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Designing Healthy Communities

Weaving the Threads Together

Professor Tony Capon

CRICOS #00212K

This talk

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- History
- Health and climate change
- Systems thinking
- Human ecology to understand human health
- The way forward

Population of the world

(billions, UN estimates)

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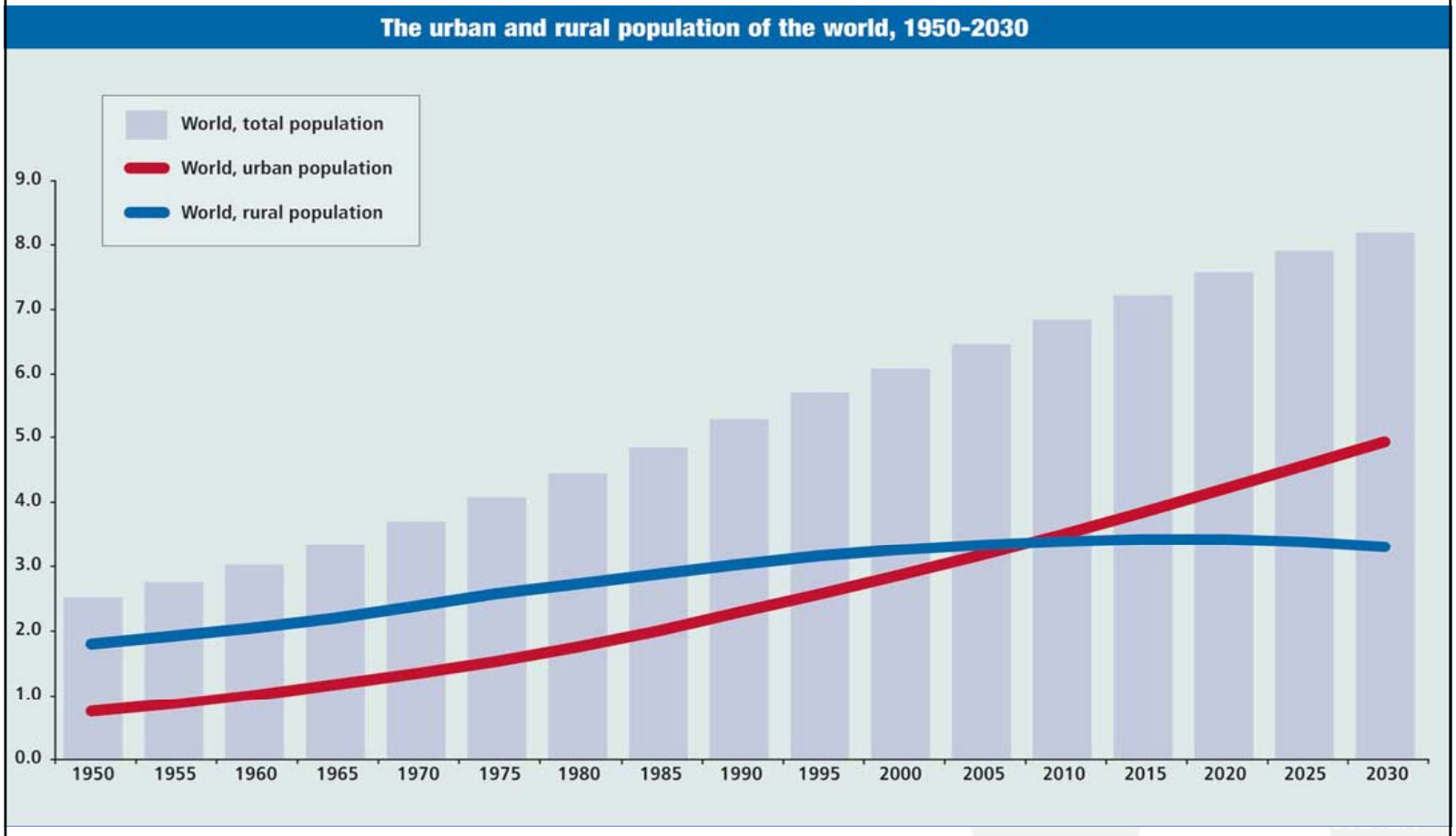

Population of Australia

(ABS estimates)

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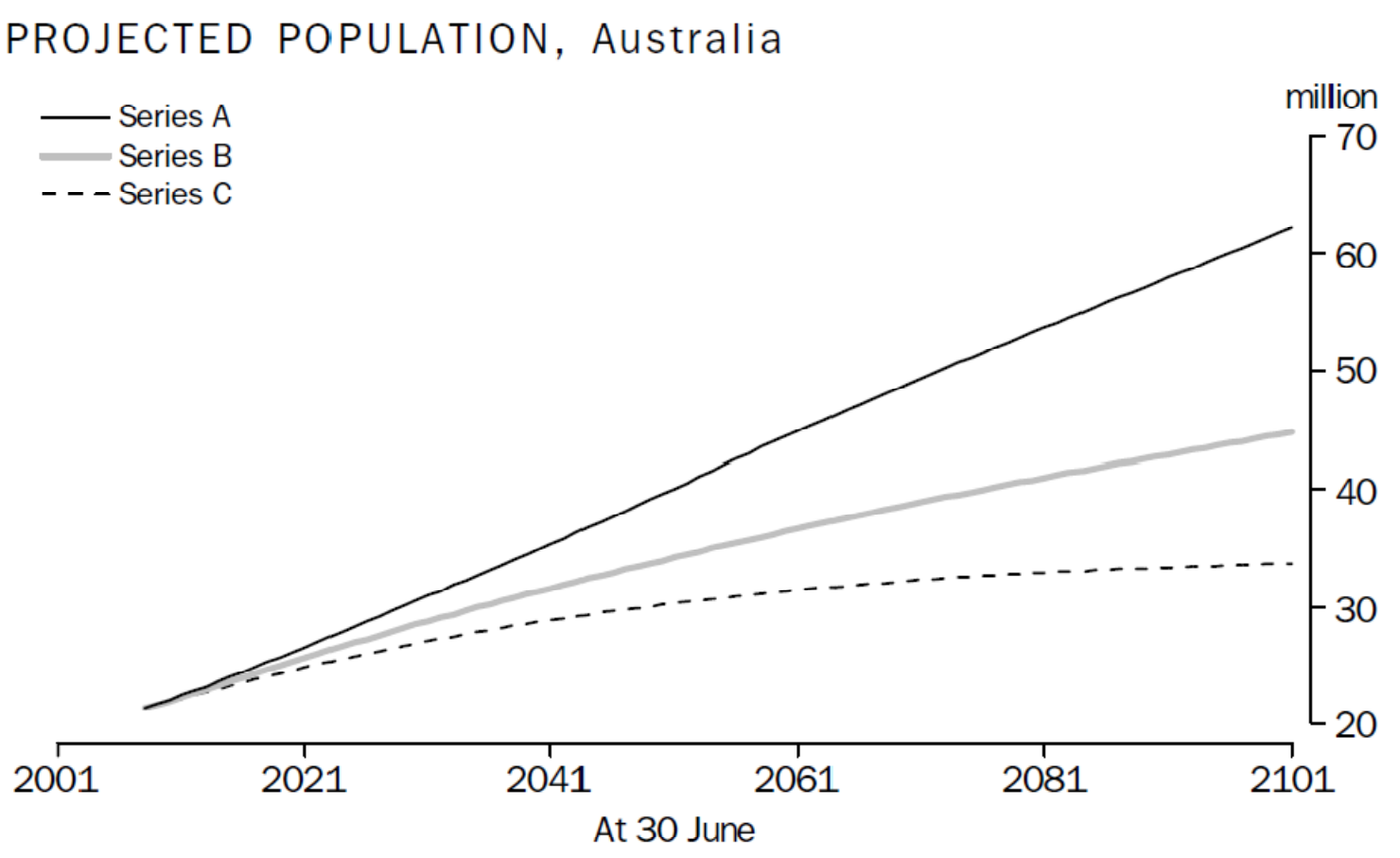

An urbanising landscape

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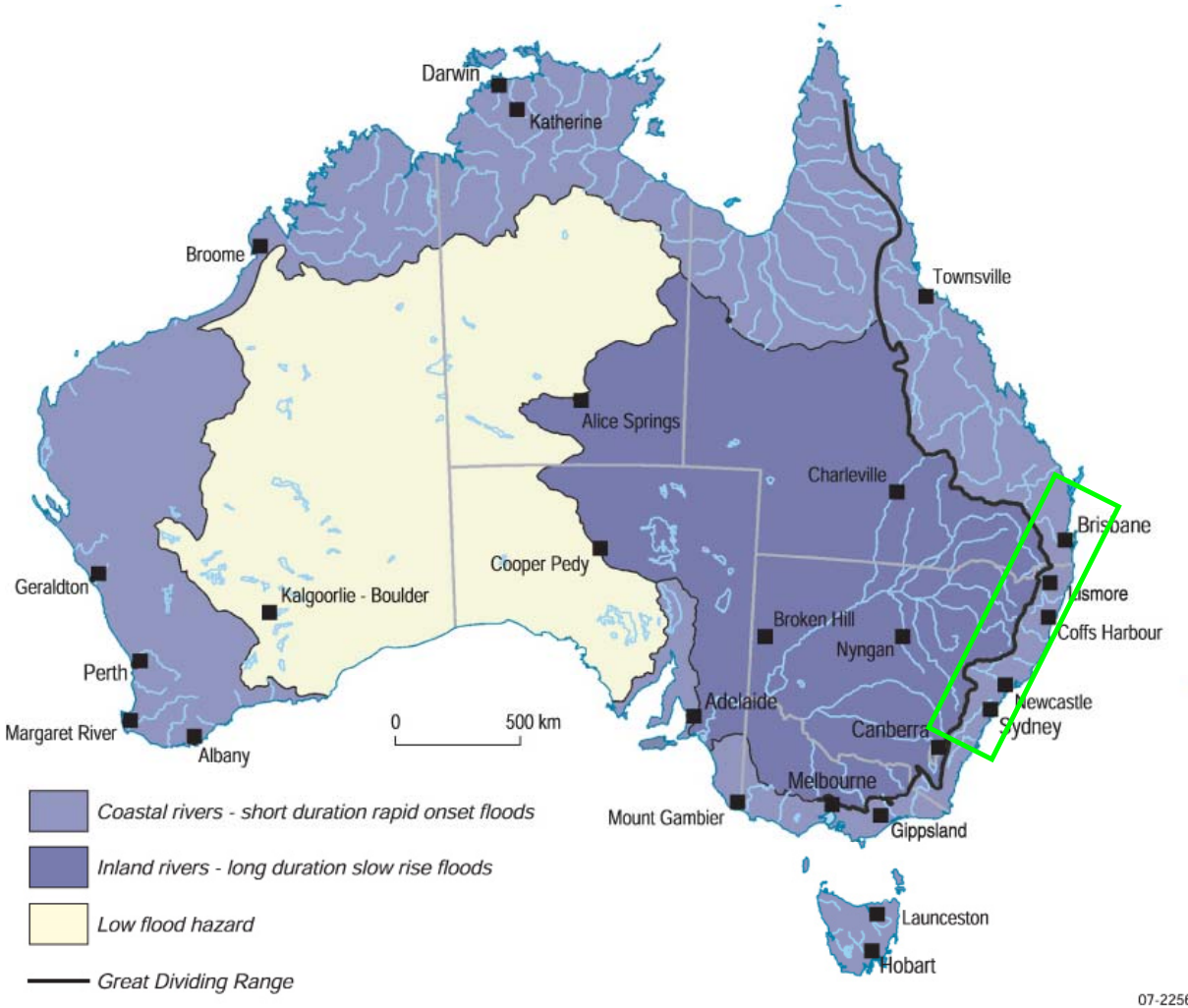

History

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1800s: rapid urbanisation and epidemics of infectious and respiratory disease.

Edwin Chadwick: *Health of Towns* movement

Other phases of concern about health and cities:

- *Garden Cities* Ebenezer Howard
- *UNESCO Man and the Biosphere* Stephen Boyden
- *WHO Healthy Cities* Leonard Duhl, Trevor Hancock, Ilona Kickbusch, John Ashton

Historical view of urban health penalties
(developed country perspective)

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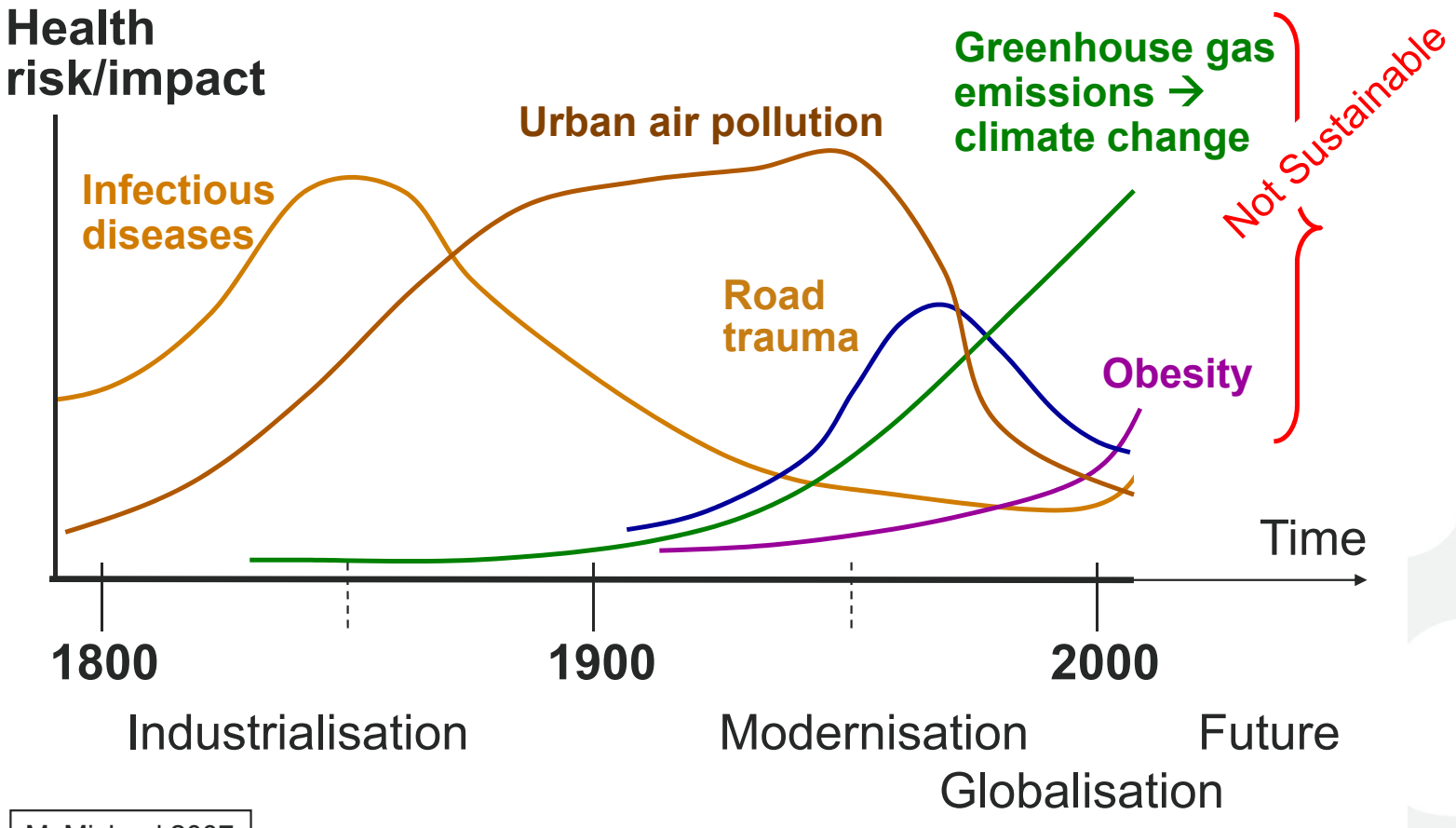

McMichael 2007

The Lancet

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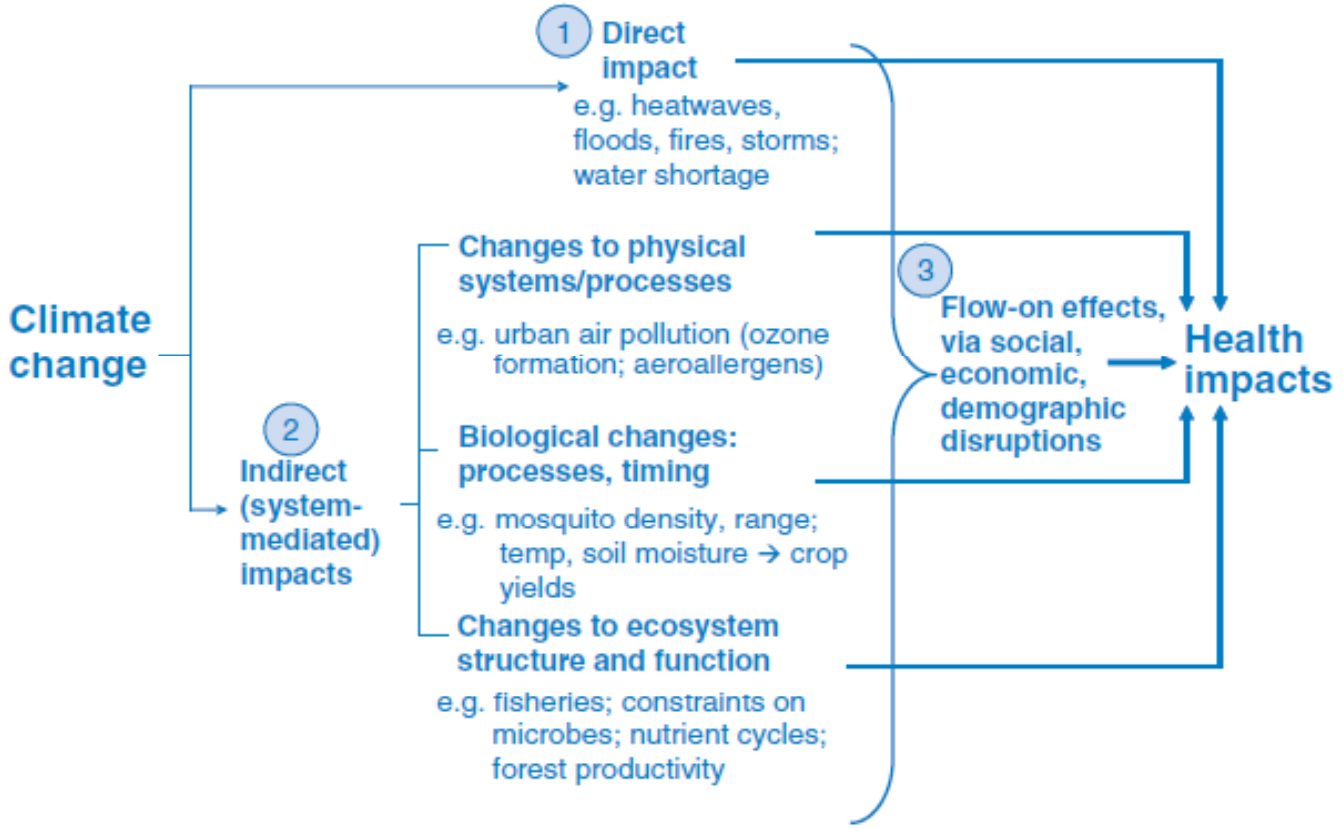
"Climate change is the biggest global health threat of the 21st Century"

May 16, 2009

Putative pathways between climate change and human health

(McMichael, 2009)



2009 Summer Heatwave

(Victorian CHO)

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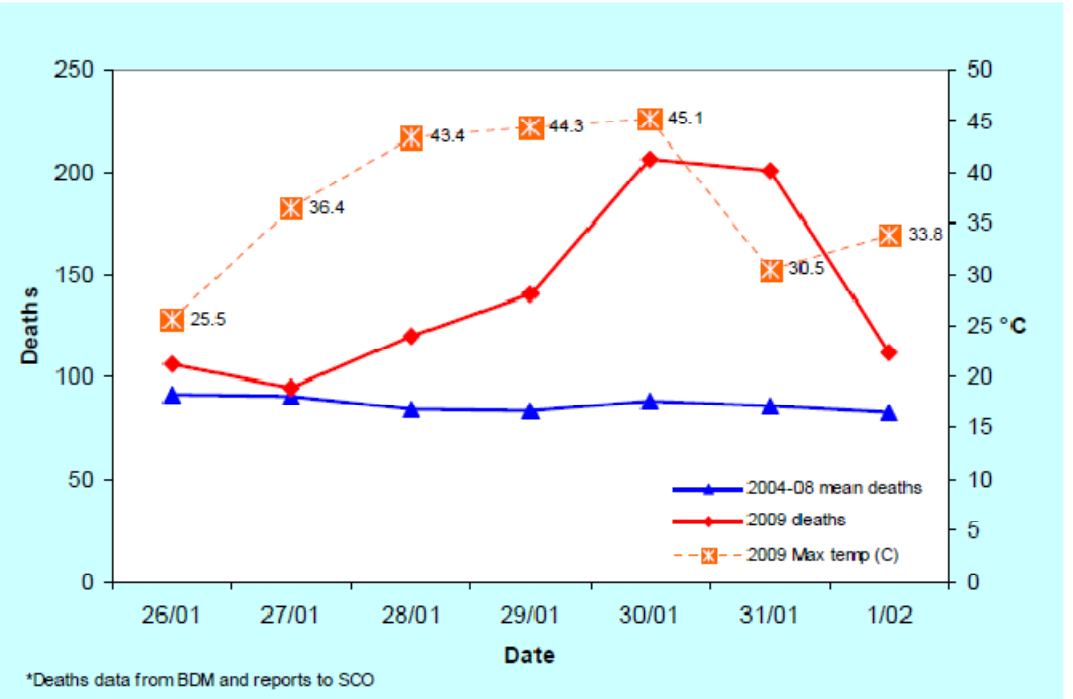

Figure 10. Deaths between 26 Jan and 1 Feb: Mean deaths in 2004-08 vs 2009

Equity and climate change

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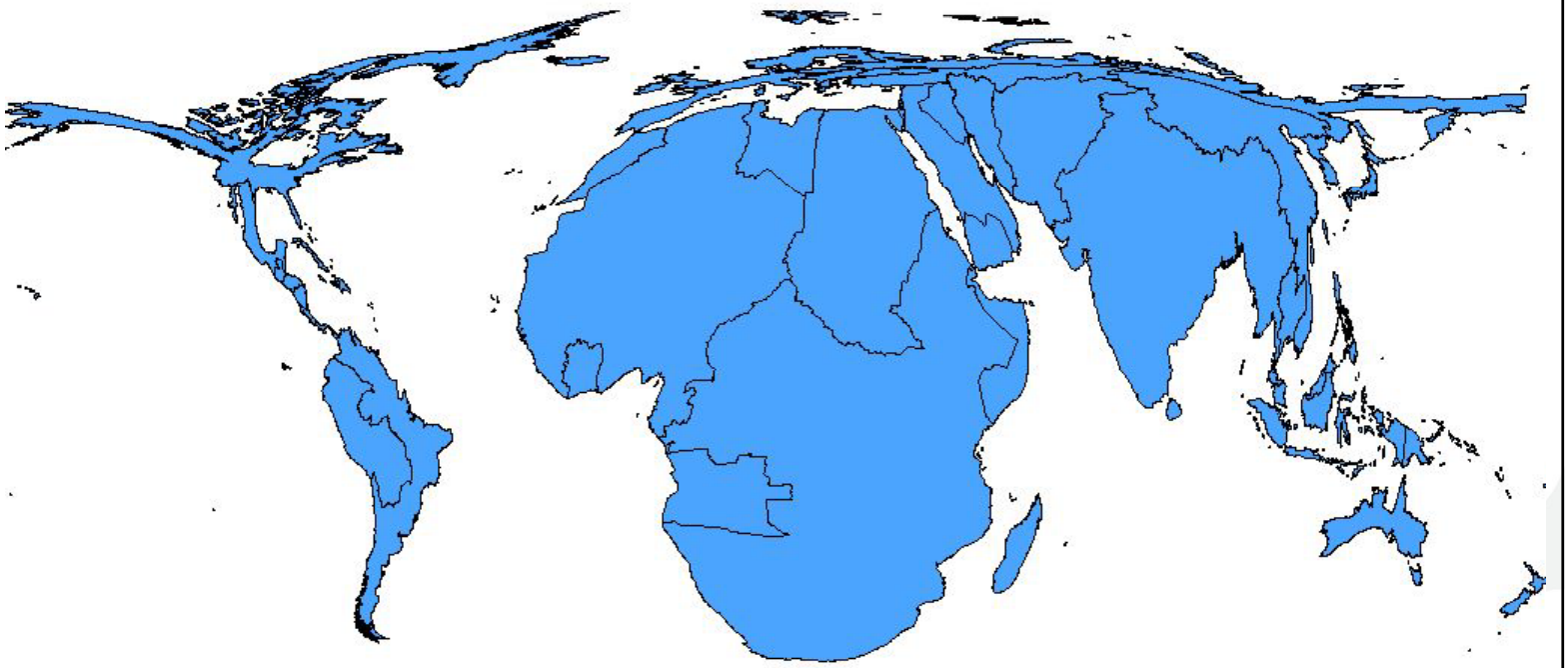
- Those least responsible will be worst affected

- Risk of worsening disadvantage (policies to reduce greenhouse gas emissions could worsen inequity)

Mortality Impacts of Climate Change: Year 2000

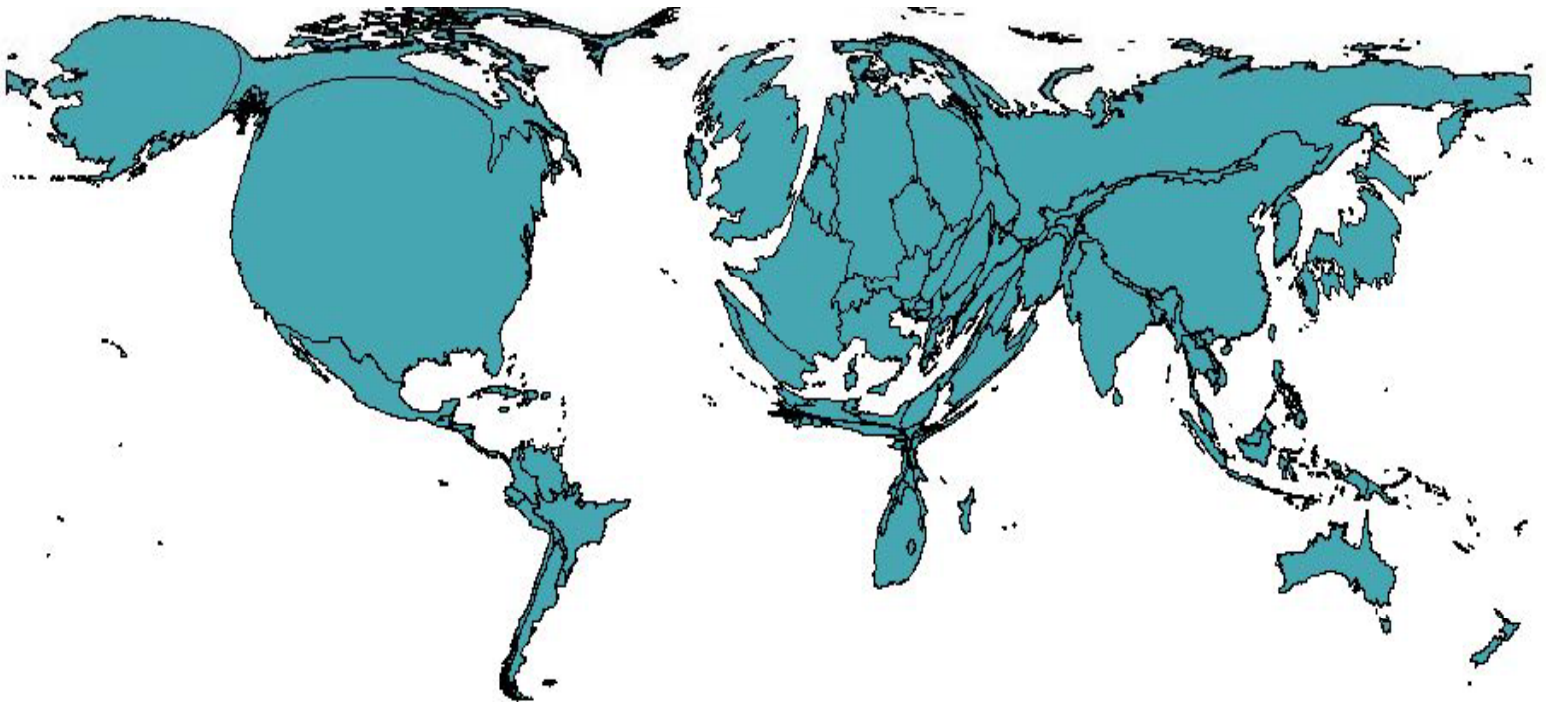
Estimated annual deaths due to climate change: malnutrition (~80K), diarrhoea (~50K), malaria (~20K), flooding (~3K)



14 WHO regions scaled according to estimated annual death rates due to the change in climate since c.1970.

(Patz, Gibbs et al, 2007: based on McMichael, Campbell-Lendrum, et al, 2004)

Cumulative Emissions of Greenhouse Gases



Countries scaled according to cumulative emissions (billions of tonnes CO_2-equivalent) up to 2002.

(Patz, Gibbs, et al, 2007)

Good news story – ‘co-benefits’

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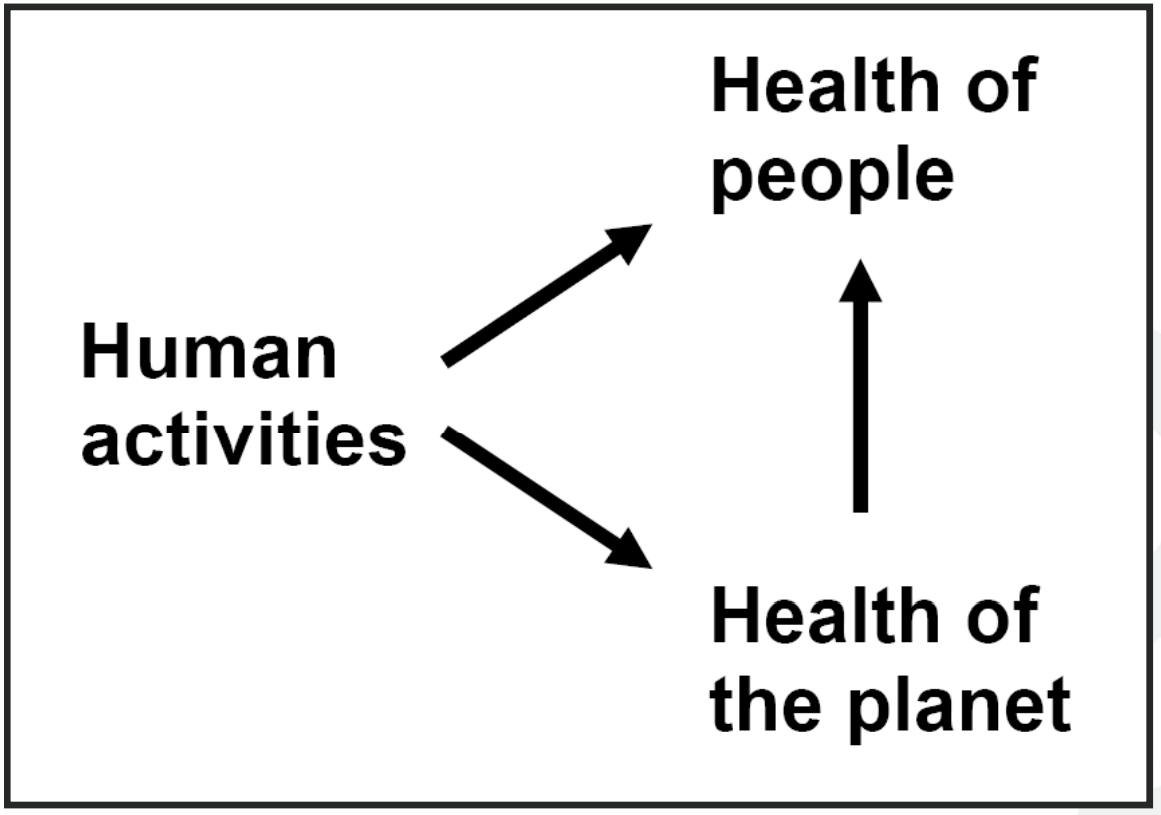
Health co-benefits from action on climate change

Lancet series on health and climate change:
http://www.thelancet.com/series/health-and-climate-change

- Energy generation
- Mobility
- Food choices
- Housing

‘Low-carbon ways of living are healthy ways of living’
AAS Fenner Conference, Canberra, 2010
http://nceph.anu.edu.au/Fenner2010/index.php

Boyden's biosensitivity triangle



Diabetes and climate change

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- *Medicine*: diabetes is part of the human metabolic syndrome

- *Human ecology*: the obesity epidemic and climate change are symptoms of problems with societal metabolism

Energy: somatic *vs* extrasomatic

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- Most efforts to reduce carbon emissions focus on extra-somatic energy
- Obesity is a problem with our somatic energy account

Root cause is way of living

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- Over consumption at the individual level
- Over consumption at the societal level

Healthy Built Environments Program

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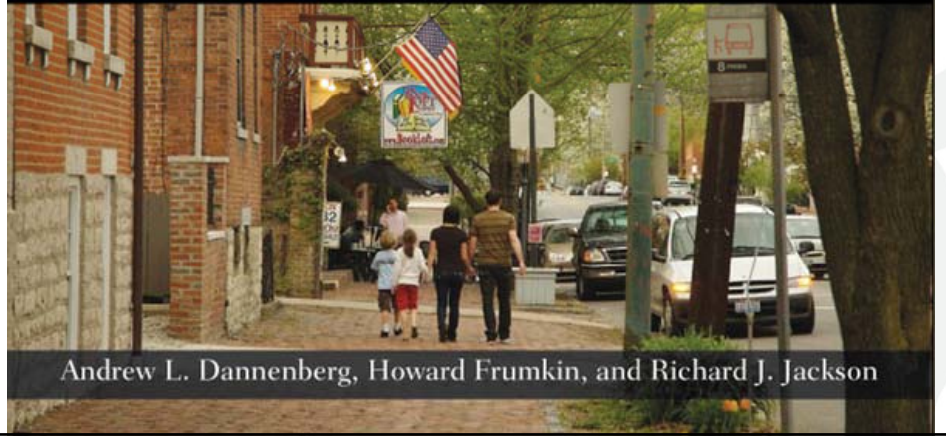
- Joint initiative of the University of New South Wales and the NSW Health Department
- Associate Professor Susan Thompson
  City Futures Research Centre
- 3 focus areas
  - Policy-relevant research
  - Workforce capacity
  - Leadership and advocacy

MAKING HEALTHY PLACES

Designing and Building for Health, Well-being, and Sustainability



Andrew L. Dannenberg, Howard Frumkin, and Richard J. Jackson

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Urbanism, climate adaptation and human health

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CSIRO

Understanding climate-related risks to health in urban environments from systems perspectives

- Built environment, thermal stress, vulnerability
- Food security, safety, alternate provisioning systems
- Urban transport systems, air quality, physical activity

- Collaborative conceptual modelling

Systems Thinking

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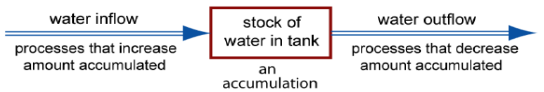
COLLABORATIVE CONCEPTUAL MODELLING (CCM)

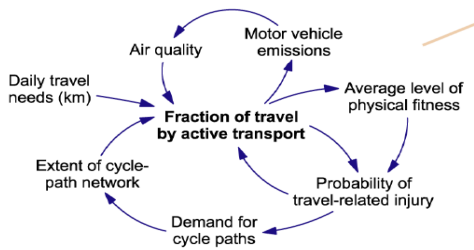
The transition to a sustainable society requires a systems approach. Our efforts to adapt to the realities of a finite planet are guided by our mental models of cause and effect. Simplistic models, that ignore the influence of accumulation and feedback on the behaviour of social-ecological systems, give rise to misleading perceptions, conflict, and policy failure. Dynamical models, that take these fundamental effects into account, can support the evolution of improved understanding and greater adaptive capacity.

The Water-Tank Metaphor



Influence Diagrams

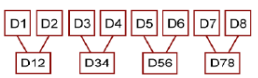
Influence diagrams constitute a shared 'visual language' that helps individuals to see the structure of each others' mental models.



Pair-blending of Influence Diagrams

A rapid and effective form of conceptual integration

'Pair-blending' allows individuals to combine and review their mental models in order to build wider understanding and enhance adaptive capacity.



Each participant constructs an influence diagram around a 'focus variable' that he or she believes to be central to the issue of concern. Participants then work in pairs to combine their diagrams, retaining both of their focus variables. A key aim is to identify potentially important feedback loops.

I

1. *What is the challenge?* Discuss problem or situation of concern
2. *What is the story?* Use historical narratives to identify key variables and patterns of change
3. *Can I see how you think?* Integrate individuals' mental models of cause and effect using pair-blending and focused dialogue
4. *What drives system behaviour?* Identify dominant stock-and-flow structures. Focus on feedback and system inertia
5. *Where are the leverage points?* Identify opportunities for effective adaptation
6. *Can we have new eyes?* Use improved understanding of system behaviour to develop 'memories of the future'

II

Dynamical History

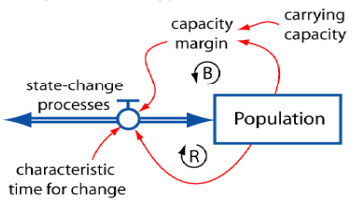

Source: National Library of Australia

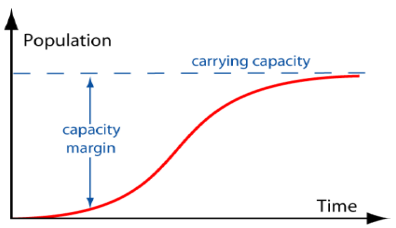
History provides the basic data needed to track change and assess the effectiveness of adaptation strategies. Dynamical history focuses on the interplay between cultural, social, political, economic, technological, and biophysical forces. Its aim is to trace the evolution of basic feedback structures that drive the endogenous behaviour of complex social-ecological systems.

Low-order Dynamical Models

Dominant cause-effect structures can be described using causal-loop and stock-and-flow diagrams. Such diagrams provide a starting point for the identification of archetypical feedback structures, the generation of dynamic hypotheses, and the construction of low-order dynamical models. Models need to be kept as simple and generic as possible if they are to be useful guides to scenario development.

The *Limits to Growth* System Archetype

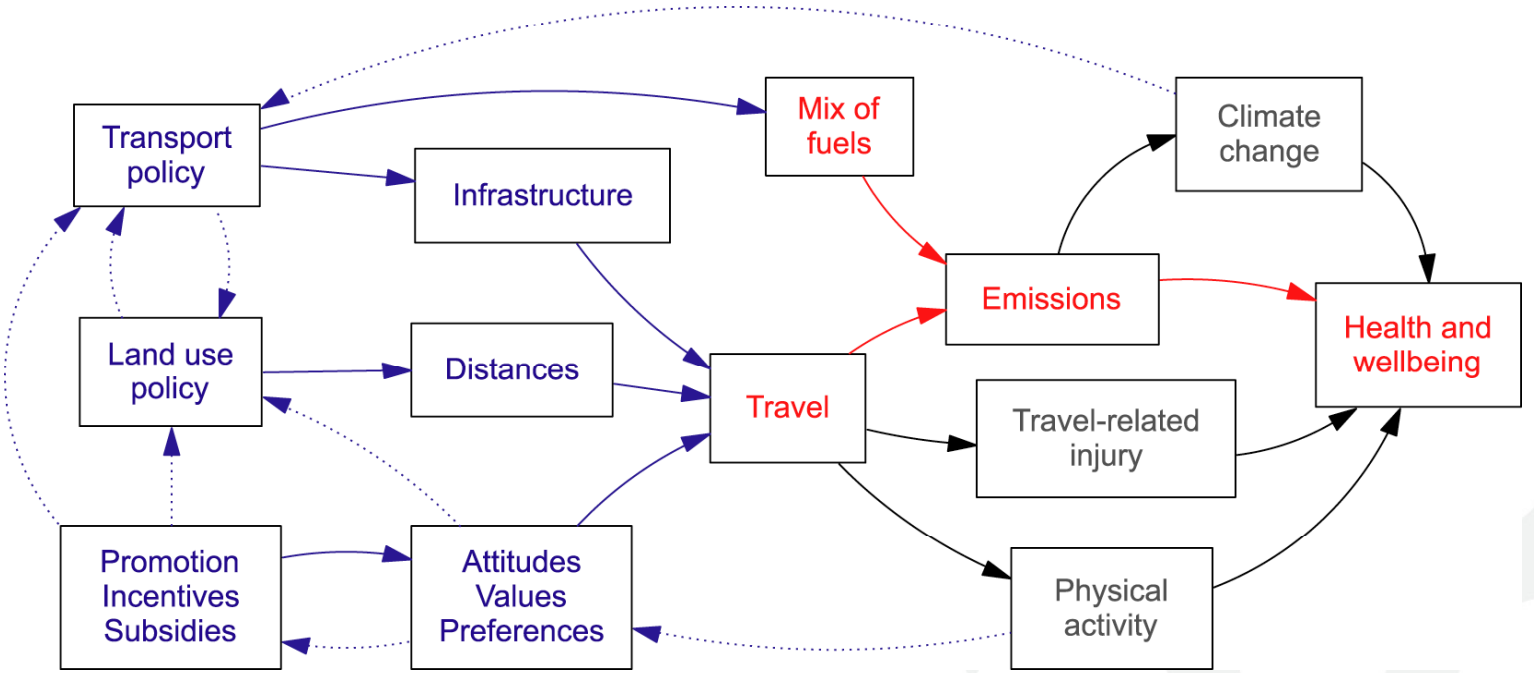




Scenario Development

Simple models can support scenario-development processes that increase a community's ability to detect the signals that significant new opportunities or dangers are emerging—thus enhancing community adaptive capacity.

Relationships between urban transport, land use and health and wellbeing



Co-Effects Template

(Proust et al, *Int J Environ Res Public Health*, 2011)

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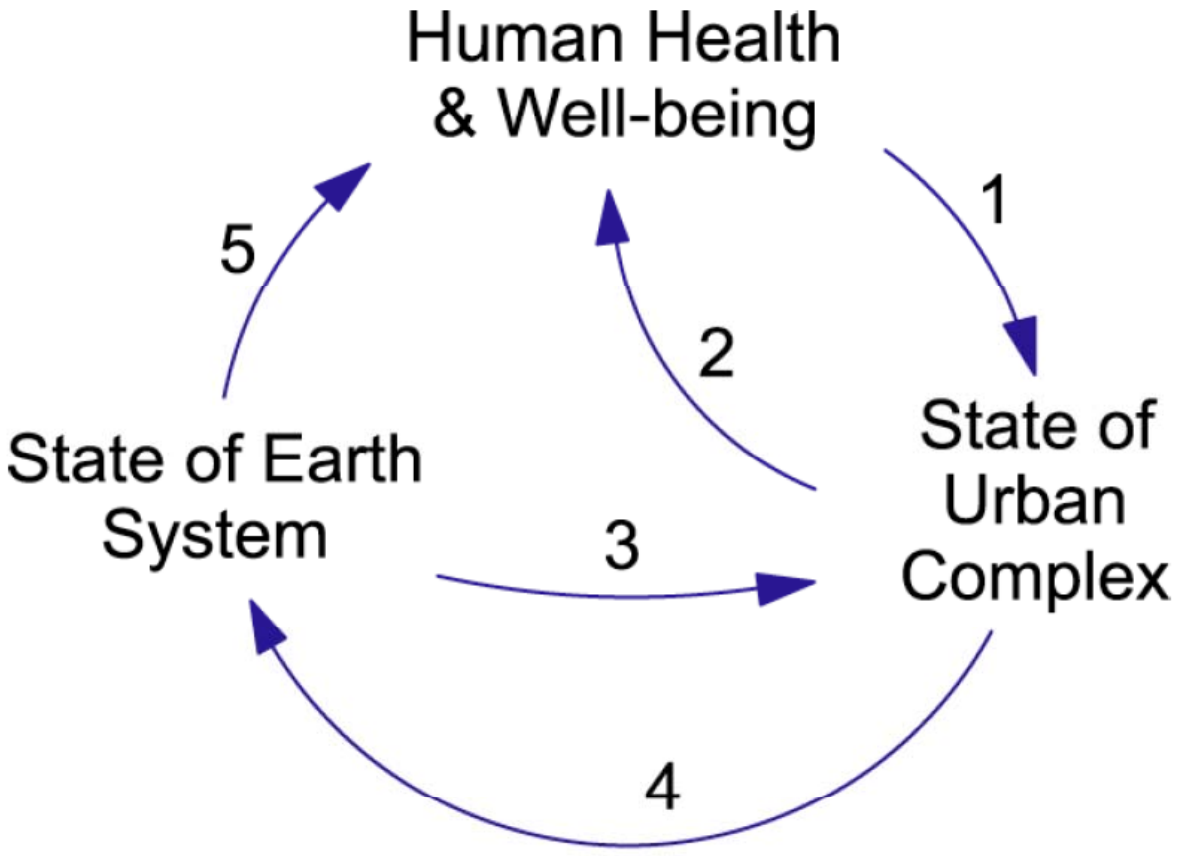

International Council for Science (ICSU)

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Health and Wellbeing in the Changing Urban Environment using Systems Approaches

http://www.icsu.org/what-we-do/interdisciplinary-bodies/health-and-wellbeing-in-the-changing-urban-environment

Contested landscapes of western Sydney

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Moving forward

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- New narrative aligning concerns about human health with concerns about planetary health
- Get 'somatic' energy on the agenda in the discourse about climate change and sustainability
- Positive story about 'co-benefits' for health from action on climate change

Moving forward

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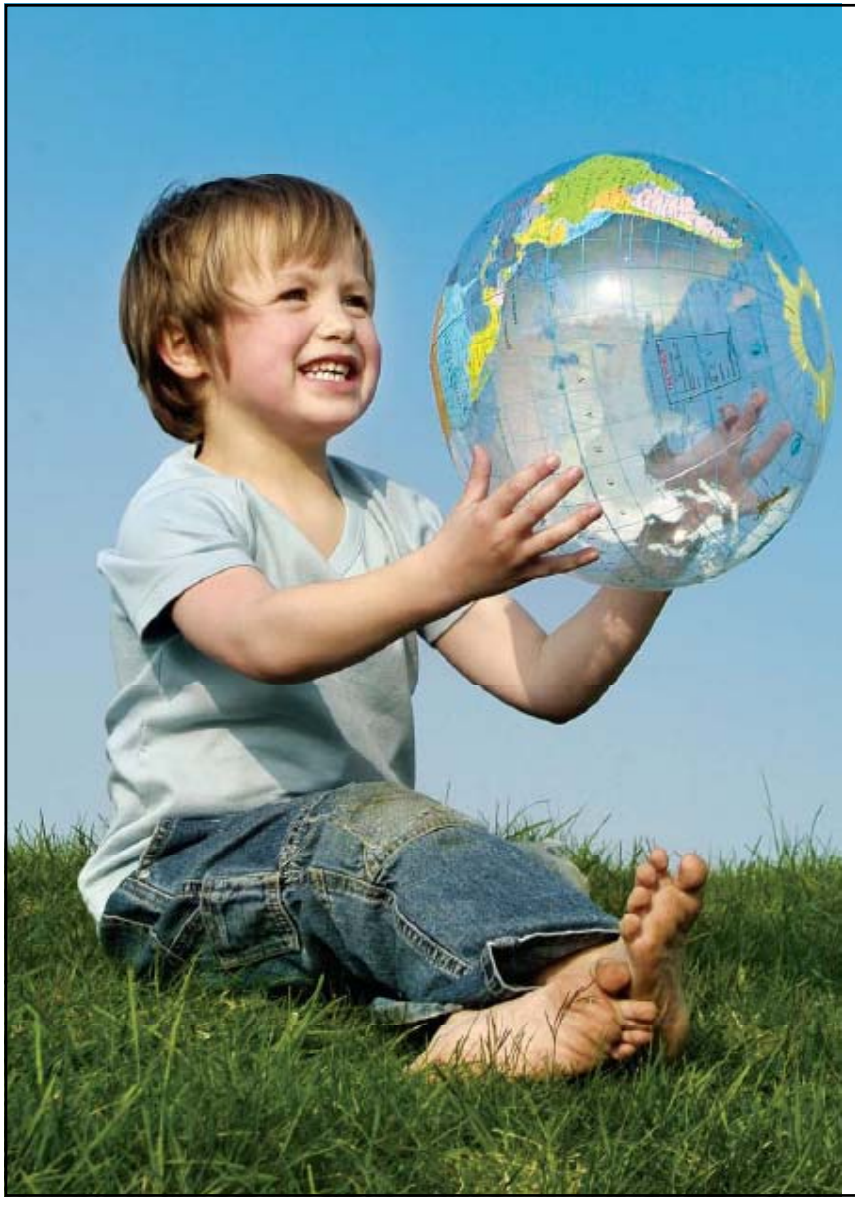
- Public health must embrace concern for the health of future generations

- Transcendence of disciplines (beyond medical sovereignty of knowledge about health) and alternate ways of understanding health (e.g. traditional philosophies, human ecology)

- Adaptive management in our approach



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Healthy Planet, Places and People

Research Australia
2007

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