Links between natural environments and physical health

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Foreword

Natural England commission a range of reports from external contractors to provide evidence and advice to assist us in delivering our duties. The views in this report are those of the authors and do not necessarily represent those of Natural England.

Contents

Purpose of briefing

This briefing note is one of a series that summarises evidence of the links between the natural environment and a range of outcomes. They are based on rapid reviews, not systematic reviews. Please refer to the Methodology (EIN069) document for further details on the method and search strategy. They build on the evidence but are not comprehensive and should be read together with the original notes:

- EIN015 Connection to Nature
- EIN018 Links between natural environments and mental health
- EIN019 Links between natural environments and physical activity
- EIN020 Links between natural environments and physiological health
- EIN021 Links between natural environments and obesity

This briefing focuses on the links between the natural environment and physical health (encompassing physiological health, physical activity and obesity). This is an update of EIN019, EIN020, EIN021 (2016): Dr Rebecca Lovell, University of Exeter. The notes are aimed at: policy makers, practitioners, practice enablers (including Natural England), local decision makers, and the wider research community. They highlight some of the implications for future policy, service delivery and research. It is intended that this note will help to inform practitioner planning, targeting and rationales, but not the identification of solutions or the design of interventions. Barriers to access or use of natural environments are not considered in this note. The notes consider evidence of specific relevance to the UK and outcomes for both adults and children. Please see EIN069 for methodology and glossary. Words marked with an asterisk are defined in the glossary.

Extent of the issue

Physiological health

Due to advances in medical science and public health interventions*, UK premature death rates (particularly from causes such as respiratory and circulatory disease) have significantly reduced over the past 50 years.[1] Currently, The Health Profile for England 2017 report [2] identifies heart disease and dementias as the most common underlying causes of death for individuals in the UK. Rates of such non-communicable diseases* (NCDs) [see glossary] have been described to be at epidemic* levels and are set to rise in the coming years.[3]

The National Institute for Health Research predicts that by 2035 two in every three adults over 65 will live with multiple health conditions.[4] The Kings Fund[5] provides information on rates of mortality and NCDs: around 835,000 people in the UK have been diagnosed with chronic obstructive pulmonary disease; 5.4 million people in the UK currently receive

treatment for asthma; the number of people with arthritis in the UK is expected to rise from 8.5 million to 17 million by 2030; coronary heart disease and stroke are the biggest causes of death in the UK; the number of people diagnosed with diabetes rose from 1.4 million in 1996 to 3.1 million in 2010. By 2025 it is estimated that it will rise to more than 4 million, a 29 percent rise. Diabetes alone currently costs the NHS approximately £1.5million an hour and takes up about 10 percent of the total budget per annum.

Obesity

Obesity has serious implications for both physical and mental health, increasing the risk of health conditions such as type 2 diabetes, some cancers, heart disease, stroke, depression, and anxiety. Many factors influence a person's body weight including diet, physical activity, and the environment we live, work and socialise in. Public health behaviour change initiatives around moving more and eating less are crucial for addressing obesity related health challenges. Increasing physical activity levels helps to maintain a healthy body weight and support weight loss when combined with a reduction in calorie intake.[5] Excess weight costs the NHS more than £6.1bn each year and is estimated to lead to lost earnings of around £2.35bn-£2.6bn a year.[6] By 2050 it is estimated that the cost of weight related conditions will £50bn[7] per annum.

Physical Activity

In England (2016) 68 percent of men, 58 percent of women met the recommended levels of physical activity for good health as set out by the Chief Medical Officer[8]. 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[9]. It costs the UK an estimated £7.4bn per year, including £900m to the NHS alone[10,11]. 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 and benefits accrue at whatever age a person starts being active[12]. 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.[13]

Summary statement

Literature reporting the positive relationship between natural environments and physical health continues to emerge. There is evidence for the interventional impact of nature exposure on the immune system[14], perinatal health*[14], physical activity behaviour change[14] alongside a range of behavioural, environmental, and occupational, and metabolic risks.[3] The present review outlines data on *exposure* to nature (i.e. proximity, time spent in nature and quality of nature) and its impact on health. In addition, an emerging evidence base also assesses the benefits of connection to nature which is

defined as “a measurable psychological construct that moves beyond *contact with* nature to an individual’s sense of their relationship with the natural world.[15] The evidence presented in this summary describes nature exposure. Since the two concepts tend to be combined within the literature, the separate evidence briefing (EIN068) should be viewed for specific details on nature connectedness.

The following evidence base is occasionally contradictory and varies according to the nature of exposure assumed and population in which it is assessed. The evidence for most of the outcomes included in this briefing is indicative of a relationship; the types of studies used to investigate the relationships are not suitable to help us understand causal* linkages, instead we find indicative associations*. Pathways between an exposure (e.g., living near natural environments) and outcome (e.g., respiratory disease) are complex and likely to be affected by many factors, such as lifestyle. Without more robust studies it is difficult to identify exactly what role natural environments have in causing better outcomes.

Physiological health

There is extensive empirical evidence* of the association between exposure to nature and physical health.[14] A mounting body of evidence tends to show that, at a population level, higher levels of exposure to natural environments are associated with lower all-cause mortality, rates of type 2 diabetes, cardiovascular and respiratory disease, and more positive perinatal outcomes. Less is known about relationships with cancer, musculoskeletal health, allergies, or of the impact of different types of environments. Also, more research is needed to understand the links between natural environments and physical health in outcomes for different socio-demographic groups.

Obesity

There is a moderate quantity of evidence[14] (of varying reliability, including a number of systematic reviews), which suggests that there is a positive (though usually weak) association between exposure to natural environments and rates or prevalence of obesity and overweight in adults and children. There is some evidence that the impacts vary according to socio-demographic group. There is little evidence which demonstrates the effectiveness of different intervention* options. The available evidence is indicative of a relationship, however further robust studies are needed to better understand associations and causal pathways between natural environments and obesity.

Physical activity

There is a substantial body of evidence[14] which has examined the relationships between natural environments and physical activity. Although the evidence which has examined whether a greater amount of natural environment around the home promotes higher levels of physical activity is not conclusive, there is some evidence that tends to demonstrate that the use of accessible, better quality natural environments is associated with a higher

likelihood 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.

Review of the evidence

What are the impacts of activity or time spent in natural environments on physical health?

Physiological health conditions:

All-cause mortality There is 'strong' and generally consistent evidence that greater amounts of natural environments around the home are associated with lower rates of all-cause mortality (death for any reason).[16] Analysis of death records from across England showed higher rates of mortality in the groups exposed to the least amount of green space* around the home.[17] A meta-analysis* of green space and mortality [18] looking at nine studies, compiling 8.3 million people from seven countries, found an inverse relationship between green space exposure and mortality.

The internal biome*, immunological system and allergies. A small but robust[14] body of evidence suggests that natural environments provide exposure to the microbial diversity necessary for immune regulation.[19] It is thought that exposure to microbial diversity (including that from the natural environment) affects the human microbiome which is linked to most of the health states included in this briefing.[20] Living in an environment with higher levels of biodiversity has been shown to be associated with a higher diversity of bacteria on the skin (an indicator of exposure to microbial diversity). A Finnish study found that adolescents with 'allergic disposition' tended to live in areas with lower biodiversity and to have lower microbial diversity on their skin.[21]. A German study of two sets of children found a reduced risk of allergies was associated with the amount of greenspace around the home in one of the groups but a raised risk in the other group.[22]

Perinatal health and pregnancy outcomes There is relatively consistent evidence[14] from a small number of studies to suggest that exposure to greenspace during pregnancy is associated with better perinatal health and pregnancy outcomes, such as healthy birth weight, head circumference and lower infant mortality risk.[23] An American study found that a 10% increase in tree-canopy cover within 50m of a house was associated with a reduction in the number of small for gestational age births.[24] A meta-analysis of 37 studies [25] found that increases in greenness in residential areas was associated with higher birthweight and lower likelihood of being small for gestational age; interestingly, this was not found for blue spaces* and birth outcomes.

Musculoskeletal health There is currently very little evidence which has investigated any association between musculoskeletal health and natural environments.[26]

Cardiovascular disease and mortality There is some evidence to suggest that rates of cardiovascular disease are lower amongst those who live in greener environments. A study from New Zealand showed that after controlling for all confounders the amount of neighbourhood green space was positively related to better cardiovascular health status.[27] A cross-sectional* study from Iran [28] found that people with cardiovascular diseases were more likely to visit the parks most often than older people with other health conditions such as hypertension.

Respiratory disease and mortality There are relatively few studies which have considered linkages between green space and respiratory disease (such as Chronic Obstructive Pulmonary Disease). Existing evidence suggests that growing up in a rural area is protective of respiratory health but the link with natural environments (over other factors) is not certain. A Canadian study found that greater amounts of residential green space was protective against all forms of mortality but especially so for deaths from respiratory disease [29]. A Swiss national cohort* study with 4.2 million adults [30] found that a higher exposure to green space was associated with lower rates of death from respiratory disease.

Cancer A systematic review of nature exposure and health found that research on the link between green space and cancer is limited and may vary depending on the type of cancer [31]. A Canadian study found women living in the greenest areas had lower rates of all-cause non-accidental mortality than those in the least green areas, the associations were strongest for respiratory and cancer mortality[32]. A positive association has been indicated (i.e., higher rates) with skin cancer in Australia [33].

Type 2 Diabetes Positive associations between exposure to green spaces and lower levels of type 2 diabetes have been found in a small number of studies [34, 35]. Studies from the UK and Australia have found that after controlling for other relevant factors the risk of type 2 diabetes is significantly lower in neighbourhoods with greater amounts of greenspaces [34,35]. The Australian study showed the risk was considerably less for those living in neighbourhoods with relatively high levels of green space (41- 60% coverage) [34]. A systematic review [31] found that although evidence is limited, there seems to be an association between green space and the prevention of type 2 diabetes. This is supported by another systematic review of 19 studies [36] which found that green space could increase likelihood of physical activity and decrease likelihood of obesity, leading to less risk of developing type 2 diabetes.

Neurological health Some positive evidence exists in relation to neurological health and exposure to nature. A cohort study [37] of 4.3 million adults in Canada found that increased exposure to urban green space was linked with reduced risk of dementia and stroke. A rapid review* of 22 studies [38] found that outdoor green space exposure was protective for brain health, cognitive impairment, and Alzheimer's disease.

Obesity

The evidence as to whether living nearer green space leads to reduced likelihood of obesity and overweight is mixed, some studies find a positive association while others find no relationship. Exposure to green space may reduce obesity via increased physical activity.[39] Some evidence has shown that green spaces can be associated with lower levels of obesity in adults [40] and children [41]; but the results are conflicting, and the evidence is often cross-sectional studies which cannot show direct causality*.

Physical Activity

Studies which have assessed actual use of natural environments tend to show that they promote and facilitate higher levels of physical activity. Most of the evidence is cross-sectional and does show that people do more physical activity in areas with more access to green space. However, cross-sectional studies cannot show a causal link between green spaces and levels of physical activity. A study from the UK found that people who lived nearest to formal parks were more likely to achieve the recommended level of physical activity.[42] This was supported by another UK study assessing rates of physical activity [43] but not by another,[44] showing that the evidence is mixed. 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[45,46]. Several studies suggest that people enjoy physical activities more when undertaken in greener environments.[47] 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 [47]. 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.[48]

What is the impact of the type or quality of natural environment on physical health?

Physiological health

Currently there is a small amount of evidence of the influence of the type or quality of environment on the health outcomes. Typically, studies have focused on the amount or proximity of generic natural environments around the home without seeking to differentiate between different environment types. What does exist suggests that high quality (both in terms of ecological quality and maintenance) greenspaces are associated with better outcomes. A UK study found that people who lived in areas with greater amounts of 'brownfield'* sites were significantly more likely to suffer from poorer physiological health than those living in areas with less. [49] Using data from the Monitor of Engagement with the Natural Environment Survey (2014/15- 2015/16) analysis has shown that spending 120 minutes a week in nature is associated with good health and wellbeing [50]. Recent research has differentiated between green space and blue space exposure. One

randomised control study[51] found that short walks in blue spaces was beneficial for mood, but not for cardiovascular outcomes. A meta-analysis of 8 randomised controlled trials* [52] did look at the benefits of green and blue spaces in terms of physical activity and quality of life but found no difference between the two types of environments.

Obesity

Having greater amounts of green space around the home has been shown to be associated with reduced rates and likelihood of overweight and obesity in local populations, however the evidence is not consistent with some studies failing to find the relationship. A study of several European countries found that the likelihood of obesity was around 40% lower for those living in residential environment with high levels of green features.[53] Research from the UK and Canada was inconclusive, finding no significant association between greater amounts of greenspace around the home and rates of obesity. [54] An Australian cohort study [40] of over 240,000 people over the age of 45 years did find that women living closer to green space had lower risk of being overweight, but did not find this for men.

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 study found that while positive relationships were identified in many studies, a similar number were inconclusive.[43] Most 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). There is some evidence that suggests that physical activity in natural environments may be more beneficial than activity in other environments.[47] 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. This was to a greater extent than physical activity in other environments. Those who regularly 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[55]. A systematic review found that compared with indoor activities, physical activity in natural environments is associated with greater feelings of revitalisation and positive engagement, decreases in tension, confusion, anger and depression, and with increased energy.[47]

Does the relationship between natural environments and physical health vary between different groups of people?

Physiological Health

The relationship between health and natural environments does appear to differ according to various socio-economic and demographic factors. These patterns appear to vary between studies and dependent on the health condition considered.[56] Analysis of data from across the UK showed that whilst rates of mortality from cardiovascular disease and respiratory disease decreased with increasing greenspace for men, no significant correlations* were found for women.[57] A systematic review of 59 studies of older adults found limited and inadequate benefits from exposure to residential green space for morbidity, cognitive function, physical capability, cardiometabolic risk and perceived wellbeing[58].

Obesity

Relationships between natural environments and being overweight differ according to factors such as age, gender, and socio-economic status. In terms of gender, Australian research found that neighbourhood natural environments had some protective effect against obesity in older women but not for men. [40] A similar result was found in a Spanish cohort study.[59] For age, further Australian research found that age was an important factor, and the protective effect of living in greener environments in childhood appeared to become more important with increasing years.[60] However, a recent systematic review[61] found access to green space was beneficial in terms of reducing obesity across all age groups. In terms of ethnicity, research from the USA found the strongest associations between greater access to greenspaces and a lower likelihood of obesity amongst African American children.[62]

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.[55,63–66] The evidence suggests that certain socio-demographic groups, including those with a long-term illness or disability, aged 65 and over, and of minority ethnic origin, are consistently less likely to use the natural environment for physical activity.[63,67] A UK study of children's activity showed that about half of their weekend moderate-vigorous activity took place in green space.[64] 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.[48]

Do natural environments have an impact on physical health inequalities?

Physiological Health

There is a growing body of evidence which typically shows that higher levels of natural environments around the home are associated with reduced levels of socio-economic inequalities in multiple health outcomes, however, there has been no systematic examination of the consistency of this according to exposure or outcome. Analysis of death records from England found that income related health inequalities in all-cause mortality and mortality from circulatory diseases were lowest amongst those people living in the greenest areas.[68] A study based in post-industrial North-East England concluded that the natural environment was one of several factors which contributed to deprived communities' better-than-expected health.[69] The natural environment was thought to ameliorate the detrimental health effects of long-term deprivation. Inequalities in birth outcomes have also been shown to be lowest in populations who have the greatest exposure to greenspaces, with the strongest associations for parents with the lowest rates of educational attainment and socio-economic-status (SES).[70] A systematic review of 90 studies from around the world [71] looked at the potential of green space to reduce health disparities. The researchers found that people with lower SES derived more beneficial effects from green spaces and parks compared to affluent people. European data showed a stronger protective effect of green space for people with lower SES than comparative data from North America. There was no difference in the protective effects of green space between different minority ethnic groups within Europe and North America.

Obesity

No specific evidence was found that considered the impact of natural environments on obesity and overweight related health inequalities. There is relatively little evidence which has addressed whether there is a relationship between physical activity in natural environments and health inequalities and 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 green spaces than people with better health. A Scottish study found no evidence that income-related inequalities in rates of physical activity taking place in green space were narrower in those areas with a greater quantity of natural environment.[42]

Physical Activity

Only a small amount of evidence was found that considered the role of the natural environment in relation to levels of physical activity in the context of health inequalities. However, levels of deprivation are associated with reduced levels of physical activity.[72] A large-scale survey of adults with learning disabilities in England found that people living in more deprived areas were less likely to take part in sport.[73] A UK survey data looking at SES and distance living from nature found that people living more than 300m away from

accessible greenspace had less likelihood of achieving the required recommended physical activity levels than those who lived closer to green space.[74]

What is the cost-effectiveness of health interventions using or taking place in natural environments?

Most cost-effectiveness research has occurred in the area of mental (rather than physical) health and the natural environment**.** One wide-ranging review looking at cost-effectiveness of nature and health[75] found that nature-based interventions may confer potential social and wider returns on investment.

Physiological Health

There appears to be little direct cost-effectiveness evidence for physiological interventions taking place in the natural environment.[14]

Obesity

Similarly, no evidence relating to the cost-effectiveness of obesity or overweight focused natural environment interventions was found.

Physical Activity

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 green space'.[76] The health benefits of walking on the Welsh Coast path have been estimated to amount to approximately £18.3 million per year.[77] The estimated value of a proposed expansion of the Walking for Health programme was found to be: 2817 *Quality Adjusted Life Years (QALY)* [see glossary] delivered at a cost of £4,008.98 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. 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**.**[78] Social return on investment assessments undertaken by greenspace Scotland [72] 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.

Implications for policy, service delivery and research

Policy and service delivery

Physiological health

- The weight of evidence detailed in the summary above suggest that future policy and decision making should support the creation of high-quality natural spaces close to where people live to promote better physiological health.
- Planners and developers should consider the role of natural environments on physiological health outcomes; however, it should not be assumed that all greenspaces will result in improved health gain unless they are appropriately sited, sensitively designed, and well maintained.
- The limited evidence of variation between social groups suggests that the difference in impacts should be considered in the design of future policy and interventions.
- Although there is very little evidence as to the effectiveness of environmental interventions targeting physiological health outcomes, it appears there may be value exploring how the design or use of natural environments can help tackle some of the key health issues we face. Modification of the environment may facilitate and contribute to health interventions which address other physiological health risk factors, such as health behaviour.

Obesity

- The small body of evidence, which while occasionally contradictory and not yet conclusive, suggests that there may be value in increasing the quantity and accessibility of good quality safe urban greenspaces to contribute to tackling overweight and obesity. This could be achieved, for example, through strengthening the planning recommendations regarding the quality and quantity of natural spaces within living environments
- Any interventions, policies and programmes should be suitably targeted to reduce risk of enhancing obesity related health and social inequality**.** Tackling obesity is complex, the use of theoretical frameworks and theory of change models would enhance intervention design.

Physical Activity

- 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.
- Strengthen the planning recommendations regarding the accessibility, quality, and quantity of (public and private) natural spaces within living environments.
- Identify opportunities for natural environment related physical activity in wider social and educational policies and programmes.
- Identify effective natural environment-based intervention options to increase activity for people of all ages and activity levels and abilities. Adopt the recommendation that opportunities for children's self-directed play in the outdoors should be increased.
- 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.
- Policies and programmes should be suitably targeted to reduce risk of enhancing physical activity, health and social inequalities.

Research gaps

Physiological health

- There is a need for further research into the relationships between natural environments and with cancer, musculoskeletal health, and allergies, and to systematically address the variation in physiological outcomes associated with exposure to natural environments between social and demographic groups.
- To inform decisions relating to the design and use of natural environment interventions to address physiological health there is a need to better understand causality and mechanisms, cost-effectiveness, variation in any outcomes, and potential to ameliorate or exacerbate health inequalities.

Obesity

- Planners and other spatial decision makers would benefit from greater evidence as to the influence of the type and quality of natural environments on weight status with guidelines on what is 'enough green' within the living environment to lead to positive weight related outcomes.
- There is a need to better understand: causality, cost-effectiveness, variation in any outcomes, and potential to ameliorate or exacerbate health inequalities; the influence of the type and quality of natural environments on weight status and the role of other important mediating factors (e.g., social support, compensatory behaviours etc.).

Physical activity

- Clarify whether, and to what degree, physical activity is a key mechanism explaining the health benefits of natural environments.
- 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 environments promote active lifestyles in different populations.
- 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.
- Carry out cost-effectiveness research to see if taking part in physical activity in the natural environment is more cost-effective than other settings.

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Glossary

Please see EIN069 for a full glossary

Brownfield	A brownfield investment is when a company or government entity purchases or leases existing production facilities to launch a new production activity.
Blue space	Outdoor environments–either natural or manmade–that prominently feature water and are accessible to people, e.g., the collective term for rivers, lakes or the sea.
Causal, causality, causation	When something has an actual effect on something else- and is not simply correlated with it
Cohort	Cohort studies are a type of longitudinal study—an approach that follows research participants over a period of time (often many years)
Correlation/ association	A correlation reflects the strength and/or direction of the relationship between two (or more) variables. The direction of a correlation can be either positive or negative. This is also sometimes referred to as an association.
Cross-sectional study	A cross-sectional study involves looking at data from a population at one specific point in time.
Empirical evidence	Empirical evidence is information that is acquired by observation or experimentation.
Epidemic	An epidemic is the rapid spread of disease to a large number of hosts in a given population within a short period of time.
Green space	Green space refers to land that is partly or completely covered with grass, trees, shrubs, or other vegetation. Green space includes parks, community gardens, and cemeteries.
Internal biome	Refers to all of all the microbes - bacteria, fungi, protozoa and viruses - that live on and inside the human body
Intervention	Something that comes between two things or something that changes the course of something.

Non communicable disease	A non-communicable disease (NCD) is a disease that is not transmissible directly from one person to another. NCDs include Parkinson's disease, autoimmune diseases, strokes, most heart diseases, most cancers, diabetes, chronic kidney disease, osteoarthritis, osteoporosis, Alzheimer's disease, cataracts, and others.
Perinatal health	Perinatal refers to the time before and after the birth of a child.
Quality Adjusted Life Years	The quality-adjusted life year or quality-adjusted life-year (QALY) is a generic measure of disease burden, including both the quality and the quantity of life lived. It is used in economic evaluation to assess the value of medical interventions. One QALY equates to one year in perfect health.

About Natural England

Natural England is here to secure a healthy natural environment for people to enjoy, where wildlife is protected and England's traditional landscapes are safeguarded for future generations.

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