



# UCL

# GREEN INFRASTRUCTURE: HEALTH AND WELLBEING

## A factsheet on urban green and blue space

EngEx GI Factsheet

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Based on EngEx report 'Green Infrastructure for London: A Review of the Evidence'



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Green and blue spaces have been linked to positive effects on human health and wellbeing: physical, mental and social. The natural environment is considered to be beneficial for all aspects of human health and is often used as a quality of life indicator. Urban green infrastructure provides space for city dwellers to spend time outdoors in natural or semi-natural environments. Access to green infrastructure has a number of human health and wellbeing benefits such as increased levels of physical activity, reduced symptoms of poor mental health and stress, increased levels of communal activity, and greater opportunities for active transport by encouraging walking and cycling.

### Box 1: What is Green Infrastructure?

Green infrastructure is a strategic, planned network of natural, semi-natural and artificial plant and water components, designed and managed to deliver a wide range of 'ecosystem services' (benefits to environment and people) and quality of life benefits. In an urban setting, green infrastructure may include parks, woodlands, wetlands, rivers, private gardens, street trees, allotments, playing fields, green roofs and sustainable drainage systems.



## Benefits and issues: Green infrastructure and health and wellbeing

### Benefits

- **Physical health:** Urban residents face several unique health challenges, including high levels of air pollution and threats due to the urban heat island effect as well as lifestyles with low physical activity. Consistently, evidence shows that urban Green infrastructure exposure increases physical activity and decreases heart rate and mortality. Numerous studies have found increasing green space had a protective effect for some diseases such as coronary heart disease (CHD), asthma, chronic obstructive pulmonary disease (COPD), diabetes mellitus, which includes a number of diseases associated more strongly with income deprivation.



- **Mental health:** Urban environments are associated with higher incidences of anxiety and depression; however, mental ill health is complex and poorly understood, and stigmatization often means that mental health issues are not reported. Evidence consistently shows that exposure to urban green infrastructure improves attention and mood. The accessibility and use of urban green infrastructure has been shown to reduce psychological distress in a deprived urban population.
- **Social wellbeing:** Social cohesion is important to the health and wellbeing of people in a community. Improved and increased interactions between residents can help reduce crime and create a sense of safety. Studies have shown that being in a natural environment encourages social interaction. Green infrastructure provides a space for residents to meet and interact, thereby acting as a 'green magnet' by drawing members of the community together. Evidence consistently shows a reduction in violence with exposure to urban green infrastructure.
- **Built environmental aesthetics:** Green infrastructure plays a role in shaping the aesthetics of the urban environment and the presence of green infrastructure is typically viewed as having a positive effect on the character of urban spaces. The presence of urban green infrastructure has been shown to have a positive effect on house prices. However, increasing house prices may not be a long-term desirable outcome of urban green infrastructure and may contribute to 'green gentrification'.
- **Local food production:** Urban green infrastructure can support the local production of food, typically in allotments and domestic and community gardens. This reduces reliance on food production systems outside of the city, increases access to locally produced food and supports the creation of new businesses.
- **Skills and employment:** Green infrastructure provides the spaces for people to interact with biodiversity and learn skills to use nature in the urban environment.
- **Natural tourism and leisure:** Offering space for recreation and biodiversity can also attract economic activity from a range of leisure and nature tourism activities. In 2016, the Royal Botanic Gardens at Kew was the third most visited paid attraction in the UK, with over 1.8 million visitors.

### What don't we know yet?

- **What kinds of green space are best and for whom:** While there is a considerable amount of information demonstrating the benefits of green spaces for health and wellbeing, we need more evidence on what forms of urban green infrastructure may be best for different urban populations. To ensure use by a wide range of community members and to increase engagement, and the resulting health benefits, urban green infrastructure needs careful planning to account for local needs, contexts and demographic preferences. It is important that new urban green infrastructure is developed with at-risk groups, such as people with disabilities, the elderly, women, teenagers and ethnic minorities in mind, in order to encourage its use, leading to greater physical activity and social cohesion.
- **Lack of data on green walls and roofs:** There is a gap in the existing evidence base on the observable positive human health effects from green walls and roofs.
- **Issues with attribution / causality:** It is difficult to understand which features of green space influence health benefits and to disentangle the many different factors in this relationship. The majority of studies have provided 'correlational' evidence for the benefits of green infrastructure (an apparent relationship), but very little on the 'causal' mechanisms (a confirmed, direct relationship). More, high quality, studies are needed to understand the reasons behind the observed effects of urban green infrastructure on health. New technologies that measure exposure to green space, such as high-resolution remote sensing and mapping, and portable and personal sensing technology for example will allow more detailed information to be gathered.
- **Impact of urban green infrastructure on a broad range of health outcomes:** The range of health topics covered in the existing evidence base for urban green infrastructure is not as varied as in wider studies on nature and health. For example, to date there has only been very limited investigation of the specific relationships between urban green infrastructure and birth outcomes, blood pressure, heart rate variability, cancer, diabetes, or respiratory symptoms. Evidence is also inconclusive for the association between urban green infrastructure and general health, depression, and stress.

## Summary

There is growing evidence that green infrastructure improves the physical and mental health of urban populations. It provides space for social interaction, local food production, skills and employment opportunities, tourism and leisure, and contributes to a more attractive urban environment. However, most of the current evidence doesn't demonstrate the direct mechanisms that underlie the associations between urban green space and human health. Future work, including the use of new technologies, is needed to investigate these mechanisms, explore what types of urban green infrastructure benefit whom, and examine a broader range of possible health outcomes.

## Find out more

This factsheet accompanies a full report. For more details and key references please refer to:

- **'Green Infrastructure for London: A Review of the Evidence'** <https://www.ucl.ac.uk/engineering-exchange/sites/engineering-exchange/files/ucl-green-infrastructure-for-london.pdf>

It is one of a series of factsheets produced by The Engineering Exchange at University College London. Others in this series are:

- **Green infrastructure:** Air quality
- **Green infrastructure:** Water

## Other resources on green infrastructure and health and wellbeing:

- GLA, 2014. London mental health report. London: GLA.  
Available at: <https://www.london.gov.uk/london-mental-health-invisible-costs-mental-ill-health>
- GLA, 2015. Natural Capital. Investing in a Green Infrastructure for a Future London. London: GLA.  
Available at: <https://www.london.gov.uk/WHAT-WE-DO/environment/environment-publications/green-infrastructure-task-force-report>
- London Health Commission, 2014. Better health for London, London.  
Available at: <https://www.healthylondon.org/resource/better-health-london-report/>
- Kondo et al. 2018 'Urban Green Space and Its Impact on Human Health'.  
Available at: <https://www.mdpi.com/1660-4601/15/3/445>



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