transport stops for longer trips. However, the importance of walkable neighbourhood destinations, as a means of increasing the frequency of walking trips and time spent in public is generally not recognised.

The policy focus on large activity centres, and the association of urban renewal and pedestrian improvements with targeted housing developments, is problematic for citywide health improvements, as it simply creates isolated islands of walkability amongst car dependent suburbia. In addition, the suburbs which lie outside the targeted areas are often the most un-walkable places within the city and are also where large proportions of metropolitan populations now live and will continue to do so for many decades. Thus, residents in these areas will continue to have to rely upon motorised transport to obtain basic services well outside of their home area neighbourhood with associated health detriments.

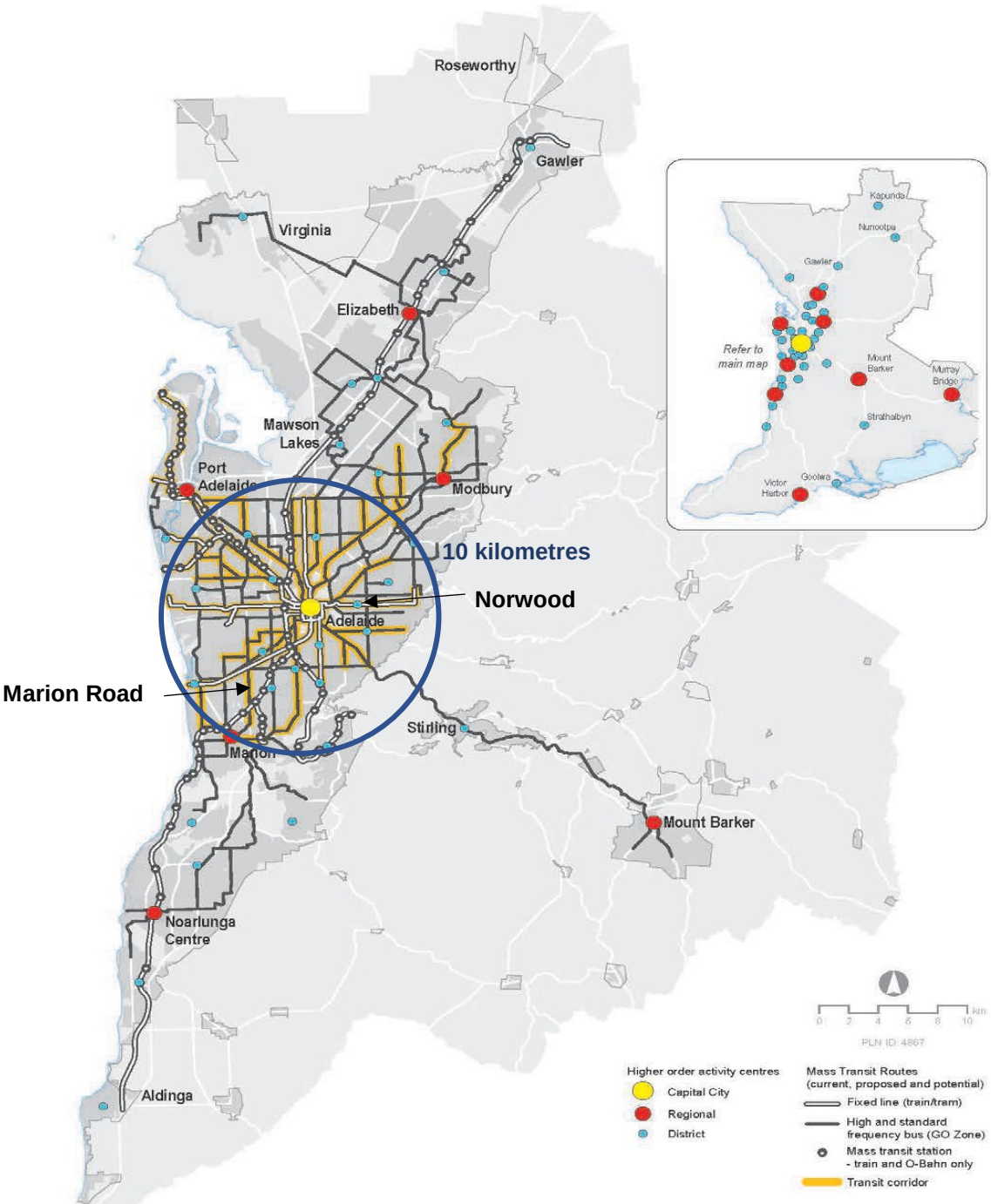
Only the Adelaide plan has a city objective of lifting the numbers of people living in ‘walkable neighbourhoods’ (DPTI 2017, p 146). However, in the outer suburbs the target is quite modest, lifting the number from the current 28% to 36% by 2045 (reference). In addition, even with this modest target there is evidence of drift from objectives elsewhere in the document that referred to the importance of vibrant mixed use destinations, as the activity centre destination required to be within 800m of all homes are simply described as ‘shops’.

Of the targeted development programs, arterial corridor redevelopment with low rise mixed-use development, spreads the benefits of renewal and walkability the widest. As there are far more arterial road corridors than rail corridors, and bus and trams stops can be spaced far closer together than heavy rail stations. The focus of redevelopment is also long and narrow and passes within walking distance of many neighbourhoods as a result. There are two possibilities for this style of development. The first is to build additional housing in inner suburbs such as Norwood in metropolitan Adelaide which already have most of the physical attributes and destinations required of walkable neighbourhoods (Figure 1). Targeted infill in these locations places new residents in walkable and often commercially attractive places but does nothing to improve the walkability of other less walkable

suburbs. The second possibility is to use development as a means of recreating the high street commons as neighbourhood destinations along arterials where none had previously existed such as Marion Road in metropolitan Adelaide (Figure 1). In these developments new mixed use buildings abutting road corridors can incrementally provide premises for new destinations and some of the increased density required for threshold viability. Therefore, this policy has the potential to increase walkability broadly.

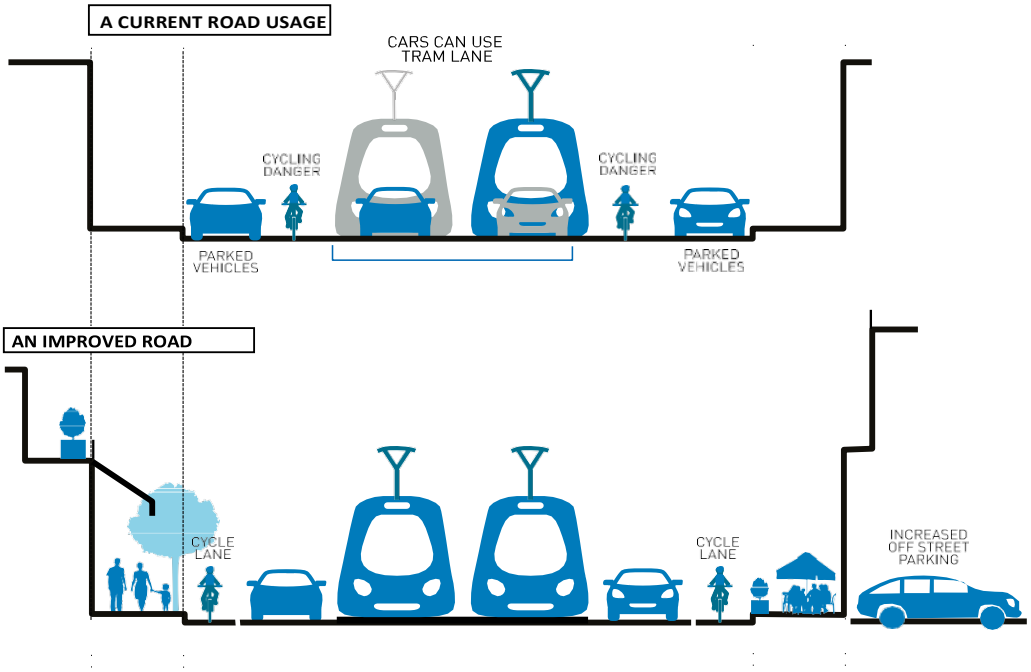
An example of the potential of a corridor focus is shown in the Adelaide plan. It has a corridor policy encouraging infill development along major aerials with high frequency bus services (highlighted in in yellow) radiating in all directions from the CBD (Figure 1). The result of this approach are opportunities for high-street style redevelopment within walking distance of nearly every household in the inner and middle suburbs. However, the breadth of corridor redevelopment targets in the inner and middle suburbs contrast sharply with the sparsity of targeted activity centre and railway station growth targets in outer suburbs further than 10 kilometres from the CBD (Figure 1).

Figure1: 30 Year Plan: Activity centres and mass transit routes (DPTI 2017, p 43)



However, a focus on arterial corridor development creates other issues. A major one is the tension between the role of the road as a neighbourhood commons or place and that of traffic arterial. Adkins et al. (2012) note that one of the greatest discouragers of walking are major arterials full of speeding traffic. The tension between arterial and place is exemplified in a policy illustration contained in the Melbourne plan (Figure 2). This illustration shows what are considered to be problematic current road usage and improved road configurations. The current road usage in this case contains pedestrian friendly features of on-street car parking, slow and congested traffic with trams and cars sharing the only lane and cyclists left to manoeuvre between restricted traffic and parked cars. In addition, pedestrians crossing the road need only traverse two lanes of slow-moving traffic which makes them relatively easy to cross and integrates residential areas and uses on either side. On the other hand, 'the improved' version consists of the road being an efficient traffic arterial, speeding up the flow of both trams and cars by removing on street parking. In essence 'the improved' sacrifices the needs of the gathering place and features that encourage neighbourhood walkability and social interaction to benefit traffic flow and public transport reliability (Table 1).

Figure2: 'Improved road use' image from Plan Melbourne (DELWP 2014, pp 89)



The Adelaide and Perth plans attempt to ameliorate this tension by advocating a policy of link (traffic arterial) and place (pedestrian oriented gathering place). The Adelaide plan states: "*Link and Place approach advocates that both these functions should be given equal consideration, with the balance guided by the street's role within a wider street network hierarchy*" (DPTI 2017, p 90).

Ultimately, the walkability of neighbourhoods will be influenced by the spacing of places along it. If these are smaller and spaced at one kilometre intervals, they have the potential to become neighbourhood commons'. However, the more they are spaced beyond one kilometre, the more people will be left outside the pedestrian catchments of the neighbourhood commons (reference). In addition, the extent design elements can be used to slow and calm arterial traffic through 'places' will determine the extent to which they encourage walking and public interaction and the health and wellbeing benefits they can engender.

Conclusion

In conclusion, all of the planning documents analysed acknowledge the link between urban form and health and wellbeing. However, urban environmental effects upon physical health are predominate. The effects neighbourhood form and function can have on social connectedness and feelings of belonging are sometimes mentioned but not linked to mental health and wellbeing. The importance of

walking and cycling is mentioned in preambles, and most documents provide objectives and strategies that help to facilitate them. The importance of both physical health and wellbeing is referred to but the notion of walking with in one's home area as an important factor in mental wellbeing is largely overlooked. In general, the availability of services and liveable public places is viewed as the most influential factor upon mental health and wellbeing.

However, health is only one focus amongst many of the documents' objectives. The overriding focus is facilitating urban expansion in places, and in a manner, which reduces motor vehicle dependence and use. This includes bringing people to jobs in inner urban areas and jobs to people in outer suburbs. In a similar manner they also advocate bringing people to public transport and public transport to people, as well as increasing active transport in all areas. The emphasis of the documents is that this occur in large scale developments in targeted locations. This overlooks the potential of small scale neighbourhood renewal, the scale of development likely to provide the greatest benefits for health and wellbeing for whole populations, especially those (like older people and families with young children) who spend a higher proportion of their time in local neighbourhoods.

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Appendix 1: Quotes from Documents 1

	Destination access	Land use/transport integration	Open space/parks	Public Transport
NSW	*support council-led urban infill and to support local efforts to lift housing production around local centres, transport corridors and public transport access points*	*Locate jobs in around 30 to 40 large centres. Strategic centres are areas of intense, mixed economic and social activity that are built around the transport network.*	*improve the quality of green spaces and create an interconnected network of open spaces and parks, tree-lined streets, bushland reserves, riparian walking tracks and National Parks.*	*Connecting centres with a networked transport system*
VIC	*encourage targeted infill development of areas with insufficient population to support a 20-minute neighbourhood experience*	*supporting the creation of new activity centres, with priority given to developments based on transit-oriented development principles* *support a network of vibrant neighbourhood centres*	*provide new neighbourhood parks and open space*	*Work towards providing the majority of new housing in established suburbs within walking distance of train, tram and Smartbus routes*
QLD	*A compact urban structure of well-planned communities, supported by a network of accessible and convenient centres*	*Apply transit oriented development principles and practices to the planning and development of transit nodes, having regard for local circumstances and character*	*adequate and well-situated open space—including public parks, trails and sporting and recreational facilities— which supports healthy behaviour, social activity and physical and psychological wellbeing*	*transit corridors linking residential areas to employment locations establishes the context for achieving a consolidated urban settlement pattern*
WA	*A network and hierarchy of centres All people should be able to easily meet their education, employment, recreation, service and consumer needs within a reasonable distance of their home*	*planning and design of activity centres around transit oriented development principles to promote public transport, walking and cycling as an alternative to private car use*	*Provide quality passive and active public open space*	*An integrated system of public and private transport networks that are designed to support and reinforce the activity centres network.*
SA	*Close Access to Local Shops, Services and Community Centres Up to 10 minutes walk (800m) to an activity centre which includes local shops, services and community gathering places such as libraries*	*Increase residential and mixed use development in the walking catchment of:* *• strategic activity centres* • appropriate transit corridors • strategic railway stations.* *.*	*Provide diverse areas of quality public open space in neighbourhoods (especially in higher density areas) such as local parks, community gardens, playgrounds, greenways and sporting facilities*	*The Plan aims to encourage active transport (i.e. walking, cycling and public transport) as important everyday modes of travel and as key parts of our urban transport systems.*
TAS	*The Activity Centre Network demonstrates how activity centres can logically form a complementary network providing the population with reasonable access to necessary facilities and services*	*Focus employment, retail and commercial uses, community services and opportunities for social interaction in well-planned, vibrant and accessible regional activity centres that are provided with a high level of amenity and with good transport links with residential areas.*	*Plan for an integrated open space and recreation system that responds to existing and emerging needs in the community and contributes to social inclusion, community connectivity, community health and well being, amenity, environmental sustainability and the economy*	*Locate major trip generating activities in close proximity to existing public transport routes and existing higher order activity centres.*
ACT	*Ensure everyone has convenient access to a range of facilities, services and opportunities for social interaction by reinforcing the role of group and local centres as community hubs.*	*Create a more compact, efficient city by focusing urban intensification in town centres, around group centres and along the major public transport routes, and balancing where greenfield expansion occurs.*	*Provide vibrant, pleasant urban parks and places for everyone to enjoy by ensuring they are safe and accessible for the most vulnerable in our community*	*Improve everyone's mobility and choice of convenient travel by integrating the design and investment of the various networks and transport systems with the land uses they serve.*
NT	*Develop activity centres to maximise local employment opportunities, availability of services, walkable neighbourhoods and the use of public transport.*	*Identify a regional hierarchy of activity centres to: ○ establish an efficient and equiTable framework for the distribution of retail, commercial and other community needs and to provide a range of residential opportunities*	*appropriate provision and management of regional recreation facilities to encourage involvement of residents in sport, and to provide for healthy living and premier sporting activities* *○ recognising the role of parks and reserves in meeting the recreation needs of the community*	*Develop activity centres to maximise local employment opportunities, availability of services, walkable neighbourhoods and the use of public transport.*

Appendix 2: Quotes from Documents 2

	Mixed use	Walking and cycling	Adjacent scale/ density	Wellbeing
NSW	*provide a mix of uses, day and night, to create safe places for everyone*	*improve walking and cycling connections between Global Sydney precincts and to the surrounding area.*		*The revitalisation of established urban areas to provide for a greater range of housing and improve liveability through better access to employment, improved services and social infrastructure.*
VIC	*the establishment of new housing and mixed use zones and planning changes to encourage small-lot construction, infill and mixed-use development*	*Implement design guidelines to promote walking and cycling neighbourhoods for healthy living*	*Promote urban design excellence by extending the emphasis on good design, apparent in the inner-city's built environment, across the whole metropolitan area*	*create neighbourhoods that support safe communities and healthy lifestyles*
QLD	*Include a broad mix of land uses in activity centres and structure them as mixed-use centres in a predominantly main-street format to best serve their surrounding communities.*	*Implement best practice urban design to create built environments that enable walking and cycling, support community safety and provide adequate shade*	*Design and site development to reflect SEQ's subtropical climate, reinforce local character and achieve innovation and design excellence*	*Develop healthy and safe environments that encourage community activity, participation and healthy lifestyles, and prevent crime*
WA	*Plan for a diverse mix of services, facilities, activities, amenity and housing types in centres to facilitate economic development and employment*	*encourage the efficient operation of the transport network, with particular emphasis on promoting public transport, walking and cycling and reducing the number and length of trips*	*set a target of 15 dwellings per gross urban zoned hectare of land in new development areas*	*Design accessible, well-connected and sustainable urban communities that support and enable effective inclusion and participation in the community for all residents*
SA	*Develop activity centres as vibrant places by focusing on mixed-use activity, main streets and public realm improvements*	*Create healthy neighbourhoods that promote cycling, walking and public life* *Streets will be green and leafy 'places' to spend time as well as cycling and walking friendly 'links*	*Encourage development that positively contributes to the public realm by ensuring compatibility with its surrounding context and provides active interfaces with streets and public open spaces*	*develop design standards for public realm and infrastructure to support well-designed, liveable neighbourhoods*
TAS	*Increasing residential densities and mixed use around designated integrated transit corridors where appropriate*	*Ensure residential areas, open spaces and other community destinations are well connected with a network of high quality walking and cycling routes*	*Increase densities to an average of at least 25 dwellings per hectare (net density)(i) within a distance of 400 to 800 metres of Integrated transit corridors and Principal and Primary Activity Centres, subject to heritage constraints*	*Provide high quality social and community facilities to meet the education, health and care needs of the community and facilitate healthy, happy and productive lives*
ACT		*develop walking plans to ensure the network covers the residential areas and links them to centres, public spaces and public transport routes* *creating a precinct that provides an easy 10 to 15 minute walk along the streets and paths to a centre or rapid transit corridor*	*Invest in design that will ensure urban change creates amenity, diversity, a more sustainable built form and adds to Canberra's landscape setting*	*In 2030 Canberra will be a city where everyone can take advantage of its network of centres, open spaces and modes of travel to enjoy a sense of wellbeing and participate in a vibrant civic and cultural life.*
NT	*encourage vibrant centres providing a mix of activities appropriate to the type of centre and the target population* ○	*encourage active transport including walking and cycling and enhanced access to public transport*	*development that is consistent with the community's economic, social, cultural and environmental values*	○ *the creation of character and identity* ○ *opportunities for community initiatives that support happier, healthier and inclusive communities*