

Links between natural environments and physical activity: evidence briefing

Purpose of briefing

This briefing note is part of a series that summarises evidence of the relationships between the natural environment and a range of outcomes. This briefing focuses on links between the natural environment and physical activity. The notes are aimed at: policy makers, practitioners, practice enablers (including Natural England, Natural Resources Wales etc.), local decision makers, and the wider research community. They highlight some of the implications for future policy, service delivery and research. It is intended they will inform practitioner planning, targeting and rationales, but not the identification of solutions or design of interventions. Barriers to access or use are not considered in these notes. The other briefings in the series published so far cover obesity, mental health, physiological health, connection with nature, and learning. The notes consider evidence of relevance to the UK and outcomes for both adults and children. Please see [EIN016](#) for methodology, glossary and evaluation resources.

Extent of the issue

- In England (2012) 66 percent of men, 55 percent of women, 21 percent of boys and 16 percent of girls met the Chief Medical Officer's recommended levels of physical activity for good health [1].
- Insufficient physical activity is responsible for 1 in 6 deaths (the same as smoking) and up to 40 percent of many long term conditions such as Type 2 diabetes. It costs the UK an estimated £7.4bn per year, including £900m to the NHS alone [2,3].
- There is reliable and robust evidence to suggest that physical activity is beneficial throughout the life course and that even small changes such as an additional 10 minutes of activity can improve health [1]. Benefits accrue at whatever age a person starts being active [1]. Systematic reviews of the evidence have

established links between adequate levels of physical activity and good health including reduced rates of type 2 diabetes, colon cancer, breast cancer, hip fracture, and depression [4].

- There is a robust body of evidence which indicates that interventions using physical activity can be effective at preventing conditions including childhood asthma and cerebrovascular disease, in treating conditions such as depression, or in the promotion of recuperation from diseases such as cancer¹.

Summary statement

There is a substantial body of evidence which has examined the relationships between natural environments and physical activity. Although the evidence which has examined whether a greater amount of natural environments around the home promote higher levels of physical activity is not

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conclusive, there is some evidence that tends to demonstrate that the use of accessible, better quality natural environments is associated with a higher likelihood and rates of physical activity. The evidence suggests that physical activity in natural environments is more beneficial to health than that undertaken in other environments and that people enjoy it. There is some evidence which demonstrates the impacts and cost-effectiveness of different intervention options designed to increase or facilitate physical activity in natural environments. Much of the available evidence is indicative of a relationship, further robust studies are needed to better understand associations and causal pathways between natural environments and physical activity.



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Review of the evidence

Is the amount and availability of natural environments associated with physical activity?

The current evidence is mixed as to the associations between measures of the amount and availability of natural environments (typically in relation to the home) and rates of physical activity; a recent review of reviews found that while positive relationships were identified in many studies, a similar number were inconclusive [5]. The majority of the evidence relates to population level studies, is cross-sectional in nature and cannot demonstrate causality (e.g. more active people may choose

to live in greener environments). Usually whether or not people are actually using or visiting the natural environments is not accounted for in these studies.

- Analyses of large datasets show, after controlling for confounding factors, positive associations between greater amounts of natural spaces around the home and rates of physical activity [6, 7], however some studies find no association [8-10].
- An evidence synthesis found that a higher proportion of greenspace around the home was positively associated with rates of cycling [11].
- A UK study found that although rates of activity were highest in the greenest area, they did not find an association with the types of physical activities that would take place in greenspace [6].

Does use of the natural environment encourage higher levels of physical activity?

Studies which have assessed actual use of natural environments tend to show that they promote and facilitate higher levels of physical activity. This evidence is drawn from a variety of different study types, some of which are prone to multiple sources of bias.

- Research from the UK has shown that use of natural environments is particularly important in supporting a variety of different forms of physical activity, from walking, gardening to children's play [13-14].
- Distance from greenspaces appears to influence frequency of use for physical activity. A study of people living in Bristol found that those who lived closest to a park were most likely to achieve the national physical activity recommendations [15]. The type of natural environments [16], perceived accessibility, feelings of safety, and the presence of others

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[17-20] have also been shown to have positive associations with rates of physical activity.

- The *Monitor of Engagement with the Natural Environment* dataset shows that in 2013-2014 around 1.3 billion visits were made to the natural environment for health or exercise reasons, 1.5 billion visits involved walking with a dog and further 775 million visits involved walking without a dog [21].
- Several studies suggest that people enjoy physical activities more when undertaken in greener environments [22, 23]. A systematic review found evidence that people were more satisfied following physical activities in the outdoors (compared to indoors) and reported a greater intention to repeat the activity at a later date [22]. A review of older people's physical activity found that opportunities to spend time in natural environments was one of the factors which encourages participation [24].
- Desire to be physically active has also been shown to facilitate engagement with the natural environment. In studies of the motivations for the use of urban parks, physical activities such as walking or children's play are commonly cited [25].

Who uses natural environments for physical activity?

Socio-demographic characteristics appear to influence use of natural environments for physical activity, associations differ according to health status, age, ethnicity, and socioeconomic status [26- 31]. The evidence suggests that certain socio-demographic groups, including those with a long-term illness or disability, aged 65 and over, and of Black or Minority Ethnic origin, are consistently less likely to use the natural environment for physical activity [20,27].

- Use of natural environments is particularly important in supporting physical activity in certain population sub-groups such as those living in urban settings and boys [14]. A UK study of children's activity showed that about

half of their weekend moderate-vigorous activity took place in greenspace [28].

- Qualitative research undertaken in the South West of England highlighted that despite awareness of health benefits, not all families are motivated to regularly use natural environments [29]. Barriers such as lack of interest, limited time, lack of car access, cost of parking, unsuitable paths, and cold weather have been identified in several studies [17, 24].

Is there an association between physical activity in natural environments and health inequalities?

There is relatively little evidence which has addressed whether there is a relationship between physical activity in natural environments and health inequalities, what exists is inconsistent.

- There is some evidence to suggest that those with poorer health benefit more from physical activity in environments with a greater proportion of greenspaces than people with better health [30].
- A Scottish study found no evidence that income-related inequalities in rates of physical activity taking place in greenspace were narrower in those areas with a greater quantity of natural environment [8].

Is there an additional beneficial effect of physical activity in the outdoors?

There is some tentative evidence that suggests that physical activity in natural environments may be more beneficial than activity in other environments [22, 30, 31]. Current evidence is limited in extent and reliability.

- A Scottish study showed that physical activity in natural environments is associated with a reduction in the risk of poor mental health to a greater extent than physical activity in other environments and that those who regularly

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used woods and forests for physical activity were significantly less likely to experience poor mental health compared with those who did not use such places [31].

- A systematic review found that compared with indoor activities, physical activity in natural environments is associated with greater feelings of revitalization and positive engagement, decreases in tension, confusion, anger and depression, and with increased energy [22].

What are the outcomes of specific interventions?

There is a growing body of evidence which tends to show positive outcomes of health interventions which a) offer or make use of physical activity in the natural environment or b) modify the environment to promote activity [27]. Multifaceted interventions (e.g. combinations of built environment and social programmes) are likely to have a more significant impact on levels of physical activity than singular intervention strategies [32].

- Improvements to local woodlands resulted in significant improvements in local people's attitudes to woods as places for physical activity and increased frequency of summer woodland visits in comparison to control sites [33].
- Green exercise programmes such as outdoor walking groups have been shown to increase activity rates and result in improved self-reported self-esteem and mood states [34-37] and are increasingly commissioned by health care providers [38]. Evaluation of the Sport England led 'Active England' Woodland projects found increases in engagement by groups previously dis-engaged [36].

What is the cost effectiveness of interventions?

Although there are limitations to the methodologies a range of economic values have been estimated regarding the monetary value of physical activity related natural environment interventions, which are typically shown to be cost-effective.

- An estimated annual saving of £2.1 billion would be achieved through averted health costs (as a result of a projected 24 percent increase in rates of physical activity) if everyone in England had equal '*good perceived and/or actual access to greenspace*' [39].
- The health benefits of walking on the Welsh Coast path have been estimated to amount to approximately £18.3 million per year [40].
- The estimated values of a proposed expansion of the Walking for Health² programme was found to be: 2817 Quality Adjusted Life Years (QALY) delivered at a cost of £4008.98 per QALY. This was estimated to be a potential saving to the health service of £81,167,864 (based on life-cost averted) at a cost-benefit ratio of 1:7.18.
- The estimated economic value of increased physical activity resulting from the Forestry Commission's 'Woods In and Around Towns Challenge Fund' was approximately £0.36m per year [41].
- Social return on investment assessments undertaken by greenspace scotland [42] found a range of favourable cost-benefit ratios of health related natural environment interventions, including for every £1 invested in a single health walk the generation of around £5 of benefit.

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Implications for policy, service delivery and research

Policy and service delivery

- Although the evidence as to whether the presence of natural environments around the home *promotes* higher levels of physical activity is currently inconclusive, there is now a relatively reliable and extensive body of evidence which suggest that actual use of such places promotes activity of benefit to health and which is enjoyed by participants.
- As a result it is suggested that decision makers could:
 - As suggested in the NICE guidelines [43], protect accessibility to and facilitate an increase in the quantity of areas of good quality safe urban greenspaces and encourage provision for private greenspaces such as gardens in new developments [17, 25, 31, 32, 43, 44].
 - Strengthen the planning recommendations regarding the accessibility and quantity of (public and private) natural spaces within living environments [44].
 - Identify opportunities for natural environment related physical activity in wider social and educational policies and programmes [45].
 - Identify effective natural environment based intervention options to increase activity for people of all ages and activity

levels and abilities [12, 46, 47]. Adopt the recommendation that opportunities for children's self-directed play in the outdoors should be increased [46].

- When developing environmental physical activity interventions engage local communities during the planning and management processes. Interventions should take account of local socio-demographic characteristics and the needs of specific marginalised or disengaged groups, particularly those facing various forms of inequity [20, 48, 50].
- Policies and programmes should be suitably targeted to reduce risk of enhancing physical activity health and social inequalities [49, 50].

Research

- Future research could, using robust methodologies guided by theoretical frameworks [5, 51]:
 - Clarify whether, and to what degree, physical activity is a key mechanism explaining the health benefit of natural environments [5].
 - Explore if and how interactions with the natural environment supports activity [51].
 - Seek to explain the role of other important mediating factors (e.g. social support, compensatory behaviours etc.) in linking natural environments to physical activity behaviours.
 - Clarify which types of natural environment promote active lifestyles in different population [13].
 - Identify the specific physical and experiential characteristics of the environment that encourage, facilitate and support ongoing physical activity explaining how these characteristics and mechanisms vary within the population [15, 27, 44, 52].
- There is a need for robust evaluations of natural environment physical activity health interventions, clarifying what works, for whom

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and in what circumstance and which clarify the relative benefit of such interventions in comparison to alternative options [53].

- As many interventions are essentially complex and often part of wider programmes of activity, evaluators should consider application of the principles of the Medical Research Council's '*Complex Intervention Guidance*' to better define interventions and understand process and outcomes [54].
- Good quality evaluations, using robust methodologies with rigorous reporting, should be integrated into future greenspace interventions to help clarify 'what works, when and for whom' [55].

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¹ See NHS [Why be active](#) pages for more information.

² The [Walking the Way to Health Initiative](#) (WHI) aimed to get more people walking, especially those who took little exercise or lived in areas of poor health. The initiative helped to create over 500 local health walk schemes.