

HUMAN HABITAT AND HEALTH

Interdisciplinary and Integrative Perspectives

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Abstract

Since 2008, for the first time in human history, more people live in cities than in the countryside. By mid-21st century, the United Nations estimates are for two to three billion additional people being housed in cities – more than one million extra every week. While cities can be desirable places, living there can pose risks to human health. Beyond cities, ecosystems are the planet's life-supporting systems on which human health and survival is dependent. Because cities concentrate people and economic activity, they also concentrate resource consumption and waste production. Thus, cities can affect the health of ecosystems. Consequently, cities should be planned, designed, developed and managed to protect not only the health of people but also ecosystems.

The International Council for Science (ICSU) recently launched a 10-year global interdisciplinary science programme on health and well-being in the changing urban environment. The programme will bring scientists together with counterparts in government, industry and communities to tackle critical urban policy and planning questions. The ambition of the programme is to build new knowledge and develop capacity for decision making in cities, and about them, and thereby protect and promote human health in sustainable ways. Tony McMichael's influence on my thinking in this regard is described.

Introduction

... the prime role of societies is to create enduring conditions that promote the population's wellbeing and health. (A.J. McMichael, quoted in Shetty, 2006)

Homo sapiens is undergoing a radical transformation of its ecology (McMichael, 2000). Since 2008, cities have been the dominant habitat for the human species. The majority of the world's people now live in cities and, for the foreseeable future, most population growth will be in urban areas (Figure 36.1). By the middle of the 21st century, two to three billion more people will need to be housed in the cities of the world – more than one million additional people every week. Most of this urban population growth will be in small and medium-sized cities in low- and middle-income countries. This urban transition provides an unparalleled opportunity to improve health outcomes for people and planetary systems through improved urban planning, design, development and management.

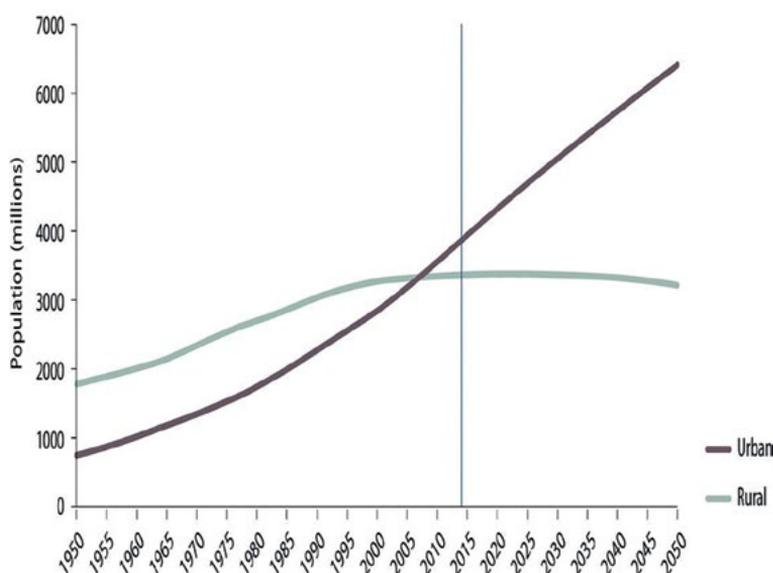


Figure 36.1 The urban and rural population of the world in millions, 1950–2050.

Source: United Nations Department of Economic and Social Affairs, Population Division, *World Urbanization Prospects: The 2014 Revision*, © 2014. Reprinted with the permission of the United Nations.

Cities can be great places to live. People are attracted to cities for work, education and social and cultural reasons, and access to food, health care and other services. However, cities can also be unhealthy places to live. Contaminated water, lack of sanitation, inadequate housing and overcrowding are health issues in many low-income cities. The way people live in cities affects their health via exposure to pollution, levels of physical activity, food choices, safety and social connection and participation (Capon and Blakely, 2007). These are determinants of common, contemporary health problems such as heart disease, chronic respiratory disease, obesity, diabetes, cancers, injury and depression.

The way people live in cities also affects the health of the environment through loss of biodiversity, changes to ecosystems, carbon emissions, climate change and environmental pollution. These environmental changes have feedback impacts on human health. While city dwellers, on average, often enjoy better health than those who live in the countryside, this masks health inequities within cities. Urban health inequities are detrimental to all city dwellers. Infectious disease outbreaks, social unrest, crime and violence are some ways that urban health inequities affect everyone (WHO and UN-HABITAT, 2005).

Population growth is increasing competition for planet Earth's finite resources. With rising incomes, per capita consumption is increasing in many parts of the world. This combination of increasing population and per capita consumption is increasing greatly the demands on planetary systems. To reduce potential conflict, it is essential that resources be shared more equitably. The availability of cheap liquid fuels during the 20th century enabled the development of energy-intensive cities, and many cities became reliant on the motor car for transport (Newman and Kenworthy, 1999). This era of cheap liquid fuels is now over. In order for cities to thrive in the future, they must adapt to rising liquid fuel prices and transition to be less energy-intensive places to live.

Because cities usually develop in places that are good for growing food, urban population growth consumes surrounding fertile agricultural land unless appropriate planning controls are in place. In almost every country, the proportion of people aged over 60 years is growing because of increased life expectancy and reduced fertility rates. This demographic transition presents challenges and opportunities in cities. From a health perspective, cities are confronting global epidemics of chronic diseases (i.e. heart disease, diabetes, chronic lung disease, cancers and depression) (Yach et al., 2005). As these epidemics mature, we should think of the built environment as a potential 'treatment' for chronic disease, as well as a place for 'prevention' of disease.

Personal Reflections: A Case Study in Collegial Influence

My interest in relationships between urban environments and human health was first sparked in 1991, when I was appointed Director of Public Health and Medical Officer of Health (MOH) in western Sydney, Australia.¹ MOH is a statutory appointment under the *NSW Public Health Act 1991*, with responsibility for protecting the health of a geographically defined population,

¹ Participation in a 1993 British Council course on healthy cities led by John Ashton imbued me with a long-standing passion for improving urban health in sustainable ways.

in this case about one million people living along, and to the north of, the main western metropolitan railway line, from Auburn through Parramatta, Blacktown and Penrith to Hawkesbury and the Blue Mountains. This is a socioculturally diverse part of Sydney that includes several large relatively socio-economically disadvantaged communities. The landscape ranges from remnant Cumberland forest, through Hawkesbury River floodplain to the UNESCO world heritage listed parklands. While average health status in western Sydney is comparable to the rest of Australia, an aggregate analysis masks considerable health inequities across subregions.

Our research demonstrated that the pattern of urban development in western Sydney (similar to most of the outer metropolitan regions of Australia's large cities) was presenting risks to health for the people who lived there – from air pollution (Jalaludin et al., 2000) and food insecurity (Webb et al., 1998) to injury (Close et al., 1993) and newly emerging infectious diseases (Bell et al., 1996), among others. As interest in urban health developed, I reached out to Howard Frumkin,² who shared concern about the impacts of urban sprawl on public health in similar contexts in North America (Frumkin, 2002).

In 2002, I approached Tony McMichael. I knew of McMichael's work because *Planetary Overload* (McMichael, 1993) was, by then, considered a public health classic. His thoughtful commentary about urbanisation and health (McMichael, 2000) had already inspired me to think in more integrative ways about urban health problems in western Sydney. Our first encounter, in the Director's office at the National Centre for Epidemiology and Population Health (NCEPH),³ The Australian National University (ANU), remains imprinted on my memory. As we discussed the health challenges facing the residents of outer metropolitan Australia, and I made a case for enhanced academic attention to these challenges, McMichael was clear that he would be delighted to help in any way he could. He expressed concern for the people affected and a readiness to contribute from an academic perspective. Since that first meeting, McMichael was a consistently wise and generous mentor to me. While he was a singular scholar, unlike many academics he was also committed strongly to the application of new knowledge in policy and practice (knowledge translation). He was well known as a tireless advocate for the urgent need for action on climate change in Australia and internationally.

2 At that time, Howard Frumkin was professor of environmental and occupational health at Emory University, Atlanta, USA. Subsequently, he directed the National Center for Environmental Health and Agency for Toxic Substances and Disease Registry at the Centers for Disease Control and Prevention, and is now Dean of the School of Public Health at the University of Washington in Seattle. Howard is another environmental health scholar who has been inspired by McMichael's contributions.

3 Having co-supervised field placements in western Sydney for a number of Master of Applied Epidemiology (MAE) trainees during Bob Douglas's tenure as founding NCEPH director during the 1990s, I was well acquainted with the centre and always ready to collaborate with their scholars.

At the same time, I contacted the CSIRO urban systems programme and arranged to meet with their Canberra-based team, led by Allen Kearns. This was a turning point for me, and I resolved to learn more about systems thinking⁴ and its applications in population health research and intervention (Proust et al., 2012). In Australia, 2004 was declared the Year of the Built Environment. In recognition of the mounting evidence of detrimental health impacts of urban development, the Western Sydney Area Health Service Chief Executive Officer, Stephen Boyages, allowed me to spend the year advocating for policy responses across the three levels of government in Australia, in partnership with the land development and transport sectors. The House of Representatives Standing Committee on Environment and Heritage established an enquiry into the sustainability of Australian cities and, in this context, I spent much of that year exchanging with a diverse range of stakeholders – from members of parliament through planners, infrastructure builders and funders, to land developers and private bus operators (a mix of academics, civil society and business people). I even spent a memorable day in a truck traversing Sydney to experience first-hand the challenges of urban transport from the perspective of a delivery truck driver – essential qualitative research because the urban transport challenge is as much about the movement of resources as it is about the movement of people.

In 2006, McMichael chaired an Australian Academy of Science (AAS) Fenner Conference on the Environment⁵ on the theme of ‘Urbanism, Environment and Health’. Bruce Armstrong, from the University of Sydney (where I had an honorary academic appointment), had suggested an AAS Fenner Conference as one option for getting concerns about urban health and sustainability debated by the Australian public policy community. The inspiration for the conference was the seminal work of Stephen Boyden⁶ on the ecology of cities and their people (Boyden et al., 1981). The conference brought researchers together with policymakers, practitioners and concerned citizens to examine the relationships between ‘urbanism’ – ways of living in urban areas – and the health of people and ecosystems. The outputs of the conference included two collections of papers on Australian urban health and sustainability challenges authored and edited to attract a policy audience (Capon and Dixon, 2007; Dixon and Capon, 2007).

4 Potential applications of systems thinking in population health research and practice definitely warrant more attention by the international public health community (Foresight: see www.gov.uk/government/publications/reducing-obesity-future-choices, accessed July 5, 2015).

5 AAS Fenner Conferences on the Environment are supported by a generous endowment from the late Frank and Bobby Fenner.

6 McMichael introduced me to Stephen Boyden. Apart from stimulating my interest in human ecology and health, Stephen inspired me to join the Frank Fenner Foundation (then known as the Nature and Society Forum) with its vision of *Healthy People on a Healthy Planet*. Some time later, McMichael told me that for a while he kept a copy of Stephen’s book, *The Biology of Civilisation: Human Culture as a Force in Nature*, in his tennis bag in anticipation of moments when there would be room for inspiration.

The fifth Oxford Health Alliance Global Summit was held in Sydney in 2008, on the theme of 'Building a healthy future: Chronic disease and our environment'. The summit picked up this developing urban health agenda, and McMichael, a keynote speaker at the conference, was influential in the framing of the resultant Sydney Declaration (The NCD Alliance, 2013). In 2009, ANU led a successful bid for funding from the CSIRO Climate Adaptation Flagship to establish a multi-institutional research programme on 'Urbanism, Climate Adaptation and Health', which spanned thermal impacts, vector-borne disease, food security, air pollution, urban transport and urban form and housing.

Around this time, I was invited to join the planning group for the first International Council for Science (ICSU) global interdisciplinary programme on 'science for health and well-being' (SHWB).⁷ McMichael had advised an earlier scoping group that had settled on the topic of 'Health and Well-being in the Changing Urban Environment – a Systems Analysis Approach' as the focus for the new 10-year programme. Inspired by the experience of the AAS Fenner Conference, I relished the opportunity to contribute to this ICSU process, which has since provided outstanding opportunities for collaboration with leading international scholars in the broad field of urban health and sustainability (Bai et al., 2012). The Chinese Academy of Sciences' Institute of Urban Environment in Xiamen was recently named as the host for the International Programme Office for this new programme, now sponsored jointly by the Inter-Academy Medical Panel and United Nations University (UNU).

Ways of Understanding

Evolutionary perspectives

There is value in understanding contemporary health problems from an evolutionary perspective. Most humans are now living in very different ways to those of our hunter-gatherer ancestors (Box 36.1). The evolutionary health principle postulates that if an animal's environment changes in a significant way, then it is likely that the animal will be less well adapted to the new conditions and will consequently show signs of physiological or behavioural maladjustment (Boyden, 2004). From an evolutionary perspective, chronic disease can be seen to arise from human maladaptation to the current ready availability of fossil fuel energy, contemporary food systems, patterns of urban settlement and ways of living.

⁷ As president of the International Union of Nutritional Sciences during 2001–05, Mark Wahlqvist was one of the agitants for an ICSU SHWB initiative.

Box 36.1 From city dweller to urban hunter-gatherer

For thousands of generations, our ancestors were hunter-gatherers. It was only about 10,000 years ago that humans began to take up farming as a way of life (Boyden, 2004). From an evolutionary perspective, the human body is well suited to the hunter-gatherer way of life – procuring plants and animals from the wild, by gathering and hunting – because it provides a natural diet and plenty of exercise. Nowadays, most people are living in ways that are very different from the way hunter-gatherers lived. Modern lifestyles can be very sedentary and modern diets can be far from natural. The way we live in cities contributes to many of our contemporary health problems. In order to design healthy cities, perhaps our ambition should be to plan and develop cities in ways that would enable people to live more like hunter-gatherers. What would such cities be like? *Urban hunter-gatherers* would get plenty of exercise in daily life – walking to school, up and down stairs in buildings, to the shops, to work. Bursts of intense physical activity – *hunting* – would occur when people ran fast (e.g. running late for the train) or when they cycled at speed. The *urban hunter-gatherer* could *gather* healthy food at local shops and markets, or from a community or street garden. While this may seem an unusual vision for the future of our cities, it may provide useful insights for the design of active and healthy cities.

Change in cities and their environs has been conceptualised as an evolutionary process with four distinctive stages – poverty, industrial, consumption and eco-city (Bai and Imura, 2000). Cities do not fit neatly into a single stage, rather they usually exhibit characteristics of more than one stage at any one time. The principal health concerns are different for each stage (Table 36.1), although this is also not clear-cut – chronic diseases are an increasing burden in low-income cities. The value of this typology is in identifying typical transitions in the evolution of cities, including the aspirational stage of healthy eco-city. The challenge becomes how cities might avoid the pitfalls of stages 2 and 3 by moving directly from stage 1 to eco-city.

Table 36.1 Stages of urban evolution and characteristic environmental conditions and health issues.

Stage	Characteristic environmental conditions	Characteristic health issues
1. Poverty	Contaminated water, lack of sanitation, inadequate housing	Infectious diseases, malnutrition, injury
2. Industrial	Air pollution and land contamination by chemicals and solid waste	Chronic respiratory disease, injury, heart disease, cancers
3. Consumption	High levels of consumption of water, energy and other resources	Chronic diseases (obesity, diabetes, heart disease, cancers), injury, depression
4. Healthy eco-city	Conditions of life in balance with nature	Maximum health potential

Source: Adapted from Capon, 2007.

Adaptive approaches

Climate change affects health in many ways – most of them adverse – and will do so increasingly over coming decades (McMichael et al., 2006). The threats include more frequent, and more intense, heatwaves, hurricanes and other extreme weather events. Coastal cities are particularly vulnerable to beach erosion and inundation. There are also indirect health impacts from changes to physical and biological processes, such as enhanced health risks from urban air pollution. In addition, there are flow-on health impacts from social, demographic and economic disruptions, such as declining rural incomes from agricultural production, with consequent urban migration. The health impacts of climate change are greater in low-income communities – those least responsible for climate change are affected the most.

Responses to climate change – so-called mitigation and adaptation actions – also affect health. These health impacts are mostly beneficial and have been called ‘health co-benefits’ (Haines et al., 2009). A co-benefit is an additional benefit arising from an action that is undertaken for a different principal purpose. Putative co-benefits from action on climate change (i.e. additional benefits beyond greenhouse gas reductions) include reduced air pollution, increased levels of physical activity, a healthier diet, improved energy security through a more diverse energy supply and less dependency on oil, a reduction in traffic congestion and new employment opportunities. Co-benefits are sometimes referred to as a ‘no-regrets approach’ because, even in the absence of a need to act on climate change, there are already strong arguments for many of the proposed actions. A figure in the foreword to this book shows a diagrammatic representation of the concept of co-benefits for health (Boyden, 2014). Human activities have direct human health impacts – via pathways including nutrition and level of physical activity – and indirect human health impacts – via the health of planetary systems (e.g. the climate system). It follows that there can be co-benefits for health from actions to address climate change. (For clarity, the arrows are presented as unidirectional. However, there are relationships in both directions.)

An understanding of health co-benefits could have profound implications for decisions about the future of cities. In the interest of our future health, the findings of research on health co-benefits should be accounted for in the design of cities. However, although the take-home message is a positive one – low-carbon ways of living are healthy ways of living – urban policymakers should be alert for potential unintended negative impacts, such as exacerbation of social inequity.

Eco-social perspectives on health

McMichael greatly influenced the way I think about human health futures. His arguments for integrative perspectives on the health of people, the places where they live and work and the health of broader planetary systems are compelling. Currently, I am transitioning the UNU International Institute for Global Health (UNU-IIGH) from its initial focus on health services research to eco-social perspectives on human health. Eco-social perspectives mean recognition of the ecological, economic and social foundations of human health. Fundamentally, future human health, well-being and survival depend on the health of planetary systems (McMichael, 1999, 2013).

The World We Want

As the world's people come together to shape a post-2015 development agenda, it is timely to consider the way human health and well-being should be framed in this agenda. The current proposal is for a new set of development goals that integrate poverty reduction with sustainable development. For this to be meaningful, all people – from across all nations and societal sectors – will have a part to play in achieving such sustainable development goals (SDGs). One challenge is representing urban health futures in this agenda. Cities are for people (Gehl, 2010). Health is relevant not only to urban planning and development; health should also be considered a key outcome of the ongoing management of cities. While the form and size of cities are highly variable – reflecting different histories, geographies, cultures, technologies, economies – human health needs are universal (Boyden, 2004). The increasingly urban habitat of the human species is a determinant of habits, including health behaviours and health. An essential prerequisite for achieving 'the world we want' is to embrace the eco-social perspectives on human health and well-being advanced by McMichael.

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