

Health and climate change: a roadmap for applied research

Climate change is one of the defining challenges of the century, and increasingly recognised as a public health priority.¹ Research in this field is increasing, but is comparatively undeveloped in view of the complexity of the issue, and the potential magnitude and range of health consequences. For example, the average annual number of articles published in PubMed-indexed journals that referred to “health” and either “climate change” or “global warming” more than doubled between the early 1990s and the middle of the current decade. Over the same period, however, more than eight times as many articles referred to “health” and “air pollution”, and over 40 times more referred to “health” and “smoking”.

To promote health protection from climate change, national governments requested WHO to undertake research under a series of defined headings.¹ In the second half of 2008, WHO convened a global consultation of over 70 public health researchers, practitioners, representatives of the UN and other agencies, and donors to identify immediate research needs. Their insights and recommendations are summarised around six key themes in a new report.²

The first is that research on the health effects of climate change must be placed more firmly within the overall context of improving global health, and health equity, rather than being considered to stand alone. Such research should more closely link the immediate imperative (reduction of the burden of climate-sensitive health outcomes) to the long-term aim of increasing resilience to climate change. This effort should include making use of the substantial existing research capacity in fields such as infectious disease control and air pollution.

The second is the need for improved policy-relevant risk assessment, building a stronger bridge between evaluation of the existing health risks from short-term to medium-term climate variability and the effects of gradual climate change, in the context of other drivers such as socioeconomic development and urbanisation. This risk assessment should pay greater attention to previously neglected mechanisms, such as the diverse effects of population displacement or the degradation of water supplies. Assessments should further focus on particularly vulnerable population groups, especially those exposed to multiple environmental hazards.

Third, a comprehensive evaluation of the effectiveness, and cost-effectiveness, of protective measures is needed. Proven interventions exist against most climate-sensitive risks, and expanding their coverage would reduce current and future health burdens. But there are gaps in baseline cost-effectiveness information, and limitations in our understanding of how these interventions might be compromised by changing environmental conditions. Another need is the development of analytical methods that take into account the uncertainty, long time frames, and equity considerations that characterise decisions related to climate change.

Fourth, applied research can help maximise the health benefits of decisions taken beyond the health sector. This interdisciplinary research needs to include assessment of the diversity of potential health effects of mitigation actions, from macro level policies such as carbon pricing, to decisions in key sectors, such as household energy, power generation, transport, and agriculture. The health implications of adaption policies, such as increasing use of wastewater, also need to be evaluated. These sectoral studies can be complemented by settings-based approaches that provide a more holistic assessment of the effect of, for example, urban development plans.

Fifth, improved research on surveillance and other decision-support tools is necessary to enhance operational effectiveness. Although existing disease surveillance systems already provide some coverage for most climate-sensitive diseases, there are gaps. The potential for using environmental information to enhance early warning, avoid health risks, and lower costs remains largely unproven. Additional research is needed to improve understanding of the kinds of information, dissemination methods, and participatory approaches that are most effective in engaging decision makers, including the general population.

Sixth, economic assessments of the costs and benefits of mitigation and adaption decisions are crucially important. The limited available research suggests unmitigated climate change will substantially increase financial costs to health services, and that health co-benefits could be larger than the costs of many mitigation policies. More studies, over a wider range of health-impact pathways, are needed.



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Identifying urgent and immediate research needs for evidence-based action is just the first step in reducing the health risks of climate change. Filling these research gaps requires a sustained process to mobilise resources and update objectives as needs change.³ Crucially important is the need to build interdisciplinary research capacity, with a focus on the low-income countries that are most vulnerable to the health effects of climate change and have the weakest research base. Meeting this challenge will require additional human and financial resources. However, the necessary investment will be very small compared with current investment in climate research, marginal compared with the economic implications of adaptation and mitigation decisions, and trivial compared with the potential health consequences of unmanaged climate change or poorly designed climate policies.

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- 1 WHO. Climate change and health: Resolution of the 61st World Health Assembly. 2008. http://apps.who.int/gb/ebwha/pdf_files/A61/A61_R19-en.pdf (accessed May 4, 2009).
- 2 WHO. Protecting health from climate change: global research priorities. Geneva: World Health Organization, 2009.
- 3 The Lancet. The Bamako call to action: research for health. *Lancet* 2008; **372**: 1855.