An ecological public health approach to understanding the relationships between sustainable urban environments, public health and social equity

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SUMMARY
The environmental determinants of public health and social equity present many challenges to a sustainable urbanism—climate change, water shortages and oil dependency to name a few. There are many pathways from urban environments to human health. Numerous links have been described but some underlying mechanisms behind these relationships are less understood. Combining theory and methods is a way of understanding and explaining how the underlying structures of urban environments relate to public health and social equity. This paper proposes a model for an ecological public health, which can be used to explore these relationships. Four principles of an ecological public health—conviviality, equity, sustainability and global responsibility—are used to derive theoretical concepts that can inform ecological public health thinking, which, among other things, provides a way of exploring the underlying mechanisms that link urban environments to public health and social equity. Theories of more-than-human agency inform ways of living together (conviviality) in urban areas. Political ecology links the equity concerns about environmental and social justice. Resilience thinking offers a better way of coming to grips with sustainability. Integrating ecological ethics into public health considers the global consequences of local urban living and thus attends to global responsibility. This way of looking at the relationships between urban environments, public health and social equity answers the call to craft an ecological public health for the twenty-first century by re-imaging public health in a way that acknowledges humans as part of the ecosystem, not separate from it, though not central to it.

Key words: ecological health; public health model; urban environments; environmental justice

INTRODUCTION
More than half the world’s population now live in cities (United Nations Department of Economic and Social Affairs, 2010), so it is not surprising that increasing attention has been paid to urban environments and health (Pacione, 2003; Kearns et al., 2007; Kjellstrom et al., 2007; Bambrick et al., 2011). A number of reports from Australia and elsewhere have stressed the importance of creating healthy urban environments for humans [World Health Organization, 1997; Centre for Urban & Regional Ecology, 2002; National Heart Foundation of Australia (Victorian Division), 2004; Planning Futures Pty Ltd, 2009; Commission for Architecture and the Built Environment (CABE), 2010].

The environmental determinants of public health and social equity present many challenges to a sustainable urbanism—climate change, water shortages and oil dependency to name a few. There are many pathways from urban environments to human health (Frank and Engelke, 2005). The ‘science of discovery’ (Catford, 2009) has been very successful in describing the many links between urban environments and public
health, going back to the nineteenth century when, in countries such as Great Britain, crowded cities with poor sanitation saw diseases such as tuberculosis and pneumonia flourish, with polluted water leading to outbreaks of cholera and typhoid. The response to these problems was the gradual development of a public health movement, based on medical officers of health, sanitary inspectors and their staff, supported by legislation [(Ashton and Seymour, 1988), p. 15] and resulted in the 1848 and 1875 Public Health Acts (Ashton and Seymour, 1988). This, in turn, influenced similar responses in the British colonies (Baum, 2008).

However, the underlying mechanisms behind some of these more recent links (e.g. urban green spaces) are less understood (Sadler et al., 2010). Catford ([Catford, 2009], p. 1) argues for a ‘science of delivery’, asserting that ‘the delivery mechanisms for effective health promotion may be poorly researched’. Combining theory and methods is a way of revealing the mechanisms behind a phenomenon (Danermark et al., 2002). This paper proposes an ecological public health model that is theoretically informed and can be used to examine the relationships between sustainable urban environments, public health and social equity. As Krieger notes, ‘models do not exist independently of theories’ [(Krieger, 1994), p. 891].

PUBLIC HEALTH: OLD, NEW, ECOLOGICAL

There are a number of descriptors of public health, which include conventional, old, new and ecological. Baum (Baum, 2008) provides a brief history of (old) public health and the evolution of the new public health. She observes that the new public health evolved during the 1970s and 1980s, a time when social movements were active in campaigns for women’s rights, gay liberation and environmental protection. Rayner (Rayner, 2009) provides a comparison between conventional and ecological public health. He argues that an ecological public health has its roots in the Victorian era, a time when structural interventions including policy and legislation were seen to be important mechanisms for public health action. Suffice to say that there are tensions within and between these terms that are based on the debate between structure and agency. Baum and Rayner (Baum, 2008; Rayner, 2009) agree that the focus on agency—individual choice, social marketing—is prevalent in the current milieu. The new public health is increasingly concerned with sustainability and viability of the physical environment and its human impact (Baum, 2008). So, rather than grafting an ecological public health onto existing structures, the challenge for the twenty-first century is crafting an ecological public health in a way that acknowledges humans as part of the ecosystem, not separate from it and not central to it. As Baum (Baum, 2008) notes,

Ecological sustainability is at the heart of the aspirations of a public health for the twenty-first century… Crafting an ecological public health is an absolute priority for public health practitioners (p. 387).

Models of public health have attempted to go beyond the biomedical view of health that focuses on symptoms, diseases and patients. Figure 1 illustrates a health determinants model (Dahlgren and Whitehead, 1993) that places people, and their age, sex and hereditary factors, at the core of a number of layers of influences and conditions (from individual lifestyle factors, social and community influences, living and working conditions to general socio-economic, cultural and environmental conditions).

It is a model that has been widely used (Ministry for Health, 2002; SACOSS, 2008; The Scottish Government, 2008) and adapted (Institute of Medicine, 2003; Barton and Grant,
The focus is on people and their environment. Barton’s (Barton, 2004) conceptual model of human settlements, which draws on the model of Dahlgren and Whitehead (Dahlgren and Whitehead, 1993), is explicitly anthropocentric:

People are at the heart of the model, in line with the anthropocentric view of sustainability. The health, well-being and quality of life enjoyed by people are the core purpose of settlement planning (p. 10).

Hancock (Hancock, 1993) posited three ecological models to link health, human development and the community ecosystem. In his first model, the mandala of health, humans are at the centre, illustrating the interrelationships between human health, culture and environment (Brown et al., 2005a; Baum, 2008; Nicholson and Stephenson, 2009). Hancock’s (Hancock, 1993) two other models each have three intersecting circles: the first of these places human development as the intersection of health, economy and environment, the second centres (human) health as the intersection of a convivial community, a viable environment and an adequately prosperous economy. Health, in this model, is linked to liveability, sustainability and equity. Dooris [(Dooris, 1999), p. 374] takes this latter model (substituting social values for community) and argues for ‘a gradual convergence of the three circles’ towards an integrated approach. So, how might we integrate health and environment in a just and sustainable way? Grootjans and Townsend (Grootjans and Townsend, 2005) give an account of the various frameworks developed for health (e.g. the Declaration of Alma-Ata, the Ottawa Charter for Health Promotion) and environment (e.g. the Rio Declaration on Environment and Development, the Kyoto Protocol on Greenhouse Gases) and see that the development of a holistic framework such as the Earth Charter might provides the guiding principles needed to integrate health and environment into a coherent framework. The Earth Charter, developed by the United Nations Educational, Scientific and Cultural Organisation articulates four principles: respect and care for the community of life; ecological integrity; social and economic justice; democracy, non-violence and peace (The Earth Charter Initiative, 2000). These principles also form the four pillars of global green parties (Global Greens, 2001).

Though these are broad principles, they offer a starting point for developing a theoretical perspective for a critical examination of the relationships between sustainable urban environments, public health and social equity. The next section takes this further by developing a model for an ecological public health.

**ECOLOGICAL PUBLIC HEALTH**

The concept of an ecological public health is not new. In the 1980s and 1990s, several authors (Kickbusch, 1989; Chu and Simpson, 1994) paid particular attention to how ecological public health could be applied to sustainable development and health promotion. Indeed, the Ottawa Charter acknowledges that the ‘inextricable links between people and their environment constitutes the basis for a socio-ecological approach to health’ (World Health Organization, 1986). Recently, ecological public health has re-emerged as a focus for sustainability and health (Brown et al., 2005b), and in areas of concern such as obesity (Lang and Rayner, 2007), healthy lifestyles (Fitzgerald and Spaccarotella, 2009) and climate change (Morris, 2010). MacDougall et al. (MacDougall et al., 2007) also revisit the ecological metaphor as a way of re-imagining health promotion.

Morris [(Morris, 2010), p. 34] is succinct in stating that ecological public health is ‘underpinned by the paradigm that, when it comes to health and well-being "everything matters"’. However, when public health takes an ecological turn, it presents the problem of complexity (Gatrell, 2005; Rayner, 2009). Rayner [(Rayner, 2009), p. 590] observes that complexity ‘is then used as an excuse for inaction or, worse, for its trivialisation’. Despite various approaches that take up the challenge of complexity (Dimitrov, 2001; Resnicow and Page, 2008; Poland and Dooris, 2010), when faced with complex issues, public health often reverts to ‘lifestyle drift’ (Popay et al., 2010). The new public health movement has been critical of public health promotion campaigns that focus only on tackling individual behaviours around smoking, alcohol consumption, physical activity and nutrition (Keleher, 2007; Baum, 2008). The appeal to individual agency dominates these strategies—‘please behave differently!’ [(Rayner, 2009), p. 590]. In isolation, these campaigns at best are unlikely to bring about sustained improvement in...
population health and at worst will increase social and health inequity (Murphy, 2007). At an ecological level, this type of thinking is limited. Moore ([Moore, 2010], p. 33), in his examination of fire, trees and climate change, warns that a ‘focus on one ecological factor to the exclusion of others is usually a recipe for environmental disaster’. An ecological approach would ‘consider what changes we need to make to social and ecological determinants to bring about, at the population level, health, well-being, social justice and a sustainable ecosystem’ [(MacDougall et al., 2007), p. 358]. These are complex matters and beg the question, what are we to do with this thing called complexity?

One approach comes from Kickbusch who draws on Bateson’s (Bateson, 1979) concept of the pattern which connects to stress the need to connect the physical, social and political into ecological thinking. In doing so, she answers the call to ‘get the politics out of hiding’ by making the values embedded in theory explicit (Tesh, 1988). Kickbusch (Kickbusch, 1989) posits the following principles for an ecological public health: conviviality, equity, sustainability and global responsibility. These principles relate closely to the principles of the Earth Charter: conviviality (respect and care for the community of life); equity (social and economic justice); sustainability (ecological integrity) and global responsibility (democracy, non-violence and peace). Kickbusch’s (Kickbusch, 1989) principles provide a way into theoretical concepts that can inform ecological public health thinking.

Conviviality

At the core of this ecological public health thinking is the concept of conviviality. According to the Oxford dictionary, a convivial atmosphere is one that is friendly, lively and enjoyable. Its origin lies in the Latin *convivialis*, which can be taken literally to mean: ‘live with’. In an ecological sense, this can connote the relations of the entities of an environment to each other and their surroundings. Conviviality has been conceptualized as

a political project that is concerned with a more broadly conceived accommodation of difference, better attuned to the comings and goings of the multiplicity of more-than-human inhabitants that make themselves at home in the city (Hinchliffe and Whatmore, 2006, p. 125).

This project is relevant to an ecological public health. The cities where the majority of the world’s population now live are a setting for human and more-than-human health. There is congruence in the standpoints of health promotion and urban ecology. The Ottawa Charter for Health Promotion states: ‘Health is created and lived by people within the settings of their everyday life, where they learn, work, play and love’ [(World Health Organization, 1986), p. iii]. Relatedly, the new field of reconciliation ecology calls for ‘inventing, establishing and maintaining new habitats to conserve species diversity in places where people live, work and play’ [(Rosenzweig, 2003), p. 7]. In this sense, nature is not *out there* but part of the urban fabric (Davison, 2005; Jones and Cloke, 2008) and, moreover, the more-than-human inhabitants can exercise agency (Jones and Cloke, 2002; Latour, 2004). This is not to say that trees (or birds, insects, etc.) ‘possess the particular and extraordinary capabilities of humans ... [but] they do possess very significant forms of active agency, which have usually been assumed to exist only in the human realm’ [(Jones and Cloke, 2008), p. 81]. In Australia, a general pattern is for people to separate the more-than-human environment from their built environment (Head and Muir, 2005). The private space of the backyard (or back garden) is best for people and the natural environment (referred to as the ‘The Bush’ in Australia) is best for wildlife. In between these spaces—the neighborhoods, streets, local parks and bushland areas—people and wildlife encounter each other in different ways. That is not to say that the more-than-human environment is not valued—sometimes it is just somewhere else. However, this pattern is not homogenous. Diversity in garden types varies with income and education; people with tertiary degrees favour more complex native gardens (Kirkpatrick et al., 2007). In the USA, ecological patterns also vary with socio-economic gradients, with larger variations produced by bottom-up human influence at the household level and more uniform patterns produced by the top-down human influence at the government level (Kinzig et al., 2005). Conviviality requires a shift in thinking about health and ecology separately. Living with the more-than-human inhabitants of urban areas opens up new ways of thinking about health ecology and the equitable distribution of convivial areas.
Equity

Equity in health has a long history deriving from theories of justice and fairness. In an ecological sense, equity and justice are social and environmental concerns [see, e.g. (Agyeman and Evans, 2003; Heynen, 2003; Heynen et al., 2006; Wilson, 2009)]. Theories of political ecology are germane to equity in this sense (Low and Gleeson, 1998; Forsyth, 2001; Heynen, 2006). A tenet of political ecology is that there is no nature-culture divide (Ugglan, 2010), long recognized by Australia’s Indigenous peoples (Burnam, 1987; Memmott, 1994; Bayet-Charlton, 2003). Rather than examine nature and culture separately, they can be seen as a socio-nature, ‘a hybrid that mediates both part of nature and society’ [(Roy, 2011), p. 2]. This hybrid is an entangled entity of assemblages, within which various interactions occur (Latour, 1993, 2004). To understand these interactions, urban political ecology draws on the concept of metabolism as a socio-ecologic process (Swyngedouw, 2006). Thus, urban areas are sites of socio-ecological production that (re)produce social and environmental inequities at different scales (Heynen, 2003). How social and environmental goods are equitably distributed points to thinking about sustainability.

Sustainability

Sustainability is so widely used as a catch-all term that its meaning has taken on many (often conflicting) aspects (Low and Gleeson, 2005). There are many initiatives that are sustainable, yet (re)produce inequity (Marcuse, 1998). It is important to consider sustainability in the light of social and environmental justice (Dobson, 2003), which inextricably links sustainability to health and equity. This is brought into sharp relief by the issue of climate change (Baum and Fisher, 2010; Poland and Dooris, 2010). If we accept that we are all part of socio-ecological systems, which are complex and adaptive (Resnicow and Page, 2008), then sustainability takes on particular significance. Resilience, that is ‘the capacity of a system to absorb disturbance; to undergo change and still retain essentially the same function, structure and feedbacks’ has been proposed as the key to sustainability in complex adaptive systems [(Walker and Salt, 2006), p. 32] and a better way of thinking about sustainability (Hopkins, 2009) and health (Eckersley and Cork, 2011). A key to resilience thinking is the notion of the threshold or tipping point, which, if a socio-ecological system crosses, may result in irreversible change—‘Sustainability is all about knowing if and where thresholds exist and having the capacity to manage the system in relation to these thresholds’ [(Walker and Salt, 2006), p. 63].

Global responsibility

At a time when a growing majority of the world’s population live in urban areas, the local actions of living in cities and towns have global consequences. The ecological footprint of all cities is much larger than their land area (Rees and Wackernagel, 1996). There is an urban blind spot in environmental ethics (Light, 2001) and an ecological public health would take into account ecological ethics. One approach comes from Curry (Curry, 2000), who makes the case for an ecological republicanism, which acknowledges the virtues of the ecological common good and incorporates humans into ecology. The reconciliation of nature and society requires the participation of urban ecological citizens (Light, 2003). Ecological ethical thinking links the other three principles of an ecological public health. As citizens of an ecological republic, we are dependent on the integrity of the ecosystem (sustainability), on the sharing of the ecological common good (equity) and on living together in human and natural communities (conviviality). In one sense, this model fits the thinking of futurists such as Robertson (Robertson, 1983), Hancock (Hancock, 1994) and Lowe (Lowe, 2005). Figure 2a illustrates the interconnectedness of the four principles of an ecological public health.

The choice of three conviviality circles is the minimum number to show more than one relationship between different convivial communities interacting with each other in equitable ways, although in practice there would be many more than just three communities, especially when those communities contain both human and non-human communities. In this model, each conviviality circle has a fractal nature (Figure 2b), allowing for a self-similarity at multiple scales (Krieger, 1994), whether they are at the neighbourhood, suburb or city level. Bateson (Bateson, 1979) asked:

What pattern connects the crab to the lobster and the orchid to the primrose and all the four of them to me? And me to you? ... What is the pattern that connects all living creatures? (p. 8).
This model gives us such a pattern. It reasserts the new public health’s call for a stable ecosystem and sustainable resources and focuses on the health of the ecosystem. Equity and justice are seen as social and environmental concerns. In this ecological public health model, people are no longer at the centre of the model but one part of it, reflecting the theoretical concepts that inform an ecological public health.

**BACK TO SUSTAINABLE URBAN ENVIRONMENTS**

Theorizing how urban environments relate to public health and social equity goes beyond the mere appearances of urban environments to understand and explain the underlying structures of urban environments that relate to public health and social equity. The relationships between sustainable urban environments, public health and social equity can come into a new perspective when viewed through an ecological public health lens and point to several topics for further investigation.

Theories of more-than-human agency inform ways of living together (**conviviality**) in urban areas and cast biodiversity in a new light. A convivial urban community includes many biotic inhabitants (**Daniels, 2011**). Stronger relationships between public health and urban ecology could build on the interest in the environmental, social and cultural factors that influence, amongst others, the diversity of birds.

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**Fig. 2:** (a) A model of ecological public health. (b) The fractal nature of conviviality.
Political ecology links the equity concerns about environmental and social justice, such as the distribution of environmental ‘goods’ and ‘bads’, industrial and suburban development, for instance (Pearce et al., 2011). Moreover, there is an argument that ‘nature has certain rights, while humans also have obligations, to nature and to each other, to ensure that individual animal species and indeed whole ecosystems are not degraded to the point of non-sustainability’ [(Haughton, 1999), p. 237].

Resilience thinking offers a better way of coming to grips with sustainability. How can the process of urban development and regeneration retain and strengthen the basic functions and structures of convivial and equitable urban living and healthy ecosystem functioning? The social, environmental, economic and cultural sustainability of urban environments is subject to the socio-natural processes of urban metabolism (Heynen, 2006). Urban metabolism models have been used in socio-ecological frameworks for health, which illustrate how physical and social resources are transformed or metabolized by urban systems and processes, resulting in outcomes that influence liveability, environmental quality and waste (Kearns et al., 2007).

Integrating ecological ethics into this thinking considers the global consequences of local urban living and thus attains to global responsibility.

In seeking to inform ecological public health thinking, this model has drawn from several literatures. It remains to assess the extent to which conviviality can inform social and environmental justice, how political ecology informs resilience thinking and how the local informs the global. Kurt Lewin [(Lewin, 1951), p. 169] said, ‘There is nothing so practical as a good theory’. In practice, ecological public health thinking can inform efforts to develop ‘holistic approaches to holistic policies’ [(Mulgan, 2010), p. 46] and to create local sustainable communities that are globally connected (Hopkins, 2009). Crafting an ecological public health for the twenty-first century re-imagines public health in a way that acknowledges humans as part of the ecosystem, not separate from it, though not central to it. The saying, ‘think globally, act locally’ may well apply here though it is better described as ‘think and act locally, nationally, transnationally and globally all at the same time, and do so in an ethical way’ [(Mulligan and Adams, 2003), p. 297].

REFERENCES


