Public Health Ecology

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Our health promotion strategies recognize the environment as a crucial variable in a holistic approach to health (Barton & Tsourou, 2000), and our conception of the environment is expanding as the field of public health reawakens to the importance of context (Macintyre, Ellaway, & Cummins, 2002). Among the most fundamental contextual influences on health is our place within and dependence upon ecosystems (Jackson & Kochtitzky, 2001). Ecosystem functioning is important to deliver the water and air essential to sustain life, but the lands and landscape on which ecosystem functioning depends also influence health in many important ways. Therefore, land conservation that supports not only ecosystem integrity but also other health outcomes can be viewed as an environmental health promotion strategy. A growing amount of attention has been given to the built environment and health, but the development choices that influence the built environment also have a fundamental influence on the natural environment. The objective of this commentary is to offer public health ecology as a method to conceptualize the deleterious connections between land conservation and human health.

Figure 1 presents the conceptual framework of public health ecology. This framework is not presented as a comprehensive encapsulation of the environmental influences on health. Rather, it is a visual aid demonstrating how the natural and built environments have a reciprocal relationship and both influence the conditions and behaviors that lead to health outcomes. By focusing on not only the relationship between humans and the environment but also the interrelationship of humans and the environment, this approach can highlight the “...direct and indirect health impacts caused by unhealthy trajectories of development (Parkes, Panelli, & Weinstein, 2003),” including direct anthropogenic ecosystem change and the health outcomes related to these changes. In line with McMichael (2002), public health ecology adopts the proposition that the time has come to halt the somewhat misleading use of the term ecology in public health and “...confine the use of the word ‘ecological’ to references to ecological systems and processes.”

This framework situates the natural environment as the primary level of environmental influence. The landscape structure under the heading of the natural environment can be imagined in the following way. Consider an aerial view of a town or metropolitan area. Elements of the built environment such as roadways and buildings are visible, but so are scattered clumps and larger swaths of tress, open fields, scrubland, and possibly winding corridors of greenery following waterways big and small. The pattern of these undeveloped lands and their relation to one another creates the landscape structure (Forman, 1995). Considering the landscape structure or green infrastructure as well as transportation and sanitation infrastructure is an essential ingredient in creating an environment supportive of health.

The public health ecology framework indicates that the landscape structure and the resources to support city structure have an influence on the agents or stressors that can lead both directly and indirectly to identifiable health outcomes. Landscape structure has a direct influence on health due to the ecosystems dependant on it to produce the necessary quality and quantity of water and air to sustain life. The choices we make to adapt the environment to meet our needs impacts the ability of ecosystems to supply these basic resources. Also, city structure can produce direct threats to health through zoning, land use, and infrastructure decisions, which result in conditions such as pollution and poor sanitation. Indirectly, the structure of the built environment can facilitate—through cues to action—or hinder—by creating barriers—individual action. For example, one’s ability to perform physical activity or increase their social capital is influenced by their access to public space and the equitable spatial distribution of public resources. The parks and other forms of conserved lands that contribute to the landscape structure and support health promoting behaviors are an important public space and resource.

So, if maintaining a balance between the natural and built environments is important for health, what does a sound, health-enhancing, and sustainable landscape structure look like? Green infrastructure provides us with answers. Green infrastructure is the “...interconnected network of natural areas and other open spaces that conserves natural ecosystem values and functions, sustains clean air and water, and provides a wide array of benefits to wildlife and people (Benedict & McMahon, 2006).” Figure 2 provides an abstract representation of a connected landscape structure.

Hubs and corridors create everyday access to natural environments and the pattern necessary for ecosystem functioning. These hubs create a viable green infrastructure system through their connections to one another. People are probably aware of the health benefits of these green hubs if they think of parks and the many benefits of these green oases (Geis, 2006). People are less likely to be aware of corridor features such as multiuse greenways that can simultaneously satisfy myriad environmental and public health goals. A greenway is a “linear open space established along either a natural corridor, such as a riverfront,
stream valley, or ridgeline, or overland along a railroad right-of-way converted to recreational use, a canal, a scenic road, or other route (Little, 1990).” These forms of linear open space are essential components of a functioning landscape. They connect larger patches of open space and protect sensitive environmental features such as ridgelines and rivers. These corridor features can support health in many synergistic ways. For example, vegetated river buffers filter non-point-source pollution and help control flooding. At the same time, when greenways are easy to reach, they can support active living and physical activity by connecting an assortment of land uses (Coutts, 2008). While achieving physical activity on greenways, the public also reaps the added mental health benefits of contact with nature (Frumkin, 2001; Kaplan, Kaplan, & Ryan, 1998).

An important point to consider is that the connected hubs and corridors in Figure 2 are subsequently connected to a regional green infrastructure system. As important as having a connected system is at the local level, it is also important to consider its relation to supporting ecosystems at much larger scales. In the early 1990s, research activity increased that was devoted to understanding the health consequences of ecosystem change (Haines, Epstein, & McMichael, 1993) and the potential influence of the associated global conditions of warming, drought, and elevated sea levels. A more recent examination of the public health impacts of ecosystem integrity also approaches this phenomenon from a global perspective (Aron & Patz, 2001). A global perspective is important but it overlooks the millions of local land use decisions that determine the form of the built and natural environments. How we manage the surface of the earth and our human signatures locally is what accumulates to regional and global health impacts. For example, a given city’s transportation planning choices in the U.S. may lead to more vehicle miles driven in a given period of time. This may increase inactivity, obesity, and carbon dioxide emissions and exacerbate asthma attacks locally, but it also contributes to global climate change that could reduce the viability of a rice harvest in Malawi. Applying ecologically sensitive land use practices would not only provide a supportive environment for health promotion at the local level, but it would also result in an incremental approach to remediating global sustainability efforts. A useful motto may be to “think globally by planning locally for public health.”

Conserving green infrastructure systems will obviously require the inclusion of a broader set of stakeholders beyond those in public health. In addition to working with urban and environmental planners, the tacit knowledge of our dependence on natural systems must be harnessed among the general public. In fact, awakening the anthropocentric benefits of conservation among the populace may be necessary to instigate the political will and public process of land use decision making. The fact that substantial knowledge about ecosystem services already exists but that it is not consistently applied to how we develop (Palmer et al., 2004) may be due to the fact that we have not done very well in fostering
the public opinion that conservation is not only good for the birds and fish, it is also important to protect and enhance health. Through its adoption of sustainability as an environmental health issue, NEHA has situated itself as a leader in demonstrating the connection between environmental conservation and health. It is under the umbrella of sustainability that the synergy between protecting the environment and protecting ourselves can be made more evident.

A vital part of our efforts in sustainability and creating ecologically sensitive and health-supporting environments is the conservation and rehabilitation of the green infrastructure that delivers not only basic environmental needs essential to sustaining life but also the behaviors that ameliorate chronic disease. Public health ecology adopts the interrelationship between humans and their environment, and the quality of this relationship is measured in the health of the persons who are dependent on its form and structure.

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References


