VALUING NATURE PROGRAMME

Valuing Nature Programme Report No. 6

The cost-effectiveness of addressing public health priorities through improved access to the natural outdoors

August 2017

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A report produced following a Valuing Nature Programme workshop held on 2nd March, 2017 and organised by the Ecosystems Knowledge Network and Centre for Sustainable Healthcare.[1]

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Introduction

The rationale for a greater focus on preventative healthcare in the UK has been presented over many years (Wanless, 2002; Merkur *et al*., 2013; Edwards *et al*., 2016). As part of this there is growing interest in the economic case for using a greater proportion of NHS funding to bring about a healthier population and reduce future demand on health services. There is also an ongoing need to ensure that public health funding throughout the UK is used to improve health in ways that are cost-effective.

Throughout the UK the role that people's surroundings play in their mental and physical health is gaining interest. Initiatives such as the *Good Places Better Health* Programme in Scotland (Scottish Government, 2008) have helped to demonstrate how this can work in practice. In order to support the more widespread use of interventions based in the natural environment for improving health outcomes, local planners need support in deciding which interventions are the most effective and cost-effective in promoting good health and reducing health inequalities (McAuley *et al*., 2016). Natural outdoor spaces offer unique benefits in both preventing and treating ill health, as well as promoting good health and wellbeing. The evidence base to support general strategies for greater use of the natural environment to promote health is robust (Maxwell and Lovell, 2017).

Previous assessments of the availability of evidence for the cost-effectiveness of interventions to improve physical activity through changes to the environment have suggested that more work is required (NICE, 2008). Despite an ongoing lack of clarity as to what methods are available and how robust they are, the need to demonstrate the cost-effectiveness of environmental interventions remains. Following an inquiry into public parks in England, a House of Commons select committee stated that "*Quantifying the value of the contribution of parks and green spaces to the public health agenda could…help to provide*

[1] The Valuing Nature Programme is a five year £7M research programme which aims to improve understanding of the value of nature both in economic and non-economic terms, and improve the use of these valuations in decision making. It funds interdisciplinary research and builds links between researchers and people who make decisions that affect nature in business, policy-making and in practice. See www.valuing-nature.net.

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evidence for money allocated by the NHS to preventative health initiatives or to public health to be invested in parks infrastructure, maintenance or programmes." (CLG Committee, 2017).

The Naturally Healthy workshop

The objective of the *Naturally Healthy* workshop in Birmingham on 2nd March 2017 was to discuss the availability of methods to demonstrate the cost-effectiveness of addressing local public health priorities through increased access to the natural outdoors. It brought together 40 invited experts in health economics, healthcare, environmental economics and the provision of outdoor spaces. (**Annex A** contains a list of names of participants). The meeting was focused on research, policy and practice in the UK.

The focus for this meeting was how cost-effectiveness can be made available to the wide range of organisations that are, or could be, involved in funding public health outcomes in the UK. The event programme is provided in **Annex B**. Professor John Newton, Chief Knowledge Officer for Public Health England, chaired the morning session. *Naturally Healthy* involved presentations, panel discussion and group discussion.

The terms 'natural outdoor spaces' and 'natural outdoors' were used in the workshop to refer to environments where natural or semi-natural elements (vegetation, waterbodies, landform etc.) are an important part of the user's experience. Natural outdoor spaces range from public parks in the heart of cities to open landscapes in the countryside. Access to these spaces takes many forms, including views, visits for learning and recreation, as well as through participation in looking after them.

This report describes the ideas presented at the workshop, as well as literature identified by workshop participants and the event organisers. The perspectives presented in the report do not necessarily represent those of individual participants.

Cost-effectiveness analysis and public health

Cost-effectiveness analysis is a type of economic analysis used widely in public health (Owen *et al*., 2015). The National Institute for Health and Care Excellence has defined it as:

> *An analysis that assesses the cost of achieving a benefit by different means. The benefits are expressed in non-monetary terms related to health, such as symptom-free days, heart attacks avoided, deaths avoided or life years gained (that is, the number of years by which life is extended as a result of the intervention). Options are often compared on the cost incurred to achieve one outcome (for example, cost per death avoided)*.
>
> From NICE the on-line glossary (accessed March 2017).
> https://www.nice.org.uk/Glossary?letter=C

Cost-effectiveness analysis compares health outcomes in units relevant to the disease or condition being treated (typically Quality Adjusted Life Years or Disability Adjusted Life Years). Cost-benefit analysis measures both costs and outcomes in monetary terms (Drummond *et al*., 2015).

All parts of the health system have a stake in improving the health of the UK population. This includes public health, NHS organisations, providers of care in the community, as well as

funders of private healthcare and the third sector. Providers of natural outdoor spaces that contribute to a healthier population can be seen as being part of the health system, even if they don't come under the jurisdiction of the parts of government responsible for health. Demonstrating cost-effectiveness is, therefore, a challenge for a wide array of organisations. The roles, responsibilities and funding capacities of these organisations are continuously evolving.

Studies of the cost-effectiveness of environmental interventions to improve health

The few available studies of the cost-effectiveness of programmes intended to deliver health benefit through activities in the natural outdoors have tended to focus on nature-based therapies. An example is an examination of the cost-effectiveness of the *Branching Out* mental health referral scheme in Scotland (Willis *et al*., 2016). This study highlights the importance of assessing the impacts of an environmental intervention over an appropriate timescale. It used the SF-12 questionnaire (a standardised way to assess health and well-being from the patient's perspective) to determine health-related quality of life. A total of 150 individuals interviewed before and after participating in a 12-week programme of the woodland-based activities. The cost of the programme per Quality Adjusted Life Year was calculated (one QALY is equal to one year of life in perfect health). The authors estimated that if QALY improvements last for one year, then the cost per QALY would be £8,600. However, if the benefits only lasted three months, the cost would be £34,343.

The *Naturally Healthy* workshop included a presentation of one UK case of cost-effectiveness analysis (in terms of health benefit) of an investment in environmental infrastructure. The analysis was performed on the Connswater Community Greenway in Belfast (**Box 1**). The study was a natural experiment that used peer-reviewed sampling and modelling methods. It considered both the capital and running cost of the Greenway. The cost per Disability Adjusted Life Year (DALY) was calculated for various projected long-term increases in the level of physical activity attributable to the presence of the Greenway. (DALYs are a measure of the impact of a disease or injury in terms of healthy years lost.)

The Connswater study provides an approach to demonstrating the cost-effectiveness of investing in environmental infrastructure – such as greenspace – with a view to health benefits at the population scale. It suggests that the health outcomes of investment in environmental infrastructure in an urban area are favourable in relation to thresholds between £20,000 and £30,000 for what may be considered as cost-effective (see NICE, 2013 and NICE, 2015). The comparator in this study was no investment in a measure to improve the health of the population. The cost-effectiveness ratio of the Connswater Greenway can, however, be compared to equivalent ratios for the provision of pharmaceuticals such as statins.

There is a need to determine how the methods used in the above studies might be applied to broader population-scale public health challenges. Both studies highlight a gap in knowledge as to the enduring lifetime benefits of improved access to the natural outdoors . This is important in demonstrating a cost-effectiveness case.

Box 1

Cost-effectiveness evidence the health benefits of investment in an urban greenway

Based on Tully et al*. (2013) and Dallat* et al*. (2014).*

The Connswater Community Greenway is a £40 million urban regeneration project involving the development of a 9km linear park through East Belfast. It includes the provision of 19km of new cycle paths and walkways, and the construction of 43 bridges over waterways. The work also includes programmes that encourage physical activity within the local communities. Approximately 87,500 people live within 1 mile of the Greenway. 7 out of 22 wards surrounding Greenway are within the top 25% most deprived wards in Northern Ireland. The Greenway has been funded by the National Lottery.

To economically evaluate the Connswater Greenway, a Cost-Utility Analysis (CUA) was conducted in line with the NICE reference case. Data from a household survey of the Greenway population was used to determine baseline physical activity levels in the area. Following this, the macro-simulation PREVENT model (Soerjomataram *et al*., 2010) was used to simulate how many new cases and deaths from Ischaemic Heart Disease, Type 2 diabetes, stroke, colon and breast cancer could be prevented in the greenway population if three hypothetical scenarios were achieved. That is if 2, 5 or 10% of the population considered to be 'inactive' at baseline, became 'active', over the expected lifetime of the Greenway of 41 years.

By calculating the total cost savings through diseases avoided for each scenario and taking these away from the total construction and maintenance costs of the Greenway, the net cost of the Greenway per scenario was obtained. Finally, by dividing the net costs by the health benefits (DALYs) accrued, an incremental cost-effectiveness ratio (ICER) for each scenario was derived. All ICERs were found to be well below a £20,000 (a possible cost-effectiveness threshold).

Scenario (estimate of effect)	Discounted construction & maintenance Cost	Discounted disease cost savings	Incremental costs	Total DALYs saved	Total Discounted DALYs saved	£/DALY
A (2%)	£6,857,811	£211,811	£6,646,000	1479.25	361	£18,411
B (5%)		£481,179	£6,376,633	2959.24	722	£8,830
C (10%)		£946,088	£5,911,723	5420.19	1323	£4,469

Key considerations in demonstrating cost-effectiveness

Workshop participants were asked to identify key considerations when seeking to show the cost-effectiveness of addressing public health priorities through improved access to the natural outdoors. These are summarised as follows:

1. Changing roles, responsibilities and priorities in the health sector

There is a trend towards a more integrated healthcare system that places greater emphasis on preventative healthcare. Examples of this are:

- The implementation of Sustainability and Transformation Plans for the NHS across England. They are expected to facilitate a shared understanding between organisations in the health system of how to improve patient experience and health outcomes over the longer-term.
- The Wellbeing and Future Generations (Wales) Act, 2015. This requires public bodies, including Local Health Boards, Natural Resources Wales, Public Health Wales and local authorities, to work collaboratively through new Public Service Boards. Achievement of a healthier Wales is one of the Act's goals.

As a result of the implementation of policies such as these, roles and responsibilities for achieving public health improvements are likely to overlap more than before. Methods for analysis of the cost-effectiveness of actions involving the natural outdoors will need to take account of uncertainty over how funding responsibilities for public health outcomes are to be shared. Evidence from cost-effectiveness analyses will need to be acceptable to a diverse range of organisations.

2. The role of cost-effectiveness evidence in funding decisions

Programmes that increase access to the natural outdoors with a view to achieving public health outcomes may not sit comfortably in the frame of cost-effectiveness analysis for clinical or traditional public health programmes. There is a need to recognise that health interventions involving the environment are different from medical interventions (such as the provision of pharmaceuticals) or public health programmes involving relatively controlled environments (such as indoor gyms). In particular:

- The precise effect of any one action to improve the quality, quantity or accessibility of natural outdoor spaces on physical activity or mental health may be difficult to determine. There is a wide array of confounding factors, such as education, cultural factors, involvement of local GPs and the influence of local community leaders.
- The benefits of preventative healthcare are broad, such as improved workforce productivity and a sense of wellbeing within local communities. Cost-effectiveness analysis (assessing the cost of achieving a benefit by different means) will need to be applied in the context of cost-benefit analysis. The latter is able to consider the broad range of benefits arising from improvements to the quality of the environment.
- Some actions to improve access to the natural outdoors may take several years to have their desired effect on the health status of a population. This is the case for example, in the creation of greenspace around a new housing development.

3. Understanding the breadth of possible interventions

Cost-effectiveness analysis needs to recognise that interventions that improve access to the natural outdoors can take many forms. They range from educational programmes through to enhancements of the quality of greenspace through tree planting or enhancement of biodiversity. Alongside this, the planning and design professions have a fundamental role in creating the environments in which access to the natural outdoors is not only feasible but also desirable.

4. The scale at which evaluations are required

The different parts of the health and environment sectors are each focused with action and outcomes at different spatial scales. These range from local administrative designations (such as wards) and individual natural outdoor spaces through to programmes that could operate across towns, cities and regions. The health outcomes at each level are likely to differ, and therefore will require different methods for demonstrating cost-effectiveness.

Alongside this, there is a need to differentiate between methods that apply to individuals and those that will apply to diverse communities.

5. How to measure health outcomes

Quality Adjusted Life Years (QALYs) have been widely used for measuring the cost-effectiveness of health interventions. Some participants of the *Naturally Healthy* workshop expressed uncertainty as to whether QALYs are an appropriate way to assess the benefits of an intervention involving the natural environment for preventative healthcare.

Consideration should be given to how the capabilities approach to economic welfare applies to cost-effectiveness analysis. Health capability involves examination of the conditions that aid, and barriers that impede, health and people's ability to make health choices (Ruger, 2010). Alongside consideration of the outcome of an action to maintain or improve overall health, it also considers how the ability of an individual to determine their own health can change as a result.

The process of demonstrating cost-effectiveness

Demonstration of the cost-effectiveness of improving access to the natural outdoors in order to achieve public health outcomes involves many different steps. Participants at *Naturally Healthy* examined the following four:

a) Design of an intervention involving the natural outdoors that is likely to be cost-effective. An intervention may relate to:
   - Improvement to the quality or quantity of a natural outdoor space
   - Facilitation of greater use of spaces by priority groups, such as exercise programmes.

   During the design process, there is a requirement for clear identification of the intended health outcomes and when these will be achieved.
b) Prior estimation of potential health cost-effectiveness for a particular intervention involving the natural environment. This includes identification of the alternatives to achieve the desired health outcome.
c) Progressing from design and analysis to implementation. This includes finding ways in which local partners in the environment and health sectors can work together with local communities. Implementation may take an extended period.
d) Evaluation to assess effectiveness in achieving the desired outcome.

An approach to cost effectiveness appraisal

The *Naturally Healthy* workshop included a presentation by economists from PwC of a new analytical approach to improving public health and reducing the cost of healthcare. A summary is provided in **Box 2**.

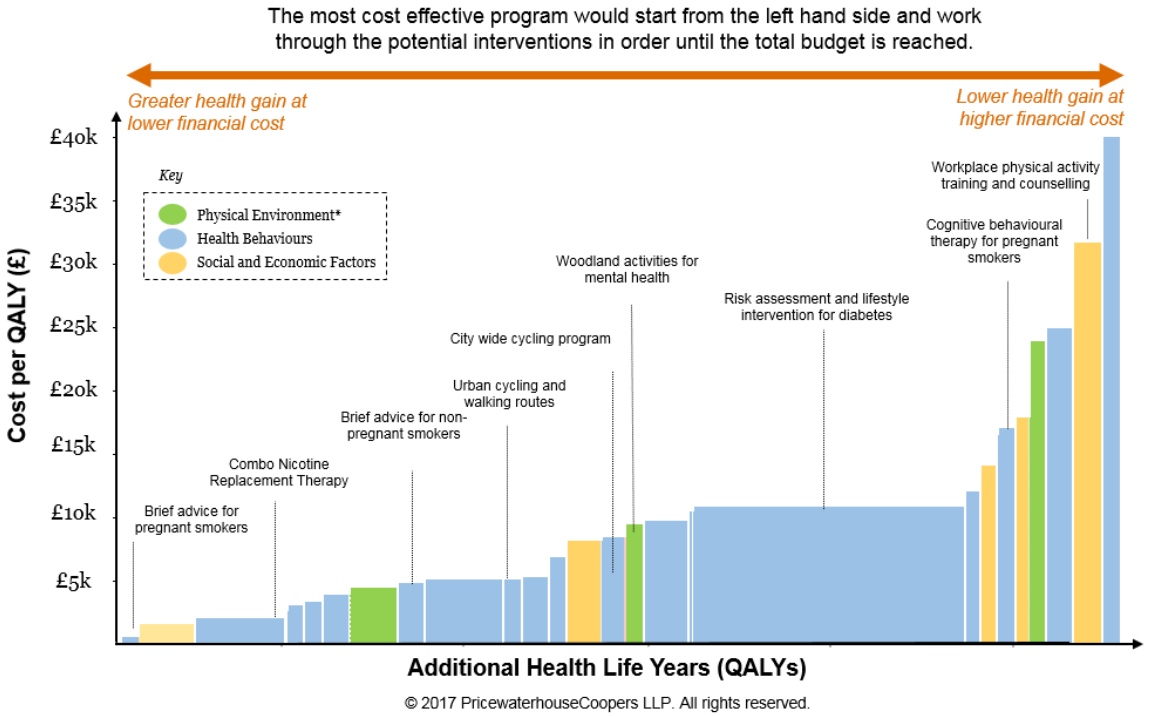
Box 2

Getting more health for your money: a new analytical approach to improving public health and reducing the cost of healthcare

Information provided by Mark Ewins and Will Evison, public health economists at PwC

Existing analytical tools only allow interventions to be considered in isolation, and build in county-level population data at best. To be able to prioritise spending effectively, Directors of Public Health need to understand at a very local level the likely effectiveness of the full suite of available interventions, as well as the effects of interactions between them.

Using big data and enhanced computing power, PwC has developed a model that can deliver just that. One of the model's key outputs: *The Health Improvement Cost Curve (HICC)*, is illustrated[2] below.



* Physical environment refers to activities that impact housing or the natural environment

The HICC uses evidence tailored to local circumstances in order to provide commissioners with a clear roadmap to deliver improved public health services in their locality. By ranking interventions in order of cost effectiveness (using the metric: £ / Quality Adjusted Life Year (QALY)), it is clear which interventions will deliver the most health gains per £ spent.

In addition, the HICC is also able to demonstrate the total potential health improvement delivered by each intervention within a given locality, represented by the width of each bar. This is critical information because: 1) it helps understand the scale of the prize from each intervention in a locality (i.e. whether it has the potential to deliver large or small health improvements overall), and 2) combined with the cost effectiveness data, it enables estimation of the budget needed to implement each intervention to its maximum potential.

As a result, decision makers can quickly understand the range of interventions that will optimise their budget, by simply working through them in order from left to right and stopping once their budget has been reached.

The model underpinning the HICC can also be used to quantify the expected NHS savings based on the suite of interventions selected. This is done by identifying the conditions avoided as a result of each intervention and quantifying the related avoided treatment costs.

While cost-effectiveness and NHS savings are not the only considerations for local public health strategy, they should be central components. Now, with the HICC, we have the tools needed to credibly and systematically assess both, giving public health decision makers a great opportunity to reduce unnecessary ill health and ease the pending NHS budget crisis.

Note: Evidence and results used for this HICC curve are for illustration purposes only. For further information contact: Mark.R.Ewins@pwc.com or William.J.Evison@pwc.com

Requirements for research and knowledge exchange

Participants of the *Naturally Healthy* workshop discussed action to improve the availability of methods that demonstrate the cost-effectiveness of increasing access to the natural outdoors in order to achieve public health outcomes. In all cases this is expected to be highly interdisciplinary research and involve close collaboration with organisations in the health sector.

1. Evaluating pathways to scaling up of existing evidence

Within the UK, there is little understanding of the barriers to replication of existing cost-effectiveness evidence with regard to delivering health outcomes through improved access to the natural outdoors. This stems partly from the fact that the alternative ways in which funds could have been spent on health outcomes are not clear. More importantly, it is unclear how evidence from studies such as Connswater Greenway (**Box 1**) can be applied by different types of organization. There is an opportunity for inter-disciplinary research to investigate how cost-effectiveness evidence might be used by organisations that could invest in improved access to the natural outdoors for health benefit. In this work, the extent to which cost-effectiveness evidence is a factor in funding decisions needs to be made clear.

2. Evidencing cost-effectiveness over long time periods

Participants at the *Naturally Healthy* workshop acknowledged that changes in access to the natural outdoors have impacts over the lifetime of an individual. This is a particularly important consideration in programmes that help children and young people engage with the natural environment. Short-term studies of the cost effectiveness of health outcomes of improved access to the natural outdoors don't capture these longer-term benefits. There is a need to devise research methods that demonstrate the cost-effectiveness of investment in the environment now for health outcomes that will manifest themselves over many decades. Diabetes prevention programmes would be a useful focus for such research. There is an opportunity for greater usage of UK household surveys, as well as the Monitor of Engagement with the Natural Environment (England) and the People and Nature Survey (Scotland).

3. Inclusion of cost-effectiveness analysis and method development into research on the relationship between health and access to the natural outdoors

Interactions between the quality of the natural environment, access to the natural outdoors and health and wellbeing are inherently complex. A systems view is needed, including the behavioural science of change. Funders of research that generates evidence of the health benefits of improved access to the natural outdoors should consider incorporating cost-effectiveness analysis into this work.

4. Embedding cost-effectiveness assessment in local environmental programmes

Programmes to improve the natural environment in and around local communities often arise from the people who live and work there. Such activities have distinct benefits as they address issues from the perspective of the local community, taking into account cultural factors. There is a need to ensure that these programmes generate cost-effectiveness evidence which informs funding decisions locally. If health economists were embedded within community-based environmental programmes, this is likely to have significant benefits for the cost-effectiveness evidence base.

5. Cost-effectiveness analysis for clear alternatives

Funding actions to improve access to the natural outdoors differs from other public health interventions because they are less controlled and are usually associated with multiple benefits. There are opportunities for evaluation of clear binary alternatives, such as the provision of indoor and outdoor gyms or 'talking therapies'.

Discussion

Discussion between participants at the *Naturally Healthy* event highlighted that the cost-effectiveness of using the natural outdoors for public health needs to be demonstrated at many different spatial scales and timescales. These include:

- Informing decisions about the quality and quantity of greenspace provision around built development. In principle, there is a case for investment in the environment of these areas with a view to securing long-term health outcomes.
- Guiding local authorities and NHS organisations seeking to reduce health inequalities across metropolitan areas or counties. In this case, commissioning of environmental programmes that increase physical activity may be competing with a wide range of traditional public health interventions. This includes the promotion of active travel routes.
- Commissioning of environmental programmes in or for individual local communities. This could include actions taken by groups of GP surgeries and single natural features such as public parks and woodlands.

It is important to differentiate between analysis of the cost-effectiveness (in terms of health outcomes) of providing people with a high quality natural environment in which to live and work, and actual use of specific natural outdoor spaces. A wide range of cultural, climatic, behavioural and social factors determine actual use in individual locations.

If cost-effectiveness evidence relating to the health benefits of improved access to the natural outdoors were more readily available, it would benefit a wide range of organisations. In England, local authority Public Health Directorates are a prime user of the evidence. In other parts of the UK, NHS organisations are taking the lead on preventative healthcare. An

example is the inclusion of the Larbert Woods Project on the site of the newly-constructed Forth Royal Hospital near Falkirk in Scotland.[2]

There is a need to create the conditions for collaboration to develop and use cost-effectiveness evidence relating to health and the natural outdoors. In Wales, the Wellbeing and Future Generations Act (Wales) 2015 has provided a starting point for this by requiring public bodies, including the NHS, to collaborate to reduce health inequalities. In England, there are opportunities to do this within the frame of Sustainability and Transformation Plans.

The increasing recognition of the economic value of the multiple benefits arising from natural outdoor spaces mean that future funding models for their upkeep are likely to be complex. Upstream analysis of the wider economic benefits from investing in preventative healthcare delivered through the natural environment needs to recognise the role of public goods. For instance, a coastal footpath may be considered a public good as it is "non-excludable" (it is not possible to prevent individuals using it) and "non-rivalrous" (the utility gained from its use by one person does not, within reason, detract from the utility gained by another person).[3]

Conclusions and next steps

- While there are several case studies demonstrating the cost-effectiveness of the use of natural outdoor spaces to achieve public health outcomes, the topic remains at an early stage with no standardised methods.

Next step A - The research community has a significant opportunity to integrate cost-effectiveness analysis into existing and new health-environment research programmes. Long-term collaboration between health, economics and environment research funders will be required for this. Organisations in the health system will need to be involved in this so as to ensure that new methods arising are fit for their decision-making processes.

- A key part of demonstrating the cost-effectiveness of improving access to natural outdoor spaces to deliver health outcomes is evidence of cause and effect.

Next step B - Organisations responsible for preventative healthcare in the UK have the opportunity to collaborate to pool and share evidence relating to the long-term effect that improved access to the natural outdoors has on health outcomes at the population scale. The research community should be involved in this process in order to ensure integration into methods for demonstrating cost-effectiveness. As part of this, guidance is needed on evidence standards.

- There remains a need for methods for cost-effectiveness analysis for natural outdoor interventions that (1) meet the evidence needs of the health sector and (2) are capable of integration into broader environmental cost benefit and return on investment analyses.

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[2] See http://greenspacescotland.org.uk/project-larbert-woods.aspx for a description.
[3] This is one of a number of ideas raised in a blog produced by Professor Rhiannon Tudor-Edwards following the Naturally Healthy workshop: http://cheme.bangor.ac.uk/blogs/Valuing%20nature%20in%20public%20health%20economics.RTE.16.3.17.pdf

Next Step C - There is an opportunity for local pilot projects to demonstrate how cost-effectiveness analysis could be integrated into broader economic valuations of environmental assets. NICE method guidelines will be an important consideration within this, as well as the environmental economics advice provided by bodies such as the Natural Capital Committee for England. The pilots would be initiated by local environmental organisations in partnership with organisations in the health sector, supported by researchers.

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Annex A – Naturally Healthy event participants

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Will	**Evison**	PwC
Mark	**Ewins**	PwC
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Julian	**Harlow**	Defra (Natural Capital Committee Secretariat)
Joe	**Hayden**	Birmingham City Council
Dominic	**Higgins**	The Wildlife Trusts
Dean	**Hill**	Dudley Metropolitan Borough Council, Office of Public Health (to 2nd March 2017)
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Dr. Bruce	**Howard**	Ecosystems Knowledge Network
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John	**Porter**	Birmingham City Council
Graham	**Randles**	NEF Consulting (consultancy arm of the New Economics Foundation)
Pete	**Rawcliffe**	Scottish Natural Heritage
Prof. Julia	**Fox-Rushby**	Brunel University (Institute of Environment, Health and Societies)
Dr. Laetitia	**Schmitt**	The University of Leeds
Dr. Phil	**Shackley**	University of Sheffield
Rachel	**Stancliffe**	Centre for Sustainable Healthcare

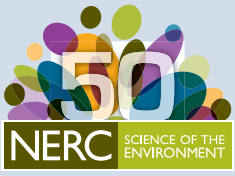
Julia	**Thrift**	Town and Country Planning Association
Prof. Rhiannon	**Tudor Edwards**	University of Bangor (Centre for Health Economics and Medicines Evaluation)
Malcom	**Ward**	Public Health Wales
Prof. Catharine	**Ward-Thompson**	University of Edinburgh (Edinburgh School of Architecture and Landscape Architecture) OPENspace (Universities of Edinburgh and Heriot-Watt)
Dr. Anita	**Weatherby**	Valuing Nature Programme Co-ordination Team (Centre for Ecology & Hydrology)

Note – the views expressed in this report are not necessarily those of any individual participant in the Naturally Healthy workshop, or the organisations to which they belong.

Annex B – Naturally Healthy event programme

10 am	**Morning session:** Chair: Prof. John Newton (Chief Knowledge Officer, Public Health England)
10 am	**Welcome and chairperson's opening remarks**
10:10 am	**An introduction to the economics of health inside and outside the 'health sector'** Prof. Rhiannon Tudor Edwards (Co-Director of the Centre for Health Economics and Medicines Evaluation, University of Bangor)
10:35 am	**Urban greenways have the potential to be cost-effective. The case of Connswater, Belfast** Dr. Mary Dallat (Speciality Registrar, HSC Northern Ireland)
10:55 am	**Healthcare Decision Making in Practice** Dr. Caroline Jessel (Lead for Clinical Transformation and Outcomes Medical Directorate, NHS England South East)
11:20 am	**Refreshments**
11:45 am	Small group discussion: formulation of key questions
12 noon	Panel discussion followed by questions from participants Panel members: Ece Ozdemiroglu (Director of eftec, Economics for the Environment Consultancy), Dr. Ben Gershlick (Economist, Health Foundation), Prof. Catharine Ward Thompson (Professor of Landscape Architecture, University of Edinburgh).
12:40 pm	**Lunch**
1:30 pm	**Afternoon session 1: Reducing diabetes in Birmingham cost-effectively** Led by Dr. Bruce Howard (Ecosystems Knowledge Network) and Rachel Stancliffe (Centre for Sustainable Healthcare)
1:35 pm	Primer talks Dr. Ewan Hamnett An introduction to diabetes interventions in Birmingham. Will Evision and Mark Ewins, PwC. An example cost curve for public health interventions.
2 pm	Small group discussion: how would the cost-effectiveness of an intervention to reduce diabetes incidence through the natural outdoors be appraised?
3 pm	**Refreshments**
3:30 pm	**Afternoon session 2: Priorities and opportunities for collaborative research** Chair: Prof. Julia Fox-Rushby (Theme Leader for Health Economics, Brunel University). Panel discussion followed by questions from participants Panelists: Malcolm Ward (Public Health Wales), Dominic Higgins (Wildlife Trusts), Dr. Laetitia Schmitt (University of Leeds, Academic Unit of Health Economics).
4:30 pm	**Close**

VALUING NATURE PROGRAMME



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