Put simply, planetary health is the health of human civilization and the state of the natural systems on which it depends.
Evidence for the Anthropocene epoch
Global surface temperature change for the end of the 21st century is *likely* to exceed 1.5°C relative to 1850 for all scenarios.
Regional temperatures at 1.5C and rising risks
Global physical labour capacity decreased by ~ 5.3% between 2000 and 2016 (Lancet Countdown 2017)

Climate change and increase in extreme heat exposure which prevents moderate intensity labour in the hottest month (Andrews et al in press)
France, August 2003 ~15000 excess deaths (~70,000 in Europe) Robine et al 2007


European summer temperatures for 2003 to become the norm in coming decades
Climate change exacerbates food insecurity in areas currently vulnerable to hunger and under-nutrition. By 2050: Net increase of ~ 530,000 nutrition related deaths p.a. worldwide (Springmann et al Lancet 2016)

Impacts of climate change on the productivity of food crops in 2050
World Bank Publishers
World bank Development report 2010
http://wdronline.worldbank.org/

2016 Global Hunger Index
Welthungerhilfe, IFPRI and Concern Worldwide

Tim Wheeler and Joachim von Braun Climate change impacts on global food security. Science 2013 (updated 2017)
Carbon dioxide fertilisation reduces nutrient concentration - meta analysis of 7761 observations
(Loladze eLife 2014;3:e02245)

http://elifepublishing-cdn.s3.amazonaws.com/02245/elife-02245-fig2-v3.jpg
WATER STRESS BY COUNTRY

ratio of withdrawals to supply

- Low stress (< 10%)
- Low to medium stress (10-20%)
- Medium to high stress (20-40%)
- High stress (40-80%)
- Extremely high stress (> 80%)

This map shows the average exposure of water users in each country to water stress, the ratio of total withdrawals to total renewable supply in a given area. A higher percentage means more water users are competing for limited supplies. Source: WRI Aqueduct, Gassert et al. 2013

Aqueduct
World Resources Institute
Fishery decline (Pauly and Zeller Nature 2015)
Mental health effects (e.g. Burke et al 2018, Ahern et al 2005)

Solastalgia is defined as, “the distress caused by environmental change”. Albrecht et. al. (2007)

Many studies have shown increase in common mental disorders for long periods after floods.

Rising Seas Could Affect 1.4 Billion People by 2060
Land use change, biodiversity loss and disease risk

Disease control strategies require better understanding of the relative importance for health of land use change, biodiversity loss, and other environmental drivers and their interactions.

Drivers of recently-emerging infectious diseases in humans from wildlife

- Land use change
- Food Industry Change
- Infection susceptibility
- Ag. Industry change
- Int. Travel and Commerce
- War and Famine
- Unspecified
- Climate and Weather
- Public Health Breakdown
- Bushmeat
- Human Dem. And Behavior
- Medical Ind. Change
- Antimicrobial agent use
- Other

EcoHealth Alliance/Loh et al. in State of knowledge review, 2015
EU asylum applications under climate change

Meeting the challenges

- Imagination (Conceptual),
- Knowledge,
- Implementation
Strengthening adaptation to protect health

**The EU Strategy in a Nutshell**

**Priority 1: Promoting action by Member States**
- Action 1. Encourage MS to adopt Adaptation Strategies and action plans
- Action 2. LIFE funding, including adaptation priority areas
- Action 3. Promoting adaptation action by cities along the Covenant of Mayors Initiative

**Priority 2: Better informed decision-making**
- Action 4. Knowledge-gap strategy
- Action 5. Climate-ADAPT

**Priority 3: Key vulnerable sectors**
- Action 6. Climate-proofing the Common Agricultural Policy, Cohesion Policy, and the Common Fisheries Policy
- Action 7. Making infrastructure more resilient
- Action 8. Promote products & services by insurance and finance markets
Health co-benefits of decarbonizing the world economy—millions of premature deaths averted annually from reduced air pollution (Lelieveld, Klingmüller Pozzer, Burnett, Haines, Ramanathan PNAS 2019)

Phase-out of fossil fuels would avoid excess mortality of ~350,000 persons/year in EU-28
The Future of Planetary health will depend on cities

Cities are engines of economic growth and social change, with annual economic activity of about US$62 trillion, 85% of global GDP in 2015 and 71–76% of global energy-related greenhouse gas (GHG) emissions.

Newclimateeconomy.report/workingpaper_cities_final_web.pdf 2015
Sustainable mobility trends scale up
Increased active travel and low carbon transport – health and environmental benefits

( Woodcock et al 2009, Jarrett et al 2012)
Psychological and emotional outcomes from exposure to natural versus synthetic environments

<table>
<thead>
<tr>
<th>Outcome type</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attention</td>
<td>Attention (4 studies)</td>
</tr>
<tr>
<td>Pleasurable moods</td>
<td>Energy (5 studies)</td>
</tr>
<tr>
<td></td>
<td>Tranquillity (7 studies)*</td>
</tr>
<tr>
<td>Displeasurable moods</td>
<td>Anxiety (6 studies)*</td>
</tr>
<tr>
<td></td>
<td>Anger (7 studies)</td>
</tr>
<tr>
<td></td>
<td>Fatigue (4 studies)</td>
</tr>
<tr>
<td></td>
<td>Sad or depressed (4 studies)</td>
</tr>
<tr>
<td>Physiological outcomes</td>
<td>Systolic BP (6 studies)</td>
</tr>
<tr>
<td></td>
<td>Diastolic BP (5 studies)</td>
</tr>
<tr>
<td></td>
<td>Pulse (5 studies)</td>
</tr>
<tr>
<td></td>
<td>Cortisol (4 studies)</td>
</tr>
</tbody>
</table>

Pooled effect size (Hedges g)
Restoring ecosystems can play an essential role in regulating freshwater quantity and quality, flood protection, air quality.

33 of 105 of the world’s largest cities source their clean water from protected areas.
Benefits of low carbon and energy efficient housing in the UK (combined insulation and ventilation control improvements) (Wilkinson et al 2009)

<table>
<thead>
<tr>
<th>Impacts</th>
<th>Reduced exposures e.g. to fine particles, radon, cold, mould, tobacco smoke</th>
</tr>
</thead>
<tbody>
<tr>
<td>Premature deaths averted</td>
<td>~ 5400/ year</td>
</tr>
<tr>
<td>Mt-CO₂ saved (vs 1990)</td>
<td>55</td>
</tr>
</tbody>
</table>
“Food in the Anthropocene represents one of the greatest health and environmental challenges of the 21st century.”

**Fruit and Vegetables**
- Fruits: 200g
- Vegetables: 300g
- Including 100g of dark green vegetables (cabbage, broccoli etc)
- AND 100g red and orange vegetables (peppers, carrots)

**Carbohydrate**
- Whole grains: 232g
- Two slices of wholemeal toast: 60g
- Rice: 60g
- Pasta: 80g
- Starchy vegetables (potatoes): 50g

**Dairy**
- (half a pint of milk): 250g

**Sugar**
- Added sugar and artificial sweeteners: 31g

**Fat**
- Olive oil, sunflower oil: 52g

**Protein**
- Soy foods: 25g
- Lentils or peas: 50g
- Nuts: 50g
- Beef or lamb (16th of a burger): 7g
- Pork (quarter of a rashers of bacon): 7g
- Poultry (1.5 chicken nuggets): 29g
Public opinion survey

92% of the public think it is important for the health system to work in a more sustainable way – (was 92% 2011, 89% 2013)

43% of the public said that the health system should act in a more sustainable way even if there is a cost involved – (was 33% 2011, 36% 2013)

25% of the public felt that sustainability should be a top priority – (was 19% 2011, 19% 2013)
NHS Goods and Services carbon footprint – carbon hotspots

- Acute - building energy use (gas and electricity)
- Acute – medical instruments and equipment
- Primary care – pharmaceuticals including GP prescriptions
- Primary care and acute – business services
Towards an environmentally and socially sustainable health system

- Reduce energy use, GHG emissions and environmental footprint.
- Provide care closer to home
- £370m savings pa by 2020
How do we reduce Health Service emissions?

NHS England emissions reduced by 11% from 2007 to 2015, despite an 18% increase in activity.

Eg.
• Grid decarbonisation
• Vehicle efficiency
• Supports 30% reduction

Eg.
• Energy and travel efficiency
• Anaesthetic gases
• Models of care
• Public health
• Supports 58% reduction
The need for urgent action to safeguard health

’Solutions lie within reach and should be based on the redefinition of prosperity to focus on the enhancement of quality of life and delivery of improved health for all, together with respect for the integrity of natural systems’