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EDITORIAL

Research on climate change and health: looking ahead

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Next year the Intergovernmental Panel on Climate Change (IPCC) will start its Fifth Assessment Report. The role of the IPCC is to evaluate the peer reviewed literature on current and future impacts of anthropogenic climate change and synthesise the findings for governments. The IPCC has three working groups. Working Group I (WGI) addresses the climate science including an assessment of observed warming due to human activities and projections of future warming and regional climate change. Working Group II assesses the scientific evidence for impacts, adaptation and vulnerability—in all regions, in all ecosystems, for all outcomes, for all population groups. Working Group III evaluates the evidence with respect to options for mitigation (reducing carbon emissions and enhancing carbon sinks). The IPCC authors only include peer-reviewed articles published since the last assessment and have a strict policy regarding the use of grey literature. Public health science contributed to WGII (Confalonieri et al. 2007) and WGIII (Barker et al. 2007) in the Fourth Assessment report. It is likely that public health research will make an even more important contribution to the next Assessment—but only if the appropriate research studies have been undertaken.

This paper belongs to the special issue "Climate changes health".

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The IPCC assessments are *scientific* assessments and the IPCC process prohibits including any policy prescriptive statements. Global scientific assessments are becoming more common (we now have the Millennium Ecosystem Assessment and the International Assessment of Agricultural Knowledge, Science and Technology for Development). The IPCC was the first of its kind and represents a fantastic and unique achievement to science and policy (and world peace). Scientific rigour is maintained across diverse research disciplines and from observational studies to modelled projections. The IPCC has its origins in the physical sciences—as it started with the climate system. As the input from social scientists is increasing—in recognition of the complex social and economic determinants of vulnerability to climate change—the IPCC authors will increasingly face familiar issues regarding the synthesis and evaluation of qualitative and quantitative social research. Fortunately, public health has some established methods for reviewing and evaluating research results. These now need to be applied to the climate–health research questions. The IPCC will require many comprehensive and systematic reviews—to demonstrate a causal role of climate for a relevant health outcome and to quantify the attributable fraction. Systematic reviews of the effectiveness of adaptation measures (interventions) are also needed. As yet, few systematic reviews are conducted in the sphere of environment and health. In effect, climate change–health research is suffering from the legacy of reductionism in the health sciences and its clinical bias. Too few researchers are working on the environmental determinants of disease, even for major climate-sensitive causes of death such as malaria and malnutrition.

The climate change research agenda is moving forward. An expert meeting organised by WHO last year identified the following research needs (WHO 2009):

- Improved risk assessment to inform decision-makers about the broad range of health impacts at international, national and local levels.
- Comprehensive evaluation of the effectiveness, and cost-effectiveness, of interventions aiming to protect health from climate related hazards.
- Quantification of health effects of mitigation and adaptation decisions in other sectors (e.g. transport, water resource management, agriculture and food systems) to avoid harm (maladaptation) and identify important opportunities for health promotion.
- Economic assessments of the costs of the health impacts of climate change and of adaptation measures.

The 2003 heat wave in Europe illustrated many key aspects of this research gap. First, the public health systems were quick to respond after the major event that caused approximately 35,000 deaths across western Europe. Most large cities in this region now have a heat health protection plan in place. Many systems were implemented in 2004 and probably there has been sufficient time for them to be evaluated for their effectiveness, but very few studies have been published. Although we have learnt much about the impacts of heat on mortality and morbidity, we have learned almost nothing about the role of housing and indoor temperatures in modifying that risk. There appear to be few intervention studies for housing measures to reduce heat-related health effects. The main reason for this is cost-routine epidemiological data are not readily linked to housing conditions and would require additional data collection. Thus, policy making for adaptation for health is floundering because the health issues of concern (climate hazards) do not have a well-developed public health evidence base (heat waves, floods, fires and droughts are the prime examples). Economic assessments and risk management models ultimately rely on the empirical evidence for exposure–response functions and their effect modification by important factors such as socio-economic status or policy measures. Movement towards generating the research desired is needed from research scientists and funders alike. We have a very short window of opportunity between planning research and it being published in a peer reviewed journal by 2013 in order for the research findings to be included in the Fifth Assessment Report. The IPCC Fifth Assessment Report represents an opportunity to make a difference—but it depends on good science. It is up to all of us to do our best to address the climate research gaps identified by WHO and other organizations.

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