Smart Development: designing the built environment for improved access and health outcomes

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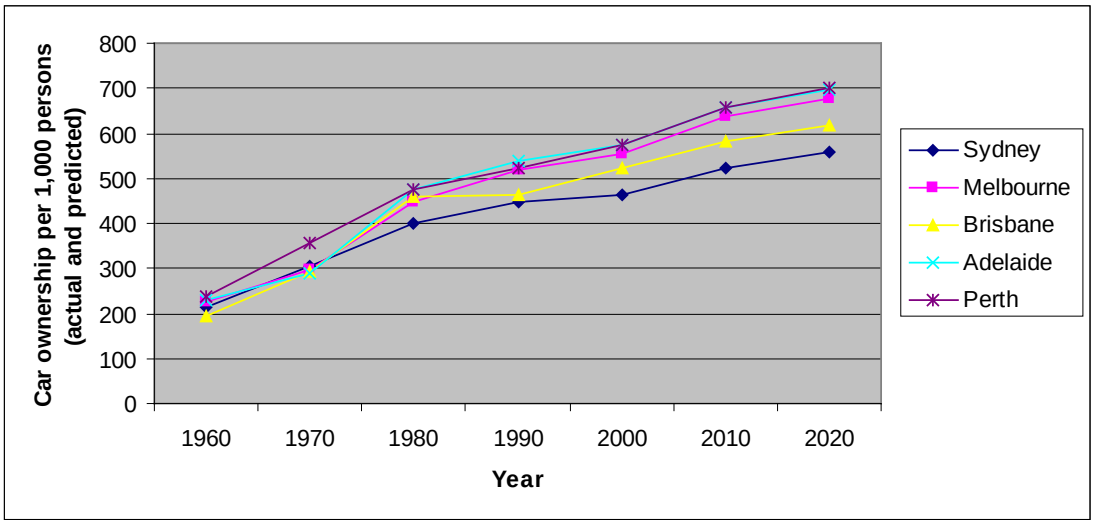
Deficiencies in conventional land use and transport planning

Land use and transport policy in Australia's major cities have been modelled on the US, and are characterised by low density housing development and separation of land uses. Until the end of World War II, there was little car ownership, urban areas were relatively concentrated and public transport was the principal mode of transportation (1). In Melbourne, for example, only one in every four households owned a car at the war's end (2). Moreover, streets tended to be multi-functional: they were play spaces for children and places for public transport, walking and bicycling, as well as for cars (2).

In the period immediately following the war, a number of significant events signalled a change in city planning. First, there was a rapid growth in suburbia when the War Service Homes Scheme financed land purchases and detached dwellings for returning servicemen (3). Second, the US model for urban growth, which involved separating land uses, building to low densities and investing in roads was replicated in Australia (4-6). Finally, innovation and increasing competition in the automotive sector, combined with mass marketing, helped to sell the virtues and reduce the price of private motor cars, making them more accessible to the less affluent.

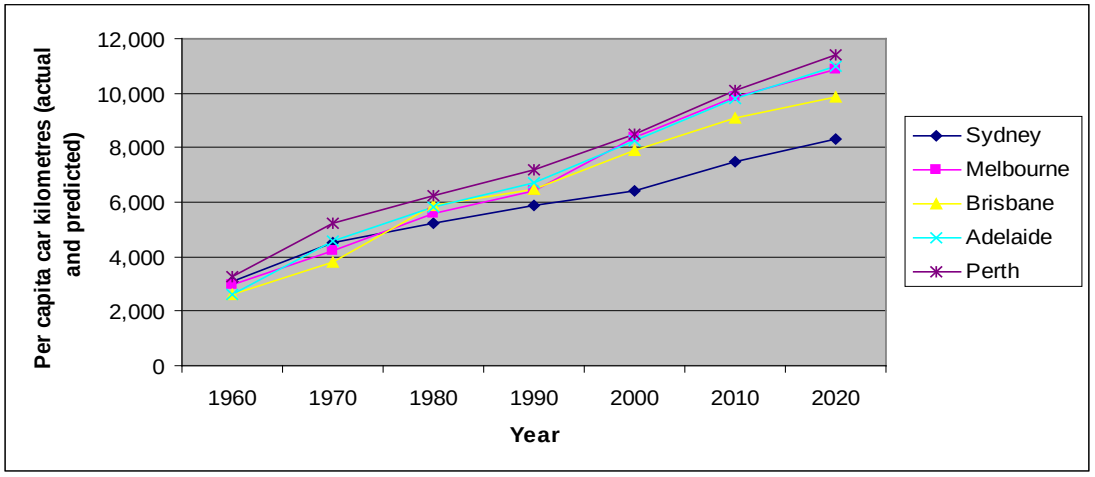
In Perth, for example, there has been a long-term upward trend in vehicle ownership per 1,000 people. In 1961 there were 239 passenger cars per 1,000 people, rising to 357 per 1,000 in 1971, 475 per 1,000 in 1981 and 523 per 1,000 in 1991 (7). Nowadays, estimates of ownership range from 630 cars per 1,000 (8) to 679 per 1,000 persons (9). A similar trend is evident for other Australian cities (6, 10). While at some point the market may become saturated with vehicles, it has been argued that this 'saturation point' is nowhere in sight, with vehicle ownership projected to continue rising (8). Combining data from Kenworthy (7), the Australian Bureau of Statistics (11) and Cameron (8), Figures 1 and 2 shows projections for vehicle

ownership in five Australian cities, concurrent rise in annual per capita car kilometres respectively. [1]



Source: (7, 8, 11)

Figure 1 – Historic and Projected Vehicle Ownership in Major Australian Cities



Source: (7, 8, 11)

Figure 2 – Upward Trend in Per Capita Car Kilometres (Per Annum) for Major Australian Cities

As private motor vehicles became more affordable and their usage more prevalent, it also became necessary to facilitate motor vehicle mobility through land use planning.

[1] Data for 1961, 1971, 1981 and 1991 have been used as proxy for 1960, 1970, 1980 and 1990 respectively, to ensure continuity.

The growth in use of private motor vehicles was facilitated by planning policies that prioritised motor vehicles as the principal form of transport with the aim of increasing motor vehicle mobility. It has been suggested by Cameron (12: p296) that

> [Perth has had] limited if any significant physical planning, transport or economic policy interventions to manage growth in demand for private transport…[showing] the extent to which automobile dependence can grow largely unabated

These planning policies have combined with an increase in infrastructure to support motor vehicle travel, including drive-in facilities, franchised petrol stations and extensive car parking (2).

The rapid uptake of private motor vehicles offered people unprecedented mobility enabling them to live further away from their places of work and from services. For the first time in history, residing within a short distance of essential facilities and places of work became unnecessary, as did proximity to public transport. Thus, residential choices have increased dependence on cars for travel (10).

Car dependence also has been perpetuated by government expenditure favouring development of the road network at the expense of public transportation infrastructure, once again paralleling the US experience (2). In 1969, for example, the State government of Victoria conceived Melbourne's Metropolitan Transportation Plan, which allocated AU$1.675B of a $2.6B transport funding package for a 494 kilometre urban freeway system. The key aim of the Plan was to facilitate commutes between decentralised residential areas and decentralised places of employment. In comparison, only AU$0.355B was allocated to public transport (2). Similarly, from the 1970s to the 1990s, the Australian Federal government took on national responsibility for developing roads and interstate highways with the aim of providing more seamless motor vehicle travel. Road networks were considered the modern transport framework (13).

The preoccupation with providing infrastructure to make commutes fast and more convenient may partly explain community preferences for private motor vehicle travel. The convenience and quality of infrastructure also encourages the tendency to

make additional (and often unnecessary) car trips (14). Thus, motor vehicle affordability combined with increasing affluence and the provision of supportive infrastructure, has increased opportunities (and the expectation) to drive (12).

Recent evidence provides insights into the extent to which the preferred mode of choice. In 2005, the Planning and Transport Research Centre (PATREC) estimated that around 4.8 million trips were made daily in metropolitan Perth and Region, of which 83% were made by car, as either driver or passenger (15). The strong preference for private motor vehicle travel in Perth is highlighted in the 2001 data, which suggested that, on average, each Perth resident made about 803 trips by car per annum, compared with only 159 trips by foot, 65 by public transport and 32 by bicycle (16).

However, approximately 250,000 of the daily car trips are 1 kilometre or less (17). Based on these estimates, around 5% of the 4.8 million daily car trips made in Perth could potentially be substituted for active modes. While some of these trips would involve the movement of heavy goods, such as groceries, or goods that would be awkward for pedestrians or bicyclists to carry, a significant proportion could undoubtedly be substituted for an active mode. Giles-Corti (18) estimated that even if one quarter of these daily short trips were converted to a 10 minute walk, it would increase daily walking in Perth by some 625,000 minutes of walking, which could have a potentially significant health benefit at a population level.

But why choose to drive over active modes? In a society that has favoured planning for the motor vehicle at the expense of alternative modes, motor vehicle use has become so habitual and convenient that driving is as much a part of the Australian culture as it is in the US (14, 19). So much so, that driving may be now seen as ‘necessary’ even when there are alternatives available (20). There is evidence that people drive more than even *they* think they *need* to (21, 22) and changing habits may prove challenging (23).

These introductory comments highlight the range of factors that influence high levels of car use. First, the increasing affordability of private motor vehicles combined with city designs that make cars the only practical choice for many trips has resulted in

high levels of car dependence in Australia. Second, car use has become so much part of the Australian culture that driving is preferred even when other practical alternatives are available.

For decades, the dependence on cars for daily travel needs and the preference to drive, have generated concerns about sustainability. However, more recently there have been growing concerns about how decisions about land use, transportation systems and urban design affect the population's health. The section that follows considers the public health implications of sprawl and car dependence.

2. Sprawl and car dependence: implications for public health

It is now recognised that urban sprawl and car dependence harms human health by decreasing physical activity - in particular walking - and by increasing levels of obesity and respiratory problems (24). A growing body of evidence suggests that aspects of the built environment such as residential density, street connectivity, mixed use planning and neighbourhood design influence levels of walking, cycling and transit use (25). Moreover, it is especially concerning that the time spent driving is related to levels of obesity (23) by increasing sedentary behaviour and decreasing time available to be active.

So are these trends important? Physical inactivity is second only to tobacco smoking as a behavioural risk factor in terms of its contribution to the burden of disease in Australia (26). Physical inactivity is an independent risk factor for major chronic diseases including cardiovascular disease, diabetes, mental ill health and some cancers (27) and is associated with other risk factors for these diseases (e.g., it is associated with other cardiovascular diseases risk factors such as obesity, hypertension and hypercholestrolaemia). A recent Access Economics report estimated that the direct and indirect cost of obesity in Australia is around $21 billion annually (28), while the direct cost of physical inactivity is $377 million (29).

Just under one-half of adult Australians do insufficient recreational and transport-related physical activity to benefit their health (30), i.e., as little as 30 minutes of moderate physical activity – even walking – on five or more days per week. Alarmingly, between 1997 and 1999, the proportion of Australians who reported being completely inactive increased from 13% to 15%, while the proportion of those sufficiently active (i.e., 30 minutes on 5 or more days/week) declined from 62% to 57% (30).

Increasing levels of inactivity and obesity are of concern globally, For more than a decade, governments around the world have been on red alert in response to surveillance systems showing an unrelenting increase in the proportion of adults and children who are either overweight or obese (31). In Australia, two thirds of men and one half of women are overweight or obese (32) as are 19%-23% of the Australian children and adolescents (33). In Western Australia, the proportion of overweight or obese boys between 1985 and 2003 jumped from 9.3% to 21.7%; and in girls it jumped from 10.6% to 27.8% (34). Increasing physical activity is a key strategy to curb the global epidemic of obesity and overweight (28, 31, 32).

How do these trends relate to the built environment? While numerous explanations have explored the rapid change in weight status, one plausible explanation is that the obesity epidemic is, at least in part, a 'physiological response to a toxic environment': an 'obesogenic' environment that discourages physical activity (35-37), encourages sedentariness and over consumption of food. In 2002, the International Task Force on Obesity developed a framework that attempts to articulate the complex web of societal forces contributing to obesity levels (38), in which land use and transportation systems are implicated.

The built environment either facilitates or discourages participation in physical activity. For example, in the last decade or so, there has been a rapid decline in the number of children walking or cycling to school (39). Western Australian data from 2002 suggest that only 27.8% of adults report walking for transport and only 2.6% cycling for transport (40). There is now strong evidence that the built environment –

land use systems, transportation systems and urban design - affects the transport-mode choices of both adults (7, 10, 41-43) and children (44, 45).

Pedestrian-friendly neighbourhoods are an example of urban design that encourages physical activity. These pedestrian-friendly neighbourhoods have destinations required for daily needs close to the houses, connected street networks that provide alternative routes to local destinations, aesthetic streetscapes, footpaths present and streets and parks that are designed to encourage surveillance. These neighbourhood attributes not only encourage local walking, but also said to help create social capital and feelings of safety in local residents. Social capital is the feature of social life – networks, norms and social trust – that enables participants to effectively pursue joint objectives (46) and to co-operate for mutual benefit. Leyden found that social capital was higher in more walkable neighbourhoods (47) while Lund (48) showed that regular walkers experienced a higher sense of community in the pedestrian-friendly environments. However, real and perceived traffic and crime-related safety are also associated with walking in local neighbourhoods for adults (49) and children (50). From a crime perspective, there is growing interest in the relationship between sustainable urban development and crime prevention through environmental design (51). It is likely that residents living in neighbourhoods they perceive to be safe are less likely to constrain their behaviour and are more likely to walk than those who are fearful (Foster 2007).

3. Addressing deficiencies: smart development strategies

Thus, the links between land use, transport and public health suggest a need for a revised planning agenda that will not only aims to improve urban sustainability, but also public health. In this section, we discuss some of the dimensions of ‘smart growth development’ and consider examples of where smart growth development may redress deficiencies associated with conventional planning practice and produce enhanced sustainability and health outcomes.

A range of design alternatives have emerged to counter urban sprawl and encourage travel by active modes (24). These alternatives include Transit Oriented Development, New Urbanism and Smart Growth (52). Residents of pedestrian-friendly neighbourhoods with higher residential density, mixed land-use, and accessible shops and transit are more likely to use non-motorized forms of transport than those living in conventional suburbs poorly served with these characteristics (52-54). Based on this premise, new developments are being trialled with the hope of countering the negative influences of urban sprawl.

Although there is a paucity of longitudinal evidence on the impact of the built form to influence transportation patterns, land use has been identified by some US government agencies as one mechanism to improve transport sustainability (21). Cross sectional evidence suggests that improved access and hence opportunities for more sustainable travel behaviour (particularly walking and bicycling) can be achieved by mixing land uses, increasing development densities and improving street network permeability (4, 6, 10, 55-57). Where there is greater activity intensity (thus, a greater mix of land uses and higher development densities) residents have access to a variety of opportunities in close proximity (see (56, 58, 59)), theoretically reducing the need to drive. Importantly, the creation of a pedestrian-friendly development is a sustainable and passive public health intervention, increasing incidental daily physical activity in the course of undertaking one's daily business. Aside from improving transport sustainability, pedestrian-friendly development can also improve urban vibrancy, with associated benefits for community life.

In the US, *New Urbanism* and *Smart Growth* are two well-known urban reform approaches. New Urbanism has become increasingly popular during the last 20 years. The movement advocates design qualities reflective of small US cities *circa* 1900 to 1920 (60, 61). In particular, New Urbanist developments are intended to increase social interaction because they encourage more walking, thereby generating more social capital than may be expected in conventional neighbourhoods (62).

The defining characteristics of these developments are argued to be increased walkability, high permeability, increased land use mix, local character and compactness, all of which combine to provide residents with a highly liveable

community (63). These features are supportive of active transport and public transport (64). Moreover, such developments are often built to a walkable scale and anchored by a multi-use neighbourhood centre.

In contrast to the many advocates of New Urbanism, Marshall (65) is somewhat more sceptical. He argues that New Urbanist developments are all-too-often located within an outdated transport system. In his view, there is insufficient attention given to sustainable transport in New Urbanist planning. This is a significant point and one that needs to be explored in the context of any smart growth development strategy.

Smart growth is said to be somewhat different to New Urbanism, in that it is focused as much on long-term as on short-term outcomes (66). Gillham (5: p156) defines Smart Growth as:

> Managed growth that attempts to fulfil the need to provide for growth (both economic and in population) while at the same time limiting the undesirable impacts of that growth.

The Smart Growth network was formed in 1996 in the US by the Environmental Protection Agency. It now includes more than 30 different organisations with an interest in sustainable growth (4). Frumkin and others espouse higher level strategic planning as an integral part of smart growth. This is to guard against piecemeal development and to ensure a high level of connectedness between new and existing neighbourhoods. Moreover, smart growth can best be realised by a focus on infill rather than greenfields development. A major advantage of smart growth development is that it takes advantage of existing infrastructure rather than greenfields development on the urban fringe which usually requires starting from scratch with the creation of transportation, utilities, social and community infrastructure. Thus, van Vliet and Gade (67: p310) argue that "urban renewal is a good example of recycling". By implication, cities reflecting smart growth patterns will be more compact.

In Australia, smart growth strategies have been contextualised to produce vibrant flagship developments. Two examples are considered here: Subiaco, Perth and Brisbane Urban Renewal, in inner north-east Brisbane. Subiaco is situated three

kilometres from the centre of Perth. Development of 'Subiaco Centro' has occurred since the mid-1990s following the sinking of the Perth-Fremantle rail line underground which previously divided the suburb. Subiaco Centro includes more than 1,000 dwellings with provision for 350 more (68). Importantly, it is characterised by a mix of housing opportunities, including apartment-style living and town houses, and mixing of uses, with provision of street level commerce and retail, with densities relatively high by Perth standards at 12 dwellings per hectare. These dwellings are in close proximity to a vibrant well-established 'main street' offering ready access to retail and entertainment and shops and services required for daily living.

The vibrancy of Subiaco Centro likely relies on street-level design as much as density and mixing of uses. Local roads tend to be narrow and much consideration has gone into balancing the needs of pedestrians and bicyclists with motorists. Public transport users are well catered for with the rail line and ancillary bus services. Additionally, thoughtful planting and other aesthetics, including sympathetic street lighting and architecture make Subiaco Centro an appealing community. While Subiaco Centro exhibits many of the characteristics that seem likely to facilitate sustainable transport, there has as yet been little research into the travel patterns of members of the community.

The Brisbane Urban Renewal project was initiated by a City Council taskforce, established in 1991. The localities of Fortitude Valley, New Farm, Teneriffe, Newstead and Bowen Hills, a combined area of around 730 hectares was originally earmarked for renewal, but the target area has since grown to exceed 1,000 hectares (69). The Australian Council for New Urbanism (68: p54) reports that:

> Over the past 12 years the area has been transformed from a declining, outdated and unattractive precinct to a vibrant, diverse and increasingly high amenity inner urban area

This area shares characteristics common to Subiaco Centro: characteristics that undoubtedly improve local vibrancy. A new railway station in Fortitude Valley provides a strong anchor point and increased urban density and mixing of uses throughout the renewal area are positive. Street level design is well managed with

infrastructure to support active mode users. Particular areas of renewal, including Fortitude Valley's Brunswick Street West, Brunswick Street Mall and Chinatown Mall have been reinvigorated with lighting, landscaping and footpath improvements (69).

Their positive qualities aside, smart growth developments could be criticised for giving insufficient attention to socially equity. While developments such as Subiaco Centro and inner north-east Brisbane have superior community environments, this can translate to exclusive housing costs when the market sets the prices. US research, for example, has found that land value near to rail stations is generally at a premium (70). It is therefore important that governments engage in partnerships with land developers to ensure that a minimum amount of affordable housing is provided, to ensure that lower socio-economic groups are not excluded. Clearly, consideration of social equity issues will be a priority within smart growth developments, and there needs to be ongoing evaluation to ensure there are housing opportunities for all members of the community. For example, the website for the Brisbane City Council (69) states that there are:

> …low-cost housing units, boarding house rooms and detached houses [in the renewal area], whereby developers contribute to the Brisbane Housing Company for low-cost dwellings.

Subiaco Centro and inner north-east Brisbane, too, are showcase examples of smart growth developments, rather than having been developed as part of an underlying strategy or development code. However, using another Perth example, the *Network City* planning strategy (71) is a step towards sustainable and integrated land use and transport planning in the greater metropolitan region. Significantly, it recognises that a nodes and corridors approach to urban growth and change is necessary and that existing areas must be better utilised. It targets 60% of new growth in established areas, leaving 40% to be in areas of new growth (71). The strategy includes aims to decrease car dependence, enhance public transport and not "inequitably limit accessibility based on location or access to a private car" ((71): p66). The strategy recognises that to realise these objectives, improvements to city-wide alternative mode networks are necessary.

Furthermore, *Liveable Neighbourhood*s (LN) has been developed to tackle the need for a 'smart' statutory planning *mechanism*. LN remains an alternative to conventional standards: standards that have facilitated sprawl and car dependence. Of particular interest is its potential to facilitate more travel by alternative modes. The Western Australian Greenhouse Task Force (72) reports that LN is:

> …a voluntary planning design code that promotes the development of sustainable communities with mixed land use and a balanced transport system. It encourages reduced car usage, better use of public transport, more walking and cycling, improved access to services and more efficient land use

LN has links to New Urbanism, Transit-Oriented Development and Smart Growth. A trial of the code began in February 1998, and after a number of reviews over the last decade, the code will be mandated in late 2007. However, until now developers have had the option of voluntarily accepting the LN code over the conventional code, as an *optional set of standards*[2].

The design code was developed by the DPI through a process of retooling the *Australian Model Code for Residential Development 1995* to facilitate a better fit for the West Australian context. State planning authorities recognised the need to address issues associated with conventional planning practice, especially rapid fringe development. Such issues include the high cost of providing services and facilities, including utilities to outlying developments, a lack of local employment opportunities, relatively poor public transport provision, car dependence, and questionable social, economic and environmental sustainability.

The LN aims to be a performance-based vehicle to meet the objectives of the State Planning Strategy. It is intended to facilitate the development of more sustainable communities, as part of the vision for Western Australia 2029. Some of the key outcomes envisaged for LNs are increased support for active modes and public transport, higher development densities and increased lot diversity. Development is intended to be focused round activity centres and public transport nodes (73). The

[2] The voluntary nature of the code is a significant challenge to it being a useful part of the sustainability agenda. This is discussed more in 7.6.2a.

design code is to be applied to development proposals on *greenfields*[3] sites encompassing two or more lots and larger infill sites (73). Moreover, the code is a regulatory tool, not simply an advisory document and it can be applied at a variety of scales, with the intention being that development is coordinated.

There is a *prima facie* case to suggest that the smart growth developments and policies presented are more sustainable than conventional developments and policies and will have a positive impact on health. Nevertheless, as yet there is little supporting evidence. Assessment of sustainability and health impact requires a concise understanding of what needs to be achieved: how success can be measured (74)? It would seem that key indicators of sustainability would include lower vehicle kilometres travelled and a modal split more in favour of alternative modes - particularly active modes, for the health benefits that might result. However, as yet there has been little research to show how well is the policy being implemented and whether it is facilitating more sustainable transport behaviour. For example, are land uses and transport being coordinated in new neighbourhoods? Is the design code being consistently applied? Importantly, what is the impact on local residents? .

Changes to the built environment, such as development of new neighbourhoods affect transport systems and vice versa. Many researchers acknowledge this association but remain undecided about the exact influence of the built environment on travel patterns (6, 75-79). One key reason is because most research to date has been cross-sectional that than longitudinal, which limits conclusions being drawn on causality between the built environment and transport, mode-choice or behavioural outcomes.

The extent to which a new government policy can influence active transport behaviour is the subject of a project funded by the Western Australian Health Promotion Foundation (Healthway) and the Australian Research Council. The RESIDential Environment project (known as RESIDE) commenced in 2003. RESIDE's principal aim is to study the impact of the state government's Liveable Neighbourhood (LN) Community Design Codes on the walking, cycling and public transport use behaviour of local residents.

[3] It is significant to note that the code anticipates *greenfields* development and does not require (at least a minimum of) infill

RESIDE was designed to redress the need for causal evidence on relationship between the built form and physical activity (21, 54). Its longitudinal design will enable self-selection to be studied: do residents choose neighborhoods that support their preferred travel behaviour or does the neighbourhood change their behaviour?

RESIDE is being conducted over five years. Study participants are people building homes in 74 new housing developments (n=1813): 18 of which have been designed according to the Liveable Neighbourhood Guidelines (LND), 14 of which are hybrid neighbourhood developments (HND) and the remaining are conventional neighbourhood developments (CND). Study participants are first surveyed before they move into their new homes; then 12 and 36 months after moving in to their new home.

RESIDE is an ecological study (80-83), studying the multiple-levels of influence on behaviour: individual, social environmental and physical environmental. Each time they are surveyed, RESIDE study participants complete a comprehensive questionnaire that measures individual-level (e.g., demographic and health-related characteristics, attitudes, perceptions); social environmental (e.g., social support for physical activity); and physical environmental (e.g., perceptions of the local neighbourhood) factors that that might influence participation in active modes of transportation. Study participants provide comprehensive information about the frequency and duration of walking and cycling undertaken within, and outside, their neighbourhood (84), as well as information about their where they work, how they travel to work and how much time it takes. A sub-sample of study participants have also participated in a Transport Sustainability and Health Study, and have completed a comprehensive 2 or 7-day travel diary. Other related PhD studies include the impact of urban design on mental health outcomes (Jacinta Francis), the relationship between perceived safety and walking (Sarah Foster); and the relationship between dog walking and physical (Hayley Cutt).

In addition to collection of self-reported data, a key objective of RESIDE is to develop objective measures of the built environment surrounding the study

participants' homes (both at baseline addresses and in new neighborhoods), using Geographic Information System data. A walkability index based on that developed by Frank (23, 85) has been developed (Learnihan 2007). The index combines measures of residential density, mixed use planning and street connectivity, and the index will be used to assess the extent to which local walking is associated with neighbourhood walkability.

Longitudinal studies like RESIDE are important to inform the development of future policy and practice with the aim of optimizing neighbourhood designs to produce health, planning and sustainability outcomes and to avoid unintended negative consequences. However, a key feature of RESIDE is that it collects information on the multiple levels of influence of behaviour in order to better understand the independent impact of the built form, over and above individual and social-environmental determinants of behaviour. This information will assist in decision-making about future educational and policy interventions.

5. Cities at the crossroads: making smart development into common practice

Australian cities are at a crossroads. With sustainability now firmly entrenched in policy rhetoric, it is time to consider the future development of our cities and how this will affect the economy, environment, society and the health of Australians. While there have been various deficiencies in the way in that Australian cities have been planned, strategies are emerging as a means of redressing these problems, including flagship 'smart growth' developments. The case studies presented here are testimony to their potential and to the vibrant landscapes that can be created when the rhetoric is put into practice.

Nevertheless, to really impact the community, smart growth development needs to become more widespread. The examples presented, while significant, do not reflect common development practice. Moreover, strategic coordination is essential with a link between regional and neighbourhood planning to facilitate switches to active

modes (86, 87). Accordingly, smart growth development needs to be city- or regional-wide rather than governed by individual local government authorities. A regional approach offers greater potential to develop strong transport links between sub-centres of cities, enabling greater emphasis on public transport. Individual neighbourhoods may themselves be strong anchor-points for public transport, but for the system to work, they have to be linked to other equally well-designed neighbourhoods.

When smart growth development principles begin to be considered at the metropolitan level, challenges facing planning authorities can be recognised. Increasingly, governments will need to consider whether there is need to retrofit areas of the city that are poorly served by public transport and lack the urban characteristics that make them pedestrian- and transit-friendly.

It remains important, too, that smart growth developments and the strategies that underlie them are regularly re-evaluated. The RESIDE study demonstrates that it is possible to establish a cohort to evaluate the impacts of government-policy with a view to informing policy into the future. Further research and evaluation in this area is essential. Evaluation will enable intended and unintended consequences to be monitored to ensure that any changes observed are consistent with changing sustainability and health priorities. Increasing population and related demand for housing, for example, are likely to create new challenges for land use and transport planners in the future.

What will be the intended - and unintended - environmental and health consequences of building on the urban fringe or even retrofitting existing neighbourhoods? Will higher density developments generate fewer motor vehicle trips and increase walking and cycling? And if not, why not? Will obesity levels in these neighbourhoods decline because people are more active? If successful, will it be possible to produce similar outcomes in disadvantaged neighbourhoods? On the other side of the coin, will there be unintended negative consequences of higher density contemporary living? What are they, and what can we do about them? For example, will we have the wisdom of the 19th century planners to ensure that there is sufficient public open space that provides a high quality restorative nature experience that gives people a

sense of novelty and surprise, and reduces stress and aggression? Planning has the potential to have a major impact on the health and wellbeing of people. Thus, monitoring consequences is essential to maximise the positive outcomes, to expediently minimise the negative consequences, and help build healthy public policy into the future.

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