



## Summary: Review of Green Space and Mental Health

### Purpose

The physical and mental health effects associated with the built and natural environments, including green space (generally defined as any form of nature featuring vegetation), are of growing interest to the public health community. This document summarizes a student evidence review on the impact of green space on population mental health and on those diagnosed with mental health disorders.

### Findings

- A literature search of peer-reviewed journals identified 32 relevant qualitative and quantitative epidemiological studies. Green space has been defined in broad terms and is usually considered to be parks or forests, but also can be playgrounds, gardens, arboretums, or plantings along streets.
  - Exposure to green space is considered to benefit mental health through the interaction of three principal pathways: psychophysiological responses, including reductions in stress and improvements in directed attention and mood; augmented mental health benefits of physical activity (green exercise); and facilitated social contact, with concomitant improvements in levels of social support and social capital (institutions and relationships that shape society's social interactions).
  - Exposure to green space has been consistently shown to improve mood, both in healthy subjects and non-institutionalized individuals with mental health disorders. For example, after walking in green space, compared to a high-traffic environment, improvements in mood and directed attention were evident in studies of healthy university students as well as adults with clinical depression.
- Measurements of the stress hormone, cortisol, tend to show a reduction when subjects were exposed to green space, such as forests. Large population health studies suggest a relationship between the amount and quality of green space and lower mental distress, but the findings were not consistent.
  - Whether green space promotes physical activity, and thereby has a role in reducing obesity, is unclear. Positive effects on mood have been demonstrated for brief, one-time walks held outdoors in comparison to indoors.
  - Meta-analysis of 10 studies showed improved self-esteem and mood with short-term exercise in a variety of green environments, including forests and urban parks. Green space may mitigate stress by providing a unique setting for individuals to gather and socialize, strengthening existing networks that individuals rely on for social support and promoting engagement in socially oriented activities that can increase social capital within communities.
  - Green space has shown promise as a useful therapeutic setting for patients with mental health disorders. A treatment course of cognitive-behavioral therapy provided in a forest setting for patients with clinical depression was more effective at reducing symptoms and inducing remission than treatment in a hospital.



## Gaps in Research and Knowledge

- *Limited evidence related to study design:* The majority of studies have a cross-sectional design. Without follow-up and longitudinal study designs, changes in mental health status over time and stability of effects cannot be determined. Exposures to green space are typically brief, such as a 15-minute viewing session in a laboratory or an hour-long walk in a park. Extended periods of exposure to green space may be necessary to effect stable improvement in mental health status. The small sample sizes (ranging from 20 to 96 subjects) and often homogenous study populations (e.g., all university students) limit generalizability of the findings.
- *Accounting for confounders:* Given that socioeconomically deprived communities may have less green space and that individuals living in poverty may be particularly vulnerable to mental health disorders, the potential for unmeasured confounding in the large number of studies that did not take account of socioeconomic variables is especially concerning. Other possible confounders that should be considered include the impacts on mental health related to reductions in noise, pollution, and overcrowding.

- *Definition of green space:* What is considered to be green space varies from satellite-based measures of total green space to the presence of tree-lined streets. Such heterogeneity of exposure makes it challenging to summarize the body of evidence. Greater attention to a precise definition of green space exposure is essential to advancing the state of the literature and critical to guiding projects and policies.

## Conclusion

Overall, the evidence indicates that exposure to green space may be beneficial to mental health by improving mood and reducing stress and anxiety. Better treatment outcomes for individuals with mental health conditions, particularly those with mood and anxiety disorders, is another benefit. However, the weight of the evidence is relatively weak due to a number of common methodological flaws, including reliance on small study samples; a failure to properly account for confounding, particularly by socioeconomic status; and a lack of longitudinal study.

Future research efforts should use clear, specific measures of green space to identify the characteristics and frequency of access to green space that are associated with longer-term benefits to mental health and, in this way, support planners and policymakers in the design of healthier communities.

This document was abstracted from a Student Evidence Review: Green Space and Mental Health: Pathways, Impacts and Gaps by Emily Rugel, UBC Bridge Program; March 2015, and was produced by the National Collaborating Centre for Environmental Health at the British Columbia Centre for Disease Control, March 2015.

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*Production of this document has been made possible through a financial contribution from the Public Health Agency of Canada through the National Collaborating Centre for Environmental Health.*

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ISBN:978-1-926933-83-2

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