Oceans and Human Health: Brief Overview

LE Fleming, N McDonough, M White, M Depledge, M Austen, S Pahl
Interconnections: Environment ↔ Human Health

Environment
- Physical Environment
- Biodiversity
- Natural Environment

Behaviour

Human Health and Wellbeing
RISKS & REMEDIES
from the OCEANS

National Need:
• To Increase Understanding of Human Health Risks & Remedies from the Seas

International Need:
• To Increase Understanding of Human and Ecosystem Interactions with the Seas and Oceans

• Both Risks AND Benefits/Opportunities
RISKS:

- Storms, Climate Events, Climate Change
- Harmful Algal Blooms (HABs) & Other Toxins
- Infectious Diseases
- Anthropogenic Chemicals
- Fisheries Destruction
BENEFITS & OPPORTUNITIES:

- Modelling/Forecasting
- Pharmaceuticals & Other Bioactive Compounds
- Biotechnology
- Marine Organisms as Biomedical Models
- Coastal Living/“Blue Gym”
US NSF NIEHS & NOAA Oceans & Human Health Centers:
Inter-disciplinary Research, Training, Pilot Projects, Facilities Cores, Shiptime
2015
2 NSF NIEHS OHH Centers + 11 RO1s
3 NOAA OHH Centers + Training Grants
OHH New Scientific Discipline

Gordon Conference in

OCEANS & HUMAN HEALTH

• June 2008
• June 2010
• June 2012
• June 2014
Europe – a maritime continent

• 4 seas & 2 oceans
• 91,000km coastline (EU + Norway)
  • 50% EU population lives within 50km of coastline
  • 50% EU territory underwater
• Trade: 90% external, 40% internal
  • 40% World’s Merchant Fleet
• 5.4 M jobs
• GVA = €500 Billion/year

¹ EU Blue Growth Strategy: COM(2012)494 final; N McDonough ESF Marine Board
European Marine Board

Provides a pan-European platform for its member organizations to:

• develop common priorities;
• advance marine research;
• bridge the gap between science and policy;

to meet future marine science challenges and opportunities.
2014 OHH Recommendations

- Interdisciplinary collaboration
- Transmission processes
  - Ocean Literacy
- Valuation methods
- Causal relationships
- Monitoring and surveillance
- Indicators
- Environmental modelling
“A coordinated, cross-disciplinary and integrated Programme on **Oceans and Human Health**, targeted at understanding and managing the risks and benefits to human physical and mental wellbeing from interactions with the seas.”

• **OHH Priority area** for potential cooperation on Roadmap for Transatlantic Ocean Research Alliance.
EU Blue Growth strategy: Risks & Benefits?

Goal to reach 7 million jobs by 2020 with 5 Sectors

- Blue energy
- Aquaculture
- Marine mineral resources
- Maritime tourism
- Marine biotechnology
The Coast: An Under-researched Public Health Resource?

Mat White
Mathew.White@Exeter.ac.uk

Michael Depledge
Sabine Pahl
Ben Wheeler

Ian Alcock, Debbie Cracknell, Karin Tanja-Dijkstra, Lewis Elliot, Bonny Hartley, Lora Fleming, Ian Frampton, Amanda Hignett, Rebecca Jenkin, Will Stahl-Timmins, Shanker Venkatasubramanian, Abigail Weeks, Kayleigh Wyles, Julie Hollenbeck, Cassie Phoenix
<table>
<thead>
<tr>
<th>Method</th>
<th>Pros (inc.)</th>
<th>Cons (inc.)</th>
<th>Our studies</th>
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| Systematic reviews | Good handle on what’s out there                                              | Can exclude important information, no new evidence                          | - Attention Restoration Theory  
- Biodiversity & health                                                         |
| Lab experiments    | Reduced confounds & selection effects. Increased understanding of underlying processes (e.g. physiological, emotional, cognitive). | Small Ns (convenience samples); non-ecological e.g. may miss synergistic effects | - Videos/photos/sounds  
- Attention processes  
- Delay of gratification  
- Risk taking  
- Pain |
| Where people live  | Representative samples  
Some longitudinal data                                                        | Causality?  
Multiple confounders                                                        | - Census (N = 48 million)  
- BHPS (N = 12,000 x 18 yrs)                                                   |
| Visitor surveys    | Big numbers  
Multiple environments (controls)  
Voluntary/chosen                                                              | Memory biases, selection effects                                              | - MENE (N = 142,000)  
- Wembury surveys  
- Surfing / sailing studies                                                    |
| Field experiments  | Realistic exposure conditions  
with some control                                                               | Hard to randomise/blind to condition                                          | - Marine Aquarium  
- Dental surgeries  
- Volunteering studies                                                         |
| Imaging (fMRI)     | Observation of brain activity using blood flow proxy                         | Risk of Type 1 errors, “fishing trips”, temporal snap-shots                  | - Urban/green/blue images  
- Matched liking sets                                                           |
| Qualitative interviews | In-depth understand of people’s motives & beliefs                             | Unrepresentative samples  
Demand characteristics                                                         | - Parent interviews  
- Child interviews                                                               |
Choosing a hotel room……..

All 3 rooms are identical (2-3 star, size, furniture, en-suite, price) except view from the balcony

A

B

C

£60.81

£72.85

£47.96

Mean Willingness to Pay (per night)

White et al., 2010, J Environ Psych
Beyond green space – The Coast

Self-reported Health
Census Data (England, n = 48 million)

- The effects are strongest in poorer communities

Stress reduction from coastal visits

Monitor of Engagement with the Natural Environment (visits n = 11,680)

Controlling for: Age, gender, SES, activity type, visit duration, companions, distance travelled & mode of transport

Bringing the sea into health care

Randomised Control Trial

Dental room

Iced water

Virtual beach

Outcomes
Pain
Ease of treatment
Keep appointments

Pahl, White et al
Vulnerable Communities Business

Next steps

• What is the optimal dose?

• How long do effects last?

• Comparisons to/Synergy with drugs (e.g. depression)?

• What about children, other vulnerable populations?

• Other countries?

• Environmental impacts?
Salutogen

- Lowers blood pressure
- Lowers heart rate
- Promotes wellbeing

Available from all parks, seashores, forests or countryside near you.

Dr Will Stahl-Timmins
Prof Michael Depledge
Interconnections between the Environment & Human Health

www.ecehh.org

L.E.Fleming@Exeter.ac.uk