Environment (including weather and climate), and health (including mental wellbeing): challenges and opportunities

Dr Dan Bloomfield
Met Office / University of Exeter, UK
Seamless prediction

Forecasting is essential to help you prepare for the best and worst of our climate.

- **Today**
  - Nowcast & real-time
  - Demand forecasts
  - Weather warnings

- **Week**
  - Disruption planning
  - Balancing resources
  - Stand-by preparations

- **Months**
  - Balancing resources
  - Maintenance planning
  - Mitigation / advertising
  - Operations planning

- **Seasons**
  - Maintenance schedules
  - Resource planning
  - Market trading
  - Hurricane forecasts

- **Years**
  - Regulatory standards
  - New infrastructure
  - Resources
  - Financial & property portfolio risk management

Forecast lead time:
- Minutes, Hours, Days
- 1-2 Weeks
- Months
- Seasons
- Years
European 2003 and 2006 summers could be ‘normal’ by 2040 and ‘cool’ by 2060

Source: Gareth Jones, Hadley Centre
The European Centre for Environment and Human Health

Exeter Medical School
Truro Health & Wellbeing Campus
Cornwall, UK
The European Centre’s **Mission** is:

“To explore the interconnections between the Environment and Human Health using a unique cross-cutting interdisciplinary approach.”
Introducing the Centre

Interconnections: Environment ↔ Human Health

Environment
- Climate, Radiation
- Toxins, Pollutants
- Microbes, Physical Environment

Human Health
- Obesity, Mental Illness, Cancer
- Allergies, Respiratory & Reproductive Diseases

Behaviour
Introducing the Centre

Interconnections: Environment ↔ Human Health

Environment
- Physical Environment, Biodiversity, Natural Environment

Behaviour

Human Health and Wellbeing
Health Data

81 101921 N DEE4E5107B0B76123C8447A7888677C4 EX1 2 07082003 21

Age
Born Oct. 1921
African
Patient identifier

Postcode district of residence
Female
Admitted 7 Aug. 2003
Emergency: via Accident and Emergency services

30082003 19 1 23 J450 Z501 Z508 RH8 L83143

Discharged 30 Aug. 2003
Destination: usual place of residence
Discharged on clinical advice or with clinical consent
Duration of spell
Predominantly allergic asthma
Other physical therapy
Care involving use of other rehabilitation procedures
Royal Devon and Exeter NHS Foundation Trust

Source: maps.google.com
Some relevant ongoing research topics:
• Blue Gym
• Healthy Marine Environment
• Wellbeing across the life-course
• Workplace dimension
• The benefits of participation
• Systematic Review
Basic Experimental Paradigm

Stressor → T1 Mood Physio. → Green Space → T2 Mood Physio.

Lab work: (Films, Sounds, + During Exercise)

Applied Settings & Different Populations

Dental surgeries (+ VR)

Mat White PhD et al
Blue Gym = Campaign + Research

Rockpool rambles
Sailing

Health and Wellbeing from the Environment

Rigorous scientific studies
(Secondary Data, Intervention & Mechanistic studies)

Mike Depledge PhD et al
English census data shows that people living near the coast report higher levels of self-reported good health (especially among more deprived communities).
Self-reported health
Census Data (England, n = 48 million)

Fig 1. The coast and good health in urban areas. Age standardised % of population stating ‘good health’ relative to those in areas furthest from the coast (>50km) - adjusted regression coefficients with 95% confidence intervals; total and by income deprivation quintile.

The Value of a Healthy Marine Environment

- Doctoral Research between with the European Centre for Environment and Human Health, the University of Exeter Medical School and Plymouth Marine Laboratory.
- Examining the barriers and motivators that influence public usage of the marine environment for recreation, particularly from a health and well-being perspective and whether those motivating factors have the potential to be used to encourage more people to use the sea and coast for the health and well-being benefits.
• Andrea will then try to estimate what the economic value to the public is of a marine environment that supports health and well-being through facilitating and motivating recreational use.

• Andrea’s study will involve a survey of residents and visitors to Cornwall in the UK.

• Andrea Harvey
• Email: anha@pml.ac.uk
• Tel: +44 (0)1752 633100 / +44 (0)7770 954529
Health & Wellbeing in the Natural Environment Across the Life Course

Transitions into Retirement

Young Adults & Outdoor Physical Activity (ESRC/National Trust)

‘Stories of the Sea’: Exploring *Embedment* in Deprived Coastal Communities

Cassie Phoenix PhD et al
Cornwall Healthy & Sustainable Workplace Research Programme

- ↓ Absenteeism
- ↑ Productivity
- ↑ Mental Health & Wellbeing
- ↓ MD Visits, Rx, Referrals

↑ Protection & Appreciation of the Natural Environment

Jane Abraham et al
School for Public Health Research, Peninsula

The health and wellbeing impacts of participating in environmental enhancement/conservation activities:

a systematic review of quantitative and qualitative evidence

1European Centre for Environment and Human Health, University of Exeter Medical School, Truro, TR1 3HD. 2PenTAG, University Of Exeter Medical School, Exeter, EX2 4SG.

*Corresponding author: Ruth.Garside@pms.ac.uk 01872 258148

Review aims
The review will investigate the impacts of being involved in environmental enhancement activities on health and well-being for different groups of people.

The project will use theory-driven systematic review methods to understand the proposed mechanisms by which environmental enhancement is thought to affect health and well-being, and to assess the empirical evidence to support them. We will include evidence about activities across a range of settings and population groups in order to examine both whether these activities can have positive impacts, but also to understand how and why these occur, and in what contexts these effects can be optimised.

We will review and synthesise quantitative and qualitative research evidence and develop, where data allow, a logic model which describes the nature and potential interactions of impacts.

Review questions
- What are the health and well-being impacts (both positive and negative) of taking part in environmental enhancement/conservation activities for different groups of people?
- How do these activities achieve these impacts?
- Are there any particular impacts on different groups of people?
- What are the contextual factors contributing to these differing impacts?

Work to date
• We convened the project reference group & held the first workshop to:
  - Initiate the development of the theoretical framework to identify the mechanisms through which the activities are believed to have health effects (see Figure);
  - Refine our definition of “environmental enhancement activities”; &
  - Develop search terms and inclusion criteria.
• Contacted more than 200 organisations in the UK to identify grey literature. 245 documents obtained which, after screening, yielded 12 quantitative and eight qualitative studies for inclusion in the review.
• These twenty studies have been data extracted and quality appraised.
• Developed the search strategy for use in the electronic databases.
• We have registered the title with the Cochrane Public Health Group.

Various hypotheses have been proposed to explain the potential health and well-being impacts of involvement in these activities. These include formal, academic theories as well as lay, “everyday theories” understood by participants and organisers.

Academic theories include BIOPHILIA which suggest an evolutionary connection between humans and the natural world which causes individuals to seek out contact with nature and for them to experience negative health impacts when unable to do so (Wilson 1984). ATTENTION RESTORATION THEORY was developed by psychologists and posits that contact with nature can reduce levels of mental fatigue and stress (Kaplan & Kaplan 1989; Ulrich et al 1991).

The project reference group suggested a number of possible mechanisms of action which we found reflected the Foresight “ecosystem approach” where ecosystems can interact between elements through the remainder of the review.

The National Institute for Health Research’s School for Public Health Research (NIHR SPHR) is a partnership between the Universities of Sheffield, Bristol, Cambridge, UCL; The London School for Hygiene and Tropical Medicine; The Peninsula College of Medicine and Dentistry; the LiLaC collaboration between the Universities of Liverpool and Lancaster and Fuse; The Centre for Translational Research in Public Health, a collaboration between Newcastle, Durham, Northumbria, Sunderland and Teesside Universities.

This is an outline of independent research funded by the NIHR SPHR. The views expressed are those of the author(s) and not necessarily those of the NHS, the NIHR or the Department of Health.
Salutogenesis
• The process of ‘health creation’

Most research simply discusses generic ‘greenspace’—what about benefits of specific environments?
• Environment type – woods, parks, beaches, upland…
• Blue or Green? What kind of green/blue?
• Biodiversity?
• Urban vs rural environments?
• Protected/designated areas?

ECEHH Systematic review - in progress
"What is known from existing literature about whether more biodiverse ‘natural’ environments can have greater salutogenic effects than less biodiverse ‘natural’ environments?“
Summary

• Data is key
• Climate change and weather is part and parcel of the environmental context and the drivers of behavioural change
• There are European dimensions to explore further
• Mental health and wellbeing is not an isolated phenomenon
• Research requires multi-disciplinary groupings