



NATURE AND HEALTH

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ABSTRACT

Urbanization, resource exploitation, and lifestyle changes have diminished possibilities for human contact with nature in many societies. Concern about the loss has helped motivate research on the health benefits of contact with nature. Reviewing that research here, we focus on nature as represented by aspects of the physical environment relevant to planning, design, and policy measures that serve broad segments of urbanized societies. We discuss difficulties in defining “nature” and reasons for the current expansion of the research field, and we assess available reviews. We then consider research on pathways between nature and health involving air quality, physical activity, social cohesion, and stress reduction. Finally, we discuss methodological issues and priorities for future research. The extant research does describe an array of benefits of contact with nature, and evidence regarding some benefits is strong; however, some findings indicate caution is needed in applying beliefs about those benefits, and substantial gaps in knowledge remain.

INTRODUCTION

The public health field views the natural environment with ambivalence. Infectious agents, extreme weather, and geological events regularly sicken, injure, and kill people, often en masse. Yet, people cannot remain healthy without clean air, clean water, food, and other resources provided as “ecosystem services.” Enormous amounts of research inform these contrasting perspectives, describing how the natural environment harms humans, how health depends on the natural environment, and how human impacts on the natural environment rebound on health.

A theme that has become increasingly distinct over recent years concerns the natural environment, or “nature,” perceived, valued, and engaged with as such, particularly in urbanized societies. This research focuses primarily on benefits of contact with nature. Key segments of this literature are young, but central ideas, such as the link between vegetation and air quality, have ancient provenance in the public health field. Interventions prompted by those ideas, such as urban parks, have long remained in place, presumably because the public has enjoyed them and believed in their salutary value. The recent research tests such beliefs, and it encourages more nuanced theoretical and practical consideration of nature-health relations.

In this article, we review work done in recent decades to better characterize the health benefits of contact with nature. We do not cover this body of work comprehensively, but instead we focus on nature as represented by aspects of the physical environment relevant to planning, design, and policy measures that target broad segments of urban populations. We touch on clinically oriented work on contact with nature in therapeutic contexts, but we do not discuss benefits of companion animals, which may be taken as representations of nature. Although the core ideas we discuss have a durable legacy in public health practice, the topic has not previously been the focus of an Annual Review of Public Health article.

Below, we examine the concept of nature, consider reasons for the current expansion of research, and provide a “review of reviews.” We then review research on pathways involving air quality, physical activity, social cohesion, and stress reduction. Finally, we discuss methodological issues and priorities for future research.

DEFINING “NATURE”

In an objective sense, “nature” as used here refers to physical features and processes of nonhuman origin that people ordinarily can perceive, including the “living nature” of flora and fauna, together with still and running water, qualities of air and weather, and the landscapes that comprise these and show the influence of geological processes. As such, “nature” overlaps substantially with “natural environment,” an environment with little or no apparent evidence of human presence or intervention, and the two terms have been used interchangeably.

In practice, however, much research does not accept exclusion of the artificial as a basis for defining nature or natural environment. The nature of interest is often situated in built environments, as with indoor plants and street trees. Similarly, allotment (or community) gardens and urban parks comprise natural features, appear natural, and provide opportunities to engage with and follow natural processes, but they are typically designed, constructed, regulated, and maintained. Research has also acknowledged that a person may experience nature as such when viewing natural elements or landscapes from a building or vehicle, in photographs and films, or in virtual reality setups.

REVIEW OF REVIEWS

Many review articles on nature and human health have been published in recent years. Assessing them is one means of summarizing the state of the field in terms of what is known and the quality of the research. In April 2013, we undertook a systematic search for reviews. We used Medline and all Web of Knowledge databases to identify peer-reviewed papers, sought non-indexed, non-peer-reviewed (gray) literature, and online reviews via Internet searches, and examined citation lists of already identified reviews. We included review articles or reports relevant to relationships between nature and human health and well-being. Inevitably, because the topic boundaries of nature and health are fuzzy, relevance was sometimes difficult to establish. For example, reviews on environmental correlates of physical activity often include access to urban parks or trails among many other environmental characteristics, but they may not focus on natural environments. We identified 59 relevant reviews at the time of the search (see Supplemental Material). Of the peer-reviewed articles, most appeared in journals concerned with public health or environmental planning.

PATHWAYS THROUGH WHICH CONTACT WITH NATURE RELATES TO HEALTH

Contact with nature may affect health via multiple pathways. Pathways that have received relatively large amounts of research attention involve air quality, physical activity, social cohesion, and stress reduction. We describe each of these pathways and indicate some of the complexities involved in drawing conclusions about its role, including variation in association across people, activities, and characteristics of the nature under study. The pathways emphasize different aspects of nature, as physical environment, as setting for (individual and social) behaviour, and as experience. Contact with nature involves all these aspects, so multiple pathways are likely to be engaged simultaneously and affect one another, a point to which we return at the end of this section. The different pathways and possibilities for effect modification by individual or contextual variables are illustrated

Air Quality

Trees, shrubs, and other vegetation may affect ambient air quality and, through it, human health and well-being. There are both positive and negative impacts. Trees and other vegetation may reduce levels of some pollutants, including gases and particulate matter (PM), but they may also contribute to air pollution by releasing hydrocarbons. Some trees and plants release pollen, aggravating allergies. Finally, trees improve air quality indirectly when they cool urban environments and reduce building energy demand.

Physical Activity

Physical activity promotes physical and mental health across the life span. Recent evidence suggests that the health benefits of increased physical activity are largest among those who were initially doing the least. The outdoor environment may influence how physically active an individual is by offering suitable spaces for certain types of activities. It may also attract people outdoors because of the experiences it offers. Such outings ordinarily entail some form of physical activity, usually walking.

PROTECTION OF NATURE, BIODIVERSITY AND ECOSYSTEMS FOR HEALTH

Human health and well-being depend on the natural environment, which is the source of clean air, water, healthy soils and food. The natural environment comprises ecosystems, which when healthy and thriving, also confer protection against climate change and disaster risk. Ecosystems include for example forests, marine and freshwater ecosystems, grasslands and mountains and comprise a range of different species that interact with each other and the surrounding environment. The stability and health of ecosystems, however, depend on biodiversity.

Biodiversity has many more strong links to health; examples include the prevention of infectious disease outbreaks and pandemics, nutritional diversity and food security, and the provision of medicines. Ecosystems and biodiversity are directly threatened by human activities such as land use change, overexploitation of resources, climate change, pollution and invasive alien species. Reducing pressure on the natural environment, from deforestation to intensive and polluting agricultural practices, to unsafe management and consumption of wildlife, will protect the environment that humans rely on, for their health and ultimately their economy.

PRIORITIES FOR FURTHER RESEARCH

Throughout this review we have identified issues that warrant further research, and in the previous section we have identified methodological challenges that must be met. Here, we try to highlight some specific priorities for the field.

First, we see a need to seek, create, and take opportunities for population-level experimental studies when they arise, within an understanding of their limits. Doing so will assist in demonstrating the degree to which nature-health relations have meaning for population health. We should also work to incorporate questions about contact with nature in ongoing longitudinal studies and ensure that high-quality data on change in type, quality, and availability of nature are maintained into the future and created retrospectively for the past. These additions would permit studies consistent with both cohort and life-course perspectives on relationships between nature and health.

CONCLUSION

We have provided for a general public health audience an overview of research on how contact with nature relates to health in urbanized societies. We have not covered this body of work comprehensively, but instead have focused on nature as represented by aspects of the physical environment relevant to planning, design, and policy measures that target broad segments of urban populations, such as the availability of urban parks, the amount of green space in and near residential areas, and the preservation of peri-urban natural areas. Given our public health orientation, we have focused on the conditions of everyday life for the greatest part of the populations of interest. We consequently have hardly touched on the extensive literatures on wilderness experience and contact with nature in the treatment and management of disability and illnesses such as depression and breast cancer.

