Public Health
Advisory Committee
Te Rōpū Tohutohu i te Hauora Tūmatanui

re-thinking urban environments and health

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introduction

In its quest to cast new light on an old public health concern, the Public Health Advisory Committee (PHAC) commissioned five 'think-pieces' that collectively provide fresh insight into the links between urban environments and health/wellbeing in contemporary Aotearoa/New Zealand. These commentaries were intended to be provocative and encourage the reader to think 'outside the square' through building on scientific evidence. They also were commissioned to engage with emerging trends that promise to shape future thinking about cities and health. It is the hope of PHAC that this material will provide a springboard for discussion, critical reflection and further research.

Our set of think-pieces begins with an essay on **'Equitable Transit in the Climate Changed Cities of Aotearoa'**. Here, Alex Macmillian and Alistair Woodward draw on the seminal ideas of Ivan Illich to reflect on global warming as the biggest current environmental issue. They argue that increased use of private transport and poor planning of our urban environments signals a warning for all New Zealanders. They argue the car-domination of New Zealand cities has resulted in a grave loss of community connectedness. Solutions offered include vigorous attempts to reduce the monopoly of cars, promoting more walkable environments, and advocacy for collaborative intersectoral urban plans which give voice to otherwise marginalised groups such as Māori and young people.

Next, Philippa Howden-Chapman offers thoughts on **'Restructuring Cities to Reduce Inequalities'**. Her view is that lessons can be learnt from 'old' urban planning ideas in terms of addressing contemporary urban environmental issues. Howden-Chapman provides an historical account of international urban planning philosophies, noting the health inequalities that existed as a result of poor planning. The author shares her thoughts on the causal factors underlying the links between urban environments and health, including climate change and economic disparities. Policies that promote mixed land use and greater population density are seen as informing preferred long-term strategy.

Our third think-piece is written by Brendan Gleeson and Jago Dodson. Titled **'Urban Planning and Public Health: Re-connecting Modernity's Separated Twins?'**, they argue for a renewed partnership between public health and urban planning, given the bare fact that the majority of New Zealanders now live in cities. The call for a reconnection between public health and urban planning is given impetus by the 'waves' of post-war Māori urbanisation and more recent Pacific in-migration facing similar experiences: poor housing, compromised health and frequent household poverty. Gleeson and Dodson see a renewed partnership as vital for policy development and research and, ultimately, to improve urban health.

In the next think-piece, Rau Hoskins explores cultural experiences in **'Cultural Landscapes – Māori and the Urban Environment'**. He argues that for Māori in urban areas, sense of place (or connectedness) has been reshaped and in some cases lost in the face of urban developments. The overlay of new buildings and landscapes has essentially alienated Māori from their 'turangawaewae'. Hoskins argues that maintaining characteristics of traditional habitat is crucial for Māori, and suggests ways that urban design and Māoridom can complement one another. The author contends that a reciprocal relationship between Māori and Tauiwi (Pakeha) can be fostered and maintained but requires a commitment to learning to appreciate the benefits of this reciprocity.

Our last reflection comes from Tony Watkins who argues that **'Sustainability is a Health Issue'**. Watkins compares unrestricted urban growth to a cancerous illness. In other words, the more cities are developed, the worse off people tend to become in terms of health and wellbeing as a result of living in these places. This does not need to be the case. Cities can be healthy and alive. They do not require the 'dis-ease' of more roads, new buildings, and the influence of unimaginative planners. Cities become unhealthy, the author argues, when people are less connected to society at large. Examples from Tokyo city and the Māori worldview are used to illustrate the way forward for urban planning.

We close this collection with two postscripts, intended to offer closing and sympathetic reflections on the foregoing think-pieces by, respectively, Rhys Jones, a public health physician and Michelle Thompson-Fawcett, an urban planner. It is the hope of PHAC that, as a collection, this material will provide a springboard for discussion, critical reflection and further research – in urban planning and public health circles and beyond.

Alex Macmillan and Alistair Woodward

"Mankind ... inevitably sets itself only such tasks as it is able to solve, since closer examination will always show that the problem itself arises only when the material conditions for its solution are already present or at least in the course of formation." (Karl Marx)

We do not underestimate the size of the challenge – resource depletion and global environmental overload coincide with a prevailing model of urban development that substitutes material consumption for social wellbeing. But, as Marx points out, in the recognition of a problem lies the roots of its solution. We begin by examining the purpose of cities, and move to consider a particularly egregious confusion of means and ends: the assumption that accessibility is the same as mobility and, in particular, the equation of connectedness with car ownership. Derived from this discussion are scenarios for the development of the New Zealand city. We argue that the starting point is all-important in deciding on the route to health-promoting urban futures: New Zealand cities will be unique because our history, landscape and resource set is not repeated elsewhere. Nevertheless there are international signposts with wide currency. Global warming is one of a new generation of environmental problems that will affect every aspect of the way humans organise themselves in the 21st century. We take the recommendations of the Intergovernmental Panel on Climate Change and consider how they might be put into effect in building healthy and sustainable local cities.

What are cities for?

Before we can visualise an urban environment that is sustainable in the face of climate change and other global threats, it is useful to briefly contemplate the purpose of cities, as opposed to small town, village, or rural habitats. In the long history of human settlement, cities are a recent arrival. They now dominate, and indeed have been described as 'a distinctive mode of human group life' (Wirth 1938). In 1800 less than 5 percent of the world's population was urban. This has increased to more than 50 percent in the past 200 years. Urbanisation is even more extreme in New Zealand, where more than three-quarters of the population live in urban areas.

Historically, cities have been theorised as both social and economic entities. We suggest that economic explanations are essentially backward-looking – they provide reasons for how cities came to be. The social explanation, in our view, is a more satisfactory answer to forward-looking questions such as, what will cities be for in the future?

Looking back, though, environmental adaptation in food production initially led to tradeable food surpluses. This is how cities began: tradeable food allowed some members of the community to specialise in other skills, and the division of labour and geographic concentration of production led to the economies of scale that were key to embryonic cities. Economies of scale are still central to the mechanics of urban living, and are therefore relevant in a discussion of healthy cities of the future. But the point of cities and why we care about their future is bound up with what the inhabitants do with the economic levers provided by the scale and concentration of activity.

The earliest cities were organised around collaborative thought, and led to early concepts of individual property, the first writing, and the beginnings of commemoration in architecture. Cities can therefore be fundamentally seen as social institutions. As Lewis Mumford summarises:

"The city in its most complete sense, is a geographical plexus, an economic organization, an institutional process, a theatre of social action, and an aesthetic symbol of collective unity ... Without the social drama that comes into existence through the focusing and intensification of group activity there is not a single function performed in the city that could not be performed ... in the open country." (Mumford 1937)

There is something special about the diversity and heterogeneity of social interaction in cities. Ongoing conversations and discussions in this context can lead to a broadening of thought, increasing tolerance and finding novel, consensus-based solutions to social problems. Of course there are downsides to mass interactions, such as the captured audience for political propaganda and mass advertising. But Jane Jacobs, in her 1961 classic *The Death and Life of Great American Cities* (Jacobs 1961), suggested that the key to urban living is found in the emergent social possibilities that arise with concentrated settlement. 'The point of cities' she wrote 'is multiplicity of choice'.

Another effect of bringing many people into constant close social contact was one of informal policing, civilisation and urbanisation (or becoming urbane). An early Greek urban community, or 'polis', such as Athens, provides an exceptional example of the public moderation of behaviour that developed as part of the city's function. The social purposes of the city therefore included more than just collaboration, diversity and theatre – they also included a sense of civic responsibility shared by its citizens (Kitto 1951).

There are two key aspects to cities, we can conclude, that make them uniquely human habitats. The economic advantages are what drive people to live in cities, while the social advantages are what attract people to live in cities. Economic factors provide the means to urban living; the new possibilities for interaction and mutual social enrichment are (some of) the ends. In planning future urban centres, we must attempt to retain these unique urban advantages, while minimising the harms that can accompany them. The machinery that generates and distributes wealth in market-oriented states like New Zealand is set to maintain labour economies. What seem to be more easily lost, and take the conscious efforts of society to maintain, are the social qualities that make cities themselves.

Car cities and climate change

Cities will remain attractive habitats only if they are environmentally sustainable. The sustainability of cities is now in question. The public health revolution of the 19th century was a response to the local environmental threats generated

The amphitheatre illustrates the theatre and drama of life in the Greek polis.

by the growth of early industrial cities. The whole of human settlement now faces the challenges of global environmental damage, exemplified by global climate change.

Climate change provides many challenges to cities. Sea-level rise, for example, will threaten most cities in New Zealand since they were built in a maritime age on the ocean's edge. There will be flow-on effects on the design of buildings, infrastructure planning, disaster preparedness, population flows and patterns of economic activity. But we focus here on the role of cities as greenhouse gas emitters, and in particular on the significance of transport. Transport makes a significant contribution to both global (13.1%) and national (18.4% – mostly from private motor vehicles) carbon emissions. In New Zealand, the rate of increase in greenhouse emissions from transport (arising principally from car and plane use) is greater than for any other sector. Climate change therefore compels us to urgently re-think transport in relation to carbon emissions, but it also provides us with an exciting opportunity to reconsider the place of transport in urban community wellbeing.

Cars are fundamental to traversing long distances at high speed on land. In an urban environment, is this necessary, and do they contribute to achieving the purpose of a city?

We must note that New Zealand cities have made cars necessary. The timing and influences on major urban growth in New Zealand have meant our urban design has

centred on automobile access and single use zoning. This has resulted in low density urban sprawl, with little to characterise walkable city centres. In considering car use in New Zealand cities, we therefore need to acknowledge their positive contribution to wellbeing in the current urban environment, through enabling access to health care, employment, education and food.

However, as well as significant climate change impacts, a reliance on cars has a number of disparate, but increasingly well understood negative effects on urban wellbeing. Comprehensive descriptions of these effects now abound. They include increasing physical inactivity and obesity, significant contributions to poor urban air quality, road traffic injury, social severance and disconnection, and stress. Any actions to change transit patterns in response to climate change will undoubtedly change one or more of these effects.
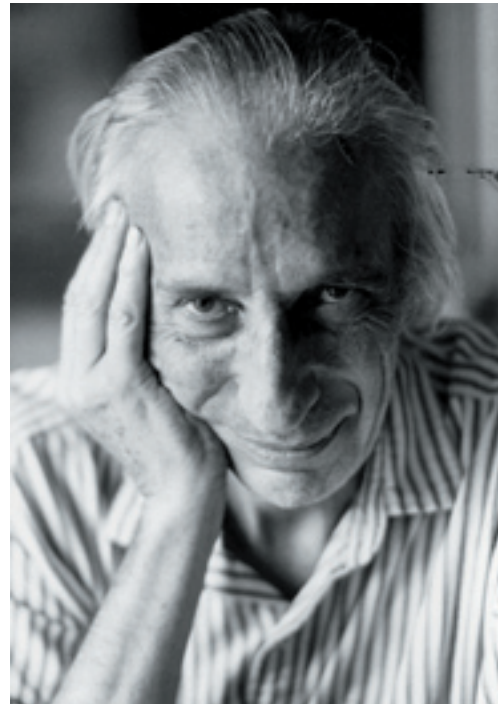
There are also important inequalities created by car use – one person gains transit time by taking another's time away, and the few gain choice (of speed by car) by taking away the transit choices of the many, a loss of Jane Jacobs' multiplicity of choice.

Ivan Illich

Cars are counterproductive to the point of cities in other ways. As Ivan Illich puts it, they 'industrially deform' the city scape (Illich 1979). Illich distinguishes between human movement as traffic, and transport as the prevailing high-speed carbon-driven technology. His argument is that a city dominated by transport is one that alienates and disempowers its inhabitants:

"The habitual passenger cannot grasp the folly of traffic based overwhelmingly on transport. His inherited perceptions of space and time and of personal pace have been industrially deformed. He has lost the power to conceive of himself outside of the passenger role."
(Illich 1979)

We have seen that both environmental and social economies of scale are vital for a well city. Public transport plays its part in achieving these efficiencies. Public transport thrives on crowding by moving more people at lower cost for greater social return than would be achieved by the efforts of

(Photo courtesy of the Illich family)

Ivan Illich

uncoordinated individuals. On the other hand, a city's fleet of private motor cars might be said to add up to the sum of its parts environmentally, since resource use and pollution is a direct function of the number of cars, but brings no social return. Indeed, at higher densities of settlement, the utility of the private car decreases as speeds fall. In this sense, a car-dominated transport system defies the purpose of a city.

In terms of the types of social interaction that are uniquely beneficial in an urban environment, widespread car use has led to a loss of diversity in these interactions, while creating an even more captive audience to advertising (accentuating the negative aspects of the urban social environment). This is manifested by the loss of the informal surveillance role of civilisation ('urbanity') – demonstrated in the extreme by incidents of road rage and aggressive behaviour in cars – behaviour that would be tempered when face to face on a busy footpath. Public spaces, such as footpaths, have become characterised by an absence of people, losing also the effect of informal scrutiny, making them less safe.

Much of the world's transport policy continues to assume a need for the movement of cars. For instance the 2006 European Union Transport Strategy mid-term review states that 'mobility is the quintessential purpose of transport policy'. It should strongly be argued, however, that mobility is not the purpose of transport, and that transport policy must focus on access rather than movement per se. Interestingly, the most recent draft update of the New Zealand Transport Strategy includes a high-level outcome that 'all individuals

have access to the facilities and activities they need' (Ministry of Transport 2007). This could be the start of movement in the right direction, particularly if it was used as the high level vision for the entire strategy.

Looking ahead, we foresee the car city expanded to become the car and plane city. In the short to medium term, it is likely that New Zealand will follow the trends observed in other countries. These include competition in the aviation industry leading to more flights, lower prices, fiercer advertising, more inter-city commuting, and more leisure travel – almost entirely in the high income quartile of the population. How will New Zealand cities respond? Will they feed this growth by building bigger airports with more car parks serviced by broader motorways? Or might a sustainable, health-promoting city of the future resist the trend by insisting the aviation industry meets the full environmental costs of its activities, not only on the ground (airports as traffic generators) but also in the air (for instance, a carbon emission loading on tickets).

The 'new' New Zealand city

"The time engaged in travel must be, as much as possible, the traveller's own: only insofar as motorized transport remains limited to speeds which leave it subsidiary to autonomous transit can a traffic-optimal transportation system be developed."

"The combination of transportation and transit that constitutes traffic has provided us with an example of socially optimal per capita wattage and of the need for politically chosen limits on it." (Illich 1979)

Thirty years prior to the emergence of climate change as the world's most significant public health problem, Illich had pointed out the fundamental necessity of energy equity in a transport context, as well as the idea of a per capita energy 'allowance'. These profound conclusions are reflected in the recommendations made by the Intergovernmental Panel on Climate Change 2007 (IPCC), including the use of emissions permits and trading, and the importance to mitigation and adaptation responses to climate change of between and within country socioeconomic inequalities. The IPCC provides a framework for mitigation technologies and policies as well as associated opportunities and constraints. These can be used as a starting point for considering necessary changes in New Zealand (see Table 1).

Table 1: Key mitigation technologies, policies, constraints and opportunities for the transport sector (adapted from the Intergovernmental Panel on Climate Change 2007).

Key mitigation technologies and practices currently commercially available	Policies, measures and instruments with evidence of environmental effectiveness	Key constraints and opportunities
More fuel efficient vehicles	Mandatory fuel economy Biofuel blending* CO	Partial coverage of vehicle fleet may limit effectiveness
Hybrid vehicles		
Cleaner diesel vehicles	Taxation on:	
Biofuels*	1. Vehicle purchase	Effectiveness may diminish with higher incomes, and have an unequal negative impact on the poor
Modal shifts from road to rail and public transport	2. Vehicle registration	
	3. Fuels	
	4. Road and parking pricing	
Non motorised transit (cycling, walking, skating etc)	Influence mobility needs through:	
Land use and transport planning	1. Land use regulations	Particularly appropriate for countries that are building transport system infrastructure
	2. Infrastructure planning	
	3. Investment in attractive public transport	
	4. Investment in cycling and walking	

*Since this was published there have been significant advancements in our understanding of the usefulness of different kinds of biofuels, and it is likely that conditions should be placed on which biofuels represent an environmental improvement (eg algae-based biofuels as opposed to corn/sugar/potato crop-based).

What is the relevance of the IPCC recommendations to the design and operation of New Zealand cities in the future? We suggest that the most important point is the potential for 'win-win' choices. Amongst the policies and technologies that are listed in Table 1 there are many that could achieve not only a reduction in greenhouse emissions, but also a direct and relatively immediate benefit for health. These possibilities are explored in detail in a series of papers published in *The Lancet* in 2007 on the theme of energy and health. Woodcock et al suggest that transport planning for environmental sustainability and public health focuses on four goals:

1. Trip avoidance strategies;
2. Increasing vehicle efficiency;
3. Shortening trip distances;
4. Increasing active transport (Woodcock et al 2007).

These goals may be met in a variety of ways, from town planning that reduces the need for travel to technology that makes an attractive alternative to the motor car. These are strategies that will determine what kinds of cities our children and grandchildren will inherit. Presently it is estimated that motor vehicle emissions cause about 500 deaths and 670,000 restricted activity days a year in New Zealand (Fisher et al 2007). Much of this mortality and ill health could be avoided by reducing the number and length of trips and improving vehicle efficiency. A serious move to replace short distance trips by private car with active transport could provide significant health benefits in other ways also. It has been estimated in the United States that substituting driving with an hour a day of walking and cycling would reduce national oil consumption by up to 38 percent and would burn 12-25 kg of fat per person per year, sharply reducing the proportion of the population that is overweight and obese (Higgins and Higgins 2005).

Looking forward to creating sustainable cities in Aotearoa, there are things we can learn from international discussions of liveable cities, transport and sustainability. Comparisons between American and European cities highlight the negative effects of sprawl on urban wellbeing (especially via car-focused urban design and obesity), and there are a number of recent urban movements attempting to counteract these effects, including the New Urbanism, Green Urbanism and Smart Growth movements. Green Urbanism, in particular, has been taken up by European policy makers, who have recently taken a more ecosystems approach to cities. Focusing on the benefits that people desire from car use, and examining alternative methods for providing these benefits, and similarly focusing on people's life goals and health as a tool for achieving these, are also part of the Green Urbanism approach. Collaborative involvement between governance, industry, commercial interest, communities, the academy and the media are also highlighted (Beatley 1999). This requires not only collaboration, but a shared language that focuses on wellbeing and what people want out of their lives, rather than on the language of health.

There are also some exciting international examples of how the social purposes of the city can be upheld in imaginative ways. One of these is the Ciclovía in Bogotá, Colombia (Eckerson Jr 2007). Every Sunday and public holiday, the main streets of Bogotá are closed to cars, and cyclists, skaters and pedestrians take over the routes; 30 percent of citizens are reported to participate (2 million people), and the Ciclovía includes more than 120 km of central city road. This has many obvious benefits, from encouraging physical activity, active transport and social interaction, to democratising city streets, decreasing carbon emissions and improving air quality.

The social attractions of cities, as well as their economies of scale, make density an essential, if controversial, urban characteristic. Some differences between healthy and unhealthy density are emerging. For instance, there is a difference in health impacts between internal density (or household crowding) and external density, with housing density being much less important than internal crowding for infectious diseases. There is emerging literature that identifies aspects of neighbourhood associated with density that improve wellbeing, including street connectedness, closeness to attractive destinations, presence of functional green spaces, and mixed use zoning. Aspects of density that can be detrimental to the health of residents include high density developments close to noise or high emissions from diesel trains or arterial roads; and poorly constructed, poorly maintained housing that becomes a way of zoning areas of poverty, forming ghettoes that systematise hopelessness. However, we hold the view that increasing the density of New Zealand cities will be a necessary step on the path to sustainability. How this is achieved to maximise the benefits of density will be critical to New Zealand cities, and there are widely varying role models in our Asian neighbours, and further afield in old European cities.

School and workplace travel planning (for instance through a Walking School Bus) has been shown to decrease car trips through a range of incentive and disincentive measures, by as much as 20 percent (Cairns et al 2004). However, current moves to make urban design and urban transport sustainable through organisational travel plans are likely to work better for men than women. It remains largely the role of women to perform the multi-purpose travel that includes work, shopping, childcare/schooling, elder care, and transporting children to social and physical activities. Dolores Haydon has long advocated for the 'non-sexist' city

(Hayden 1980). Her arguments may have added resonance in today's context. Some transition between public and private space and amenities can be envisioned that would allow for a successfully sustainable non-gendered city. This might include greater residential density with shared, safe green space and play areas as well as onsite community child and elder care. Shared community tasks could also be accommodated, including healthy ways of feeding families at low cost. Examples include communal gardening and communal cooking responsibilities. With recent changes to work and family life in cities, time poverty has become a major issue for urban families. In particular, time pressures are significant for mothers. In Australia, total time demands on fulltime employed parents is 14 hours per day for mothers and 12 hours per day for fathers; however, there is a greater discrepancy in leisure time – eight hours per week for fathers, and two hours for mothers (Strazdins and Loughrey 2008). It is clear then that initiatives to make transit sustainable must make the time dimension explicit, and highlight possible double dividends in time savings, for instance where time for transit can also be time for health in the form of physical activity.

International discussions provide helpful reference points for considering decisions about the future. However, New Zealand's existing urban foundation provides a fundamental reference point. There are a number of unique characteristics of New Zealand's cities, creating constraints and opportunities that differ from those that are found in American and European urban centres.

Māori views of health, kaitiakitanga and kawa are of primary importance, and these need to be protected in our urban landscapes. Closely related to this, cities should be designed around New Zealand's unique flora and fauna. This means more than merely maintaining what is already present with development – rather actively enhancing urban native biodiversity. The sea is central to almost all New Zealand cities, and equitable access to the foreshore will also be about enhancement of landscapes in future planning. Enhancing the natural habitat fits well with the IPCC's advice on adaptation. Greening the urban landscape will reduce the impact of extreme heat events and slow runoff from heavy rains and storms (both of which are projected to increase in New Zealand in the second half of this century). New Zealand cities currently have unusually low residential density. There is an abundance of potential green space which is mostly in private ownership. Parts of this could be amalgamated to form shared green space in the advent of a well-governed increase in density.

Our cities are young and have been designed for cars. There is therefore a possibility that encouraging organisational travel

Maumahara mo Waiparuru - "Remembering Ancient Pathways" by Caroline Robinson, situated in Grafton Gully. Photo courtesy Transit New Zealand.

plans in New Zealand's current urban environment amounts to the potential martyrdom of cyclists and children. Exposure to injury in the current transport milieu is an unacceptable risk to vulnerable road users. We would argue that the necessary environmental and infrastructural changes should be implemented to make non-car commuting for adults viable, attractive and safe, prior to encouraging our children to walk and cycle to school. Unless other steps are taken, reductions in car use are likely to have a rebound effect, firstly increasing the average speed of the remaining cars, and then attracting more cars. Since a reduction in speed is vital for the safety of vulnerable road users, the only solution to this is reduction in car use coupled with removal of road space from car users and enforced reductions in speed limits. This could mean the democratisation of roads for bicycle and pedestrian use, or removal of some roads altogether. This last option has been successful in the remodelling of Queensway (the inner ring road) in Birmingham, where flyovers have been demolished and redesigned as pedestrian spaces and links (English Partnerships and Housing Corporation 2000).

As well as young cities, we have substantial youth populations, who are often framed as a 'problem' to urban wellbeing. The place of youth in 'adult' public space becomes even more important when the youth of Aotearoa are often marginalised on the basis of ethnicity, culture and economic standing. Listening to the voice and needs of youth in the future development of urban public space may be vital to urban sustainability, particularly considering their future roles as citizens and guardians.

New Zealand's cities manifest social and wellbeing inequalities. Furthermore, addressing these inequalities is central to our system of governance and the Treaty of Waitangi. There are times when sustainability and reducing inequalities come into conflict and this limits the ability of economic instruments to address issues of sustainability.

The latest update of the New Zealand Transport Strategy highlights this, noting the likely impact on rural Northland communities of increasing transit costs through central mechanisms to improve sustainability (including increasing fuel taxation, more stringent vehicle standards and road or congestion pricing). These mechanisms create revenue, which could be hypothecated in a detailed manner to target the inequalities created by them. This has been suggested for fuel taxation, but not yet made explicit or specific enough. Greater short to medium term subsidies for public transport, and investment in walking and cycling infrastructure would have significant long-term financial and health benefits for those who are likely to be vulnerable to these inequalities.

Aotearoa's relatively small population also creates both opportunities and constraints. Low urban densities are partly a result of a sparse overall population, and make the provision of economically efficient public transport difficult. However, this same scarcity means that utilising renewable energy sources for our energy needs is easier to achieve than for many other countries. Electrification of private vehicles is therefore one technological advance that for New Zealand may not mean simply shifting the problem of carbon emissions to another source.

New Zealand's topography may also be favourable for biofuels. Cropping on marginal, erosion-prone land, without recourse to nitrogen fertilisers, provides potential for alternatives to fossil fuels at low aggregate environmental cost (Scharlemann and Laurance 2008). In addition, New Zealand is a site of biofuel innovation, with new, more sustainable biofuel options being developed, particularly in the area of wastewater algae (Clark 2006). These options have a potential double dividend – improving both human wellbeing and environmental quality.

Conclusions

Cities have a distinct social as well as economic function that distinguishes them from other human habitats. This is a starting point for considering their ongoing viability in the face of widespread environmental changes, in particular climate change. In responding to climate change, and other ecological threats, it is appropriate to focus specifically on cities. They are both the dominant human habitat, and national and international economic hubs.

Urban transport is a major contributor to city life and to climate change. Cars, in particular, are a barrier to the fundamental functions of the city, as well as to urban sustainability and wellbeing in an urban setting. The recommendations of the IPCC have given us a fra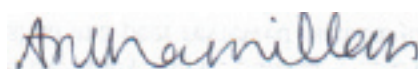mework for making urban transport more sustainable. In addition, we have argued that there are many win-win situations for urban wellbeing within these strategies, including improving physical activity, air quality, injury and social connection. However, there remain significant constraints in New Zealand's urban foundations.

The uniqueness of New Zealand's cities means we must take extra notice and care of several key matters in our urban planning. We have argued that density is important to the social, economic and environmental functioning of cities, but how that density is achieved to enhance wellbeing continues to be debated. Feminist writers have provided some pertinent direction regarding shared urban spaces, including the importance of shared green spaces and accessible shared care.
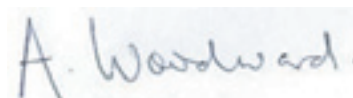
A further particular threat to urban wellbeing in Aotearoa is the likelihood of exacerbating existing inequalities or creating new ones. The mitigation of socioeconomic, ethnic and gender inequalities will need to be an explicitly discussed and fundamental part of urban design and transport strategies to avoid this threat. This is likely to require the consideration of time costs in environmental policies, the location of infrastructure required for caring for dependents, policy mechanisms that are targeted at low income households and direction of tax revenue subsidies that limit inequalities. There will be considerable pressures on containing urban growth, and the maintenance of urban limits will contribute to desirable density outcomes as well as accessibility of natural landscapes.

To link urban wellbeing, health inequalities and transport policy, collaborative intersectoral planning is needed. The new urbanism, Green Urbanism, and ecosystem health literatures draw similar conclusions about sharing a common language between sectors that focuses not just on health, but on what people want from their lives, including notions of wellbeing, fulfilment and happiness.

It is vital to work across the whole of urban governance to abolish the monopoly of cars over everyday city life. Car use will continue to be necessary for some purposes, and it is here that technological advancements in efficiency can assist towards sustainability.

Alex Macmillan

Alistair Woodward

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Philippa Howden-Chapman

Aotearoa/New Zealand is one of the most urbanised countries in the world (OECD 2006). In the 2006 Census, 87 percent of us lived in urban areas. Cities are highly complex systems, so any analysis that just focuses on one aspect of a city runs the risk of overly simplifying the issues and any policy response. The determinants of our health operate at multiple levels (Freudenberg et al 2006).

In this short 'think-piece' on aspects of urban health and wellbeing, commissioned by the Public Health Advisory Committee, I have chosen to concentrate on the underlying inequalities in urban economic and social structures and the policy links between them, rather than to describe the structures singularly, or document the well-established health inequalities they lead to.

Fundamentally, it is the underlying inequalities in economic and social structures that determine people's access to the resources and social connections needed to do well in society. Substantial stratification of economic and social opportunities allows the persistence of inequitable distribution of basic goods such as education, employment, housing and health care. The stratification caused by these social structures defines people's social and economic positions, which in turn create persistent health inequalities. Put the other way around, the inequalities in people's health are intimately and inextricably connected to their material and social circumstances. Looked at from either direction, to more fully understand and reduce health inequalities, we need to understand and reduce social inequalities (Graham 2007).

A second point is that interventions to address inequalities are difficult to implement. Given scarce opportunities, interventions have to be triaged. Among the more effective ways to intervene may be to find measures to both address inequalities with multiple impacts, and at the same time ensure that those measures yield benefits in other important political domains, such as energy or environmental sustainability.

Understanding the fundamental links between urban economic and social structures is crucial, because reinforcing or changing these structures is the most powerful strategy to affect people's social position and their health. This viewpoint does not diminish individual effort or agency, but merely highlights the relatively greater power of collective action, whether it is expressed through civil society or is market-mediated.

To illustrate these points, I will discuss an historical example and some contemporary examples to emphasise the importance of the interaction of enduring societal structures on social position and health.

What can we learn from the 'Old Public Health'?

Changing living conditions in cities creates new patterns of health and disease. The rapid rise of the first industrial cities in Britain and the United States highlighted the economic forces that created them and the responses that eventually brought improvements (Hamlin 1998).

People were driven to and from the great industrial cities of Scotland, England and the United States, by land confiscation, famine, poverty and forced migration (Szreter 1997). Those with no wealth, no education and few employment skills had little choice about where and how they lived and what work they did. Those without social connections to those with power took what they could get. Their living conditions were sub-standard, their housing was crowded, their food was inadequate and their work, if they could get it, was dangerous, dirty and unrelenting. Life expectancy in the nineteenth century remained at about 40 years for males and mirrors the conditions faced by many modern day slum dwellers (Sheuya et al 2007).

While Victorian novelists created vivid and consistent pictures of the paths to and from poverty (Howden-Chapman and Kawachi 2006), what eventually led to improvements in health and life expectancy has been fiercely contested. At the time, Engels theorised that it was the class structure that favoured the capitalists over the workers that created and maintained the appalling social conditions and he carried out the empirical work to back up his propositions (Engels 1969). In more recent times, McKeown has reopened the debate with a salvo against medicine's contribution to improved life expectancy and concluded instead that better food distribution towards the end of the nineteenth century boosted people's immunity to disease (McKeown 1979). Certainly, Fogel (2004) has shown, using historical records, that hunger and malnourishment was widespread in British and European cities and increased people's vulnerability to devastating infectious diseases, such as cholera, typhoid and typhuus. Others like Szreter (2002) and Rice (1991) have pointed out that it was the public health movement, led by doctors and engineers, that provided clean water flowing separately from sewerage that reduced the toll of communicable diseases. Troesken (2004) convincingly argues, on the basis of strong empirical data, that it was the public provision of water and sewage systems in American cities that effected dramatic improvement in health conditions of African Americans. This was during an era when residential segregation was low by modern American standards, but African Americans were largely denied access to political influence and suffered extreme discrimination in other public services.

Nonetheless, Tesh (1988) has argued that because improvements in urban infrastructure did not change the underlying power relations in cities, the 'old public health' is an inadequate model for reducing inequalities in modern urban infrastructure, because it failed to tackle the fundamental causes.

The lesson from these different viewpoints of historical causes and cures of urban health problems that I draw is that the most effective public health measures – the provision of clean water, effective sewage systems, safe healthy housing, available fresh food, accessible recreational amenities – are those that treat the city (and many would argue now that the *suburbs* should *not* be seen as a separate system) as an inter-connected system. The measures are city-wide standards, not targeted either to privilege or disadvantage. Just as urban infrastructure should be viewed systemically, it requires the inter-connected efforts of national, regional and local politicians working with public health professionals, urban planners (Corburn 2004), non-government organisations (NGOs) and neighbourhood groups to maintain and enhance urban infrastructure.

Finally, while this example has discussed the social and economic precursors of communicable diseases, the same argument can be made for the historical placement of city amenities, such as parks, schools, libraries, art galleries and public toilets. These amenities help to determine the desirability and differential accessibility of attractive public areas, which have been shown to have a significant impact on the amount of 'active journeys' – walking and cycling – that people make (Ellaway et al 2005). This regular exercise helps to keep them fit and lean and less prone to non-communicable diseases.

What happens if city structures are run down?

My second example explores what happens when we forget the lessons of urban history, by looking at the institutional antecedents of several public health 'accidents':

Smog over the Hutt Valley

the unexpected resurgence of infectious diseases and the foreseeable impacts of climate change.

Air travel ties cities together, which often makes it easier to get to a city in another country than to the remote rural regions within the same country (Brown 1993). Most world travellers enter the country through airports and ports, so people who live in cities are vulnerable to new diseases and the emergence of old ones. If there are cost barriers preventing new immigrants from accessing decent housing, social and health services, infectious diseases can spread very quickly, as the recent epidemics of AIDS and SARS have shown (Wallace 1993). The resurgence of tuberculosis in New York and other cities in the 1980s was related not only to the de-institutionalisation of psychiatric hospitals with inadequate follow-up community care, but to the establishment of crowded, poorly ventilated homeless shelters and jails and inadequate public health services (Wallace 1990; Wallace and Wallace 1997; Brudney and Dobkin 1991).

Recent reviews of the rise of tuberculosis in New Zealand (Baker et al in press) and Europe have shown that crowded housing and prisons do increase the risk of tuberculosis transmission. Migrants, refugees and ethnic minorities are more at risk of being discriminated against in private rental housing (Harris et al 2006), which all too often means they are forced to 'double-up' in over-crowded houses. Investment in adequate social housing by governments allows people to be fairly allocated to affordable housing on the basis of social and economic need, which is not a consideration in the private rental market. Tenants in social housing in New Zealand are living in less crowded conditions than in the private rental market and these better conditions reduce avoidable hospitalisations (Baker et al 2006).

The need for adequate, affordable urban housing is predictable, but those who benefit from social housing are often vulnerable in other aspects of their lives. Neo-liberal policies, which favour lower taxes and reduce the role of governments to the 'night watchmen', or as Freudenberg (2006) describes them, the paramilitary services (the police and army), assume that privatised services or civil society will be adequate for dealing with welfare needs and civil emergencies. Downsizing state functions is a hallmark of many conservative governments. Two examples from the USA graphically illustrate the potential consequences in cities for vulnerable people and those on low incomes, when the state is 'hollowed out.'

Klineberg carried out a social autopsy of the more than 700 heat-related deaths during the Chicago heat wave in 1995 (Klinenberg 2002). He describes how long-term changes

in government affected the city's capacity to respond to the heat wave. Key municipal officials, journalists and other opinion makers had come to believe that community organisations and families rather than city agencies should take the lead in protecting vulnerable individuals. According to this viewpoint, people in need should be active consumers of often-privatised social services, able to find what they need in times of crisis. But, the impossibility of individuals with few economic resources dealing with over-whelming emergencies in cities was again demonstrated with the aftermath of the flooding in New Orleans (Dewan et al 2006).

Sadly, the heat wave response story was repeated in France in 2003 and 2005, when it was estimated that 80,000 people died prematurely. Most of these people were city dwellers, whose families were away on holiday and were unable to access over-stretched emergency services before it was too late (Hales and Woodward 2006; Hales et al 2007).

These examples carry significant implications for the impact of climate change on global cities. One of the inevitable impacts of climate change is the extremes of weather and temperatures, with the frequency of weather extremes rising non-linearly with temperature. It is the very young and old, the sick and the poor, who cannot access the resources they need in order to avoid serious health effects or even death in such circumstances. Publicly organised, well-funded emergency services are thus essential.

My final example is linked by a focus on New Zealand housing and transport affordability.

How are housing and transport affordability linked?

Housing policy is an important, but often neglected, aspect of any government's policy toolkit (Maclennan 2007). Housing policy can affect not only the type of houses that people live in, but also where they live; both house type and place can affect people's health; and where they live can influence environmental outcomes such as air and greenhouse gas emission patterns, feeding back to affect both people's health and the economy over time. As houses are usually a family's largest private asset, housing in New Zealand has predominantly been seen as the preserve of the private market. The exception is state housing, or as it has been renamed, social housing, which though catering for only 'residual' households in New Zealand (Baker et al 2006), is a key aspect of the government's redistributive policies.

While European governments were rebuilding the inner city housing that had been destroyed by wartime bombing, with up to 40 percent in countries like Netherlands being social housing (Gruis et al 2006), in New Zealand, as in other Allied countries, state advances and transportation policies encouraged many middle-class people into home-ownership in the suburbs, away from the cities and rural areas, where people had previously lived. Housing loans and low-cost mortgages for returned servicemen, greater government subsidies for motorway extensions rather than public transport, all encouraged people to live in the suburbs and commute to jobs in the cities (Frumkin et al 2004).

In New Zealand in the 1950s and 60s, state houses were built in green-field sites, so that working class people also moved to the suburbs (Schrader 2005). But unlike the early state house areas, the areas developed later – for example East Porirua with its 'lollypop' layout designed for the car – were not located along public transport routes, had few amenities and were relatively residentially segregated. Indeed, the residents were often deliberately socially excluded, isolated from more prosperous areas, and cut off from key amenities by arterial roads that lacked infrastructure and facilities for cyclists and walkers. Tunnels under motorways are generally not considered desirable routes that encourage access to amenities (Frank and Engelke in press; Newman et al 2005).

The concepts of connectivity and accessibility have been useful in describing transport patterns and the ease of getting around. Connectivity between areas is determined by the layout of the streets and the provision of infrastructure for alternative modes of transport, eg trains, cycle-ways and walkways. Accessibility and walkability are measured as the average distance between houses and the places where people want to go – school, work, parks, shops etc. The less the distance, the greater the accessibility; the easier it is to walk, the greater the walkability (Frumkin et al 2004). Indeed, Lester Brown reflected that the ratio of parks to parking lots may be the best single indicator of the liveability of a city – an indication of whether the city is designed for people or for cars (Brown 1993). He contends that what societies should be striving for is not parking subsidies, but parking taxes that begin to reflect the cost to communities of cars – congestion, air pollution, road traffic injuries.

Studies have shown that people who live in suburban communities have higher transport costs than those who live in more compactly developed urban areas (Asian Planning Schools Association 2005). People who live in suburban areas are more likely to depend on cars than people in urban areas and their cars are more likely to increase

Bicycle racks outside a train station in Leiden, The Netherlands

both traffic congestion and air pollution, while diminishing a neighbourhood's accessibility (Witten et al 2005). These 'transaction costs' are predictable. The layout of suburban areas is designated by government policy and planned by regional planners and private developers (Shiftan et al 2003), and enhancing green space is all too often an afterthought (Office of the Deputy Prime Minister 2006).

The development of green-field sites can lead to large profits if developers are unconstrained in terms of how they can capitalise on increased amenity and shift the cost of infrastructure provision (eg roads) back to the public purse, and if, as with Auckland Regional Council at present, they are allowed to exclude any social housing. Following the British model, the Affordable Housing: Enabling Territorial Authorities Bill is proposing that councils *must* consider the level of affordable housing and then have the ability to require some affordable housing to be built in new developments, or to require developers to contribute money or land towards affordable housing being built elsewhere.

Land use policies that promote mixed (land) use and greater population density have been shown to encourage greater use of public transport and active travel modes (walking and cycling), which reduce individuals' weight gain (Frank et al 2004). The Brookings Institution has recently highlighted the strong link between housing and transport affordability, demonstrating that relatively cheap housing is not cheap if it means incurring expensive transport costs, which is often the case with dispersed suburban land use (Center for Transit-Oriented Development and Center for Neighborhood Technology 2006). Although purchasing and maintaining a car can be expensive, the variable costs of each trip are very low and crucially usually lower than the cost of a bus or train ticket (Litman 1999). Indeed because insurance, registration, tax and lease fees are often fixed, there is a

perverse incentive for owners and drivers to maximise their mileage in order to get the greatest return on their vehicle investment.

Traditional development strategies are targeted to meet the needs of those with more economic clout, who know how to effectively influence the political and planning processes (Bostock 2001). Transport planning, like the Auckland ring road and the Wellington 'By-Pass', are often focused on the perceived needs of rush-hour motorists from the suburbs. Continued investment in new motorways undervalues active transport modes and, moreover, marginalises the transport needs of low-income groups, as well as ignoring the contribution of transport emissions to climate change (Ministry of Economic Development 2007). For example, low-income people living in Porirua, who need to make emergency visits, or even outpatient appointments, to the tertiary hospital in Wellington for dialysis for chronic illnesses such as diabetes, have to make longer trips to reach their destinations. With lower rates of car-ownership in socioeconomically deprived areas, families are often forced to rely on taxis, often costly in proportion to their incomes. The longer travel distances, and the need to change modes of transport during the journey if they are going by public transport, mean they are left with less disposable income (Tiatia ongoing).

Only older people and school children are usually offered concessionary fares; these are not usually offered for other low-income groups. Indeed, private vehicle use is encouraged by several economic incentives (Shiftan et al 2003). This is in large part because governments often distort the costs of running a car, by more heavily subsidising motorways than public transport. Commuters do not pay the full costs of car parking, which is either free or heavily subsidised (Litman 1999). Commuters do not have to pay the negative externalities of injuries, air pollution (Fisher et al 2007), and congestion. Though demonstrably effective in London, Stockholm (Eliasson and Mattsson 2006), Trondheim and Singapore, congestion charging has not been introduced into New Zealand (Brown 1993).

While New Zealand has been slow to change its approach to land transport and urban planning, there are significant changes now being considered, particularly at the national level in the form of the Land Transport Strategy Update (Ministry of Transport 2007). Both national and regional strategies can shift the weight of future land transport investment, and make significant and multiple regulatory changes, in the wider public interest, recognising the importance of the issues discussed in this paper, particularly health and environmental outcomes, through means such as more strongly encouraging active modes of transport.

Conclusion

The examples in this paper serve to illustrate that the structural determinants of health operate at multiple levels to shape the social position and thus the health of urban populations. They also underline the importance of seeing cities as complex social, economic and environmental systems, with multiple feedback loops, and mechanisms to reinforce the status quo and further advantage those already advantaged. Institutional structures and the decisions they make often accentuate social stratification and tend to favour those who have money and power already and can access the services they need to enhance their health.

It is no accident that the urban rich have better health than the urban poor and that the social gradient is greater than in rural areas. Cities are concentrations of many economic forces, which makes it all the more important that we learn how to enhance the urban 'commons' rather than see them further privatised. As the Nobel Prize winner Amartya Sen reminds us, to fully develop people's capabilities, cities need to be designed to let people of all social positions, incomes, ages and abilities live lives that they value (Sen 1999).

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Brendan Gleeson and Jago Dodson

Public health practitioners and urban planners face new challenges in managing the health of populations through the design and management of cities. While these two disciplines share a close early history, their separation in recent decades has weakened their respective capacities to secure the health of urban populations. The overwhelming majority of New Zealanders live in the country's cities and major centres, though this is rarely acknowledged in popular debate, public policy or health scholarship. This failure to acknowledge the social and cultural salience of the urban setting for population wellbeing is a critical issue for health policy. The importance of the urban setting, in concert with new population health challenges, means there is a critical need to re-assess the relationship between public health and urban planning.

Responding to this challenge includes three key strands of action. The first is to acknowledge New Zealand's cities as the primary sites where the health of the nation's population will be determined by dynamic economic and environmental processes. The second need, which is shared by other advanced urbanised countries such as Australia and the United States, is to improve understanding of contemporary urban-health relationships through more intensive applied research, including comparative studies of distinct urban settings at different spatial scales (neighbourhood to metro region). The third involves re-connecting public health managers and researchers with their colleagues in the urban planning and research fields. This paper seeks to establish this agenda by identifying some of the shared early origins of urban public health and urban planning, reviewing the contemporary state of knowledge of health relationships and assessing the opportunities for the re-engagement of public health and planning to meet the new urban-health challenge.

Shared origins

Modern urban planning and public health were born as twin disciplines out of the misery and horror of the 19th century industrial city. Rapid urbanisation, due to the development of industrial capitalism, and rural change drew unprecedented numbers of people into cities. The industrial cities they occupied were foul and dangerous places. Industrial activity often commingled with residences within tightly compressed urban spaces, while industrial emissions, effluent and waste were disposed of in a haphazard, informal and unhygienic way. Disease was frequent with regular outbreaks of contagion spreading among poorly nourished and housed working classes – Auckland, for instance, witnessed an outbreak of bubonic plague in 1901. Fires tore easily through dense and poorly constructed dwellings. New Zealand's towns could not match the degradation of contemporary London, Paris or New York, but 'overcrowding, pestilence, miscegeny, prostitution and latent Bolshevism' were nonetheless seen as threats to the urban social order (Schrader 1999).

From the late 19th century the Victorian urban middle classes reacted against the foul slums, giving rise to paired movements which formed the basis for modern public health, urban planning and development control. The first movement involved health and sanitary reform via public works and medical intervention, while the second movement promoted the availability of good quality housing for the working classes, with residential areas clearly separated

Suburban housing, Freemans Bay, Auckland

from industrial and noxious land-uses. Together the sanitary and housing programmes gave rise to new ideas about cities as exemplified in the international 'garden cities' movement led by Ebeneezer Howard. In 1911, New Zealand's first Town Planning Bill was introduced to Parliament and by 1916 the majority of the country's population dwelt in urban areas (Miller 2002).   The use of tramways gave rise to new suburban forms comprising extensive zones of single storey detached dwellings on large lots separated from industrial, commercial and retail land-uses.

Prior to World War II development was primarily formed around rail transport, allowing residents to access the city and the majority of their needs by train and tram or on foot or bicycle. In the 1920s, New Zealand pioneered the planned development of rail-based 'new towns' in Wellington's Hutt Valley, two decades before such schemes were adopted as standard practice in the UK and Europe (Evans 1972). However, the rise and rise of affordable motoring from the mid-1920s saw government planning switch to support for the automobile. New schemes for innovative 'transit oriented' suburbs were abandoned soon after WW II and suburban development was planned almost entirely around private automobiles, transforming the layout and form of residential areas. Auckland rushed to build motorways in the 1950s – a decade earlier than Australian cities – which saw the city's public transport undergo the largest patronage collapse of any city outside of the USA (Mees and Dodson 2007). Though still strongly segregated from retail, business or industry, Auckland's suburbs are now among the most automobile-dependent in the world. While public health practice and urban planning largely parted ways after the 1940s the trajectory of urban development suggests the need for a re-engagement.   One of the consequences of the post-WW II urban transport arrangement appears to be reduced levels of transport-related physical activity. The creation of a sedentary suburbia has given rise to new anxiety about the health of urban populations. Urban science is still not clear, however, about whether suburbia creates sedentary behaviour or attracts sedentary people. This is one of the key causal questions in urban public health that invites intensive applied research.

Car-dependent travel patterns also intersect with broader urban social concerns, which have largely gone unexplored in New Zealand. For example Māori underwent one of the most rapid processes of urbanisation experienced by any population during the 20th century and were transformed from a predominantly rural to an overwhelmingly urban population, with much of this transition occurring after WW II (Statistics New Zealand 2006). While Māori no doubt benefited in many ways from the material opportunities found in cities, their arrival to poorly-planned dispersed fringe suburban housing estates coincided with increasingly automobile-dominated transport. The ongoing effects of this urban experience on Māori have not yet been extensively explored from either a planning or health perspective. Pacific immigrants also found similar experiences. The deterioration in state housing and welfare provision after the 1970s (which disproportionately affected Māori and Pacific groups) also had a clear urban dimension. Baker et al (2000) have attributed Auckland's late-1990s tuberculosis and meningococcal meningitis epidemic to poverty and poor housing.

New health questions

While the challenge of preventing 19th century diseases in 21st century (post-welfare) cities persists, new questions are confronting public health practitioners. As a result of the post-WW II history of urban planning and public health, there are two closely linked contemporary urban health questions that connect the concerns of urban planners with the responsibilities of public health managers. These issues include the relationship between health and urban form, and the relationship between health and transport systems (Badland and Schofield 2005). This is in part a false division – much of the planning literature views urban form and transport systems as forming an interconnected whole. Nonetheless, the literature on these issues is underdeveloped. Health and planning scholars and practitioners face a major challenge to expand the conceptual, methodological and empirical knowledge base to better understand these contemporary urban-health relationships. The next two sections briefly review some of the urban planning and health literature in this area.

Health and urban form

Urban form describes the bulk, density and distribution of buildings within cities. There is a relatively modest research base that establishes the connections between urban built form and health outcomes. While some associations have been found between urban form and individual behaviour, the health dimensions of these relationships remain unproven. Frumkin (2002) has argued that suburbs with dispersed low-density, homogenous, residential land use influence health outcomes through their design characteristics. Poor street connectivity within residential areas and long distances to services are seen as promoting dependence on automobiles that in turn reduces physical activity. But measurement of the built form differences remains problematic. Ewing, Pendall and Chen (2003) used a 'Metropolitan Sprawl Index'

(MSI) to assess the density, accessibility, and activity mix of urban zones in the US. Ewing et al (2003) used the MSI to assess health impacts of urban form. The authors found a relationship between higher MSI and residents' body mass index and obesity levels. Those in more sprawling zones were likely to walk less, weigh more and have greater prevalence of hypertension than those in more compact zones (Ewing et al 2003). Sturm and Cohn (2004) investigated possible links between sprawl and mental health and found that street accessibility and land-use mix were most significant in predicting the prevalence of chronic conditions such as heart disease and hypertension. Sturm and Cohn, however, found no relationship between the MSI and mental health. Saelens et al (2003) used measures of 'walkability' relative to residents' weight and levels of physical activity in two San Diego neighbourhoods. Saelens et al. (2003) found that residents of the 'high walkability' areas undertook 70 minutes more physical activity per week than the 'low walkability' neighbourhood although they cautioned that the nature of causality remained unknown. In Australia, Giles-Corti and Donovan (2002) studied the role of social and physical environments in determining individual physical activity in Perth. They found that while individual and social factors exerted the greatest influence on physical activity levels, the level of spatial access to recreational spaces and services did, in part, determine whether these were used.

In addition to physical activity there are concerns about land-use planning and its relationships with healthy eating and nutrition. The prominence of fast-food outlets made prominent via over-sized outdoor advertising and illuminated signage have transformed both retailing and eating habits. The international literature has generated unease in the health profession over the spatial availability of fresh food, especially fruit and vegetables, with many neighbourhoods having limited opportunity to purchase such goods (Rose and Richards 2004; Shaw 2006). Recent Australasian research suggests that such 'food deserts' are thankfully not yet found in our cities (Nolan et al 2006; O'Dwyer 2006), although the effects of higher urban densities on household fresh food production (and associated physical activity) due to smaller domestic gardens have been raised by Australian urbanists (Troy 1996).

A number of definitional and methodological difficulties in measuring urban built form remain. There are also problems in establishing causality between, for example, urban form, physical activity and nutrition – individuals may select residential areas that best suit their desired behaviour patterns rather than such patterns being generated by the built form of the area. Other problems are definitional, such as defining complex notions of 'walkability' or 'sprawl' or using simple measures such as housing age or street connectivity

Transport systems, in combination with urban form, have a modest effect on walking and cycling.

as a proxy for multi-variate design factors. These problems continue to pose challenges both for urban planners and public health researchers in comprehending and addressing urban health relationships. In New Zealand the additional imperatives of bicultural policy-making suggest further work is needed to understand the multivariate intersection of urban form and public health.

Health and transport

The impact of transport systems on the health of populations is already the subject of much research, including a strong emphasis on vehicle crashes and emissions. Links between transport systems and other health outcomes are not well understood at present. A modest body of research has shed some light on these issues although many research questions remain (Badland and Schofield 2005).

Cervero and Duncan (2003) investigated factors contributing to rates of physically active non-motorised travel. The authors found transport systems in combination with urban form had a modest but statistically insignificant effect on walking and cycling, in part because exogenous factors such as topography and rainfall exerted greater influence. Frank, Andresen and Schmid (2004) assessed individual travel behaviour relative to urban environment and body weight. They found that greater land-use mix and greater street connectivity and accessibility were associated with lower obesity levels, while time spent in automobiles was positively associated with obesity. In New South Wales Wen, Orr, Millett and Rissel (2006) found that higher levels of car use were associated with being overweight and obesity. Handy, Cao and Mokhtarian (2005) assessed the role of individual and contextual factors in determining longitudinal travel behaviour, finding that suburban density and built form

factors played a positive role in supporting active travel. These differences were largely erased, however, once individual and socio-demographic factors were accounted for. There has been little New Zealand research into transport, physical activity and health, although Kjellstrom and Hill (2002) provided an extensive review of the relevant literature, as well as a range of social and environmental factors.

Transport, land-use and health research faces difficulties in segregating out the effect of specific factors in research on real cities. Locations with higher residential densities also tend to be those that are located in the inner city, were developed prior to WW II, have more connected street systems, feature quality public transport services, and have a greater mix of land uses. Isolating the effect of any one variable is methodologically difficult.

While the international literature on urban health in relation to urban form and transport needs further development it is nonetheless possible to discern an emerging relationship between urban form, urban transport and health outcomes. In general, there appears to be a positive association between higher density urban environments, levels of planning support for non-automobile transport and higher rates of physical activity. Some cautions should be noted. There remains a degree of uncertainty even within the mainstream health literature over the links between physical activity, body weight and health outcomes, especially where the Body Mass Index measure is used. Further, while higher urban densities are increasingly viewed as strengthening health outcomes we do not know the extent and limits of this relationship. It is conceivable that density only provides positive effects up to a certain level beyond which new adverse health impacts due to urban density may become apparent – in relation to crowding and access to open space, for example. Clearly more research is needed to tease out urban health links across a range of physical and socioeconomic factors.

Rejoining public health and planning research and practice

Perhaps the greatest challenge in strengthening our understanding of urban health and filling the research gaps identified above is to draw public health and planning researchers and practitioners into a new research and policy engagement. This effort must develop at two levels. First there is a need for public health and urban researchers to collaborate more intensively on investigating urban health relationships. This includes sharing respective current disciplinary knowledge, perspectives and methodologies, and collaborating on new research that develops these into a more coherent and unified approach. Second there is a critical need for public health and planning to be re-united in the policy sphere. The divide between these areas of government policy means that public health practitioners are often unable to articulate their awareness of emerging urban health relationships into progressive engagement with urban planning and policy. Planners by comparison appear to show a distinct blindness to these new public health issues in the preparation and implementation of urban strategies and plans. National and district health agencies are making tentative moves to engage local governments with their planning, though most do not provide quality research-based guidance on key aspects of local land use planning or feed such advice into regional or local policy statements and schemes. Not surprisingly, few local authorities consider either physical activity or nutrition issues as part of their urban planning frameworks. There is a need for better leverage of local government place-making capacity in pursuit of public health objectives.

Further institutional questions must be raised. Planning regulation is often institutionally complex and bureaucratic and potentially opaque to health practitioners. Section 5 of the Resource Management Act which enables communities to provide for their wellbeing, health and safety implies that public health and urban planning should be closely intertwined. But there is little evidence to suggest this connection has attained any degree of policy or practical purchase. Transport planning also deserves public health attention. Hypothecation of national fuel excise and road user charges provides a continuous funding stream for urban motorways while public transport struggles to generate financial support through weak regional rates. The failure to realise the implications of such broader policies may bias urban decision-making in a way that continues to allow the development of a built form and transport system that fundamentally act against the objectives of public health practice.

These challenges may become even more pressing in an emerging era of climate heating and declining petroleum security, yet may also present new opportunities for closer linking of health and planning practice, especially at the local scale. Some of this might involve rediscovering some of New Zealand's early successes in state-led urban intervention, such as Wellington's new towns, or Ernest Plischke's schemes for transit-oriented suburbs in Auckland (Harris 2005; 2007). But any recasting of the urban-health frame must also rigorously review the effects of recent

planning policies, such as market-led urban intensification (Lyne and Moore 2004), on urban health outcomes. Health policy needs to actively re-engage with urban planning and transport strategies as a core element, not just as an aside, to ensure that New Zealand can ably grapple with the health challenges of rapidly transforming urban modernity. To achieve this will require collaborative cross-disciplinary public health and urban planning research that can illuminate and guide the development thinking about the health of New Zealand's cities into the future.

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Rau Hoskins

As Māori we have a unique sense of our landscape
It includes past, present and future
It includes both physical and spiritual dimensions
It is how we express ourselves in the environment
It connects whanau and whenua through whakapapa
It does not disconnect urban from rural
It is not just where we live it is who we are!

(Draft: Te Aranga Māori Cultural Landscape Strategy 2006)

This think-piece takes a cultural landscape perspective, drawing on Māori urban design issues and my experience working as a kaupapa Māori architectural and urban design consultant over the last 15 years in both greater Auckland and more recently elsewhere in New Zealand. It draws together a series of perspectives on Māori engagement with, and perceptions on, urban environments with particular reference to Tamaki Makaurau (Auckland) and 'Te Aranga' the Māori Cultural Landscape Design Strategy. This latter document has a potentially strong role in supporting the progressive transformation of both urban and rural environments into identifiable 'cultural landscapes' so that as iwi, hapu and whanau we may more clearly see 'our faces in our places'.

Cultural landscapes

Cultural landscapes give us a sense of place. They reveal our relationship with the land over time. They are part of our national heritage, and part of each of our lives.

The US-based Cultural Landscapes Foundation extends the foregoing quote to define a cultural landscape as 'a geographic area that includes cultural and natural resources associated with an historic event, activity, person, or group of people.'

In Aotearoa, the term 'cultural landscape' was initially adopted by Maru Whenua, the Māori arm of the Ministry for the Environment, to more appropriately reflect the term 'urban design'. In this, they were acknowledging that in a Māori worldview all physical landscapes are inseparable from tupuna (ancestors), events, occupations, and cultural practices. These dimensions remain critical to cultural identity and to the maintenance of a 'Māori sense of place'. A critical point is that the term 'cultural landscapes' was preferred as it does not make a distinction between urban and rural areas, for the rohe of iwi extend across urban and rural divides with all areas holding cultural and spiritual significance.

Significantly, the Te Aranga steering committee have adopted the term 'cultural landscape' in the development of their kaupapa Māori response to the Urban Design Protocol. The 'Te Aranga Māori Cultural Landscape Design Strategy' arose from a hui of Māori design professionals, iwi and Māori local government representatives in November 2006. It was fuelled by a strongly held desire to establish a national strategy to help accelerate the protection, restoration and development of Māori cultural landscapes. The hui was called in response to the Urban Design Protocol developed by the Ministry for the Environment in December 2005 and was financially supported by Te Puni Kokiri and the Ministry for the Environment. The strategy is currently being finalised following its presentation to a range of iwi authorities (Sept 06 to Feb 08) and will be released as a national strategy this year (2008).

Perspectives developed within this strategy will be discussed later in the think-piece. For now, some preliminary consideration of key issues for iwi maintaining sense of place is important.

Key issues for iwi maintenance of sense of place in urban cultural landscapes

The ability to maintain a cultural and spiritual connection to urbanised cultural landscapes remains a key challenge for iwi and hapu whose tribal areas have been both progressively and rapidly developed and often degraded. In exploring the issue of 'sense of place' from a Māori perspective there are several strands of thought to be investigated, some of which are closely linked to non-Māori or general sense of place issues. However while the central issues for Māori are similar to those for Tauiwi, there are some particular perspectives unique to a 'Māori sense of place' which are useful to inform a deeper understanding and appreciation of 'placeness' for the wider community.

A 'kaupapa Māori' sense of place connotes a feeling of belonging to that place as opposed to that place belonging to you. It is intimately connected with a holistic and inclusive worldview whereby the individual is not *the* actor on a passive stage but rather part of a broader ensemble of actors. This view acknowledges the 'mauri' or life force within all living and non-living things and that the mauri of each element of the environment needs to be acknowledged, respected and protected. Thus a Māori sense of place is necessarily a reciprocal one whereby one's relationship to that place is nourished by a myriad of connections.

The notions of 'sense of place' and 'placeness' are closely connected to Māori notions of environmental health and wellbeing. One of the most-quoted contributions to this field is the concept of *Te Whare Tapa Wha*, the model of the Māori understanding of health developed by Mason Durie. In the model, there are four dimensions to health: taha tinana (physical wellbeing), taha hinengaro (mental and emotional wellbeing), taha whānau (social wellbeing) and taha wairua (spiritual wellbeing). Each of these four dimensions of hauora influences and supports the others and all four of these dimensions can be seen to contribute to a kaupapa Māori sense of place.

In summary, Māori have a sense of landscape that is intrinsically connected to health and wellbeing:
- It includes past, present and future
- It includes both physical and spiritual dimensions
- It is how we express ourselves in our environment
- It connects whānau and whenua through whakapapa
- It does not disconnect urban from rural
- It is not just where we live, it is who we are.

Tangata whenua and sense of place

In a Māori worldview, there is no place in all of Aotearoa without a people of that place. Our connection to place is defined by our relationship (current and historic) with the tangata whenua (the people of that place, those Māori who hold whakapapa connection to place). Thus the framing of relationships to place via the people of that place is fundamental to understanding cultural landscapes and a Māori sense of place.

The acknowledgement that we are all tangata whenua somewhere and manuhiri elsewhere ensures that we must build and maintain a respectful relationship with tangata whenua and requires that we in turn know what it means to be tangata whenua in our own rohe.

Having and maintaining a sense of place for tangata whenua is intimately connected to the notion of tūrangawaewae. Loosely translated as 'a place to stand' this term brings with it a notion of an earthed or grounded connection to place. Here the connection to place is based on ancestral occupation, the burial of whenua (afterbirth) and a corresponding spiritual connection to whenua, ngahere and moana as exercised through the process and ethic of kaitiakitanga – the reciprocal responsibility to safeguard the interests of the environment.

For tangata whenua the issue of having and maintaining a sense of place within an urban area such as Tamaki Makaurau (Auckland) are spiritually as well as emotionally charged domains. For tangata whenua who have grown up with a sound knowledge of local tikanga, one's sense of place is imbued through the stories of the tupuna/ancestors and the naming of landmarks which ties a tupuna to an

(Photo courtesy of University of Auckland)

Whare whakairo (meeting house), Waipapa Marae, The University of Auckland

event and to a place. Here we are generally dealing with dual notions of connection and disconnection as the settlement and development process of the city has progressively overlaid the physical landscape with alien developments which inevitably inhibit one's ability to connect with these places on cultural and spiritual levels. In this situation a sense of place can be charged with pain and loss (eg having ones maunga quarried away for roading material in the case of Te Riu ki uta, and Matuku tureia). In such a case, one still quotes one's Pepeha but the maunga is no longer there as a tribal/visual marker to support the Pepeha and one's 'sense of place.'

Following on from this a Māori sense of place can be seen to be connected to both 'rangatiratanga' (the ability to exercise control over one's environment) and 'kaitiakitanga' (the ability to exercise the stewardship of resources). When one's control over the environment is progressively eroded, so in turn is one's ability to act as kaitiaki for that environment. So one's connection to place becomes confined to an academic or at best spiritual level. The relatively newly coined term 'mana whenua' has been developed and is used widely to account for a Māori relationship with the environment which is no longer under their direct control – a tenuous shadow of a relationship where the substance of control resides elsewhere, with local, regional and central government or private landowners.

For taurahere or Māori living within the mana whenua of another iwi, the issue of 'sense of place' is more complex. Here such a sense of place can achieve a measure of depth through one's tribal and historical knowledge of the particular area. This is, in effect, a de facto sense of place where one connects to place through a knowledge of and respect for another iwi's connection to that place. Here such a sense of place is important in maintaining a reciprocal relationship of respect between Taurahere and tangata whenua. It is important to note that a similar relationship between Tauiwi and tangata whenua can be fostered and maintained in such a manner. This of course requires Tauiwi to both appreciate the benefits of such a deepened sense of place and a commitment to the learning process required.

Restoring sense of place in urban areas

In focusing on aspects of the urban physical environment which can support a healthy or restored 'sense of place' for tangata whenua there are several key areas that can be addressed including the following:

(Photo courtesy of AUT University)

Nga Wai o Horotiu Marae, AUT

1) Processes with Local and Regional Government and Crown Agencies
The foundation of what makes a difference for tangata whenua is the quality of durable Treaty-based relationships anchored in knowledge, goodwill and mutual respect.

2) Integrity of the Land and Waterways
Intact and protected land marks (eg maunga), vegetation / mahinga kai (food gathering areas) and wahi tapu. Ensuring and restoring water quality – wai ora as life-giving water – is evidenced by the perceived health and vitality of water and the species caught as part of a cultural harvest. By way of example, Te Wai unu roa o Wairaka is a culturally significant and environmentally intact spring emerging from rocks in the middle of the Unitec Campus and continues to provide waiora for cultural practices to this day.

3) The Significance of Names and Naming
Intact (corrected) tribal names are critically important (eg Parihaka is the correct name of the main maunga on the Hatea River in Whangarei. It has been mis-spelled and mis-pronounced as 'Parahaki' for over a century. In Whanganui it has been both painful and galling for tangata whenua to have a majority Pakeha population decide via referendum to maintain the incorrect spelling of the town of Wanganui, ie without the 'h').

4) Scale and Sympathetic Relationships
Built environments should acknowledge issues of building or development scale and sympathetic environmental

relationships and respect for tangata whenua histories and cultural sensitivities.

5) Seeing Ourselves in the Urban Environment

Urban landscapes should actively restore and reinscribe tribal histories and allow for a visible and living tangata whenua urban presence. Here a process of reinscribing cultural histories within the built and natural environment can allow for a reconnection with place and in so doing reimbue and restore a sense of place for tangata whenua, Taurahere and Tauiwi alike. By way of example Waipapa Marae at the University of Auckland (opened in 1988) takes its name from the earlier canoe landing area and Ngati Whatua settlement and the 19th century market place below (on what is now Beach Road). Here the use of this name allows the story of the previous land use to be retained and remembered in the name of the new marae. The location of the Waipapa Marae on Alten Road and the even more prominent Nga Wai o Horotiu AUT marae on Symonds Street has ensured that at least Auckland's university precinct supports a comparatively strong Māori sense of place.

Similarly at the Viaduct Basin in downtown Auckland (redeveloped for the America's Cup in 2000) the use of a number of elements and symbols of cultural significance to Ngati Whatua o Orakei ensure that the physical environment begins to reflect their tangata whenua status and tell some of their stories.

Two examples are the use of the Patiki (diamond / flounder) pattern as the primary paving design, denoting both a local Waitemataa delicacy and the ethic of manaakitanga (hospitality); and the Pupu Tarakihi or nautilus shell cast in glass atop the light standards representing the vision of Titahi and the active seeking out of European settlement in Auckland by the Ngati Whatua Rangatira Apihai Te Kawau in 1840.

Ngati Whatua o Orakei

As perhaps the most urbanised iwi in Aotearoa, Ngati Whatua o Orakei have had urbanity forced upon them as opposed to the conventional Māori post-war migration to city areas. By 1951, the rapidly expanding city together with central and local government policies of the day had led to the almost total loss of tribal land with the church and Urupa at Okahu Bay being the only land in iwi ownership at that time.

As part of the 1991 Treaty settlement, lands at Takaparawhau (Bastion Point) were returned to the iwi with the main portion known as the Whenua Rangatira being set aside as a reserve to be jointly administered by the Ngati Whatua o Orakei Trust board and Auckland City Council under the Ngati Whatua o Orakei Whenua Rangatira Reserves Board. The management plan agreed to by the iwi and the Reserves Board in 2003 importantly involves the revegetation of the entire Takaparawhau cliff perimeter with coastal broadleaf forest returning it as much as possible to its former natural character.

Here, where many other land uses were permitted under both the Orakei and Reserves Acts, the overriding iwi sentiment was to heal the whenua by pulling 'te korowai o Tane' (the cloak of Tane) back over the land. Given the previous extensive native forest and associated bird life in the Orakei area at the time of first European settlement (Campbell 1973), the desire to once again see kukupa (wood pigeons) flying from off-shore Hauraki Gulf islands to berry- and flower-producing species at Takaparawhau is a dream which will now be realised in this generation. This example is important as it indicates a deep-seated desire to restore the mauri of disturbed landscapes allowing for a restored kaitiaki relationship to be fostered.

Similarly Te Waiparuru, a remnant forested stream and gully system below Grafton cemetery, remains as perhaps the only intact indigenous forest remaining in the

(Top left) Pupu Tarakihi light standard, Viaduct Basin
(Left) Patiki paving pattern, Viaduct Basin

Ngati Whatua o Orakei tribal area and is thus extremely important to the tangata whenua, such a remnant area offering a tangible link back to both tupuna and mahinga kai.

With iwi like Ngati Whatua o Orakei actively demonstrating the cultural and spiritual significance of intact and restored native forest areas, the challenge then is for local governments in urban areas to boldly take this lead and explore similar opportunities in their own shared landscapes (public areas) – hei oranga mo te iwi, hei oranga mo te whenua, hei oranga mo tatou katoa.

Urban design and native plantings

Today while the Resource Management Act (1991) provides for some protection of cultural landscapes in terms of water and air quality, our urban environments continue to be colonised by inappropriate development densities, landscape and architectural styles, materials as well as vegetation.

Having followed the heated debate in 2006/07 about the removal of some exotic tree species from Queen Street in Auckland, and their proposed replacement with natives, there appeared to be a notable lack of an iwi perspective either being sought or given on the matter. However, on a recent journey down Queen Street it was with some pride that I appreciated the mature nikau that have now been planted there and for a rare moment in inner city Auckland I

Nikau trees on Karangahape Road, Auckland.

Similarly in Karangahape Rd, the use of mature nikau sitting in beds of wharariki (miniature flax variety) provides a critical cultural connection to both iwi and the Pacific island community who have had a long association with 'K' Road.

As with Te Waiparuru, for iwi, such appropriate landscape interventions can act as essential re-connections back to the Māori world. Thus the planting of both nikau and other natives down Queen Street is important in allowing the energy of the Māori natural world to permeate urban spaces and consciousnesses. Furthermore with the rakau come the whakapapa (the genealogies of the trees), the stories, cultural uses (ronga, whare materials) the manu (native birds) and the connection to Te Moana nui a kiwa (the Pacific Ocean) with the nikau being named after the coconut palm widely utilised in Polynesia and known as kikau in the Cook Islands.

Hence, allowing papatuanuku me nga uri o tane (the descendents of Tane) to reveal themselves and find a toe-hold within such urban environments can make a huge difference for te iwi Māori and for the mauri of the city. It is also important in reinforcing a sense of identity for all Aucklanders and a clear and localised sense of place for its visitors.

Te Aranga

The 'Te Aranga Māori Cultural Landscape Design Strategy' mentioned earlier seeks to provide a practical means by which iwi and hapu along with their designers and artists may meaningfully engage with local, regional and central government to progressively transform the natural and built environment to better reflect tangata whenua histories, identity and aspirations. In the words of the Strategy, Te Aranga – *'will advocate and work toward the reinstatement, development and articulation of the physical and metaphysical cultural landscape of whanau, hapu and iwi that we may see ourselves reflected in the landscape'*. Furthermore, the hui attendees assert that: *'The development and articulation of the Māori cultural landscape will contribute to the health and wellbeing of all who reside in and visit Aotearoa.'*
(Draft - Te Aranga Māori Cultural Landscape Strategy – December 2006)

It is intended that each iwi/hapu will customise Te Aranga to suit their particular needs acknowledging the nature of their cultural landscape issues and any existing working relationships with councils. Hence while for some iwi the strategy will provide a primary structure or starting point for framing appropriate relationships with their design communities and local and regional governments, for other iwi it will complement the relationships and structures already established.

The wananga undertaken to date reveal a strong desire for a road-map-like strategy accompanied by specific resources to help iwi navigate their way through design and council processes, while several councils have expressed a similar desire for a mechanism by which they could better work with local iwi in the development of shared / public landscapes. The implementation of the Te Aranga Strategy over the next 18 months is intended to provide for just such a range of tools to support these collaborative working relationships. In summary, the kaupapa of the strategy is:

Te whakatipuranga o te taiao
Healing of the environment

Te whakatinanatia I nga wawata Māori o te taiao
Embodiment of Māori aspirations in the built environment

Te puawaitanga o te taiao
Manifestation of the Māori cultural landscape

These aspirations will be realised through:
- establishing a network of Māori professionals to provide response, intervention, support, advice and consultancy to iwi, hapu, whanau and relevant stakeholders in the cultural landscape;
- collating, developing and providing iwi, hapu, whanau and other relevant stakeholders with the information necessary to increase awareness and knowledge of Māori cultural landscape processes, practices, aspirations, issues and benefits;
- equipping iwi, hapu, whanau and other relevant stakeholders with the tools they need to carry out meaningful sustainable and authentic cultural landscape development and management.

Whakataunga

The Te Aranga Māori Cultural Landscape Strategy seeks to comprehensively assist iwi, their design communities and their local and regional councils in engaging collaboratively in the protection, restoration and reinscription of Māori cultural landscapes so we may all deepen our sense of place and wellbeing within our urban environments.

Essentially the range of issues cited in this think-piece and the Te Aranga Strategy itself assert that environments which celebrate intact or reinstated iwi cultural landscapes have the capacity to reconnect us with the world of our tupuna, enabling us to contextualise our tikanga (customs) and facilitate cultural practice – thereby enhancing our wellbeing and sense of place.

Such urban environments which result in an enhanced sense of place for tangata whenua have a flow-on ability to allow Taurahere, Tauiwi and visitors alike to similarly forge meaningful connections to place and enhance wellbeing.

Heoi ano

Rau Hoskins

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Tony Watkins

When we first began using the term sustainability, around 30 years ago, the meaning was very clear. We were talking about sustaining the life of the planet. It was becoming clear that the planet was sick, and some of the symptoms, such as the loss of species, indicated that the illness could be terminal. Sustainability was a health issue. It was concerned with the health of the planet.

Since that time there have been both successes and failures. One success has been that the term sustainability has become the catch-cry of our time. Helen Clark used the term 33 times in her address at the opening of Parliament in 2007. Almost all new legislation from the Local Government Act 2002 to the Building Act 2004 makes a commitment to sustainability.

One failure has been that the term sustainability has been 'captured' rather than opposed, probably because it was seen as a powerful idea which would not easily die. People began talking, for example, about 'sustainable growth' or a 'sustainable economy'. Lay people became confused, but so did the experts. We have finally reached a point where no one knows what sustainability means.

We are witnessing the same phenomenon at the moment in relation to 'climate change'. Now that the concept has gained irreversible credibility everyone, from business leaders to politicians, is wondering how they can make money or mileage out of it. Eco-guilt has become a powerful force in our community and is driving the consumer society in a completely new way. Architects can now sell insulation or double glazing because these 'products' make it seem that the underlying issues are being dealt with. Through adopting a narrow definition of health it becomes possible to avoid looking more deeply at the health of the planet.

Driving a hybrid car keeps the economy booming because it postpones the need to question the logic of planners designing urban environments which are totally dependent on both the car and dwindling oil reserves. If New Zealand planners did their job properly, no one would need to own a car. The car would become a luxury item, just like houses which are so large that to talk of designing them to save energy is a nonsense.

One of the key, but subtle, historical changes has been the move from 'sustainability' to 'sustainable development'. From a health perspective sustainable development is only another definition of cancer cells which continue replicating until they consume the host body. Cancer is the biggest killer in our time, not as this might be defined by a medical doctor, but rather as seen from a global perspective.

Knowing when to stop has become the greatest challenge of our time

Roads are useful, but they generate traffic which in turn creates a demand for more roads. If no one says 'stop' the city would eventually consist entirely of roads and nothing else. This is urban cancer. Recent rate increases reflect an inability of local government to understand the meaning of 'enough'.

Stormwater, for example, is caused by bad design. Piping the stormwater into our harbours means that no one needs to correct the urban design faults and so the cancer goes on compounding until not only the urban environment is destroyed but also the natural environment. The funding needed to support this madness in turn destroys the community. The rates inquiry felt that dealing with these fundamental issues was too difficult, by which was meant: too challenging for hedonistic, materialistic voters.

Having faith in people would lead to a different approach. Profligate spending leads to a loss of focus which leads in turn to neglect of critical concerns. Too much materialistic baggage creates barriers to the inward journey towards self-understanding. Travelling light is a good principle for any journey, whether physical or spiritual.

The problems with 'sustainable development' are partly linguistic. 'Development' in an urban context has come to mean 'destruction'. Building begins with a bulldozer. Architecture almost always destroys geology, landforms, history, stories, culture, memories, and much more. We kill the patient so that we can create a new one. If any doctor did this they would be in court by lunch-time. Doctors take an oath to protect life. The time has come when everyone in the building industry needs to do the same.

It is of course possible to have sustainable development. When we take our whakapapa, enrich it through reinterpreting it in our own time, and pass it on to another generation, we are protecting the health of our geology, landforms, history, stories, culture, memories and much more. This is our role as human beings. To sustain and enrich our inheritance so that it remains healthy and gives life to others.

The myth that the idea of sustainability was born in the Brundtland Report, which continues to be perpetuated by foolish academics who were not around at the time, needs to be dismissed. The Resource Management Act 1991 (RMA) was already law before the Rio Earth Summit

Having faith in people would lead to a different approach.

even began. Maurice Strong, Secretary General for the United Nations Conference on Environment and Development (UNCED), flew to New Zealand to discuss all these issues with us, while we sailed around the Waitemata in the Queen Charlotte, before the Earth Summit. I have discussed the 'capture' of sustainability with Gro Harland Brundtland, and she shared my concerns.

The concept of 'development' however needs to be seen in the context of United Nations global politics and the art of compromise. 'Development' promises more than it delivers, and the promise lives on, in spite of all the evidence to the contrary.

I do not mean to be critical of those who never stop to ask if sustainability is always a good thing. My point is that New Zealanders have been leaders rather than followers in the environmental debate over the last 40 years. We are now at a crucial point where the need for leadership has never been greater. It makes me sad to see bureaucrats crippling initiative with draconian regulations which support those driven by greed, while punishing those who might redefine 'built environment democracy'. You cannot make people healthy. They must do that for themselves. Leadership has never been achieved by regulation.

Ideas are more powerful than most people realise

Two ideas which have driven much United Nations thinking in the last 20 years have had a negative impact on the health of both the urban environment and the planet. Neither has been debated in any meaningful way. One is the acceptance that development necessarily means destruction and exploitation. Even academics seem to accept that cancer is the way to go.

The other is the idea of 'shelter'. The global psyche has been convinced that the natural world is a threat from which we need to be protected, rather than the sustainer of our life.

Until we seek for architecture which embraces the natural world, our buildings and our urban environments will ensure that we are constantly sick.

Life becomes much simpler if we return to the roots of the contemporary environmental movement and recognise that sustainability means sustaining the health of the planet. Healthy human beings perfectly integrated into a healthy natural environment. Healthy ecosystems; healthy cities.

It would be a useful beginning if everyone making urban decisions resolved 'to do no harm', but health is much more than just not being sick. To be healthy is to be fully alive.

Good health is a positive idea

A shrewd doctor deals with back problems. The patient never dies and they never get better either. A safe career path is assured. Academics in a Performance-Based Research Fund (PBRF) environment take the same approach. Performance is measured by paper output rather than changing the world. Our universities have become largely irrelevant in dealing with the big issues. A career path is assured only to those who deal with problems, because every problem which is solved creates five new problems.

In turn government has become focused on negative modes of thinking. New legislation constantly addresses perceived problems. We have become a nation of environmental hypochondriacs, which makes us vulnerable to every quack solution. We take pills when we would do better to park the car and go for a run.

The Ministry for the Environment is obsessed with negative carbon footprints. Huddling over a 12V solar bulb will not save the world. We need to ask completely different questions. What does it mean to be fully alive, rather than can we survive although we are half dead?

Cap and trade carbon trading will come to be seen as the greatest con-trick of all time, and the interesting question is why this is not obvious to everyone. Why has there not been any protest from the universities, or even some intellectual analysis? Giving everyone permission to pollute, and then allowing people to sell their permission to pollute is an insane idea. Giving everyone permission to be sick is never going to lead to a healthy society.

If we eat to excess, in the same way that we build to excess, then we will die of lethargy, if not obesity or diabetes. Counter-productivity is a basic principle of life. The art of life is to live at the peak of the curve of counter-productivity. The consumer society takes a different view and is sustained by excess.

Too much of everything has become our life-style ideal. To sustain that life-style through purchasing carbon credits is a nonsense. Attempting to change attitudes through yet another advertising campaign would serve only to put more money in the pockets of the spin doctors.

A return to first principles is useful.

What is the meaning and purpose of life?

In one sense this is a spiritual question, but most environmentalists would agree that most environmental questions really are spiritual.

At Stockholm in 1972 (Brundtland Report) the focus was on the 'technical fix'. Take some antibiotics and you will be just fine. Many architects have not moved beyond that position, to the delight of the manufacturers of 'technical fixes'. The drug companies have become very rich, but those whose market is sustained by eco-guilt are well on the way to following in their footsteps. You cannot sell more product to someone if you make them healthy rather than sick.

As the inadequacies of the 'environmental antibiotic panacea' were recognised, Gaia introduced the idea of interconnectedness. This was not a new idea. Māori have always believed that an individual cannot be healthy if the whanau is sick. Going to the gym needs to be seen as providing the fitness and intellectual focus to tackle the real issues of climate change in a positive way. The planet needs a healthy lifestyle too.

At this time environmentalists began recognising that our political structures were not what was needed to answer the questions which were being asked. Urban form reflects the power structures in our society. Our cities are clearly not democratic. At a time when the USA is so deeply committed to forcing democracy on people who do not seem to be particularly interested, after they have been well served by tribal structures for thousands of years, it seems appropriate to recognise that a democratic built environment is also a health issue.

People are empowered when they do their own building. They give form to their culture.

A democratic built environment is committed to the distribution of power

It empowers citizens, giving them the means to participate fully in their own future, and to take responsibility for their own decisions.

We all reach the end of the day without having achieved all that we hoped to do. We sit back, pour a glass of good wine, and decide that some things will need to wait until tomorrow. We celebrate what we have achieved. All this changes when our expectations focus on others rather than ourselves. We then become frustrated, angry and stressed. Road rage is only a symptom of deeper urban problems.

An owner-builder is empowered to take control of their own life, while also respecting the complete interconnectedness of their house and their life. People are empowered when they do their own building. They give form to their culture. They tell their stories. They live out their memories. Their built environment is totally integrated into who they are. Their satisfaction and sense of achievement knows no bounds. The act of building is a tonic which leads to good health.

In the built environment dictatorship enshrined in the new Building Act there is no interconnectedness. Developers do the building with little thought for the end user. Profit becomes the only motive driving society. Individuals switch off and become half alive, hoping that they will somehow be protected by endless regulations which really have nothing to do with them. Alienation becomes rife. Our cities have become places of resentment and hatred. Our children are abused by the built environment long before anyone lays a hand on them.

The built form violence which results from people being disempowered inevitably leads to violence in every other aspect of our society. None of this is necessary. Cities could be places of peace. This concept of the Peaceful City was presented to the world in our ambassador's plenary speech at Habitat II in Istanbul in 1996, but of course no developers were present or listening.

No individual is going to build a house for their family which is unhealthy or unsafe. They only need to be given the support, expertise and skill they need to do the job they want to do. Built environment democracy is possible but we will need a different Building Act and a different approach to planning.

In a low-rise high-density city like Tokyo every cell of the urban form can be constantly renewing itself, just as the cells do in our own bodies when we are healthy. We do not grow bigger, we grow better. We are constantly healing.

If we get the big issues right we will not need to worry about all the fine print. People are very ingenious at improving themselves if they are given a chance.

Built environment democracy is a necessary first move in preventative health care in our community.

Building is a cultural act

Throughout history well-intentioned but culturally inappropriate housing and urban design has frequently been a cause of sickness and even death.

Māori cannot be expected to be fully alive when they are forced to live in houses which have, for example, a bathroom in the middle of the bedrooms. Noa and tapu do not mix. On a marae, no one would ever mix up wharenui, wharekai and the ablutions. If the architecture is unhealthy, how can the people be healthy?

Pakeha housing which is designed around assumptions about security and exclusion makes the exercise of manakitanga impossible. Without manakitanga how can any person have mana? The house is sick and so the people become sick too.

A materialistic and consumer ethic sees buildings and cities as objects sitting in and occupying the landscape. For Māori it is on the land that you stand tall. This is your tūrangawaewae. The buildings never occupy the marae. They are set back. Māori belong to the land. The land does not belong to them. If you are dispossessed by architecture how can you exercise kaitiakitanga?

When developers and architects who understand none of these things are the form givers for the built environment good health becomes impossible.

At first it may seem that this is all bad news. Certainly many Māori health issues are a direct result of a built environment which makes it impossible for Māori to be whole. The good news is that if we return to the concept of sustainability as meaning to sustain the life of the planet and to do no harm, then recognising the sacredness of place brings us full circle to solutions rather than problems.

There is a reason why you do not put your hat on a table. There is a reason for not mixing up noa and tapu. There is a reason for not putting stormwater into pipes. Our need is not to design housing or cities which are appropriate for Māori. Our need is to recognise the strength of our whakapapa.

We all need to see the city first and foremost as a sacred place

We need to ask why we have cities. Surplus is generated by community. If interconnectedness is critical to health we need to see that the disconnectedness we take for granted is a health issue. You never meet a stranger on a motorway. How can you be fully alive if you are alone?

Diversity and complexity are the foundations on which sustainability is built, and they are also the foundations on which healthy cities are built. Seeking for more controls, more codes of compliance and more bureaucracy leads only to dull boring uniformity.

The United Nations Development Programme (UNDP), at Habitat II in Istanbul in 1996 identified placelessness as the greatest problem facing urban environments in our time. That placelessness begins when someone else takes control of our lives and we find we are living in someone else's culture in someone else's city. Placelessness is a central problem for Māori, but they are really only acknowledging what is no different for the rest of us.

Building is a verb not a noun. Healthy cities will only be possible when we regain control over our own lives. Built environment democracy may at first seem to be all too difficult because it means people taking responsibility for themselves.

If we take a positive view of climate change we could see it as a great blessing. To do nothing is not an alternative. We cannot go on living unhealthy lives on an unhealthy planet. It is probably only when we get sick that we look a little more closely at our diet or our life-style. When we begin to make changes and start to feel the sheer joy of being fully alive we are only left to wonder why we did not take good health more seriously a long time ago.

Being needlessly sick is a tragic waste of a life. Building cities which are needlessly sick is a tragic waste of an opportunity. Inheriting a healthy planet and passing on a sick planet to another generation goes against the whole notion of sustainable development.

Why would anyone choose to be half alive when the opportunity is there for them to be fully alive? Academic psychologists do not seem to even be interested in exploring these issues, let alone providing adequate answers. Fortunately urban designers, architects, and all the participants in the urban game do not need to wait for them.

To every urban question there is only one answer – 'Choose life'.

An 'action' appendix to 'Choose Life'

A brief response to the questions: 'Where to next?' and 'How might change be fertilised?'

My think-piece has already suggested wide and diverse possibilities for action. It may however be useful to briefly clarify some of these. I am more than happy to explain even further as many of my suggestions are complex and far reaching.

1)   Placing health at the centre of our national and personal agendas would already be a significant action, and from this everything else follows. When you are healthy and leading a healthy lifestyle you do not need to think too much about health. When the planet is sick, and materialistic consumerism is an unhealthy lifestyle, health needs to move to the top of all our agendas.

2) Within Government, the Department of Conservation or the Ministry for the Environment, for example, might focus on health. This would move them away from negative problem-driven thinking to creative resource-saving thinking.

3) The Local Government Act 2002 states that the very purpose of local government is to 'promote wellbeing' but in practice councils take power away from people and are driven by complaints, a lust for control, and negative thinking. A new bureaucratic culture focusing on health is needed. The statutory basis already exists but it has not been implemented.

4) A judicial process which is based on conflict and confrontation creates not only winners and losers but also resentment, ill-will and finally an unhealthy society. The Environment Court, for example, is locked into a process which, if implemented in our hospitals, would bring about the death of most patients. We need healing, not winners. If doctors argued like lawyers diagnosis would become irrelevant. The high numbers in our prisons is a direct result of a society based on threats, fear, and punishment. A healthy society would ensure that all citizens were fully alive and able to realise their potential. Some moves towards mediation, for example, have been made, but sustainability suggests we should go much further and recognise that we have no enemies other than ourselves. Even a simple move such as National Radio relinquishing its obsession with court cases would contribute to a healing judicial system.

5) The new Building Act 2004 in theory is concerned with consumer protection. In fact it is concerned with the protection of the building industry, and the industry is only concerned with the ability of the consumer to pay. The Act is a direct response to the power of the industry. Negative controls have unfortunately never produced healthy buildings or healthy cities. The Act disempowers those who have good reason to be concerned with health, namely the owner-builders. Attempting to change or repeal the Act would unfortunately only result in the same process producing the same result.

6) A positive Healthy Building Act could however sit alongside the existing negative Act. Empowering people with skills and knowledge would set them free from the tyranny of developers and development-oriented planning. The first move in achieving a built-environment democracy would be to have a populace steeped in wisdom. We assume that education is important in life. If this is so then we need built-environment education too. There was a time when everyone in New Zealand knew how to build a healthy home. Diminished understanding results in diminished expectations.

7) Building is a language and what buildings have to say is too important to be left to real estate agents and others driven only by profit and rewarded by instability.
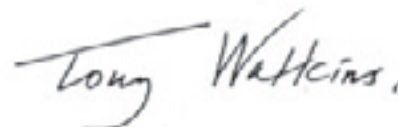
8) Legislation takes time and is not a panacea. In contrast getting all architects and builders to take an oath to protect and sustain life, and to do no harm to the natural environment, place, culture, traditions, or the built environment, could happen quite quickly. Placing the health of individuals and the health of the planet at the top of the built-environment agenda would bring about dramatic change. Resolving the ethical details would take many years but if every move was towards life, rather than towards destruction, time would be of no consequence.

9) Embracing nature rather than sheltering from it would seem to be so self-evident as to require no action, but unfortunately the risk-averse bureaucratic culture developing all around us seems to have lost the plot. We need to see the water-cycle, for example, before we can begin to understand it. Putting stormwater into pipes is a nonsense. We should save the money and also the pollution. Every building should embrace the natural world.

10) Planners typically lead dull and mediocre lives. They are not people who might provide leadership in our society or save the planet. The planning dictatorship could usefully be replaced by built-environment democracy. Humane city form makes constant cell metamorphosis possible.

11) The materialistic consumer society is not good for our health. While this is clear it needs to be remembered that politics is the art of the possible. It is not wise to engage in a battle you cannot win because a politician needs votes before they can focus on ideals. However some moves could be made. Research needs to be done on why people do not buy. Architects might be weaned away from their glorification of the materialistic object to consider the spirituality of building and above all else to ask whether a building is really necessary.

A mix of both long-term and short-term action, along with a mix of both pragmatic and idealistic action, is probably ideal. It is not possible to set priorities. It is better to adopt a lesser action which can gain political traction than to aim for a greater good and achieve nothing. It is also important to have the courage to recognise counter-productive ideas, such as carbon trading, for what they are.

Tony Watkins

Michelle Thompson-Fawcett

Complex missions

Urban environments and health are deeply entangled. Policy and practice in urban planning and public health have inevitably shared common missions. What about in the 21st century? This set of think-pieces certainly offers challenges to re-imagine how we might genuinely connect these spheres more effectively.

Many themes captivated me in these papers. Here I will focus on three aspects that threaded through the very different approaches that the authors took to their task. First, the intricate yet perplexing connections between built environment, sense of place and wellbeing demand that we rehabilitate our current research agenda. Gleeson and Dodson, for example, rightly call for a re-connection and authentic engagement between health and planning researchers and practitioners. Ironically, public health and urban planning professionals draw on each others tools and processes with frequency, but they need to shift beyond that.

Second, health and wellbeing are so multifaceted in their link to urban planning that we must not only confront the obvious (and problematical) matters of urban form and transportation for example, but also social housing, liveability and placeness, amongst other things. The latter are facets that easily fall between jurisdictions, then lack priority on policy agendas.

As Macmillan and Woodward note, New Zealand's wellbeing is constrained by our urban foundation at present, a foundation that has not envisaged the broader linkages. These are linkages that both Hoskins and Watkins emphasise, such as the importance of spiritual wellbeing and the potential for its enhancement by keeping meaningful affiliations to place on the urban planning radar.

Finally, the issue of empowerment. Innovative transformation of democracy and governance is overdue in this country. Howden-Chapman argues that the power relations in our cities inescapably affect citizen health. Hoskins contends that an erosion of the ability to act as kaitiaki diminishes social and emotional wellbeing for tangata whenua. Then, for me, Watkins delivers a most provocative invitation. He calls for 'a democratic built environment … committed to the distribution of power'.

Re-thinking environment-health relations is not a technical activity, it is a process. It involves embracing difference, taking account of complicated power relations. Watkins dares us to consider whether we are yet asking the right questions about the relationship between health and the urban environment in order to move forward meaningfully, sustainably.

If we were serious about achieving healthy cities, wouldn't we be striving to 'ensure that all citizens were fully alive and able to realise their potential'? Shouldn't health be at the top of the urban agenda?

Michelle Thompson-Fawcett

Rhys Jones

Decolonising cities

The five think-pieces included here offer diverse perspectives on urban environments and health, but they raise a number of common themes and can act as powerful stimuli to focus our thinking towards solutions.

What is clear is that our cities are developing in ways that are deleterious to our health – physically, socially, culturally, spiritually and environmentally. We are leaving a negative legacy for future generations. At one level this is a result of the disjunction between public health and urban planning. Public health professionals need to accept some responsibility here – while we have been busy exhorting people to eat properly and exercise more, the environments that most of us live in have been developing in ways that oppose good health. But more fundamentally, the unhealthy development of our cities is due to an underpinning philosophy of materialism and economic growth at any cost, combined with outright neglect of indigenous knowledge and worldviews. It is an expression of Western capitalism, in which we are sustained by excess and the planet is seen as a resource to be exploited.

One consequence of this is the way our cities have been colonised by roads. Like other forms of colonisation it represents the privileging of one system over others, and it will continue – like a cancer – until it is actively stopped. Roads provide a mechanism by which privilege and deprivation are landscaped into the urban environment. Yet in many ways the private motor vehicle-based urban form is bad for everyone. Starting from a blank slate, one would be hard pressed to design a less efficient, less healthy and more socially and environmentally destructive system for moving people around. So why do we persist with it? It is time to say 'enough is enough'.

Despite the complexity of the issues and the enormity of the challenges facing us, solutions are not as far away as they might seem. Indigenous peoples have always understood the complex interrelationships between the health of people and the land, and herein lie the answers to many of the problems identified in these think-pieces. Indeed, many of the modern urban movements sound like indigenous ideas that have been processed through a Western filter, redefined and re-presented – yet another example of Western thinking finally catching up to (or appropriating) indigenous knowledge.

What we need to do is not to reinvent the wheel, but to acknowledge and trust Māori ecological knowledge and expertise, which means reasserting the right of iwi and hapu to tino rangatiratanga. There is very little to lose from this approach (it is difficult to see how they could do a worse job than generations of city councils and town planners have done) and much to gain. It is possible to imagine a form of partnership where urban design in Aotearoa is underpinned by notions of kaitiakitanga, informed by the highest quality evidence and implemented using the most appropriate technology.

This is likely to move us much closer to achieving the true purpose of a city – by creating a sense of place, fostering diversity and complexity, promoting community life, building cultural landscapes, bringing power to the people and ensuring future development is sustainable. To get there we need to engage in a process of decolonisation, reclaim our cities, and choose life, health and human flourishing rather than the endless pursuit of excess.

Rhys Jones

Biographies

Jago Dodson

Jago Dodson is a senior research fellow in the Urban Research Program at Griffith University in Brisbane, Australia. He worked as a subdivision consents planner in Dunedin and Queenstown before completing a PhD at Melbourne University. Jago's research has investigated the links between housing transport and urban planning in cities across Australasia, North America and Europe. Jago's most recent work has examined the socioeconomic 'oil vulnerability' of cities and the urban social and environmental impacts of urban intensification.

Brendan Gleeson

Brendan Gleeson is Professor of Urban Policy and Management at Griffith University in Brisbane, Australia. His research interests include urban planning and governance, urban social policy, disability studies, and environmental theory and policy. He has authored and co-authored a number of books, including *Justice, Society and Nature: an Exploration of Political Ecology* (1998); *Geographies of Disability* (1999); *Australian Urban Planning: New Challenges, New Agendas* (2001); *Making Urban Transport Sustainable* (2003); *The Green City: sustainable homes, sustainable suburbs* (2005); *Australian Heartlands: Making Space for Hope in the Suburbs* (2006); and *Creating Child Friendly Cities* (2006). Professor Gleeson has worked professionally in a range of countries, including Britain, Germany, New Zealand, the USA and Australia. In early 2002, Gleeson was appointed by the Australian Capital Territory government to act as a key adviser on a major restructuring of the territory's planning and land development administration.

Rau Hoskins

Rau Hoskins (Nga Puhi, Ngati Wai) is a part-time lecturer and Te Hononga Coordinator at UNITEC School of Architecture and Landscape Architecture. He is also coordinator for Te Aranga Māori Cultural Landscape Strategy Steering Group. As a practitioner and educator working in the field of Māori architecture Rau brings a rare combination of kaupapa Māori design skills coupled with significant experience with urban design and Māori cultural and educational design consultancy over the last 18 years. Rau is a founding Director of the *design* TRIBE architectural company (established in 1994) which specialises in the field of Māori architecture particularly within cultural/visitor, urban design, educational and residential environments.

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Philippa Howden-Chapman is a social scientist and Professor of Public Health at the University of Otago, Wellington, where she teaches public policy. She is Director of the Centre for Sustainable Cities and *He Kainga Oranga/*Housing and Health Research Programme.

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Dr Rhys Jones (Ngati Kahungunu) is a public health physician and senior lecturer at Te Kupenga Hauora Māori, University of Auckland. His research interests include Māori men's health, child health, and inequalities in health and health care. In 2005-06, Rhys was a Harkness Fellow in Health Care Policy based at Harvard Medical School in Boston, USA. He is also Māori Director of Training for the Australasian Faculty of Public Health Medicine.

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Alexandra Macmillan is a senior lecturer and research fellow in the School of Population Health at the University of Auckland. Educated in Australia, England and New Zealand, she studied medicine in Auckland. Following experience in hospital clinical practice and surgery, she trained as a public health physician. She has worked in public health roles that have developed her interests in urban environments and wellbeing; ecological approaches to health promotion; and community involvement in decision-making. She is currently undertaking a PhD using participatory methods to develop healthy transport policy.

Michelle Thompson-Fawcett

Michelle Thompson-Fawcett is a senior lecturer in urban planning within the Department of Geography at the University of Otago. Her research involves the critical analysis of governance activities at the local scale, grounded by investigation of urban form, urban growth management, and indigenous resource management in New Zealand, Great Britain, Scandinavia and North America. Michelle worked in planning practice in New Zealand for 10 years prior to completing her doctorate at the University of Oxford in 1998. She has published widely in the areas of urban and indigenous planning and is the joint editor (with Claire Freeman) of two recent books on planning in New Zealand – *Living Together: Towards inclusive communities* (2006) and *Living Space: Towards sustainable settlements* (2003).

Tony Watkins

Tony Watkins is an architect, urban designer, planner and owner-builder. He was a founding member of United Nations accredited International Architects, Designers and Planners for Social Responsibility. He was an activist in the Velvet Revolution which brought about the end of the Cold War. Thirty years ago he was one of the group which coined the term 'sustainability' and since that time he has worked both nationally and internationally to achieve his objective of a healthy planet and a healthy lifestyle for all. www.tony-watkins.com

Alistair Woodward

Alistair Woodward is head of the School of Population Health at the University of Auckland. Born in Christchurch, he went to university in Australia, worked in hospital medicine and general practice in Britain, and then trained as a public health physician. Before moving to Auckland in 2004 he was Professor of Public Health at the University of Otago Wellington. His research, teaching and consulting has been largely in the areas of tobacco control and environmental health. He was a member of the writing teams for the last three Assessment Reports of the Intergovernmental Panel on Climate Change.

Notes

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