

**To:** Transport & Health Policy Makers, & Practitioners  
**From:** Prof Adrian Davis, TRI, Edinburgh Napier University  
**Date:** 14<sup>th</sup> June 2021  
**Subject:** Essential Evidence 4 Scotland No.40 The environment as health service

Top Line: Access to nature and green exercise leads to positive short and long-term health outcomes. The environment provides an important health service.

Green exercise is activity in the presence of nature. There is now a growing body of peer reviewed evidence to support the case that neighbourhood green environments where people can walk are likely to contribute to residents' physical and mental health.<sup>1</sup> In addition, evidence shows that exposure to natural places can lead to positive mental health outcomes, whether a view of nature from a window, being within natural places, or exercising in these environments. At the population level, there are associations between health and proximity to green spaces. Thus, green space is important for mental health and regular engagement is linked with longevity and decreased risk of mental ill-health. Yet as more than half of the world's population now live in urban settlements, daily environmental contact is becoming rarer, suggesting the growing importance of access to local green space for both quality of life and the sustainability of towns and cities. In economic terms, there should be cost savings if natural places are both protected and used as sites for activity, thus generating health benefits.

In a multi-study analysis of differences in self-esteem and mood before and after green exercise the results showed acute short-term exposures to facilitated green exercise improves both self-esteem and mood irrespective of duration, intensity, location, gender, age, and health status.<sup>2</sup> The analyses suggest important specific recommendations for the most effective dose of nature and green exercise.

1. Exposure duration: both self-esteem and mood showed greatest changes for the least duration (5 min), both showed smaller positive improvements for <1 h and half-day activities, and both increased for whole day activities. This suggests that there is an immediate effect obtained from the start of green exercise. Whole-day activities are likely to be qualitatively different activities, involving in some cases camping overnight and in others significant conservation achievements.
2. Exercise intensity: self-esteem improvements declined with growing intensity of activity, and mood improvements were greatest for light and vigorous activity. This suggests that there is a health benefit from any short engagement in green exercise.
3. Type of green space: all green environments improved both self-esteem and mood; the presence of water generated greater improvements. Although participants should be encouraged to undertake outdoor activities in both rural and urban environments, spending time near waterside (e.g., beach or river) or participating in water-based activities may give a greater benefit.
4. Sex: both men and women reported similar improvements in self-esteem after green exercise, though men showed a difference for mood.
5. Age groups: for self-esteem, the greatest change was in the youngest category, with diminishing effects with age; for mood, the least change was in the young and old. The mentally ill had one of the greatest self-esteem improvements.

In addition, other research in Scotland has shown that higher levels of neighbourhood greenspace in deprived communities are linked with lower stress. Measured through diurnal patterns of cortisol secretion, for middle aged men and women not in work in a deprived urban population, higher levels of green space are linked with lower perceived stress as shown through healthier diurnal cortisol decline.<sup>3</sup>

<sup>1</sup> See Essential Evidence on a Page No 41 [www.travelwest.info/evidence](http://www.travelwest.info/evidence)

<sup>2</sup> Barton, J., Pretty, J. 2010 What is the best dose of nature and green exercise for improving mental health? A multi-study analysis, *Environmental Science and Technology*, 44(10): 3947-3955.

<sup>3</sup> Roe, J., et al, 2013 Green space and stress: Evidence from Cortisol measures in deprived urban communities, *Int. Journal of Environmental Research and Public Health*, 10(9): 4086-4103.