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CLIMATE CHANGE AND HUMAN HEALTH RESEARCH: FACING GLOBAL HEALTH INEQUITY

If undertaken properly, tracking climatic effects through proximal and distal antecedents to actual physiological changes in the human body should be challenging. To conceptualize such a broad health determinant, researchers often rely on their own unique intellectual perspectives. This is evident in climate change and health research: malaria researchers warn of possible effects on vector populations; water and sanitation experts describe a worsening situation for diarrhoeal illness; and, disaster relief researchers decry the lack of disaster response capacity in most countries. Reflective of the Intergovernmental Panel on Climate Change's (IPCC) projected "confidence" levels, most of these sectoral researchers avoid concrete projections and admit to the uncertainties of their employed research models. In response, there is an increasing research demand for more investigations into climate models relevant to health impacts, vector dynamics, surveillance and forecasting systems for emerging diseases and epidemics, disaster risk reduction for decreasing population vulnerability and methods for improving health-related adaptive capacity. Understandably, climate change has thus been fragmented into digestible research projects. Beyond defining the research agenda, however, shouldn't this global problem of climate change require more comprehensive action from the climate change and health research community? Such a question may be critical to successful health sector responses to climate change.

Some conclusions of the IPCC Fourth Assessment Report are presented without the bold underscoring they deserve:

> In many cases, it appears that the possible negative impacts of climate change pose risks of higher total monetary damages in industrialized areas (i.e. currency valuations of property damages) but higher total human damages in less-developed areas (i.e. losses of life and dislocations of population)…'.[1]

One attempt to absorb such realities, possibly considering that the very use of the IPCC report likely suggests the reader belongs to the "monetary damages" group, and perhaps contemplating how the same climate event could lead to profit loss for a European business and loss of life for a Dhaka slum-dweller. With this in mind, climate change-related health impacts begin to seem less as components of a new research agenda, and more as symptomatic needs of the same tragic reality of global health inequity.

Consider the projected climate change effects on Bangladesh: cyclones are likely to increase in intensity with a possible increase in frequency; sea level rise is likely to inundate much of the low-lying areas of the country and generate salinity in groundwater sources; extreme rainfall events (droughts and floods) are likely to

increase in frequency; and, changes in annual and inter-annual temperature are likely to affect crops, heat events and vector populations. Such projections are both imposing and full of uncertainties. The same is true for the related health impacts, which include possible increases in diarrhoeal illness, vector-borne diseases, malnutrition, death and injury from disasters, displacement and heat and cold-related illness. Again, despite the severity of these possible impacts, especially considering existing local burden of disease, the projections suffer from many uncertainties. Yet across all of these climate change affected weather events and related health impacts, global health inequity provides one almost certain conclusion: the impoverished are the most vulnerable to all of these climatic events, to all of these health impacts, and to the whole experience of climate change itself.

Health researchers fully admit the link, arguing that adaptation is most critical for disadvantaged populations and that development policies that reduce poverty are necessary components of any adaptation plan. For others, global health inequity carries such importance that climate change policies are dismissed as an ultimate distraction from the real problems of poverty. However, admitting the link between global health inequity and climate change, and identifying it, as an intersectoral commonality for the health research community, cannot be simply described as a ranking of research importance. Indeed, climate change provides the opportunity for health research to discard simplified models of poverty, health and development. It remains unknown if health researchers can rise to such a challenge.

Like the climate system itself, the health impacts of climate change are dependent on a staggering number of determinants. It is therefore no longer sufficient to, for example, model the development of an infectious disease surveillance system and measure its effectiveness in preventing illness. It must also be examined how such a surveillance system would be used by the operating government and health system, how the resulting information would be used by citizens, and how the system would innovate with new technologies, etc. It is also unrealistic to expect a health researcher to collect and synthesize this wealth of information alone, and indeed a wide range of expertise would be required to produce applicable research. Interdisciplinary research is one proposed method for such collaboration, although the free flow of health research information must first be established.

Unfortunately, health research topics and methods are often dictated by large donors, such as the World Bank, and the resulting studies may be barricaded behind pay-to-access peer-reviewed journals. For climate change research, the United Nations Framework Convention on Climate Change (UNFCCC) sponsored National Adaptation Programmes of Action (NAPA) attempts to address such restriction issues by mandating national research and adaptation plans. In Bangladesh, their NAPA largely focuses on adaptation programmes for existing organizations who deal with climate-relevant issues. Health is given only minimal attention with a suggested dissemination of adaptation information to communities vulnerable to extreme weather events, and suggested 'mainstreaming' adaptation to climate change into all aspects of the health industry.[2] This limited health impact consideration seems to ignore the aforementioned serious implications for climate-related health impacts in the country.

However, there are plans for improved climate-related health research, as Saleemul Huq, founder of the Bangladesh Centre for Advanced Studies, is planning to establish

the International Centre for Climate Change Adaptation and Mitigation in a private Bangladeshi university.[3] It is highly expected that such national research institutions in low-income countries will provide relevant climate change and health research opportunities. However, this idea of ultimate empowerment of the least developed countries (LDCs) through the NAPA process is ignorant in its implied suggestions: that health researchers in high-income countries should focus their research elsewhere; that the tortuously slow improvement of research capacity is inevitable; and, that health researchers in high-income countries deserve their continued wealth and privilege while new research institutions in LDCs struggle to establish themselves.

Global health inequity has been acknowledged and lamented by the climate change and health research community. However, the degree of human solidarity required to promote interdisciplinary research relevant to global health inequity is wholly absent. The needed social justice extends far beyond revolutionizing methods or agendas for the latest peer-reviewed journal articles on climate change and health. Do health researchers in high-income countries purchase clothes that keep Bangladeshi children in sweatshops? Do they insist on unnecessarily driving to work and contributing to the carbon cycle that worsens the degree to which the sea encroaches on Bangladeshi farmlands and habitations? Do they work for donor organizations that pressure the Bangladeshi government to keep expenditures on health low (currently around 3.1% of gross domestic product)?[4]

It is easy to demand more research on the complexities of the climate system and its relation to health; it is easy to identify global health inequity as a principal determinant of vulnerabilities to climate change; it is easy to suggest that interdisciplinary health research should be employed; and, it is easy to pretend all of these demands require no accountability from researchers in high-income countries. It is likely that the true global lessons of climate change and health will be lost if only these easy health research reactions are undertaken.

The IPCC Fourth Assessment Report defines a new understanding of human action and the environment: humans are accountable for the problem of climate change; humans continue to determine climate change effects through their current behaviour; and, those least vulnerable to climate change's negative effects (those in high-income countries) constitute a minority of the global population. Climate change has provided health researchers with the opportunity to truly reconsider why people suffer in famine while others feast, why some die from diarrhoeal illnesses while others are merely inconvenienced, and why health research has not become predominantly interdisciplinary and more egalitarian to better tackle these injustices.

Obviously, global health inequity is not a new phenomenon, though there are some who are confident that it will not be around for long: that a simple continuation of existing models of development guarantees an eventual elimination of inequity.[5] The health research community sometimes exercises the same thought process: that minutely altering traditional research topics and techniques is sufficient to achieve successful interventions for determinants of human illness. Global climate change disrupts these similar outlooks, as it is a public health challenge distinct from any that humanity has faced in history. The climate change projections come with only one cross-cutting certainty, that those impoverished will disproportionably suffer the negative health effects. The global health research challenge is therefore human

solidarity and social justice. The methods by which this is worked towards may differ, but the health research community must accept they share a common goal, a common challenge and a common accountability for the existing and future state of global health inequity.

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1 Willbanks TJ et al. Industry, settlement and society. In: Parry ML, et al., eds. *Climate change 2007: impacts, adaptation and vulnerability.* Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge, United Kingdom, Cambridge University Press; 2007:357–390.

2 *National Adaptation Programme of Action (NAPA).* Bangladesh: Ministry of Environment and Forest (MOEF), Government of the People's Republic of Bangladesh. Bangladesh, 2005.

3 Masood E. Capacity building: the road from Rio. *Nature,* 2008, 451:8–11.

4 WHO Statistical Information System (WHOSIS). *Core health indicators: the latest data from multiple WHO sources.* Geneva, World Health Organization, 2007.

5 Feachem R. Globalization is good for your health, mostly. *British Medical Journal,* 2001, 323:504–506.

Jacob Bell was born and raised in the small fishing town of Homer, Alaska. He attended Pomona College in Los Angeles and also studied health systems in Mombasa, Kenya. Jacob participated in fundraising efforts to help implement clean water projects there. He enrolled in the post-graduate science programme in Global Health at Trinity College, Dublin in fall 2007. Here, he explored environmental health as related to global climate change and variability. Jacob's thesis investigates epidemiological evidence for the health impacts of climate change, along with adaptation strategies for the health-care sector. He was accepted in the summer of 2008 as a visiting researcher at the London School of Hygiene and Tropical Medicine to undertake this research.