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# Editorial: Urban ecology and human health

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Editorial on the Research Topic  
[Urban ecology and human health](#)

## Introduction

The character, design and biodiversity of urban ecosystems have both beneficial and negative impacts on human health and wellbeing (Flies et al., 2019). However, the ways in which urban ecosystems influence human health—positively and negatively—remain unclear. Current knowledge is dominated by research in large cities and the global north, and therefore is incomplete and biased (Kendal et al., 2020). The diverse chapters in this special issue contribute to the “Urban One Health” and “Ecology with Cities” frameworks (de Leeuw, 2021; Ellwanger et al., 2022) that bring together the ecological, social, political, and community engagement aspects of ensuring public health among the intricacy of interactions, both between organisms and within complex, changing, and diverse urban environments.

## Greenspace ecosystem services and disservices

Urban green and blue spaces provide many diverse beneficial ecosystem services (ES; Flies et al., 2017; Lai et al., 2019; Mavoja et al., 2019). They play an important role in mitigating air pollution from exhaust and industrial emissions, and health-impacting haze from wildfires, as in Malaysia (Jaafar et al.). An examination of urban ES in China found that urban agglomerations typically had lower ES than their surroundings (Shao et al.), but among other variables, the presence of green infrastructure (GI), like woodlands increased urban ES.

Urban greenspaces and GI nevertheless can also provide ecosystem disservices (Lyytimäki and Sipilä, 2009) for example, as a mixing ground for native and introduced species and between human and non-human animals. These novel urban interactions may change disease patterns and adaptation by vector species and their pathogens. The Chagas disease vector, *Triatoma dimidiata*, may have adapted to the urban environment (de Oca-Aguilar et al.) as indicated by changes in the thorax and antennal phenotype

of this species between urban and rural areas, suggesting adaptation leading to altered sensory and locomotion performance. However, as these differences seem not to have altered the insect's fecundity/fitness, the impact of the insect's urban adaptation on human health is unclear.

## Urban sustainability, urban greening, and human wellbeing

Less tangible are the impacts of urban environments on human mental health and subjective wellbeing. For example, biodiversity can be supportive of human health and wellbeing (Taylor and Hochuli, 2014; Flies et al., 2017; Mavoia et al., 2019; Schebella et al., 2019) and urbanization can homogenize animal and microbial biodiversity (Johnston et al., 2014; Morelli et al., 2016; Flies et al., 2020). However, the biodiversity-wellbeing mechanisms and how they impact urban greenspace benefits remain unclear (Lai et al., 2019). Untangling the role of biodiversity in the greenspace-wellbeing connection will require the type of interdisciplinary effort for which Hedin et al. make a plea and provide a framework.

Further exploration of the relationship between greenspace and wellbeing in two cities in Kenya and Thailand found wellbeing was most strongly influenced by availability of basic infrastructure (waste removal, accessible clean water; Cinderby et al.). Once these amenities were in place, social (crime and tenure) and environmental (noise and air quality) issues became important for community wellbeing. Spending time in urban greenspaces could mitigate city-living stresses even for residents of informal neighborhoods. Cinderby et al. demonstrate the need for diversity and equity in public realm space provision to ensure social and spatial justice.

The COVID-19 pandemic lockdowns and restrictions changed most people's use of urban greenspace. During a COVID-19 lockdown in Brisbane, Australia, greenspace use patterns changed, varying by both individual and greenspace characteristics (Berdejo-Espinola et al.). Places with access to blue spaces and good accessibility (carparks/public transport) experienced increased use; but places with foliage height diversity had decreased use. More females than males changed their greenspace visitation frequency during COVID-19. Females had increased reliance on greenspaces for social and family interactions and spiritual reasons, while males for nature interactions and mental health benefits during COVID lockdowns. Clearly, different times of stress and national crisis lead to major behavioral changes during which urban greenspace is a great asset for human wellbeing and morale. Understanding such changes during crises will help develop more resilient urban greenspace planning and policies.

Private and community vegetable gardens were a refuge for many during COVID lockdowns (Marsh et al., 2021) are key parts of urban greenery. Community gardens support social, physical and dietary health (Egli et al., 2016) and urban agriculture is a possible nature-based solution to socio-ecological challenges in cities (Kingsley et al., 2021). The ways people interact with gardens differ between countries, with few studies in the global south. In a South Africa, Du Toit et al. examined food security in a community garden scheme designed to encourage small garden plots in a community where 39% of participants reported hunger affecting the entire household and 51% were at risk of hunger. Although 72% participants planted fruits and vegetables, the gardens contributed little to food security; Du Toit et al. explore the reasons, including cultural and food-purchasing practices.

## Planning and design for urban nature to improve health and wellbeing

Understanding the ways different communities, ethnic groups, and age cohorts use urban greenspaces is an interdisciplinary effort helping toward Urban One Health. Children's views are seldom sought when designing greenspaces (Vidal and Seixas). Often urban children would rather play in a seminatural local creek area than in a formal municipal park playground. Vidal and Seixas argue that community plans ought to include special "Children Green Infrastructure" designed to link children to nature where they live, learn, and play.

Such provision for individual and groups extends into the design of other green infrastructure (GI) like green roofs and walls. Adequate planning, design, and management, especially for water in changing climates, can maximize ES health benefits of GI (Sang et al.). Sometimes trade-offs occur in planting decisions: aesthetic choices aligning with human preferences can result in greater wellbeing benefits, while opting for native species or biodiverse combinations may result in greater ES. This trade-off may be circumvented by using color theory to create aesthetically pleasing, biodiverse designs for living walls (Thorpert et al.).

Urban greenspace and the resultant ecosystem services benefit human health everywhere, but values, perceptions, uses and risks remain diverse, between and within nations and communities. The more we learn about them, the more we can help communities and individuals prosper and enjoy urban GI.

## Author contributions

ID wrote the initial draft of this Editorial summarizing the Research Topic articles. EF revised the draft and contextualizing the Research Topic articles in the broader literature. All authors revised subsequent drafts and finalized the article for

submission. All authors contributed to the article and approved the submitted version.

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## Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships

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