Why care about health impacts, apart from humanitarian reasons?

Rainer Sauerborn,
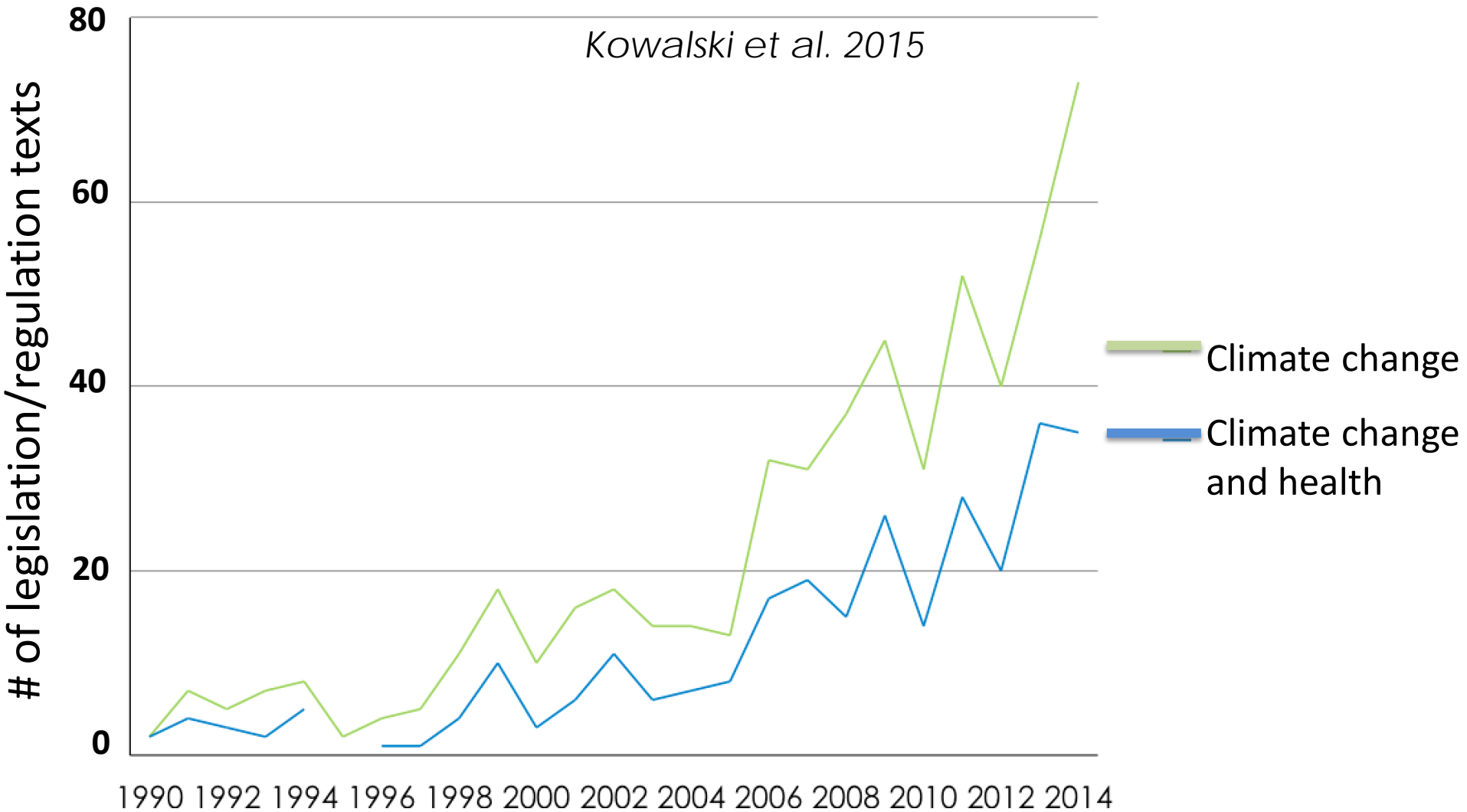Heidelberg & Harvard Universities, Germany
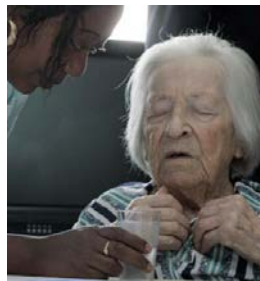
Roles of health in climate change science & policy

1. Motivator
2. Dividend generator
3. Protector
4. Victim
5. Threat to economic growth
6. Perpetrator
7. Evidence creator
8. Risk communicator

Health as an justification for EU climate legislations

Kowalski et al. 2015

Changing **individual** behavior is key

- \> 50% of emissions in OECD countries are controlled by households' consumption decisions (Aall & Hille, 2010)
  - Mobility
  - Food
  - Housing
  - Devices and consumables

Hertwich et al., 2009

2. Health as Dividend Generator

1. Reduce local emission of health damaging short-lived climate pollutants
   – Promote clean cooking fuels and stoves
   – Decarbonize energy generation
   – Decarbonize transport promoting physical activity
2. Change household consumption: food, mobility..
3. Create a climate-friendly built environment
4. Provide access to reproductive health services

Randomized controlled RCT in 4 EU cities

Randomization of 308 households

152 hh: CO2e, costs & *health co-benefits* = intervention
156 hh: CO2e, costs = control
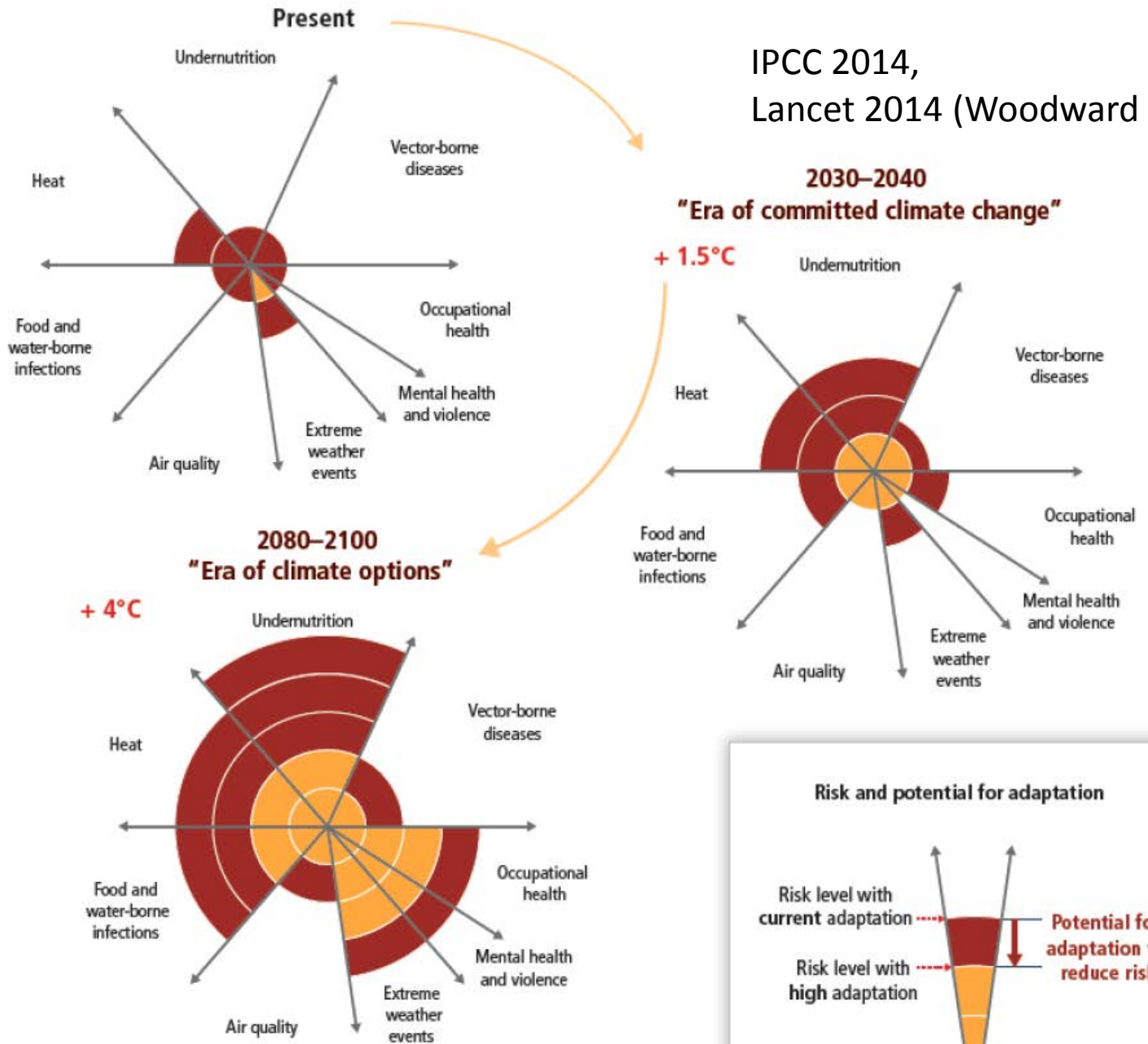

Herrman et al. 2017
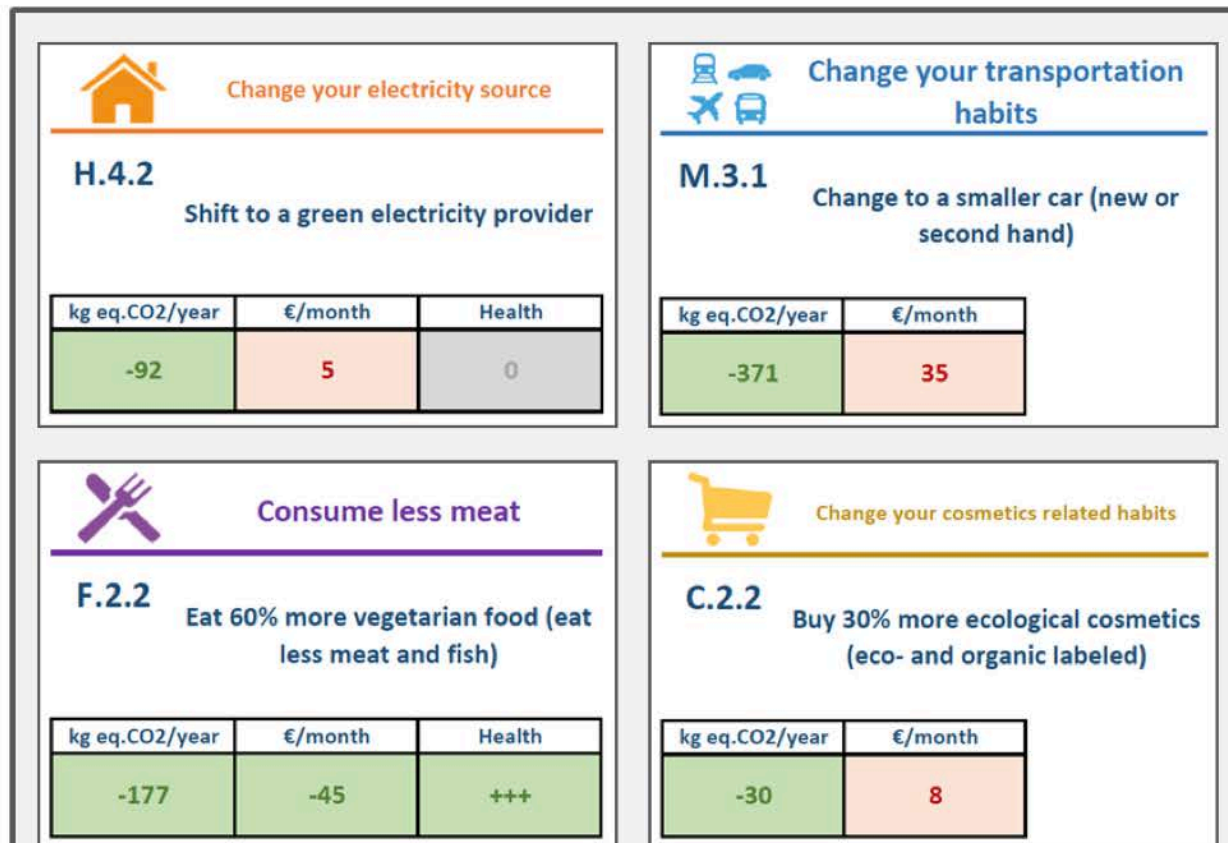
Information on co-benefits increases households' willingness to reduce their carbon footprint

- – Actions with health effect (11/65) were significantly more often chosen
- – No effect on actions without health effects between both study arms

3. Health as protector

- Strengthen and climate-proof health systems
- Provide basic public goods (clean water, sanitation, clean air, research & education)
- Develop surveillance & early warning systems for climate sensitive, particularly infectious diseases
- Communicate to policy-makers the absolute physiological limits of adaptation in already hot (and poor) countries

The limits of adaptation

Present

Undernutrition
Vector-borne diseases
Heat
Occupational health
Food and water-borne infections
Mental health and violence
Air quality
Extreme weather events

IPCC 2014,
Lancet 2014 (Woodward et al.)

2030–2040
"Era of committed climate change"

+ 1.5°C

Undernutrition
Vector-borne diseases
Heat
Occupational health
Food and water-borne infections
Mental health and violence
Air quality
Extreme weather events

2080–2100
"Era of climate options"

+ 4°C

Undernutrition
Vector-borne diseases
Heat
Occupational health
Food and water-borne infections
Mental health and violence
Air quality
Extreme weather events

Risk and potential for adaptation

Risk level with **current** adaptation
Risk level with **high** adaptation

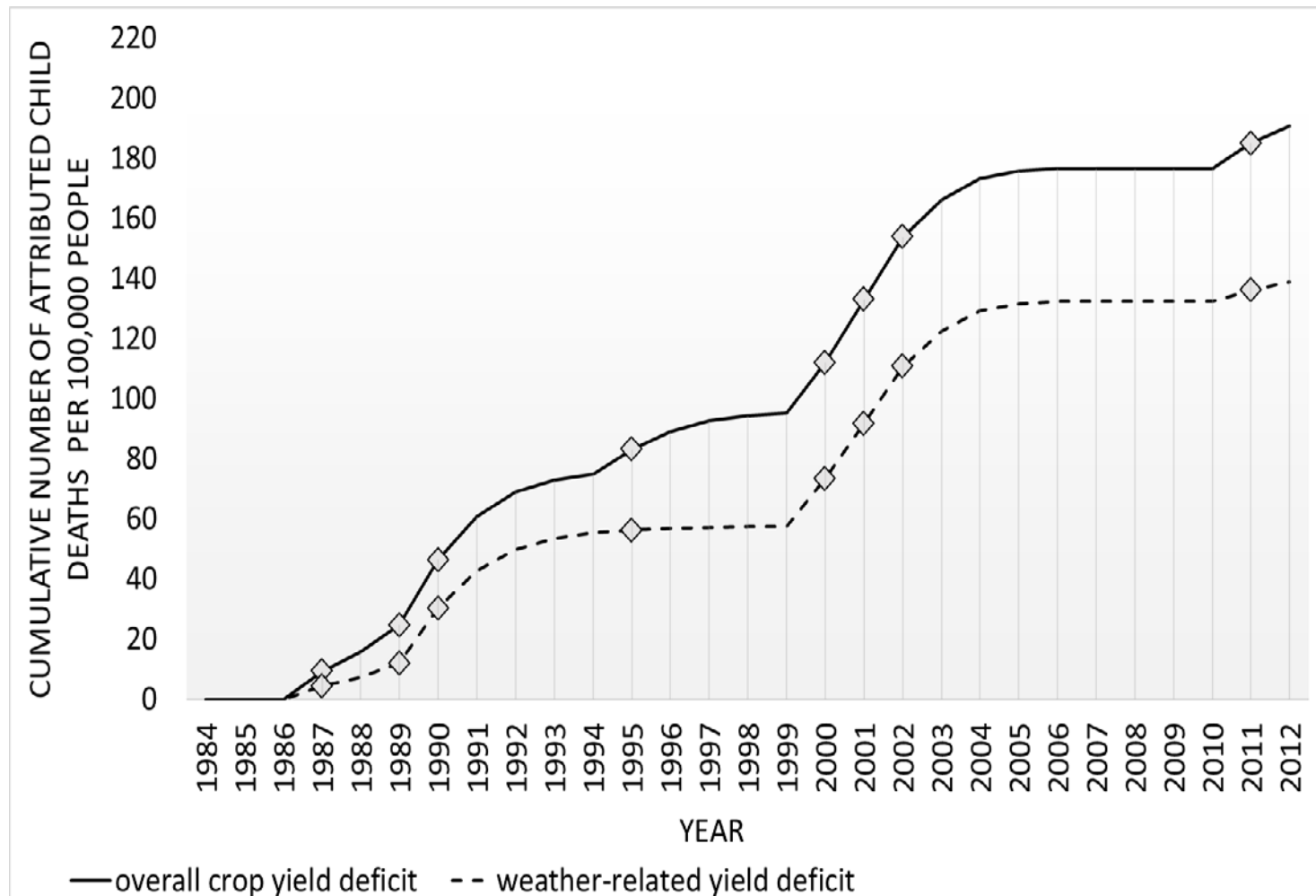**Potential for adaptation to reduce risk**
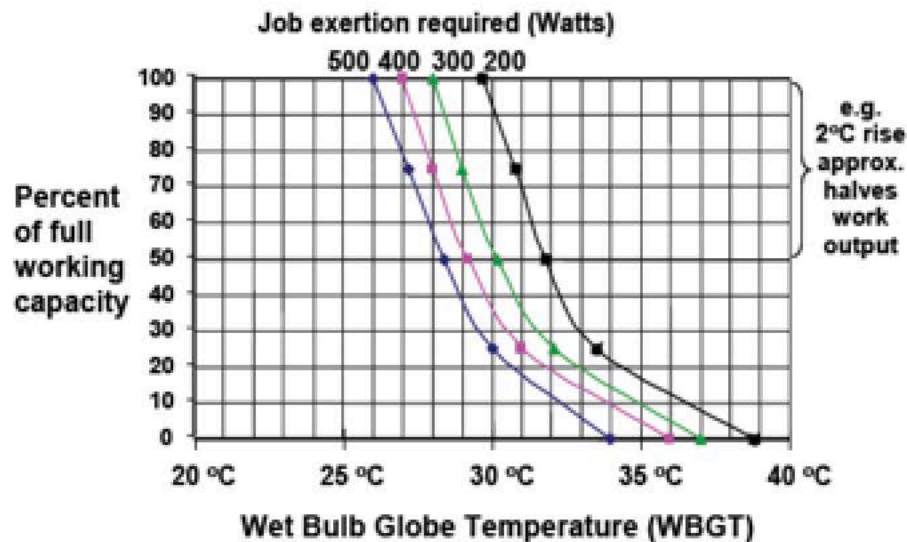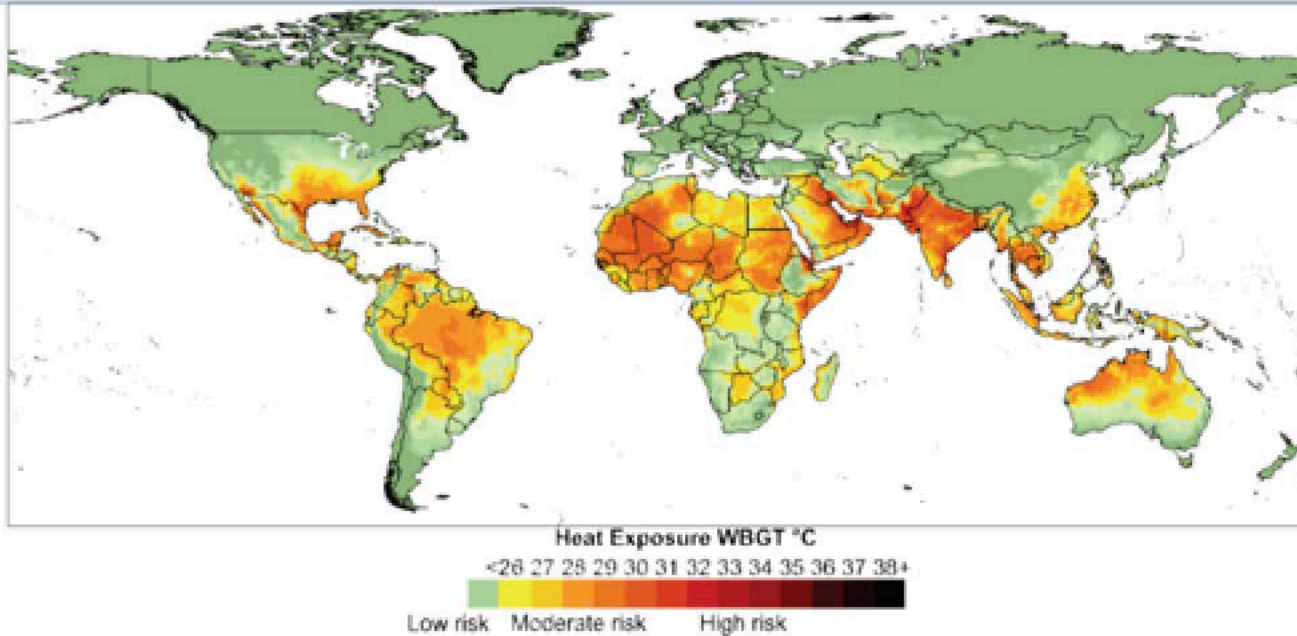
5. Health as victim (impact)

Key problems: Attribution, impact functions and projection of climate impact on health

Mortality impact of annual crop yield variation under increasing weather variability

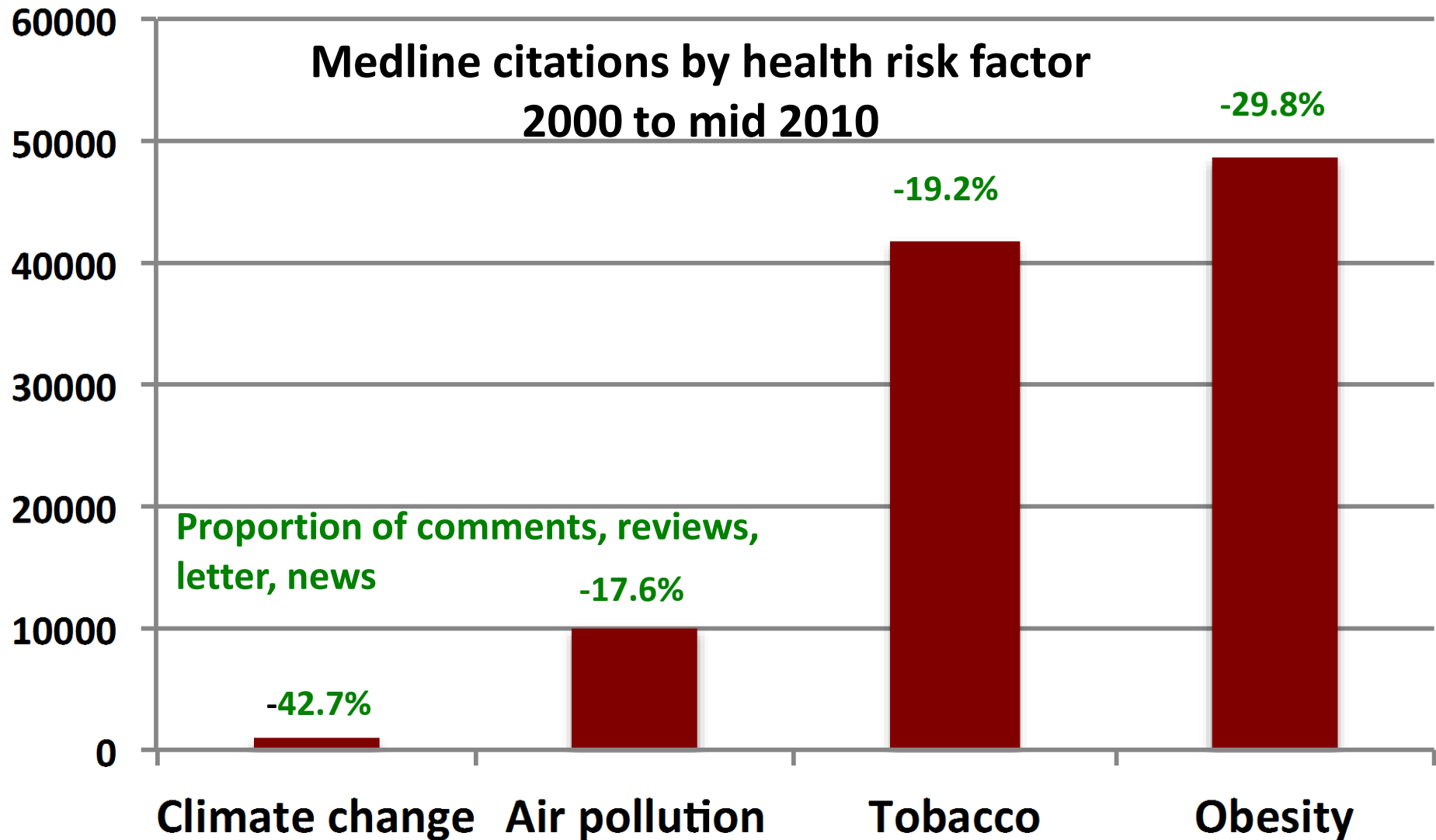Belesova K, Gornott C, Milner J, Sauerborn R, Wilkinson P

5. Health as threat to economic growth

Heat Exposure WBGT °C

<28 27 28 29 30 31 32 33 34 35 36 37 38+

Low risk   Moderate risk   High risk

Job exertion required (Watts)
500 400 300 200

e.g.
2°C rise
approx.
halves
work
output

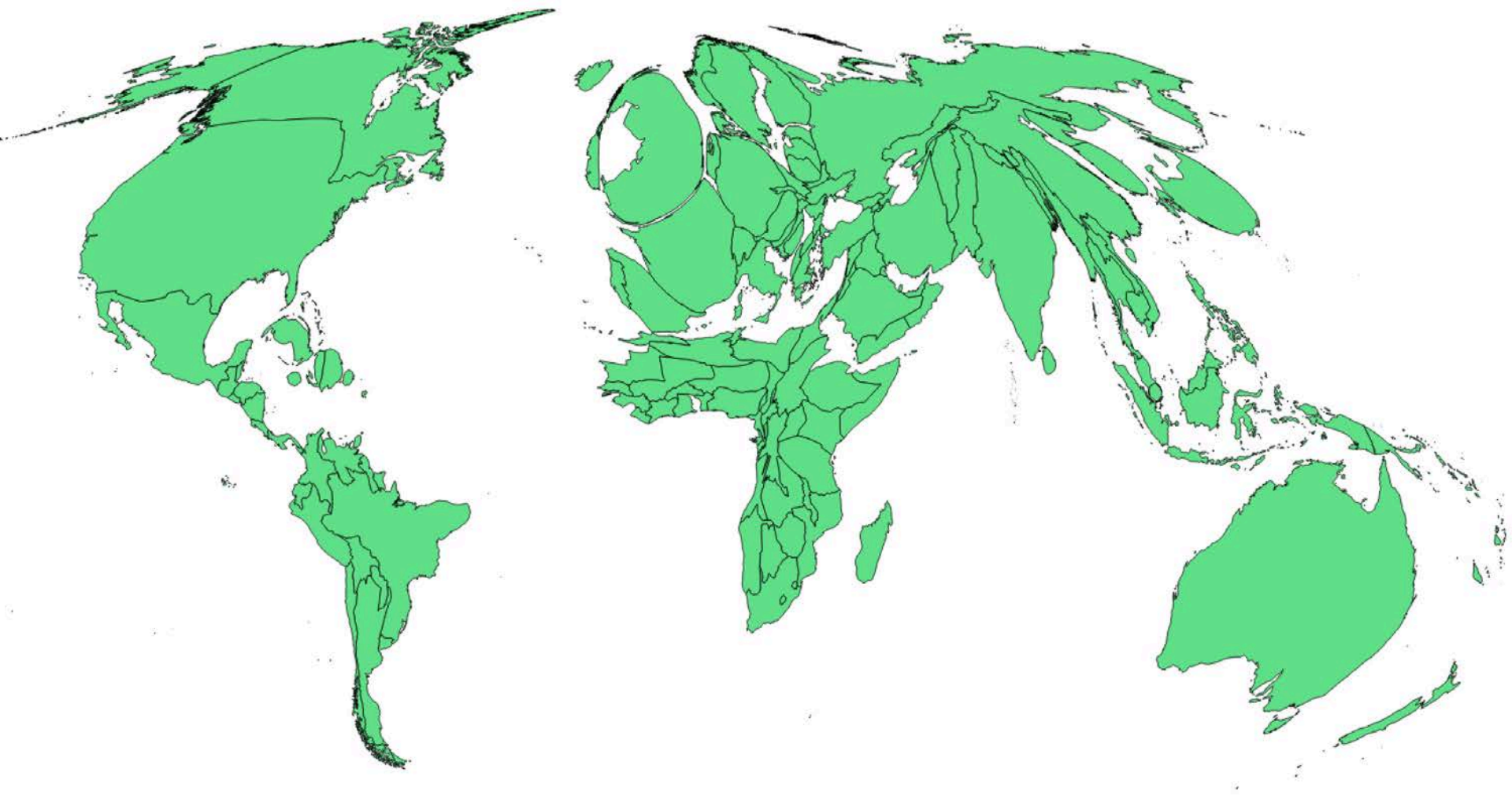Percent of full working capacity

Wet Bulb Globe Temperature (WBGT)

Many low and middle income countries are estimated to loose 2-8% of GDP in 2030 due to increasing workplace heat exposures.

Kjellstrom 2015

6. Health as evidence generator

Medline citations by health risk factor 2000 to mid 2010

Proportion of comments, reviews, letter, news

-42.7% (Climate change)
-17.6% (Air pollution)
-19.2% (Tobacco)
-29.8% (Obesity)

Calculated from Hosking and Campbell-Lendrum (2012)

USPC Université Sorbonne Paris Cité — Centre Virchow-Villermé

Papers on climate change & health, 1990-2014, by topic

Verner et al. (2015)

7. Health as perpetrator

- The health sector in rich countries contributes 3-8% to national emissions
- Main items are consumables, among them the major one is drugs….

8. Health as risk communicator

- Explaining complex multiple risk pathways with probabilistic estimates and attribution of effects to mutiple risk factors an of risk factors to multple effects

What do we know?

1. **Research output is comparatively low**
   - Too few studies on quantifying health co-benefits, adaptation and it costs, NCDs, malnutrition, too few sub group analyses: global south urban rural, most vulnerable population groups compared to
     - other sectors
     - other health risk factors
2. **Teaching is marginal**
   - 5 accredited short courses world wide
   - 3+1 MOOC: (Harvard), Madison, Heidelberg, Paris, Nouna)
   - No dedicated doctoral programs, Master courses
3. **Translation: room for impovement**
   - to policy is ok, but hampered by scarce evidence
   - communication to the public and households is works, but ..

What can / should scientists do?

1. Create truly trans-sectoral research centers with structured cooperation (inter-)nationally

   Climate and earth science, public health, nutrition, economics, unban planning, ethics, psychology, anthropology, political sciences

2. Generate training for doctoral students & postdocs to learn relevant methods (blended MOOC & f2f)

   Time series analysis, Bayesian belief networks, satellite data, weather data, *using* climate models, comprehensive health metrics,, describing uncertainty, etc.

3. Translate 8 roles of health in climate change to the public and policy-makers

4. Speak truth to power (Gina McCarthy)

Sample of our target population

Thank you

The good news:
health contains many positive messages
It can motivate individuals and policy makers