

**Taking action on obesogenic environments:
Building a culture of active, connected
communities**

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Building a culture of active, connected communities

1 Introduction

The places where we live, learn, work and play are important influences on how (and how much) we move around, what we eat and drink, our social connections and sense of community belonging. Wide-ranging changes in the built environment and in how we spend our time within it are contributing to increasing levels of overweight, obesity, and associated chronic diseases in Australia and internationally (Garden and Jalaludin 2008; Joshu et al 2008; Frank et al 2007; Papas et al 2007). Physical inactivity has been estimated to cost the Australian healthcare system \$1.5 billion annually (Econtech 2007) with the total financial cost of obesity in Australia in 2008 estimated to be \$8.3 billion (Access Economics 2008).

Recognition of the limitations of educating people to improve their diets and physical activity levels in an environment that often encourages the opposite, is now leading to action to create environments that help rather than hinder efforts to maintain a healthy weight.

Reversing the upward trend in obesity in Australia is a principal concern of the health sector, which is taking a leading role in efforts to prevent obesity. However, the major determinants of obesity lie outside the health sector, as does effective action to prevent obesity. If the Preventative Health Agency is to be effective in helping to create “the healthiest country by 2020” it will need to work with the multiple sectors, tiers of government, businesses, professional associations, community groups and organisations that, in a myriad of ways, can help build a culture of active living and community connectedness.

This paper presents options for collaborative and coordinated efforts to build active, connected communities by modifying the ‘obesogenic environment’ (Swinburn and Egger 2002) that we have inadvertently created. It aims to identify the core environmental elements that encourage obesogenic behaviours, and approaches and actions for establishing active, connected communities.

The report objectives are to identify:

1. Barriers to being active within the urban environment (including barriers to implementing policies to address them).
2. Options for increasing active travel to multiple community destinations for children and adults (and for gaining the support of state and local governments, private developers, public transport services, schools and education institutions and workplaces).
3. The scope for expanding facilities for active recreation with broad population reach, and strategies for encouraging use of such facilities.
4. The roles and responsibilities of Federal, State and Local Governments and the private sector in establishing active and connected communities.
5. The impact of town planning codes on urban design for healthy living.
6. Issues around volunteerism, industry self-regulation and full regulation in the implementation of these codes.

The report draws on research evidence as a basis for addressing these aims, but it is not a systematic review of evidence. Several narrative and systematic reviews of issues addressed in this paper have been conducted by other researchers and organisations (Saelens and Handy 2008; Kumanyika et al 2008; Papas et al 2007; Truong and Ma 2006; Gebel et al 2005; Transportation Research Board 2005), and this paper draws on these reviews and other research findings.

This paper focuses on active living, within socially connected, liveable communities. It does not include a comprehensive review of strategies and options for promoting healthy eating. This is a major additional area, which is addressed in detail elsewhere. Neither does it comprehensively address the additional environmental, energy use and transport benefits of active living, apart from noting that these are substantial (Litman 2009).

It is also important to recognise that while the relationship between urban environments and health is well-recognised in the public health field, this is not necessarily the case in the wider community, the mass media, other sectors of government, and private industry. These are the sectors that will need to be involved in the wide-ranging efforts required to reverse the upward trend in obesity in Australia. Creating awareness of the environmental determinants of health is a particular challenge for obesity prevention, which until recently has been framed as a problem caused by the unhealthy food and activity choices of individuals.

Thus, an important foundation for action to reduce obesity levels in Australia is more widespread recognition that the causes of obesity are both simple and complex. At the biological level, obesity is ‘simply’ caused by a chronic positive energy imbalance (Hobbs 2008). The ‘simple’ solution is therefore for people to eat less and/or exercise more. However, this ‘solution’ has been consistently demonstrated to be ineffective – population obesity rates are increasing (Dixon and Waters 2003), the majority of adults *are* attempting to lose weight or avoid gaining weight (Timperio et al 2000a), and most are unsuccessful in the long-term (Tsai and Wadden 2005). When there is a major mismatch between people’s intentions and actions, as is the case for weight control, it is important to address the causes of the mismatch (Thaler and Sunstein 2008; McKenzie-Mohr and Smith 1999).

The inconvenient truth about obesity levels in Australia is that the causes are complex, and so are effective solutions. Eating and exercise behaviours are embedded within individual biology and psychology, social norms and values, eating and exercise markets and environments, and government policies, regulations, programs and practices (Hobbs 2008).

In terms of educational approaches to reducing obesity, raising individuals’ awareness of the importance of healthy eating and physical activity for preventing weight gain is no longer necessary as awareness is already high (Timperio et al 2000b). On the other hand, raising societal awareness that urban environments are a key determinant of obesity is crucial for achieving the widespread support and action that is needed to build a culture of active living and healthy eating in Australia.

An evidence-based rationale for an environmental approach to obesity prevention within an ecological framework is outlined in the following section. It establishes a

foundation for the approaches and actions required to establish active, connected communities that assist people to maintain healthy weight.

2 Rationale for 'upstream' socio-environmental approaches to obesity prevention

The increasing prevalence of overweight and obesity in Australia is contributing to substantial health, social and economic costs to individuals and the wider community (Department of Health and Ageing Population Health Strategy Unit 2008; Access Economics 2008). Obesity is prevalent across the lifespan - affecting infants, children, adolescents, adults and seniors. All socio-demographic groups are affected – men, women, urban/rural populations, and diverse ethnic and socio-economic groups (Department of Health and Ageing Population Health Strategy Unit 2008). The principal determinants of increased obesity at the population level are therefore systemic rather than individual, and while individuals ultimately 'choose' what to eat and what activities to undertake, there is good evidence that environmental factors are a major influence on these 'choices' (Kumanyika et al 2008; Gebel et al 2005).

On the other hand there is no evidence that in the last thirty years there has been a substantial change in the human gene pool, or an "epidemic of decreased personal responsibility" for health (Schwartz and Brownwell 2007). At any given time, nearly half of women and about one third of men in the US are trying to lose weight (Kumanyika et al 2008). There is clearly no widespread lack of desire to maintain a healthy weight; rather, there is a lack of supportive environments to assist people to eat and act in ways that prevent weight gain.

Obesogenic environments that encourage over-eating and under-exercising are not an inevitable by-product of modern living, though they present with a high level of apparent 'givenness'. Rather, they are created, recreated, challenged or reinforced by the myriad everyday actions (and inactions) of individuals, society, business and government.

The highly prevalent and pervasive elements of the obesogenic environment we share with many wealthy (and, increasingly, developing) countries are well-established in the research literature. 'Obesogenic' products, such as energy dense foods and drinks, passive forms of entertainment, cars, and labour-saving devices, are widely available and heavily promoted (Hobbs 2008; Schwartz and Brownwell 2007).

Obesogenic products are also innately appealing because human beings evolved to consume high-energy foods and limit energy expenditure in order to survive periods of food scarcity. Our evolutionary development did not prepare us for the 21st century challenge of remaining lean in an environment with an abundance of food and numerous opportunities to 'save labour' (Hobbs 2008).

The commercial success of obesogenic products is now contributing to substantial health, social and economic costs, resulting in a novel but serious case of 'market failure' (Moodie et al 2006). When market failure has serious health, social and economic consequences there is a strong case for government intervention. We have a particular responsibility to protect children from harmful environments because they are the blameless victims of environmental conditions over which they have no control. There is a clear role for public health intervention based on the best available

evidence of the determinants of obesity and effective (both demonstrated and likely) means of reducing the prevalence of obesity.

As a basis for action, the following section outlines the core environmental elements that encourage inactivity and unhealthy eating patterns.

3 Core environmental elements that encourage obesogenic behaviours

Before discussing the environmental determinants of inactivity and unhealthy eating patterns, it is important to define the term ‘environment’.

3.1 Defining ‘environment’ in the context of public health approaches to obesity prevention

Environments for health have been defined in several different but overlapping ways. In the Victorian Municipal Public Health Planning framework, environments for health comprise *built, social, economic and natural environments* (Victorian Department of Human Services 2001). A US Transportation Research Board model refers to the ways in which the *social* and *built* environments influence physical activity (Transportation Research Board 2005), and ecological models of physical activity and obesity refer to *physical* and *social* environments (Gebel et al 2005).

This paper focuses on three ‘environments’: (i) the physical environment, (ii) the social/cultural environment and (iii) the policy/regulatory environment. In ecological models of health, environmental factors interact with individual factors (biological and psychological) to shape health outcomes (see Figure 1) (Gebel et al 2005).

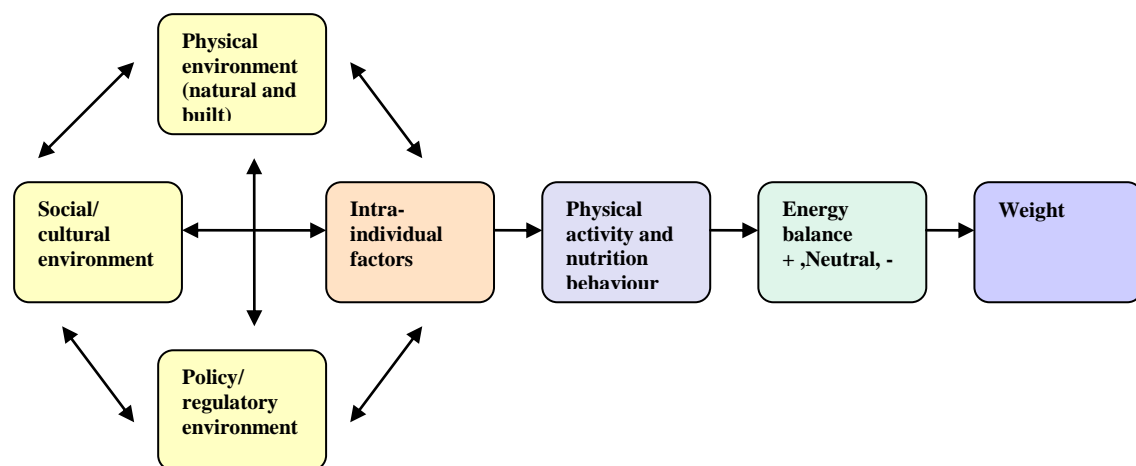


Figure 1: Environmental influences on obesity (adapted from Gebel et al 2005)

The term ‘physical environment’ includes the built and natural environments. The built environment encompasses land use patterns, transport systems, and design features of the built environment (Gebel et al 2005). The natural environment includes topography, vegetation and landscape. The ‘social/cultural’ environment refers to social values, preferences and behavioural norms. The ‘policy/regulatory

environment' refers to policies, legislation, regulations, codes and standards and their enforcement.

These three types of environments interact with each other and with individual factors to influence physical activity and eating behaviour. For example, urban sprawl in Australia arises from interactions between the natural environment (large area, temperate climate), culture (home ownership of detached houses on large allotments, transportation by private car), and government policies (few restrictions on urban sprawl, and substantial investment in infrastructure for private motor vehicle use). A number of studies have reported positive associations between urban sprawl and obesity (Ewing et al 2006; Lopez 2004), with a recent study in metropolitan Sydney reporting that, after controlling for individual covariates (socio-demographic and behavioural) and area level covariates (ABS Index of Relative Socio-Economic Disadvantage) there were significant positive associations between urban sprawl and overweight, obesity, inadequate physical activity and no time spent walking (Garden and Jalaludin 2008).

Health-related environments are characterised by the complex interactions, feedback loops and vicious (and benevolent) cycles that characterise ecological models. For example, urban sprawl is both the result of, and further encourages, car dependency. In ecological systems, the positive impacts of remedial actions are therefore magnified. Additional benefits can also come into play; for example, when reduced car dependency also leads to improved air quality and community liveability, and reduced traffic congestion and greenhouse gas emissions (Litman 2009).

The other important characteristic of environments for health is that they manifest as both macro and micro environments. Commonwealth Government policies such as permitting junk food advertising during children's television viewing times represents a macro level policy environment, while parental restrictions on children's television viewing creates a micro policy environment. Micro environments are often referred to as the 'settings of daily life', and include communities, schools, workplaces, homes and streets. Macro issues such as integrated urban planning and transport systems need to be adapted and managed at micro levels.

The consistent finding of a negative relationship between social and economic conditions and obesity points to the important influence of macro environments (eg employment, education, housing) on obesity, while the recent finding that obesity spreads through social ties such as family members and friends, suggests that social interactions between individuals also influence obesity (Christakis and Fowler 2007). The authors hypothesised that a possible mechanism by which these 'micro' social environments may influence obesity is via the (verbal and non-verbal) communication of norms around acceptable weight.

Findings from the VicLANES study in Melbourne are a reminder of the existence of micro and macro environments for active living and healthy eating, and of the complex ways in which these environments interact with individual values, preferences and circumstances. For example, people living in more disadvantaged areas of Melbourne (who are more likely to be overweight or obese) have better access to some recreational facilities (eg public swimming pools), but are less able to exercise due to health conditions and child care responsibilities. The more

disadvantaged areas had better street connectivity (a predictor of walking and cycling for transport), but traffic conditions were worse and there were fewer bicycle lanes. The more disadvantaged areas had more retail outlets selling fruits and vegetables, but also more fast food outlets (eg KFC, McDonalds, Pizza Hut). Residents in these ‘food environments’ also had less money to spend on food (and possibly on recreational physical activity, though this was not measured) (Kavanagh et al 2007).

These findings demonstrate the importance of understanding local populations and environments in the development of interventions to support active living and healthy eating. The community-based social marketing model outlined in Section 4.2.1 is a useful tool for identifying benefits and barriers to active living and healthy eating at the community level (McKenzie-Mohr and Smith 1999).

3.2 Environmental conditions that encourage inactivity

Australian and international research has identified a number of environmental conditions that encourage inactivity. Some general findings are summarised in this section, but it is important to bear in mind that environmental conditions that encourage inactivity may vary across the life course; for different population sub-groups (eg males/females, adolescents/older adults); and for different forms of physical activity including walking or cycling for transport and recreation, other forms of active recreation, active play, organised and informal sport, domestic activity, and incidental activity such as stair walking (Giles-Corti and King, in press).

3.2.1 The physical (built and natural) environment

Active transport (walking, cycling and public transport)

Urban design and transportation systems are key components of the built environment that have been shown to impact on many aspects of health and wellbeing, including physical activity, obesity, mental health, and social connectedness (Frank et al 2007; Truong and Ma 2006; Frumkin et al 2004; Dora and Phillips 2000). Inactivity and obesity have consistently been associated with urban environments characterised by low housing density with long distances to travel to destinations such as shops, schools, work, public transport and services (Saelens and Handy 2008; Frank et al 2007; Transportation Research Board 2005; Frank et al 2004).

Transport systems are a key component of the built environment, as they shape the ways in which people carry out the diverse activities of daily life. Car-reliant cities encourage sedentary transport choices and contribute to obesity as well as additional health, environmental, transport and social harms (Litman 2009). Transport systems in Australia, which are largely designed to move cars rather than people, have resulted in urban environments with poor walkability, bikeability and public transport services, and low rates of active travel (Mees et al 2008).

Australians don’t take multiple short trips¹ by car just because car travel is perceived to be (though not always in reality) faster, cheaper, safer or more comfortable. Many car trips result from lack of feasible alternatives; including poor public transport, lack

¹ 52% of trips in Melbourne are less than 5km

of bicycle lanes and paths, and road and neighbourhood environments that make walking, cycling and public transport unsafe and unpleasant.

Travel choices are based on weighing up the perceived benefits and barriers associated with alternate travel options. When urban environments and transportation systems favour car travel over active travel, active travel choices become more difficult choices. When countries adopt more balanced transport systems, citizens have greater choice of travel mode, car use declines (though not necessarily car ownership), and walking and cycling increases (Pucher and Buehler 2008). Obesity levels are also lower (Pucher and Buehler 2008; Bassett et al 2008), with recent studies reporting positive associations between car travel and obesity at both individual and national levels (Wen and Rissel 2008; Bassett et al 2008; Wen et al 2006).

Traffic safety concerns are a major barrier to active transport in Australia (Bauman et al 2008; Carver et al 2008b; Garrard et al 2006). Improved cycling and walking infrastructure is often the focus of attention to address these concerns, but supportive ‘invisible infrastructure’ is also a key feature of transport policies in countries with high rates of active travel (Pucher and Buehler 2008). For example, in Berlin (Germany) 3,800km of city streets (72%) are traffic calmed with speed limits of 30km/hr or less (Jacobsen 2006).

Speed limits in Australia are generally well above those in the industrialised world. In their review “*Balance between harm reduction and mobility in setting speed limits: a feasibility study*” Fildes et al (2005) note that “A review of international speed limits showed that Australasia has some of the highest speed zones in the world, especially when compared to Europe.” Table 1 summarises the main speed limits in Europe and Australasia.

The authors also noted that while speed limits in the US are generally closer to Australasian speeds, US limits in urban areas are generally well below their Australasian equivalents (Fildes et al 2005).

Table 1: International and Australasian speed limits
(Source: Fildes et al 2005)

ROAD TYPE	EUROPE (mainly)	AUSTRALASIA (mainly)
School areas	30 km/h	40 km/h
Residential areas	30 km/h	50-60 km/h
Built-up areas	60 km/h	70-80 km/h
Urban roads	60-70 km/h	80 km/h or higher
Rural roads	80-90 km/h	100 km/h
‘Motor’ roads	100 km/h	100 km/h
Motorways	120 km/h	110 km/h

Many of the characteristics of urban environments that can help or hinder active living are incorporated into audit tools used to assess the walkability and bikeability

of neighbourhoods. These have been reviewed by Mouden and Lee (2003), and most include measures of:

- Housing density.
- Land use: mix of housing, shops, schools, services, businesses, and recreational facilities within walking distances – usually defined as up to 800metres.
- Street connectivity.
- Street design: curb cut-outs, presence and condition of footpaths, shade, aesthetics, facilities such as seats and drinking fountains.
- Road networks: high volume and speed arterial roads and highways can divide neighbourhoods by creating a barrier effect for pedestrians and cyclists.
- Traffic flow: often privileges cars over pedestrians and cyclists (eg short pedestrian signal times make safe road crossing difficult for older adults, children, and people with a disability; left slip lanes and roundabouts improve motorised traffic flow but make intersections more difficult to negotiate for pedestrians and cyclists.
- Street safety: pedestrian crossings and refuges, speed humps, chicanes, warning signs.
- Bicycle paths and lanes.
- Traffic conditions: traffic volume and speed, posted speed limits.
- Personal safety: ‘peopled’ places are often safer places (see Australian Institute of Criminology, *Crime prevention through environmental design [CPTED]*)
- Aesthetics, cleanliness, tidiness, graffiti.

Active recreation, organised and informal sport, and incidental activity

Environmental constraints on active recreation include limited or poor quality public open spaces such as parks, reserves, playgrounds and walking/cycling/skating trails. Proximity is important to enable ready, safe access for multiple users (eg children, adolescents, families, older adults). Recreational areas need to be aesthetically pleasant and clean, and protected from traffic noise (Environment Protection Authority 2007), vehicle emissions, and the visual pollution associated with high traffic volume roads.

Lack of public open space and sport/recreation facilities are barriers to organised and informal sport and recreation, as are restrictions on the use of facilities (such as in school playgrounds and restricted-access sports facilities).

Workplaces, shopping centres and apartment blocks with ready access to lifts or escalators but difficult access to stairs discourage incidental activity.

Children’s indoor environments offer many sedentary opportunities such as television viewing and playing computer games. Outdoor areas in schools are less likely to be used for active play if they are unsupervised, have no fixed equipment (such as basketball hoops), no loose equipment (such as balls), or no ground markings (eg for ball games) (Willenberg et al 2009, in press).

The *'Healthy Spaces and Places'* discussion paper comments that “The current trend towards larger houses with bigger building footprints on smaller lots results in limited private open space, which is not always compensated for by quality public open space.” (Australian Local Government Association, National Heart Foundation of Australia and the Planning Institute of Australia, 2008. p31). Children who live in houses with smaller yards are less likely to play outdoors (Handy et al 2008), and safety concerns often prevent parents from allowing their children to play in the street (Carver et al 2008b; Handy et al 2008).

3.2.2 The social/cultural environment

Several historians (Davison 2004), geographers (Tranter 2004), transport researchers (Mees et al 2008) and public health researchers (Hinde and Dixon 2005) have documented diverse aspects of Australia's culture of car dependence.

The underlying cultural values and norms that shape travel mode choices are reflected in transportation policies, and reproduced through the narratives of daily life. Garrard (2008) describes an example from the road safety field. As noted in Section 3.2.1, vehicle speed is a barrier to active transport, but in Australia (in contrast to many European countries) speed limits are set using criteria that place a relatively high value on motorised mobility compared with safety. This represents a hazard to pedestrians and cyclists that is often not acknowledged or acted on. A recent media article on pedestrian safety illustrates these underlying value positions. The article entitled “*Sharp rise in deaths of elderly pedestrians*” (Russell 2008, see Appendix A) included the following statements:

“...drivers were at fault in only four of the incidents in which 39 pedestrians were killed this year”

“...elderly pedestrians and children under 14 ...had to be more vigilant when out walking...”

“...elderly people...who failed to heed the road rules...”

“...older people who simply aren't taking the time to walk to a crossing and crossing when it's safe.”

“...police, the State Government and VicRoads were trying to educate older people on the dangers of crossing roads...”

There is good evidence that injuries to elderly pedestrians can be prevented through speed reduction (World Health Organisation 2008). In contrast, a review of injury prevention strategies stated that “There is little evidence that efforts to change the behavior of elderly pedestrians [eg through road safety education] have any long-term effects, and there is no evidence that programs focused on drivers have any benefit.” (Rivara et al 1997). A more recent review reported similar findings (Duperrex et al 2002).

Based on the fatality-speed relationship (a pedestrian or cyclist hit by a car travelling at 50km/h has an 85% chance of being killed, while at 30km/h this drops to 10%)

(World Health Organisation 2008), many of the pedestrian fatalities referred to in the media article above might not have occurred had the speed limit been within the range of human tolerance to being struck by a car. In industrialised countries with high levels of active transport, neighbourhood speed limits are usually 30km/hr or less (see Section 3.2.1). It is inappropriate to 'blame' pedestrians for being injured by a motor vehicle when vehicles are permitted to travel at speeds that are unsafe for pedestrians and cyclists.

Not only do attitudes to appropriate vehicle speed vary between car-oriented countries and countries with safer and more balanced transport systems, but so too do attitudes to the responsibilities of road users. In Australia, a driver is generally not considered to be at fault in a casualty crash if he or she obeyed the road rules. In contrast, in many European and Asian countries a driver must anticipate pedestrian and cyclist errors and take evasive action to avoid a collision. In these countries the onus is on drivers to prove no-fault when in collisions with pedestrians and cyclists. In general, German and several other European road systems require higher standards of duty-of-care on the part of drivers for pedestrians and cyclists than does the Australian system (Pucher 2006).

Other aspects of the social/cultural environment that inhibit active transport include high and sometimes unrealistic concerns for child safety that influence parents' decisions about independent mobility for their children (Malone 2007). A greater value placed on individual good compared with social or community good, contributes to the vicious cycle whereby parents drive their children to school to protect them from the adverse traffic conditions created by other parents driving their children to school (Dora and Philips 2000).

3.2.3 Policy/regulatory environment

Within the policy/regulatory environment, a number of Commonwealth Government transport policies encourage inactivity by effectively promoting private motor vehicle use and discouraging walking, cycling and public transport. These include:

- Funding for road infrastructure but not public transport or bicycle facilities (Bauman et al 2008).
- Taxation incentives for private motor vehicle use (but not other forms of private transportation) (Public Transport Users Association 2007).
- Uniform national speed limits in urban areas that contribute to high rates of serious injury for pedestrians and cyclists (Garrard 2008).
- Reduction in fuel excise to off-set the price of carbon emissions (Commonwealth of Australia 2008).
- Financial support for car manufacturers.
- Subsidies for converting petrol-fuelled cars to natural gas.

The Public Transport Users Association has conservatively estimated that taxes and charges on Australian motorists (\$31 billion per annum) fail to cover the cost to the public of car use (\$47 billion per annum), leaving a 'road deficit' of at least \$16 billion per annum (PTUA 2007). The general public, whether motorists or not, therefore subsidise the use of cars and the consequences of car use (PTUA 2007).

There are few comparable federal government tax breaks, subsidies or incentives for active transport, particularly walking and cycling.

Inaction is also a policy position. Many policies for promoting active transport that have been effective overseas (eg congestion taxes, low urban speed limits, containment of urban sprawl) have not been implemented in Australia (see Section 5.3). Policy inaction (in the light of good evidence *for* action) illustrates that, in addition to barriers to active transport directly, there are also barriers to policy change.

Factors that constrain policy change for obesity prevention include (i) lack of public, media and organisational awareness of the importance of environmental determinants of obesity; (ii) as a corollary to (i), lack of public, media and organisational support for action to address the environmental determinants of obesity; (iii) opposition to health-enhancing environmental change (particularly legislative and/or regulatory change) from powerful and well-resourced interest groups; (iv) administrative barriers to working intersectorally; and (v) reluctance to recognise and act on the factors that make the alternative behaviour appealing (eg encouraging people to walk and cycle more, but failing to remove incentives for car use).

Finally, it should be noted that barriers to active living are also barriers to building liveable, connected communities. Litman (2005) defines liveability as:

“...the environmental and social quality of an area as perceived by residents, employees, customers and visitors. This includes safety and health (traffic safety, personal security, public health), local environmental conditions, (cleanliness, noise, dust, air quality, water quality), the quality of social interactions (neighbourliness, fairness, respect, community identity and pride), and opportunities for recreation and entertainment.”

Consequently, environments that foster active healthy living are also more liveable communities, with the two interacting reciprocally.

Section 3 above outlined barriers to building a culture of active living, within liveable and socially connected communities. The following section presents options for addressing these barriers.

4 Approaches for establishing active, connected communities

Actions for building a culture of active living and healthy eating within liveable and socially connected communities are based on (i) principles for action, (ii) theoretical frameworks and models for fostering behaviour change within ecological systems, (iii) specific actions, and (iv) building capacity for action. These are described in the following sections.

4.1 Principles for action

4.1.1 Reducing the social gradient associated with active living, healthy eating and liveable, connected communities

Several decades of experience of public health interventions addressing a range of health conditions, show that environmental approaches (often, but not always in tandem with individual behaviour change approaches) are frequently effective (McQueen and Jones 2007; Jolley 2004); cost-effective (Department of Human Services 2006; Applied Economics 2003), socially inclusive (Keleher and Armstrong 2005); and equitable (Sanigorski et al 2008).

The public benefits from environmental changes automatically as the environment improves, in the same way that passive road safety measures such as air bags in cars protect drivers and passengers from their own and other drivers' mistakes. Similarly, fluoridated water supplies improve children's oral health regardless of good or bad oral health behaviour (Jolley 2004). An added benefit of passive environmental measures is that they generally reduce health inequalities (Garrard 2008). When health improvements are dependent on individuals taking action it is often the most disadvantaged population groups that miss out.

There is some evidence that participation in walking and cycling for transport does not exhibit the social gradient that is common for leisure-time physical activity (Berrigan et al (2006). In countries with high rates of active transport, walking and cycling are inclusive population-wide activities that include children, older adults, women, and culturally and socially diverse population groups (see Appendix B).

Environmental approaches also avoid victim-blaming and social stigma because they are directed at everyone. They also frequently have multiple social benefits in addition to health benefits; for example, increasing active transport through improved walking and cycling infrastructure also contributes to reduced greenhouse gas emissions and traffic congestion (Bauman et al 2008).

Environmental change has been shown to be effective in both reducing child obesity and reducing the social gradient commonly found for child obesity. The *Be Active Eat Well* project in Colac, Victoria, which included a range of individual and environmental change measures, reduced obesity levels in Colac and also reduced the social gradient usually associated with childhood obesity (Sanigorski et al 2008).

4.1.2 Evidence-based practice

Recognising what works and does not work in obesity prevention is not simply an academic debate among public health researchers. If we only invest resources in interventions based on the belief that obesity can be prevented simply by persuading people to eat less and exercise more, we miss the opportunity to make environmental changes that are likely to have a greater impact.

The evidence base for obesity prevention needs to adopt a broad definition of evidence (ie including a range of designs and methods); include a mix of demonstrably effective and innovative actions; and adopt a culture of ‘learning by doing’. It will be important to act on the best available evidence, and invest in solution-focused research rather than problem-focused research. We also need to learn from other public health responses to epidemics (eg tobacco control, road safety, prevention of coronary heart disease) and other countries, and stop doing the same things (eg education only) expecting them to have a different outcome.

Other principles for action include value for money, a commitment to innovation, support for good leadership, recognition of the value of leverage through building on existing efforts by a range of organisations (including in related areas such as climate change and traffic congestion), setting goals and targets, and evaluating interventions and monitoring progress.

4.2 Theoretical frameworks and models for action

Several theoretical frameworks and models guide public health and health promotion action, ranging from frameworks such as the Ottawa Charter for Health Promotion (WHO 1986) which sets out five broad action areas for enhancing health, to models which outline a continuum of approaches from downstream, individual focused actions such as education and skills provision through to upstream policy and environmental change (Keleher and McDougall 2008). Health promotion action also draws on several cross-disciplinary theories and models such as the Health Belief model, Stages of Change model and Social Learning Theory (Nutbeam and Harris 1999).

Recent research from the fields of social psychology, social marketing and behavioural economics also have much to add to public health approaches to creating supportive environments (with a focus on social environments) for maintaining healthy weight. These newly emerging approaches to fostering behaviours aimed at improving health and environmental sustainability are described in the following section, with examples relevant to active living, and liveable and connected communities.

4.2.1 Community-based social marketing

Behaviour change models from the field of social psychology outline mechanisms for persuading, ‘nudging’ (or in some cases regulating/compelling) people to act in the health enhancing ways that they frequently support, but often fail to act on. An example is the Community-Based Social Marketing (CBSM) approach to promoting sustainable behaviour developed by McKenzie-Mohr and Smith (1999). This

approach focuses on voluntary behaviour change, but argues that the traditional social marketing approach to selling ‘products’ which focuses on awareness-raising, information and education, is ineffective in changing complex social behaviours such as travel behaviour.

The CBSM approach involves a series of steps aimed at identifying and addressing perceived benefits and barriers to the ‘new behaviour’ (eg walking or cycling to school) and the ‘alternative behaviour’ (eg travelling to school by car). Table 2 provides a hypothetical example. Identification of benefits and barriers should be based on evidence from the research and evaluation literature, and from qualitative and quantitative research conducted with the target group(s) for the program. Similarly, choice of strategies is both evidence-based and locally adapted. This is particularly important for ‘micro-environmental’ change; for example, in neighbourhoods, schools and workplaces. It should be complemented with ‘macro-environmental’ change that cuts across neighbourhoods, municipalities, regions and states and territories (eg vehicle speed limits).

The CBSM model stresses that the pattern of benefits and barriers will differ for population subgroups; sub-sets of behaviours; or steps in achieving the desired behaviour. For example, boys may have different perceived benefits and barriers from girls; walking to school might have different barriers to cycling; and parents and students ‘getting organised’ to travel to school by walking or bicycle might involve a number of preparatory actions.

Table 2: Perceived benefits and barriers of active and inactive modes of travel to school

	Target behaviour (active travel to school)	Competing behaviour (travelling to school by car)
Perceived benefits	Improves health	Saves time
Perceived barriers	No secure bicycle storage at school	Difficult to park car at school

McKenzie-Mohr and Smith (1999) also note that:

“To date, few programs have emphasised the development of community norms which support people engaging in sustainable behaviour. This lack of attention to norms is unfortunate, given the impact they can have upon behaviour. Norms guide how we should behave. If we observe others acting unsustainably, for instance using water inefficiently, we are more likely to act similarly. In contrast, if we observe members of our community acting sustainably, we are more likely to do the same.”

(McKenzie-Mohr and Smith 1999, p. 156)

The CBSM model also outlines strategies for influencing the social norms that shape behaviours, as well as the urban environments that in turn influence behaviours through the types of reciprocal interactions identified in Bandura’s Social Learning Theory (Bandura 1986).

4.2.2 Behavioural economics

Recent research in the field of behavioural economics demonstrates that people frequently are not ‘rational consumers’ of products and services, particularly when immediate rewards are accompanied by longer-term harm, when knowledge of multiple benefits and harms is limited, and when individual behaviours result in more diffuse social harm (Thaler and Sunstein 2008). Increasingly, economists are recognising the limitations of free market economics and calling for strategies designed to entice, compel or ‘nudge’ people into adopting behaviours that are in individuals’ and the wider community’s wider and longer-term interests (Thaler and Sunstein 2008; Schwartz 2004).

4.2.3 Frameworks for obesity prevention

A number of comprehensive frameworks for obesity prevention have been developed by a range of health organisations nationally (Department of Health and Ageing 2003) and internationally (Kumanyika et al 2008; WHO 2004; WHO 2000). These consistently propose population-based obesity prevention strategies that improve social and physical environments for healthy eating, physical activity and energy balance. They adopt a life course approach, and include strategies that span the multiple settings of daily life (eg schools, workplaces, communities). These frameworks are not described here as they are available elsewhere.

5 *Options for building a culture of active, connected communities*

5.1 Introduction

Strategies for building active, connected communities require actions that address the physical, social and policy/regulatory barriers to active living outlined in Section 3. While active living includes active transport, recreation, sport, play and incidental activity (eg at work and around the home), the main focus of this report is on promoting active transport for the following reasons.

Active transport is socially inclusive. In countries that have developed a culture of active transport, cycling and walking are inclusive, population-wide activities that include children, adolescents, older adults, women, ethnically and culturally diverse groups, and disadvantaged population groups (see Appendix B). Consequently, when active travel becomes the social norm, many of the identified ‘target groups’ for physical activity promotion are active as part of daily life, frequently achieving adequate levels of physical activity ‘incidentally’, at low cost, without having to find the time and money to participate in organised sports, exercise or fitness programs.

Active transport has multiple health benefits:

- Increased physical activity and reduced rates of several chronic diseases
- Community connectedness through increased social interactions on streets and within neighbourhoods
- Reduced air, noise and visual pollution
- Improved community safety, as ‘peopled’ places are safer places.
- Reduced road traffic injuries

(Litman 2009; Garrard 2008)

Active transport has additional social benefits:

- Reduced congestion, car space requirements and costs
- Reduced energy use, lower fossil fuel use
- Reduced greenhouse gas emissions.

(Litman 2009; Garrard 2008)

The following options aimed at increasing rates of walking and cycling for transport (predominantly) and recreation are based on the environmental barriers to active living identified in Section 3, and on Australian and international research and experience in promoting active transport.

5.2 Promoting active transport

Urban planning

The design features of the built environment that encourage active transport are:

- Strict land-use policies that effectively contain urban sprawl and foster the relatively compact, mixed-use developments that generate shorter trips which are more walkable and bikeable.
- Integrated transport and land-use planning that is coordinated across all levels of government.
- Walkable and bikeable neighbourhoods that promote local active travel, together with facilities (and incentives) for active trips linked to public transport use for longer trips.
- Traffic calming of local streets. Roads with higher traffic volumes and speeds require separate facilities for cycling (on-road or separate lanes) and pedestrian crossings to enable safe use by pedestrians and cyclists.
- State and local government planning codes that require integrated cycling and walking facilities for new suburban developments, thus reducing the need for car use.
- Mixed-use zoning that incorporates less strict separation of land uses, enabling natural development of mixed use neighbourhoods.
- Good street connectivity. However, because cul de sacs may encourage active play in younger children, street designs that provide good connectivity to nearby streets through connections and paths for pedestrians and cyclists only may be appropriate.
- Walkable street design including curb cut-outs, presence and condition of footpaths, shade, aesthetics, and facilities such as seating and drinking fountains. Streets should also be clean, tidy and the surroundings graffiti-free.
- Attractive neighbourhood environments that include pleasant scenery, public art and places of interest.

(Moudon and Lee 2003)

Transport planning

Land use planning needs to be integrated with transport planning at state, regional and local neighbourhood levels. The following recommendations for transport planning that fosters active travel have been derived from extensive international experience in the promotion of safe walking and cycling for transport (adapted from Pucher and Buehler 2008).

Extensive systems of separate cycling facilities

- Well-maintained, fully integrated paths, lanes and special bicycle streets in cities and municipalities.
- Fully coordinated system of colour-coded directional signs for bicyclists.
- Off-street short-cuts, such as mid-block connections and passages through cul de sacs and dead-ends for cars.

Intersection modifications and priority traffic signals

- Advance green lights for cyclists at most controlled intersections.
- Advanced cyclist waiting positions (ahead of cars) fed by special bike lanes facilitate safer and quicker crossings and turns.
- Bike paths turn into brightly coloured bike lanes when crossing intersections.

Traffic calming

- Traffic calming of all residential neighbourhoods via speed limits (30 km/hr) and other traffic calming measures.
- 'Home Zones' with 7 km/hr speed limit, where cars must yield to pedestrians and cyclists using the road.

Bike parking

- Large supply of good bike parking throughout cities and municipalities.
- Improved lighting and security of bike parking facilities often featuring guards, video-surveillance and priority parking for women.

Coordination with public transport

- Extensive bike parking at all metropolitan, suburban and regional train stations.
- Facilities for carrying bicycles on trains, trams and buses (eg bicycle carriage on the front of buses in Canberra).
- Bike rentals at most train stations.
- Deluxe bike parking garages at central city train stations, with video-surveillance, special lighting, music, repair services and bike rentals (eg the King George Square Cycle Centre in central Brisbane which provides end-of-trip facilities for 420 cyclists: secure parking, showers (with a fresh towel every day), lockers, plus a laundry and ironing service).

Traffic education and training

- Comprehensive road safety and cycling training courses for all school children with test by traffic police.
- Special road safety and cycling training test tracks for children.
- Stringent training of motorists to respect pedestrians and cyclists and avoid collisions.

Traffic laws

- Special legal protection for children and elderly pedestrians and cyclists.
- Motorists assumed by law to be responsible for almost all crashes with pedestrians and cyclists.
- Strict enforcement of pedestrian and cyclist rights by police and courts.

The strategies outlined above are designed to increase the perceived benefits and decrease the barriers to active travel as discussed in Sections 3 and 4. Decisions to walk, cycle or use public transport are weighed up against the perceived benefits and barriers for car travel. Consequently, taxation, car-parking and land use policies related to car use are also relevant for increasing active transport. These include the following measures (adapted from Pucher and Buehler 2008).

Car speed limitations in urban areas

- Traffic calming of residential neighbourhoods to limit cars to speeds of 30 km/hr or less.
- 'Home Zones' in many neighbourhoods give cyclists and pedestrians equal rights to road use and limit cars to walking speed (about 7 km/hr).
- Car-free zones, one-way streets (with contra-flow for bicycles) and artificial dead-ends make car travel through the city centre slow and less convenient.
- Turn restrictions for cars but not for cyclists.
- Strictly enforced speed limits and traffic regulations.
- Frequent random speed limit enforcement checks by the police.
- Advance stop lines and traffic signal priority for cyclists.

Road and parking capacity limitations

- Limited number of car parking spaces in city centres, workplaces and neighbourhood destinations.
- Parking management schemes limit easy car access to urban neighbourhoods, often with resident only parking or strict time limits.
- Replacing car parking facilities with bike parking instead.
- Combined bus-bike lanes that permit bike use but prohibit car use.
- Deliberately narrowed roads in city centres force cars to drive slowly.

Taxation of car ownership and use commensurate with the direct and indirect costs of car use (see Section 3.2.3)

- High taxes and fees on car purchase, ownership and use.
- High excise and sales taxes on petrol.
- High hourly parking rates.
- High fees and strict training requirements for obtaining a driver's licence (over €1500 in Germany).

Promotional strategies

International good practice in promoting active transport comprises multifaceted strategies including urban and transport planning (outlined above) and 'soft' interventions to promote increased walking, cycling and public transport, and decreased car use. Effective promotional strategies include the following (adapted from Pucher and Buehler 2008).

Access to bikes

- Free use of distinctive, simple City Bikes parked throughout the city, as in Copenhagen (a similar, low cost scheme is planned for Brisbane).
- Easy, convenient and inexpensive bike rentals at train stations and throughout the city.
- Free company bikes for employees to use during the day for short business trips.
- Tax breaks to purchase a bike (eg in the Netherlands).
- Convenient air pumps for bikes in city centre.
- 'Park and Bike': discount bike rentals for motorists who park their cars and bike for the rest of the journey.

Bike trip planning

- Bicycling websites with extensive information for cyclists on bicycling routes, activities, special programs, health benefits of cycling, bikes and bike accessories, etc.
- Flexible Internet bike trip planning tool allows finding the most comfortable or quickest route by bike tailored to the specific preferences and needs of each person. Comprehensive bike maps for most cities as well as most regions and states.

Public awareness campaigns

- Focus on the health, fitness, enjoyment and social benefits of walking and cycling that have been identified consistently in the research literature (Garrard et al 2009; Garrard et al 2006).
- Annual events such as Ride2Work Day, Ride2School Day and Walktober.
- Special fun programs for young children, including providing free bike accessories and other gifts to children learning traffic safety and how to cycle.
- Active transport ambassador programs that send sustainable transport advisors to residential neighbourhoods to serve as role models of safe walking and cycling and help with walking and cycling promotion, distributing newsletters and information.
- Annual walking/cycling festivals and car-free days that promote the environmental advantages of walking and cycling, display the latest bike models and accessories, and disseminate other relevant information.
- Wide range of walking and cycling competitions for different ages and skill levels.
- Special guided walking and cycling tours for older adults.

Public participation in active trip planning

- Regular surveys of residents to assess their satisfaction with pedestrian and cycling facilities and programs and to gather specific suggestions for improvement.
- Active travel councils that provide a platform for sharing expertise among stakeholders from businesses, the bike industry, the city administration, research institutes, universities, walking and cycling experts and citizen advocacy groups.

Green travel plans

- Workplaces, schools and universities develop green travel plans based on targets, incentives, facilities (eg safe bike storage, change facilities), education/skills, social support, social events, and monitoring progress.
- Provide payment for active travel to work trips (eg in lieu of subsidised car travel or car parking) (\$4 per trip in one US program).
- Provide free bicycles for employees who regularly cycle to work.

Many of the policies and activities described above for increasing active transport are system-wide measures that benefit all members of the community from children through to older adults. Additional options and recommendations for increasing active travel to school for school-aged children and adolescents are included in the following section.

Promoting active travel to school

The following options and recommendations for promoting active travel to school are based on recent evaluations of a number of Australian programs aimed at increasing active travel to school (Wen et al 2008; Fry nd; Garrard et al 2009).

Many current programs aimed at increasing active travel to school focus either on 'soft' measures promoting individual behaviour change, or 'hard' measures designed to improve the transport environment for pedestrians and cyclists. Research and consultation at both state and local levels should be undertaken into determining the optimum mix of policy, regulation, infrastructure, education/skills, community development, organisational development, and media/marketing/communication strategies required to promote active travel to school in different settings. Based on these assessments, programs should incorporate an appropriate mix of strategies.

Based on current research and evaluation evidence, it is recommended that active travel to school programs consider incorporating:

- High profile, state-wide promotion of active travel to school using online resources, active travel to school events (eg Walk/Ride to School days, Walk and Wheel Wednesdays, Walktober), and travel behaviour monitoring and incentives for active travel to school. These events and activities achieve considerable mass media and community awareness and support. State-based cycling organisations with considerable experience in conducting cycling events and activities with wide community reach are well-placed to implement these initiatives.
- State-wide promotional events and activities should be complemented with additional initiatives at the local school community level, such as those employed in the Travelsmart Schools Program (Fry nd).
- Parental involvement in travel behaviour change is crucial because parents are the principal decision-makers for how their children travel to school.
- Active travel to school for primary school students will be facilitated by (i) developing a safe and convenient active travel environment (both perceived and actual) that reduces parents' concerns about independent active travel to school; (ii) encouraging parents to accompany children to school using active modes; and/or (iii) providing other forms of accompaniment for children on active trips to school (eg walking school bus). This recommendation is based on the recent finding that high or increased rates of active travel to primary school occur predominantly among children travelling to school independently (Garrard et al 2009).
- Resources should be allocated to assist parents to plan for their children to walk or cycle to school (eg planning safe routes, organising for their children to travel with friends or neighbours, getting 'organised' earlier, maintaining their child's bicycle, wearing appropriate clothing and having a suitable school bag).
- Some strategies for promoting active travel to school are common to both walking and cycling, but others are mode specific. Active travel planning should include both general and specific strategies, based on identified benefits and barriers for each active travel mode.

- Schools should be encouraged to implement school policies that support active travel to school and discourage car use (eg students walking or cycling home permitted to leave class early, school uniforms and bags suitable for walking and cycling, car parking restrictions near school). Schools can also be assisted to advocate for improvements such as reduced speed limits, pedestrian crossings, road signage and policing of parking and driving behaviour near schools.
- Road safety education, including the Bike Ed program, should be implemented in all schools.
- Supports for schools promoting active travel to school should include ‘hands-on’ assistance with active travel planning at the school community level, organising active travel events and activities; assistance with implementing Bike Ed programs; a resource kit to assist with program implementation which includes age-specific curriculum resources; skills training for student leaders/advocates; and prizes and incentives for participation in active travel activities that take into account students’ preferences and recommendations.

Resources to support these activities may be available in local communities (eg through local government, businesses, volunteers, and local Bicycle User Groups). It is recommended that active travel to school programs establish links with a range of potentially supportive community groups and organisations.

Schools should also be supported and encouraged to work in clusters and be provided with opportunities to network with other schools implementing similar and related programs. Teacher release time should be included in program budgets to plan and implement active travel plans, and support the establishment of teacher/school networks for promoting active travel to school.

The effectiveness of interventions to increase active travel will be improved by simultaneously encouraging active travel and discouraging car travel (see Section 4.2). Making car use less attractive (eg through reduced speed, car parking restrictions, priority for cyclists and pedestrians, and additional cycling infrastructure) can initially be unpopular (though levels of support usually increase when people experience the benefits of the changes), so extensive community consultation and long-term planning are required. This should be done in collaboration with the range of local and state authorities responsible for road safety and transport planning. Collaboration with local community road safety committees will also assist in improving the safety of walking and cycling to school.

Policy and environmental support for active travel to school

Program funding needs to be consistent with implementing an appropriate combination of behavioural and environmental change strategies over an extended time period (eg the Victorian ‘*Streets Ahead*’ program conducted by VicHealth).

In addition to direct program funding, additional community resources and alternative funding sources should be investigated. Many individuals, organisations, businesses, local governments and state government departments have a direct or indirect interest in promoting active travel to school. These groups and organisations can provide

expert advice, local knowledge and access to community and organisational networks, as well as direct participation in a range of school and community-based initiatives.

Collaboration with key government and non-government organisations with responsibility for education, health, transport and sustainability-related policies, infrastructure and regulation is important for achieving the environmental and policy changes that support individual behaviour change.

In general, if increases in active travel are to achieve the proposed health, environmental, community and traffic improvements, sustained behaviour change activities together with additional policy and environmental changes will need to be supported, adequately funded, and evaluated.

5.3 Promoting active recreation

Many of the environmental attributes that lead to increases in active transport in neighbourhoods (eg traffic calmed streets, and safe, attractive environments) also contribute to active recreation.

For children, the home environment can influence active recreation and play through factors such as whether children have television sets in their bedrooms and a yard large enough to play in. These characteristics are within the ‘micro-environments’ of families, and therefore potentially amenable to parental control. Support for families to modify home environments can assist parents to create more active environments for children. Workshops and other resources can be used to empower parents to overcome the ‘nag factor’ and restrict screen-based activities and television-viewing.

Active play and sports participation at school can be increased by providing open spaces (not necessarily grass), fixed equipment (such as basketball hoops), playground markers, loose equipment (such as balls), and teacher supervision (Willenberg et al 2009).

Physical education and sport can be promoted by having a classroom teacher who encourages physical activity, core curriculum requirements for PE/sport, and access to sporting equipment and playing fields. In particular, health and physical education should be included in the national core curriculum for schools.

Neighbourhood environments should provide access to public open spaces near home with age-appropriate facilities. Cul de sacs appear to encourage active play in younger children, but not older children or adolescents, and may contribute to reduced active travel by increasing travel distance. Cut-through routes for pedestrians and cyclists should be included in cul-de-sacs and dead-end streets.

For adults, recreational walking is increased through access to quality public open spaces and attractive environments (including natural, cultural and creative features). Off-road bicycle paths (including rail trails) promote active recreation and tourism, particularly for families.

Good, easily accessible, local facilities for active recreation appear to be particularly important for women with young children (a population group with low levels of physical activity), as many women prefer to be active with their children, rather than

leaving them in child care while exercising. Adding a social element improves participation. Pram walking groups and active play groups combine active recreation with social interaction.

Walking and cycling groups for older adults appear to be successful when social interaction is combined with easy access to attractive and safe environments for recreational walking and cycling (Foreman 2005; Garrard et al 2006).

5.4 Create supportive social norms

As discussed in Section 3, aspects of the social environment can also influence individuals' behaviours related to active living. This is an under-researched area, as most research into environmental influences on active living has focused on the physical and policy environments.

While numerous studies have reported associations between the built environment and physical activity, recent research and evidence-based reviews indicate complex interactions between intra-individual, environmental and social correlates of active living (Frank et al 2007). For example, changes in the built environment (eg population density, mixed land use and street connectivity) do not explain why the established middle suburbs of cities such as Melbourne (ie 10-20km from the CBD) had high rates of active travel to school several decades ago, but very low rates now. There have been few changes in population density, mixed land use and street connectivity in these suburbs over this time period.

These observations point to the importance of social change, including in normative travel behaviour, on travel mode choices. Many suburban areas in the Netherlands have an urban form similar to the middle and inner suburbs of Australian capital cities (Fildes et al 2005), but there are large differences in transport planning and social norms of travel behaviour.

Little is known about how social environments impact on active living, and even less is known about how to influence social environments to support active living. However, McKenzie-Mohr and Smith (1999) recommend strategies for creating supportive social norms to foster sustainable living. These are likely to be relevant for promoting active living.

Social Learning Theory describes the ways in which behaviour and environments continuously interact and influence each other, and the crucial role that social influence plays in communicating (both verbally and non-verbally) appropriate and inappropriate behaviours. Social norms shape behaviour through the conformity that occurs when individuals observe the behaviour of others in order to determine how they should behave (Nutbeam and Harris 1999). The transformation of cigarette smoking from socially desirable to socially undesirable in Australia is an example of a substantial change in social norms.

Programs to promote active living should attempt to communicate what are accepted behaviours as a means of developing a new set of social norms that support active, healthy living. To be effective, a norm must also be visible, as many behaviours are invisible in a community (McKenzie-Mohr and Smith 1999).

Behavioural research suggests that direct contact in which behavioural modelling and social diffusion occur may be particularly important. For example, as part of the National Child Nutrition program, the rapid uptake of students drinking water rather than high-sugar drinks at school is likely to have been at least partly due to students having (highly visible) water bottles on their desks with student-designed logos promoting water drinking (Garrard et al 2004). The water bottles conveyed a new social norm by making less visible behaviours (drinking water) visible.

Strategies for making changed travel behaviours (to more active modes) noticeable include communicating the number of people in an organisation who walk, cycle or use public transport to travel to work. Students also comment that they are impressed by teachers who cycle to school (especially the ‘cool’ teachers) (Garrard et al 2009).

Prompts are also an effective means of encouraging healthy and/or environmentally sustainable behaviours. Often people fail to do things, not because they don’t want to or because they lack motivation, but simply because they forget (eg to take green bags to shops). Appropriately designed and placed prompts are effective in reminding people to walk to the nearby shops, take the stairs rather than the lift, or organise for children to get up earlier so they can walk to school. “A prompt is a visual or auditory aid that reminds us to carry out an activity that we might otherwise forget – it reminds us to engage in an action that we are already predisposed to do.” (McKenzie-Mohr and Smith 1999).

Specific prompt messages are more effective than general messages, as are messages that highlight financial losses compared with the equivalent financial gain (eg associated with purchasing a second family car). This is because “losing something makes you twice as miserable as gaining the same thing makes you happy” (Thaler and Sunstein 2008, p. 33).

It is recommended that further research be conducted into the influence of social norms on active living, and the effectiveness of interventions that include strategies from social learning theory, community-based social marketing and behavioural economics.

While it is important to know *what* to do, it is also equally important to know *how* to make things happen. This is addressed in the following section.

5.5 Building capacity for action: strategies for fostering adoption of measures to promote active, connected communities

Building a culture of active living and liveable, connected communities requires environmental and policy changes. Some of the change strategies outlined in this report require ‘cultural shifts’ in ways that might seem to inconvenience the public; challenge existing organisational practice; and raise concerns for businesses and interest groups that are happy with the status quo and likely to argue for a ‘business as usual’ approach. As discussed in this paper, business as usual is likely to lead to more of the same (ie increases in overweight, obesity and a range of chronic diseases such as type 2 diabetes).

As Pucher and Buehler (2008) have noted, currently, stringent land-use controls and car-restrictive measures are not politically acceptable in car-dependent countries such as the US and Australia:

“The public and the media vigorously oppose even slight increases in petrol taxes, for example, and therefore discourage politicians from even considering increased taxation on car use. Similarly, there is little support for restrictions on car parking, speeds and passage of cars through city centres and residential neighbourhoods.”

Effective action to prevent further increases in obesity in Australia will require strategies for achieving public, media, business and policy-maker support for many of the initiatives outlined in this paper. For example, in the area of vehicle speed management, the World Health Organisation’s report ‘*Speed management: a road safety manual*’ includes strategies for securing community and political support for speed reduction early in the change management process (WHO 2008).

Employment of the health promotion strategies of intersectoral cooperation and community participation through enabling, advocating and mediating have been used successfully to improve public health in areas such as smoking reduction, road safety, and the prevention of cardiovascular disease (Applied Economics 2003). These strategies and actions will also be required to help establish the supportive environments and healthy public policies required to build active, connected communities.

Intersectoral action

Intersectoral action across diverse sectors and organisations (all tiers of government, industry, private sector, non-government agencies, community groups and individuals) is required to address complex issues associated with obesity prevention.

As a first step, it is important to identify potential sectors and stakeholders in environmental and policy change for obesity prevention at both ‘macro’ and ‘micro’ environmental levels.

Guidelines and resources for intersectoral action should be used to plan appropriate intersectoral action. These include:

- An understanding of the context, including the reasons why organisations need to work together.
- An assessment of available resources, including organisational capacity.
- A planned approach to action and sustainability, including clarification of roles and responsibilities.

(Nutbeam and Harris 1999).

Capacity-building

Increasing capacity for a societal approach to obesity prevention will include building community, practitioner and organisational capacity for action.

Community capacity building includes raising awareness about the risks and causes of obesity, strategies to foster community identity and cohesion, education to increase health literacy, facilitating access to external resources, and developing structures for community decision-making (Smith et al 2006).

Building organisational capacity across the multiple sectors that impact on obesity and its prevention, involves a combination of actions in areas such as:

- organisational development
- workforce development
- resources
- partnerships
- leadership.

(NSW Health 2001)

Health communication

A key challenge for the public health field is to reframe the obesity issue from one of personal responsibility for behavioural change to that of societal responsibility for environment change. This is a necessary step in gaining public and policy-maker support for public health interventions.

Research is required to develop effective messages to gain public recognition and support for the role of the environment in the increase in obesity. Data can be used by policy makers to gain support for public policies to address obesity. Similar strategies have been used effectively for tobacco control.

Health advocacy

Research evidence in itself is rarely sufficient for achieving a political response to public health issues such as obesity prevention. Rather, ‘policy entrepreneurs’ are required to advocate for health-enhancing change based on research findings (Chapman and Lupton 1994).

Health advocacy also includes community participation. Community action can be strengthened by supporting and mobilising multiple interest groups that work towards changing environments inside and outside the home. Groups can be supported to advocate for legislative change at federal, state and local levels, and interact in sophisticated ways with the press (eg the Parents’ Jury). Groups can also work with parents to change home environments; assisting them to create a home food environment that addresses variety, availability, and access; and a home environment that encourages active, outdoor recreation and play.

6 Roles and responsibilities of Federal, State and Local Governments

Building a culture of active, connected communities requires intersectoral action across the three tiers of government: local, state and federal.

6.1 Local Government

In addition to implementing town planning codes and national and state guidelines that support active, connected communities, other council initiatives include setting aside land and venues for community gardens, farmers' markets, food cooperatives, and the provision of affordable, locally available food. Many of these facilities for healthy eating also enhance social interaction and sense of community. Local government can also assist in controlling the placement and advertising of fast food outlets, and supporting local initiatives such as 'kitchen gardens' in schools. Local government can also support 'TravelSmart' programs in communities, workplaces and schools (including the Sustainable Schools program) by establishing supportive local travel environments.

Local government also has a key role in planning, establishing and promoting the use of quality public open spaces, and recreational and sporting facilities. It is important that these cater for the needs of all age groups from children through to older adults, and are located in safe and readily accessible areas. Support for 'safe neighbourhoods' programs also helps to create active connected communities by addressing personal safety concerns.

An increasing number of cities and municipalities are developing Active Transport Plans (eg City of Yarra, Victoria) and Cycling Strategies (eg Brisbane City Council). Most of these initiatives include goals and targets, and indicators to assess progress. The '*Cycling data and indicator guidelines*' paper prepared for the Australian Bicycle Council (2000) provides a comprehensive framework for assessing progress towards achieving increased rates of safe cycling and the conditions needed to achieve these changes (eg cycling-friendly infrastructure and policies).

Other local government active transport initiatives include the 'Walkability Toolkit' (City of Greater Geelong). Based on Clause 56 of the Victorian State Government Planning Scheme, which is designed to promote sustainable neighbourhoods, the Clause 56 Walkability Toolkit has been designed to:

- Promote walkable neighbourhoods.
- Promote quality walking environments.
- Support developers thinking about walkability in subdivision planning.
- Support planners assessing walkability in applications for subdivision.

[\(http://www.geelongaustralia.com.au/Services_In_Geelong/Planning/Planning_for_People/New_Subdivisions_-_Clause_56_-_Walkability_Toolkit/\)](http://www.geelongaustralia.com.au/Services_In_Geelong/Planning/Planning_for_People/New_Subdivisions_-_Clause_56_-_Walkability_Toolkit/).

Additional local government initiatives aimed at fostering active, connected communities include 'Cyclovia' (Moreland City Council), and 'Shared Space' (City of Bendigo). The 'Rail Trails' program is a successful initiative that has led to increased cycling, walking and tourism in rural areas. As these new initiatives are implemented and evaluated they can provide case studies of good practice for wider implementation with possible modifications for different settings. Mechanisms for networking and sharing good ideas and good practice need to be established to support dissemination of effective initiatives.

Many of these programs include support from local businesses, community groups and organisations, and provide an excellent opportunity for local, state and federal governments to ‘leverage’ investment in activities that help create active communities. For example, between 1994 and 2004, Bicycle Victoria organised rides totalling 208,244 participants, with research indicating high levels of physical activity pre and post-event (Godbold 2005). Promoting physical activity directly to this large group would be very costly for the health sector, but some community organisations restrict their activities due to lack of funding.

6.2 State Government

State governments are largely responsible for land use planning, urban design and transport planning, which need to be better integrated as occurs in Europe, where provision for active transport is built into new housing developments (Pucher and Buehler 2008). Town planning codes should incorporate provisions for active transport and recreation, possibly under the sustainability provisions of planning codes (eg Clause 56 of the Victorian Planning Scheme).

State governments can also support the retrofitting of existing urban areas, for example along the lines of implementing changes such as those set out in the ‘Walkability Toolkit’ (City of Greater Geelong) and by establishing comprehensive bicycle networks. Many of the active travel initiatives described in Section 5.2 fall within the jurisdiction of state and territory governments.

State and territory government departments should implement policies and practices in their own departments and within funded programs that incorporate active transport promotion (consistent with physical activity recommendations and greenhouse gas abatement targets) and food provision (consistent with Australian dietary guidelines). These interventions should be trialled and evaluated in one or more departments, and, if effective, rolled out across government.

It is inappropriate for government departments, authorities and funded programs to provide food and beverages that are inconsistent with dietary guidelines. Health rather than choice (of high-fat, high-sugar foods and drinks) or financial gain/fund-raising should form the basis for food provision. Similarly, it is inappropriate for government departments and funded programs to promote car use in the light of governments’ own physical activity guidelines and greenhouse gas abatement targets.

Active travel promotion should be included in all Local, State and Federal Government policies aimed at reducing household (as well as general) greenhouse gas emissions. Currently, transport is a neglected area for action on greenhouse gas emissions, with transport comprising 34% of household greenhouse gas emissions, compared with lighting (5%) and home heating and cooling (11%) (Department of the Environment, Heritage, Water and the Arts 2009). Governments provide a great deal of information about home heating, cooling and lighting, but little about household transport.

Improved road safety will be assisted by re-establishing bipartisan support for road safety measures such as speed control in states such as Victoria where speed control has been politicised and the public is receiving mixed messages about the

acceptability of speeding. It is crucial to establish community norms of safe, courteous driving.

State and Territory Governments should establish agreements with education authorities for community use of school sporting and recreation facilities outside school hours.

6.3 Federal Government

The Federal Government is responsible for establishing policies that are implemented at federal, state/territory and local levels. Numerous Federal Government policies across several sectors are relevant for building active, connected communities. A policy analysis exercise should be undertaken to map these policies and the responsible government departments and other administrative structures.

Examples of relevant policy and programmatic action include.

Policies:

- Including physical education, health and wellbeing in the core school curriculum being developed nationally.
- As part of the Henry review of taxation, the fringe benefits tax provisions that encourage car use should be removed. Monies saved could be spent on improved urban infrastructure for integrated, multi-modal active travel.
- Conduct comprehensive cost benefit analyses for all transport projects, using comprehensive models such as that developed by Litman (2009) which include a range of health, social and environmental factors that are frequently omitted.
- Adopt the Swedish 'Vision Zero' Safe System approach to road safety which values the safety of road users over vehicle mobility considerations, and ensure that all road transport policies comply with Safe System principles (eg safe urban speed limits).
- Conduct comprehensive cost benefit analyses as a basis for setting road speed limits. In addition to achieving a balance between vehicle mobility and injury reduction, it is important to take into account the additional non-injury benefits of speed reduction which are likely to include the health, environmental, transport and community liveability benefits of increased walking and cycling (Garrard 2008).
- A combination of policies now in place at federal (and state) levels for tobacco, alcohol, and drugs should be considered in relation to obesogenic products. These include regulatory strategies such as controlling the conditions of sale through direct restrictions or limits (especially aimed at youth); raising prices of less healthy products; and regulating marketing and advertising.
- Develop a National Physical Activity Strategy (a possible task for the Prime Minister's Council for Active Living – see below).
- Review and revise the National Public Health Partnership's '*Portfolio of interventions to increase physical activity as a means of transport*' (NPHP 2001). This is a possible task for the proposed Prime Minister's Council for Active Living (see below).

Programmatic support for building active, connected communities:

- Establish a dedicated Commonwealth Grants program to provide funding directly to state, territory and local government for walking and cycling infrastructure.
- Develop national guidelines for programs aimed at creating active, connected communities; for example, requiring the integration of ‘soft’ and ‘hard’ measures for promoting active travel to school, workplaces and within communities.
- Identify case studies of good practice in cities, municipalities, states and territories for implementation nationally (eg development of liveable communities in WA; retrofitting a regional city such as Geelong to improve walkability; integrating public transport and bicycle trips in Perth; implementing a comprehensive cycling strategy in Brisbane; healthy eating initiatives in Brisbane).
- Assist in the dissemination/implementation of successful city-based or state-based programs nationally, possibly including the establishment of a national clearing house of interventions.
- Assist community groups to locate sources of program funding (from government, business, not for profit organisations and trusts) and write funding submissions. Community groups know their local community and issues well and often have substantial volunteer support; but lack adequate funding and may lack some technical expertise. There are considerable opportunities for government to leverage investment for optimum outcomes.
- Options for leveraged programmatic support include matched funding with local governments, states and territories; and identifying organisational, philanthropic and business partners.
- Achieve value for money by working with professional associations (eg Planning Institute of Australia, Public Health Association of Australia, Australian Health Promotion Association), non-government organisations (eg National Heart Foundation, Cancer Council of Australia, Diabetes Australia), community organisations (eg Bicycle Federation of Australia), and industry groups (eg Cycling Promotion Fund).

Establish supportive administrative structures:

- Ensure commitment from all relevant departments to intersectoral action through joined-up government (eg departmental and senior management performance measures, budgetary commitments).
- Establish a national equivalent of the successful state level ‘NSW Premier’s Council for active Living’ – the Prime Minister’s Council for Active Living.

Actions for building active, connected communities frequently cut across the multiple tiers of government. Appendix D outlines a case study of local, state and federal support for promoting cycling in Europe (Pucher and Buehler 2008).

7 Town planning codes and their impact on urban design for healthy living

Federal, state/territory and local governments enact and/or implement legislation, regulations, codes and standards related to town planning, but currently these do not have a strong focus on urban design for active, healthy living. Recently, in recognition of the impact of urban design on healthy living and community wellbeing, a number

of organisations have developed resources for including active living design considerations in metropolitan, regional and rural areas.

The Planning Institute of Australia in partnership with the National Heart Foundation, with financial support from the Commonwealth Department of Health and Ageing, has developed the planning resource '*Healthy Spaces and Places*' to provide a policy framework at the national level to address the role of the built environment and its influence on people's health. The framework will assist practitioners and decision-makers to understand the inter-connections between planning and health. It is being prepared as a guide for all levels of government, industry, private sector and community groups in their consideration of health and the built environment (Planning Institute of Australia 2008).

Healthy Spaces and Places showcases existing initiatives and draws on current practices that apply and are consistent with the proposed framework and principles. In particular, it demonstrates effective policy development and implementation that encourage and require integrated outcomes for wellbeing.

The National Heart Foundation's *Healthy by Design* framework focuses on greenfields developments (National Heart Foundation of Australia 2004); while projects such as the *Walkability Toolkit* developed for the City of Greater Geelong and a similar development in Hobart are designed to assist local governments to retrofit existing urban areas to promote active living and more connected communities.

The NSW Premier's Council for Active Living (PCAL) has developed a comprehensive web-based resource '*Designing Places for Active Living*' (http://www.pcal.nsw.gov.au/planning_and_design_guidelines). The resource is divided into six design focus areas:

- Cities, towns and neighbourhoods
- Walking and cycling routes
- Public transport
- Streets
- Open Space
- Retail areas.

For each focus area, there is a design objective, some important design considerations and links to key references and additional resources for detailed design guidelines and specifications. New references are added as they become available.

PCAL has also compiled a series of NSW case studies to demonstrate the application of Active Living design considerations for each of the specific environments within the *Designing Places for Active Living* resource. The purpose of the case studies is to document and photograph how the application of Active Living design consideration has translated into practice (http://www.pcal.nsw.gov.au/case_studies).

The Growth Areas Authority in Victoria has developed a similar resource: '*A strategic framework for creating liveable new communities*' (West and Badham 2008).

To contain urban sprawl, redevelopment of existing areas is required, and good design principles are being developed to assist local governments to retrofit existing areas; for example, in Tasmania by the Tasmanian Premier's Physical Activity Council in partnership with the National Heart Foundation.

8 Issues around voluntarism, industry self-regulation and full regulation in the implementation of such codes

Good design principles are often initially adopted voluntarily. They are frequently used as a marketing tool by developers, though often only for the more upmarket developments. Over time, good design principles are often incorporated into planning codes, which has the benefit of more equitable distribution of health-promoting urban environments; although there are some concerns that they may add to housing costs. Private developers are generally happy to comply with mandatory regulations, codes and standards, but the adoption of discretionary guidelines may place them at a competitive disadvantage if other developers are not implementing similar guidelines.

In relation to establishing mixed land use in new housing developments, reservation of land for local strip shops, for example, can be mandated, but these small retail areas are generally not viable until population levels increase. However, once people are already driving to most destinations, local businesses can be difficult to establish. Strip shops linked to destinations such as transport hubs are effective, but cannot be established in the absence of public transport services. It can be difficult to encourage people to shop locally when they are in the habit of driving to large shopping complexes and there are few additional incentives to shop locally (eg no public transport hubs, or local community services and facilities). Once, again, these factors highlight the importance of transport planning occurring in conjunction with urban planning.

The *Liveable Neighbourhoods* project in Western Australia, which initially comprised principles and guidelines for health-promoting urban planning, has now been adopted by the Western Australian Planning Commission as operational policy, and is to be followed in the design and approval of urban development (Western Australian Planning Commission 2009). *Liveable Neighbourhoods* applies to structure planning and subdivision for greenfield sites and for the redevelopment of large brownfield and urban infill sites. This development demonstrates an increasing acceptance of good design principles over time, and regulation as an acceptable means of achieving more active, liveable communities. Mandatory requirements establish consistency, an equal playing field for developers, and more equitable access to good urban design for residents.

State government legislation prescribes what local governments must incorporate in planning through acts and legislation. In Victoria, for example, Clause 56 of the planning act relates to sustainability, and this may be an appropriate place to incorporate health in urban planning codes. VicUrban² has developed a 'sustainable community rating' which includes community wellbeing as one of five sustainability objectives. Community wellbeing involves building "communities that are safer,

² VicUrban, the Victorian Government's sustainable urban development agency, is one of Victoria's largest residential land developers.

healthier and more desirable places to live; with access to jobs, learning, recreation, services and the opportunity to participate in community life.” (VicUrban 2009).

The Council Of Australian Governments includes a Health Ministers Group and a Planning and Local Government Ministers Group that includes planning officials and representation from the Australian Local Government Association. These administrative structures provide a mechanism for establishing consistent urban design principles that incorporate health considerations.

This report has outlined a number of specific recommendations for building a culture of active, connected communities. In the following section a number of general recommendations and options are described.

9 General recommendations

- A comprehensive program of action to prevent obesity should address the multiple settings of daily life, across the life course, involving the three levels of government, the multiple sectors of government, non-government organisations, and where appropriate, the private sector.
- Multiple public health strategies are required, with a focus on creating pro-health built, natural, social and policy environments that support rather than discourage active living and healthy eating.
- While childhood obesity is of immediate concern, sustained population level change (including among children) requires community-wide action.
- Population-wide strategies should be complemented with specific strategies for priority population groups.
- Tools for action include government policies, programs, legislation and regulation; but also awareness raising, education and skills with the aim of assisting individuals and organisations to create their own ‘micro-environments’ consistent with government policies (eg physical activity, dietary guidelines, and reduced carbon emissions).
- Increase public, media and policy-makers’ awareness of the environmental causes of obesity, the ease with which people gain weight within these environments, the difficulties people face trying to lose weight, and the importance of taking action to create supportive active, connected communities.
- In view of the current focus on individual responsibility for weight control, raising awareness of recent evidence about the determinants of obesity is crucial in order to gain widespread community support for government action on obesity.
- Build on current initiatives (eg *Healthy by Design*, *Healthy Spaces and Places*, *Designing Places for Active Living*, *Strategic Framework for Creating Liveable New Communities*, and *Liveable Neighbourhoods*) and support efforts to establish nationally consistent, evidence-based planning principles based on these guidelines.
- Develop two additional resources similar to *Healthy Spaces and Places* that focus on (i) healthy eating; and (ii) active living with a focus on transport planners (ie a national guide to assist transport planners to design transportation systems that foster health and wellbeing).

- Change processes should involve extensive consultation focused on the benefits and reasons for change, and identifying barriers to change and assisting individuals and organisations to overcome them.
- Fostering healthy, active environments should include the relatively neglected social environment (in the form of social norms of behaviour) in addition to the more widely recognised built, natural and policy environments. Community-Based Social Marketing, Social Learning Theory and Behavioural Economics provide useful theoretical models that can be adapted to help change social norms around travel modes and eating behaviours.
- Strategies for changing travel environments should include those that promote walking and cycling; and also those that discourage car use.

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Appendix A: Example of speed and road safety discourse

Sharp rise in deaths of elderly pedestrians

MARK RUSSELL

7/9/08

AN ALARMING rise in the number of elderly pedestrians killed on Victorian roads has prompted warnings from authorities about the dangers of not using designated crossings.

Police believe drivers were at fault in only four of the incidents in which 39 pedestrians were killed this year – a jump of 44% on the number of deaths at this time last year. Almost half of those killed were aged over 70, sparking concerns that many were elderly people trying to stay healthy by walking but who failed to heed the road rules.

Between July 27 and August 22, seven pedestrians aged between 78 and 92 were run over and killed.

"It's not the way our older citizens should be ending their lives," the state's top traffic cop, Assistant Commissioner Ken Lay, told *The Sunday Age*.

"And most of those accidents were in daylight. I guess with older people they sometimes lack spatial awareness; they don't realise cars are as close as they are and they might not be as nimble on their feet, with arthritis or other ailments that slow them down.

"It's a trend that certainly has been growing over the past five to six years . . . As society gets older, there are more and more older people out there doing their exercise and walking to stay healthy, and that probably is one of the reasons for this increase in pedestrian fatalities."

Mr Lay said elderly pedestrians and children under 14 were at greater risk of dying after being struck by a car and had to be more vigilant when out walking. "You traditionally think young people are the ones who are impatient to cross streets, but quite often it's the older people who simply aren't taking the time to walk to a crossing and crossing when it's safe," he said.

Mr Lay said police, the State Government and VicRoads were trying to educate older people on the dangers of crossing roads by holding a series of pedestrian safety programs.

TAC's senior manager road safety, David Healy, urged motorists to slow down in areas of busy pedestrian activity. "Pedestrians are very vulnerable to changes in speed," he said. "We know that if a car travelling at 30 km/h hit a pedestrian, there would be a 20% likelihood of death. This compares to an 80% chance of death if a car hit a pedestrian at 40 km/h."

Pedestrian Council of Australia chairman Harold Scruby said he could not understand why cars in Australia were still allowed to be fitted with bull bars when they had been banned in Europe.

"Everything is focused on motor vehicle safety, and pedestrians are being forgotten," he said.

Mr Scruby said deteriorating eyesight might be a factor in some pedestrian accidents. "As we have an ageing population, this situation can only get worse," he said.

Appendix B

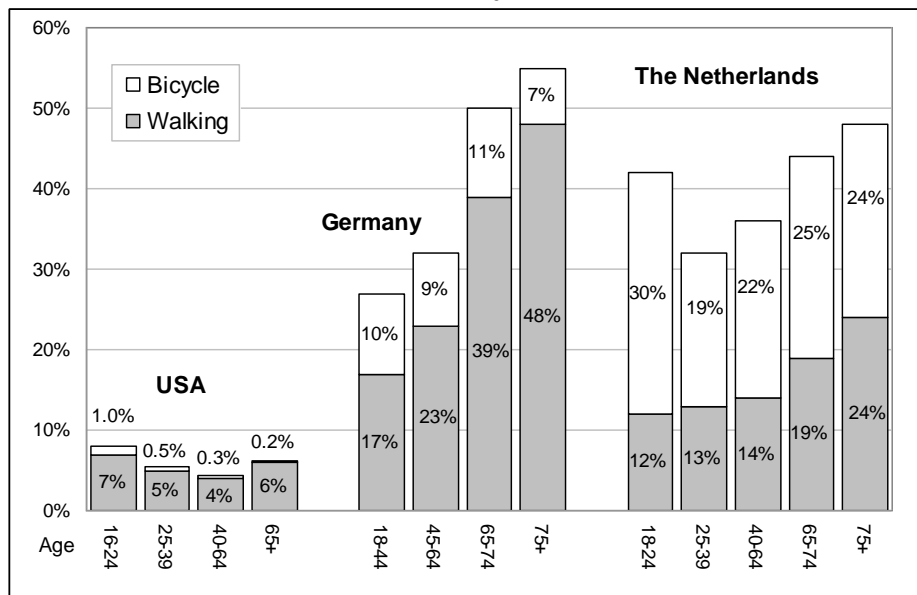
Physical activity promotion through active transport: priority population groups

The following studies indicate that physical activity through a population level shift towards more active forms of transport has the potential to increase physical activity levels among population groups in Australia that are less likely to be adequately active; namely, older adults, women, adolescent girls and disadvantaged population groups.

Older adults:

In countries with high rates of active transport, older adults undertake a high proportion of walking and cycling trips. Comparable Australian data are unavailable, but rates are likely to be similar to those in the USA.

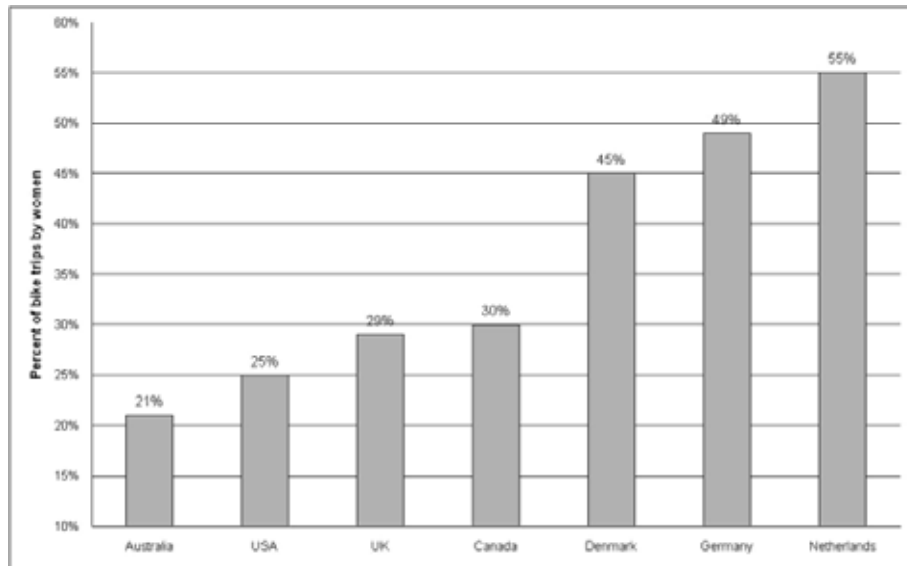
Walking and Bicycling Shares of Urban Travel by Age Group in the USA, Germany and The Netherlands, 1995 (Pucher and Dijkstra 2003)



Women:

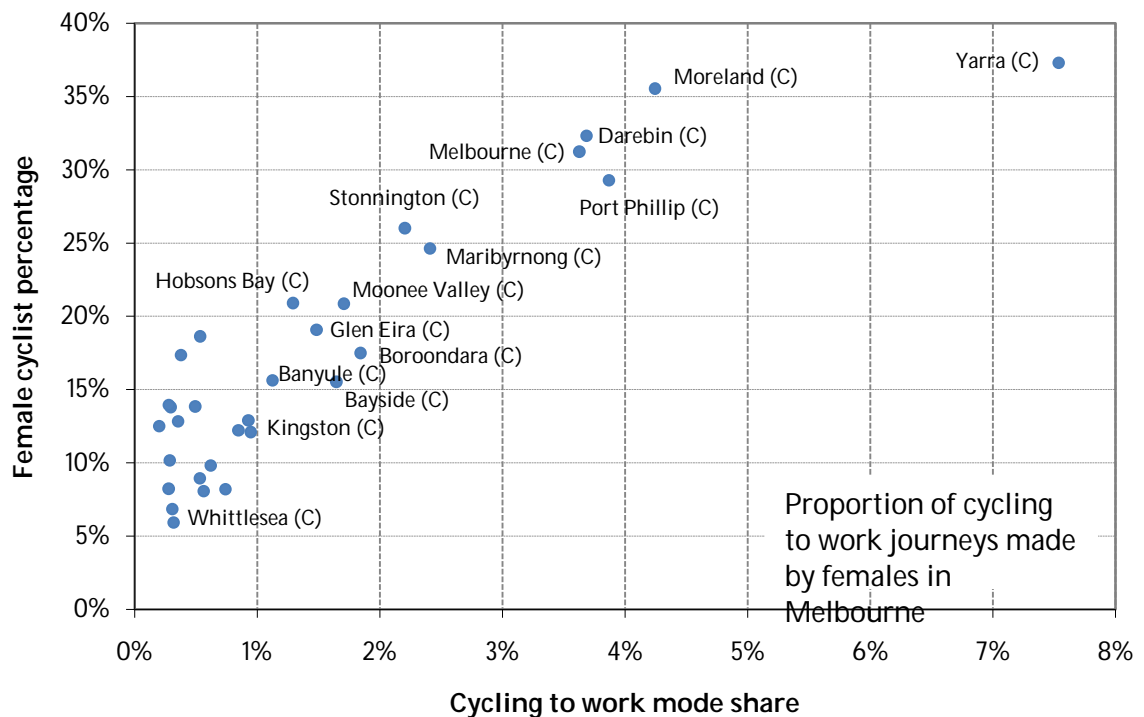
There is a positive relationship between mode share of cycling for transport and female participation in cycling for transport. In countries with high rates of active transport (eg the Netherlands, Germany and Denmark), women are more likely to cycle for transport.

Percentage of bicycle trips undertaken by women (Pucher and Buehler 2008)



Sources: German Federal Ministry of Transport (2003); U.S. Department of Transportation (2003); Danish Ministry of Transport (2005); Statistics Netherlands (2005); Australian Bureau of Statistics (2007); Department for Transport (2007) and information provided directly by bike planners in Canadian provinces and cities

This relationship also holds for Local Government Areas in the Melbourne metropolitan area (analysis conducted and graphic provided by Cameron Munro, based on 2006 ABS census data for journey to work)



Adolescent girls:

In a large UK study, Year 10 females were 6.45 times more likely to meet recommended levels of physical activity if they actively commute to school.

Smith A, McKenna J, Duncan R, Jonathan L (2008). The impact of additional weekdays of active commuting to school on children achieving a criterion of 300+ minutes of moderate-to-vigorous physical activity. Paper presented at AAESS Conference.

Disadvantaged population groups:

The social gradient for leisure-time physical activity is not apparent in active commuting in diverse population groups in USA.

Berrigan D., Troiano R.P., McNeel T., Disogra C., Ballard-Barbash R (2006). Active transportation increases adherence to activity recommendations, *American Journal of Preventive Medicine*, Vol. 31, No. 3, p. 210 - 216.

Obesity and active transport:

There is an inverse relationship between obesity prevalence and active transport mode share.

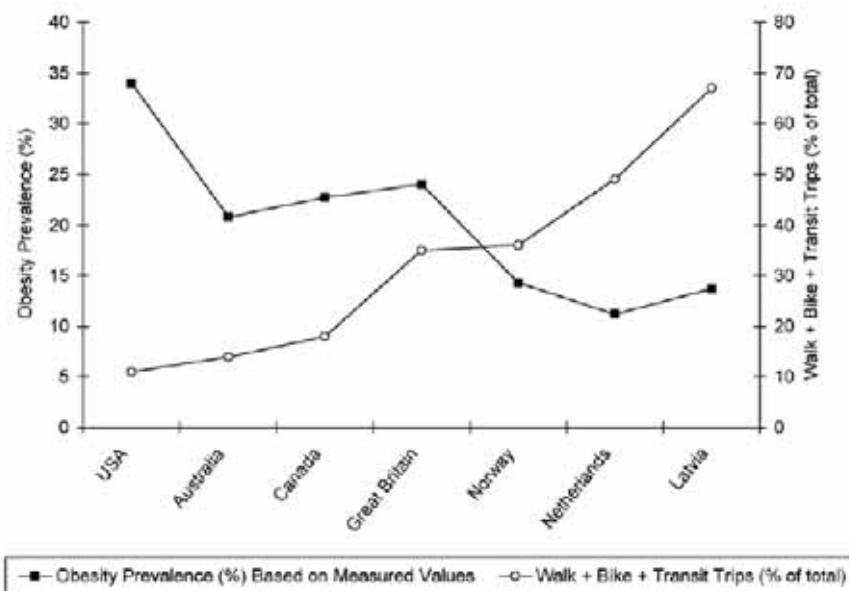


Figure 3 — Obesity ($\text{BMI} \geq 30 \text{ kg} \cdot \text{m}^{-2}$) prevalence and rates of active transportation (defined as the combined percentage of trips taken by walking, bicycling, and public transit) in countries of Europe, North America, and Australia. BMI was computed from measured height and weight. Data were obtained from national surveys of travel behavior and health indicators conducted between 1997 and 2006 (see text for details).

Bassett, D, Pucher J, Buehler R., Thompson D. L., and Crouter S. E. (2008). Walking, Cycling, and Obesity Rates in Europe, North America, and Australia. *Journal of Physical Activity and Health*, 2008, 5, 795-814.

Appendix C

Summary of the health benefits of active transport (Source: Garrard 2008)

1 Investing in better health

Better health is an important goal for individuals and a key priority for government. Investing in the health of Victorians is costly. The Victorian Health and Aged Care budget has almost doubled in the last eight years, increasing from \$5.1b in 1999-00 to \$9.7b in 2007-08 – the majority of which is spent on acute health services (Department of Human Services 2008). Despite rapidly increasing levels of health care spending, Commonwealth and State governments struggle to meet the health needs of all Australians in a timely and equitable manner.

Prevention of high-prevalence chronic diseases is emerging as a key component of health policy in Australia and Victoria (Department of Premier and Cabinet 2008). A major input into policies aimed at improving population health in Victoria is the Victorian Burden of Disease study (Department of Human Services 2005). This study measures the gap between current health status and an ideal situation in which everyone lives into old age free of disease and disability. It therefore identifies areas in which additional health gains can be made.

Cardiovascular disease is responsible for 29 per cent overall of the years of life lost (YLL) as a result of premature mortality, second only to cancer (34 per cent) (DHS 2005). The risk factors contributing most to the total disability adjusted life years (DALYs) are tobacco smoking, obesity, hypertension, high blood cholesterol and physical inactivity. Much of the death, disability and illness caused by cardiovascular disease is preventable through better diet, not smoking, and engaging in regular exercise (Australian Institute of Health and Welfare 2008). Given the interactions between physical activity and the other four leading risk factors for ill health (tobacco use, obesity, hypertension, and high blood cholesterol), increasing activity levels is one of the most important things we can do to improve our health and wellbeing (Morris 1994).

2 Improving health by promoting physical activity

In addition to its role in the prevention of cardiovascular disease, physical activity has multiple benefits including reduced risk of breast cancer and colon cancer, reduced type 2 diabetes risk, improved mental health, improved cognitive functioning, and reduced risk of osteoporosis and falls in the elderly (WHO 2002). Social health benefits include community engagement, social connectedness, and maintaining functional status and social engagement among older adults (Bauman 2004). Based on these wide-ranging benefits, the promotion of moderate intensity

physical activity has been described as today's 'best buy in public health' (Morris 1994).

The recommended levels of physical activity to maintain good health are not onerous - an accumulation of 30 minutes of moderate-intensity physical activity on at least five days a week - but approximately half of Australian adults do not achieve these recommended levels of physical activity (AIHW 2008).

Public awareness of the importance of physical activity for good health is high, but participation is constrained by a number of barriers. Lack of time is consistently reported as a major constraint on achieving adequate levels of physical activity (Trost et al 2002). Incidental activity through active transport provides an opportunity for incorporating physical activity into the routine of everyday living (World Health Organisation 2006; National Public Health Partnership 2001). 'Lifestyle' interventions such as these have been shown to be more cost-effective than structured exercise programs (Sevick et al 2000).

The main sources of health-enhancing physical activities encompass normal and simple activities such as walking, cycling...' (WHO, 2006, p.4)

3 Health benefits of active transport

Walking and cycling for transport enable individuals to achieve recommended levels of physical activity in terms of intensity, duration and frequency. Commuter cycling provides similar improvements in physical performance (VO_2 max) as specific training programs (Hendriksen et al 2000) and walking or cycling to work has a favourable effect on body fat markers and body mass gain (Wagner et al 2001). Rail transit riders in New Jersey, USA, are twice as likely to meet physical activity guidelines as the overall New Jersey population (Pucher 2004).

In Australia, the economic benefit of commuter cycling is estimated at \$144.3 million per year (including \$72.1 million in reduced health costs), based on current (relatively low) levels of bicycle commuting. Substantial increases in these benefits will flow from future growth in cycling participation (Bauman et al 2008).

The health benefits of active transport occur in the absence of, but also in addition to, occupational and leisure-time physical activity. Accordingly, daily walking or cycling to and from work has been associated with decreased risk of coronary heart disease, after controlling for occupational and leisure-time physical activity (Hu et al 2007). Cycling to work was found to reduce all-cause mortality by 40% in a random sample of Danish women ($n = 13,375$) and men ($n = 17,265$), after adjusting for leisure-time physical activity (Andersen et al 2000). For adults with diabetes, walking more than two hours a week was associated with 39% lower all-cause mortality and 34% lower CVD mortality (Gregg et al 2003). These health improvements also provide cost savings. In an economic analysis of moderate-intensity physical activity

for adults with diabetes, a 3-mile daily walk resulted in cost savings (including health and social costs) of \$1,000 per person per year (Di Loreto et al 2005).

Australia has one of the highest rates of obesity in the world, with 62% of Australian men and 45% of Australian women overweight or obese (ABS 2008). Evidence is emerging that car dependency is a contributing factor to increasing obesity rates. In a comparative analysis of walking, cycling, and obesity rates in Europe, North America and Australia, Bassett et al (2008) reported that countries with the highest levels of active transportation generally had the lowest obesity rates. In the US, the number of calories burned per capita per day by walking and cycling, is between one-fifth and one-third of that of a number of European countries (Pucher 2006). 'Time in the car' studies provide supportive evidence of the relationship between sedentary travel and obesity; with Wen et al (2006) reporting an association between driving to work and being overweight or obese.

Students who walk or cycle to school are more likely to meet recommended physical activity guidelines. In a large UK study of students' levels of physical activity and modes of travel to school, teenage girls (a relatively inactive population group) who walked or cycled to school were six times more likely to meet physical activity guidelines than girls who used sedentary travel modes (Smith et al 2008).

While there are also some health risks associated with cycling, a study in the United Kingdom found that, on balance, the benefits in terms of life expectancy of choosing to cycle were 20 times the injury risks (British Medical Association 1992). Similarly, Roberts et al (1996) concluded that, even under current road and traffic conditions in Australia, the health benefits of cycling outweigh the health costs. There is considerable room for further improvements in these benefit/risk ratios. Cross-country comparisons demonstrate that injury and fatality rates decline as cycling prevalence increases (Jacobsen 2003). The industrialised country with one of the highest bicycle mode share of trips (the Netherlands) has one of the lowest rates of road transport deaths in the world (5.0 road transport deaths per 100,000 population, compared with 7.9 for Australia). Not only did *rates* of cycling fatalities decrease markedly from the 1970s, when the Netherlands started to reverse the decline in active transport, but the marked increase in bicycle trips post-1970 was accompanied by a decrease in the *number* of fatalities (Pucher and Buehler 2008). Cycling in London has increased substantially following the introduction in 2003 of a traffic congestion tax, but the pedal cyclist accident rate per cycle kilometre remains substantially below pre-congestion charging levels (Transport for London 2007).

Not only did **rates** of cycling fatalities decrease markedly from the 1970s, when the Netherlands started to reverse the decline in active transport, but the marked increase in bicycle trips post-1970 was accompanied by a decrease in the **number** of fatalities (Pucher and Buehler 2008).

4 Active transport and social inclusion

Active transport contributes to social inclusion because it provides an affordable and convenient form of personal mobility that is accessible to people who do not own or have access to a motor vehicle. Transport costs (principally motor vehicle related) account for a high proportion (16%) of household expenditure on goods and services in Australia – second only to expenditure on food and non-alcoholic beverages (17%), and similar to housing costs (16%) (ABS 2006).

One in 10 households in the Melbourne metropolitan area does not have a motor vehicle, rising to approximately 30 per cent in some disadvantaged western and northern suburbs of Melbourne (Department of Sustainability and Environment nd). Studies in the UK have identified that a high proportion of households without a car experience difficulties visiting family and friends, and accessing employment, shops and health services (Social Exclusion Unit 2003).

Active transport modes incorporate physical activity and comprise modes of transport that lend themselves to participation by a diverse range of population groups. In countries that have developed a culture of active transport and recreation, cycling and walking are inclusive, population-wide activities that include children, seniors, women, ethnically and culturally diverse groups, and disadvantaged population groups (Pucher and Dijkstra 2003; Social Exclusion Unit 2003).

In countries such as Germany, Denmark, the Netherlands and Japan, a high proportion of children cycle to school, women cycle as frequently as men, and, in some cases, the majority of trips taken by seniors (65+ years) are active trips (cycling and walking) (Pucher and Dijkstra 2003). These diverse population groups frequently achieve adequate levels of physical activity 'incidentally', at low cost, without having to find the time and money to participate in organised sports, exercise or fitness programs.

In countries such as Germany, Denmark, the Netherlands and Japan, a high proportion of children cycle to school, women cycle as frequently as men, and, in some cases, the majority of trips taken by seniors (65+ years) are active trips (cycling and walking) (Pucher and Dijkstra 2003).

The provision of supportive environments that encourage people of all ages and capacities to be active in their local communities is integral to increasing physical activity levels, social interaction and community engagement. Motor vehicle traffic, on the other hand, contributes to adverse impacts on health and wellbeing through loss of community amenity and social isolation (Dora and Phillips 2000). The National Heart Foundation's *Healthy by Design* resource has been developed to assist in the design of more liveable communities that encourage people of all ages and

capacities to be active in their neighbourhoods, cities and towns. It recognises that healthy urban planning is about planning for people, and puts the needs of people and communities at the heart of the urban planning process (National Heart Foundation 2004). *Healthy by Design* supports the Victorian Government's Neighbourhood Principles in *Melbourne 2030*.

In addition social isolation, lack of social support and depression are important risk factors for cardiovascular disease. The increased risk contributed by these psychosocial factors is of similar order to the more conventional CHD risk factors such as smoking, dyslipidaemia and hypertension (Bunker et al 2003).

5 Health benefits of active transport – reduced risks associated with motor vehicle use

Motor vehicles are responsible for a wide range of adverse impacts on human health. A modal shift from car travel to active travel reduces these health risks (Litman 2007).

Worldwide, more than 3000 people per day die from road traffic crashes (WHO 2004). In aviation terms, this is equivalent to approximately seven fully laden jumbo jets crashing every day, killing all on board. Globally there are an estimated 50 million road traffic injuries each year with an economic cost of US\$518 billion per year (WHO 2004). Without appropriate action, by 2020, road traffic injuries are predicted to be the third leading contributor to the global burden of disease and injury (WHO 2004).

Worldwide, more than 3000 people per day die from road traffic crashes (WHO 2004). In aviation terms, this is equivalent to approximately seven fully laden jumbo jets crashing every day, killing all on board.

In Victoria in 2007, there were 332 road traffic crash fatalities, and 6177 serious injuries in 2005 (most recent available data) (TAC 2008). These casualties result in substantial health, social, and economic costs. Connelly and Supangan (2006) estimated the costs of road traffic crashes in Victoria to be \$4.1 billion based on 2003 data. Human costs (including medical, long-term care, loss of earnings and quality of life) were \$2.3 billion. The annual cost of road traffic crashes in 2003 in Australia was more than \$17 billion per annum, comprising approximately 2.3% of Gross Domestic Product (GPD). Fear of traffic is a key factor constraining active transport in Victoria (Garrard et al 2006), and is one of the main reasons cited by parents for not permitting their children to walk or cycle to school (Timperio et al 2006).

Health risks of motorised transport also include air pollution, which is said to comprise "the invisible road toll". Fine particles from diesel exhaust contribute to atherosclerosis, with Peters et al (2004) reporting a nearly 3-fold increased risk of

heart attack within an hour of exposure to traffic. The Bureau of Transport and Regional Economics estimated that in the year 2000, motor vehicle-related ambient air pollution accounted for between 900 and 4500 morbidity cases—cardio-vascular and respiratory diseases and bronchitis—and between 900 and 2000 premature deaths in Australia. The economic cost of morbidity ranges from \$0.4 billion to \$1.2 billion, while the economic cost of mortality ranges from \$1.1 billion to \$2.6 billion (Bureau of Transport and Regional Economics 2005).

Motor vehicle related air pollution also affects children. Deficits in growth in lung function in children show a linear relationship with air pollution (Gauderman et al 2004). A study of proximity to engine exhaust emissions in Great Britain and the link with children dying from cancer/leukaemia found maximum effects at short (0.1–0.5 km) effective ranges, tapering to neutral after 3.0 km. Over 24% of child cancers are attributable to these exposures, with roads exerting the major effect (Knox 2006).

Noise pollution associated with motor vehicle traffic also impacts on the health of Victorians. There is emerging evidence of an association between hypertension, heart disease and high levels of noise. Findings from a preliminary study by the WHO suggest that long-term exposure to traffic noise may account for 3 per cent of deaths from ischaemic heart disease in Europe - typically heart attacks (Coghlan 2007).

A social survey to assess the impact of environmental noise on the community was conducted by the Victorian EPA in late 2006. An environmental noise measurement survey was also completed in early 2007, measuring noise levels at 50 sites across the inner, middle and outer suburbs of Melbourne. Transport is the main (and loudest) source of noise pollution in Victoria. Environmental noise impacts on people's lives through annoyance, sleep disturbance, reduced work or school performance, stress and anxiety, reduced enjoyment of home life and other physical health effects. Seventy per cent of people hear traffic noise in their homes and over one million Victorians are annoyed by it. The social survey found that the percentage of people exposed to and annoyed by traffic noise has increased since 1986. The results of the noise measurement survey showed that there are a significant number of locations in metropolitan Melbourne that exceed WHO guidelines for community noise (EPA 2007).

Transport is the main source of noise pollution in Victoria.
Traffic noise is also the loudest noise source.
There are a significant number of locations in metropolitan Melbourne that exceed WHO guidelines for community noise (EPA 2007).

Climate change is arguably one of the biggest challenges facing the world today, with transport emissions comprising a substantial and rapidly increasing component of greenhouse gas emissions. Current (and predicted future) health impacts of climate change include:

- increased heatwave-related deaths;
- increase in malnutrition and consequent disorders, including those relating to child growth and development; and
- increased cardio-respiratory morbidity and mortality associated with ground-level ozone.

(Confalonieri et al 2007)

Transport emissions accounted for 20 per cent of all greenhouse gas emissions in the City of Melbourne in 2005–06 and are predicted to grow by 61 per cent by 2020. Passenger transport (road and rail) accounts for 12 per cent of total emissions (City of Melbourne 2008).

The Fourth Assessment Report of the United Nations Intergovernmental Panel on Climate Change (IPCC) report *Climate Change 2007*, included the following recommended key mitigation factors for the transport sector:

- modal shifts from road transport to rail and public transport systems;
- non-motorised transport (cycling, walking); and
- land-use and transport planning.

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Appendix D: Local, state and federal government support for promoting cycling in Europe

Local, state and federal government support for promoting cycling in Europe

(Source: Pucher and Buehler 2008)

Due to the mostly local, short-distance trips made by bike, policies and programmes to promote safe and convenient cycling are usually carried out at the municipal level (European Conference of the Ministers of Transport, 2004). Planning, constructing and funding bicycling facilities, cycling training, safety and promotional programmes are usually carried out at the local level as well, even if they are mandated and funded by higher levels. At the intermediate level, states, counties and regional governments provide additional policy guidance, coordination and funding, as well as some direct planning and construction of cycling facilities that serve rural areas or provide links between municipalities.

Central government involvement in cycling has been more recent, evolving gradually since about 1980 and providing overall goals, design guidelines, research support, model projects, coordination and funding. The Netherlands, Denmark and Germany all have official National Bicycling Master Plans (Netherlands Ministry of Transport, 1999; Danish Ministry of Transport, 2000; German Federal Ministry of Transport, 2002). Each of these plans sets forth the overall goal of raising levels of cycling for daily travel while improving cycling safety. They also propose various strategies to achieve these dual goals: better design of lanes, paths and intersections; more and better bike parking; coordination with public transport; and cycling safety

Although the Master Plans vary from one country to another, they generally focus on the federal government's role in fostering research, dissemination of best practice information, and funding and evaluation of a wide range of experimental, innovative projects.

Federal governments usually bear the cost of bicycling facilities built along national highways and contribute significantly to financing long-distance bicycling routes that cross state boundaries (European Conference of Ministers of Transport, 2004). In Germany, for example, the federal government contributed over €1.1 billion to doubling the extent of bikeways along federal highways from 1980 to 2000, and is now devoting €100 million per year for further bikeway extensions, cycling research and demonstration projects. In addition, about €2 billion a year in revenues from the motor fuel tax are earmarked for a special urban transport investment fund, which provides 70–85% federal matching funds for state and local governments wanting to build cycling facilities (paths, lanes, bridges, traffic signals, signs, parking, etc.). From 1990 to 2006, the Dutch Central Government contributed an average of €60 million per year to various cycling projects, including €25 million per year specifically for bike parking at train stations. In addition, the Dutch Central Government provides €1.8 billion a year for provinces to spend on transport projects, including cycling facilities. By comparison, the Danish Central Government has no regular funding for cycling projects but since 2000 has contributed about €2 million a year to various demonstration projects.

Pucher and Buehler (2008) concluded that:

“...success in making cycling so appealing is largely attributable to the coordinated implementation of all of these measures, so that they reinforce the impact of each other in promoting cycling. Indeed, that is perhaps the key lesson to be learned: the necessity of a coordinated, multi-faceted approach.”