



## Global climate change: implications for international public health policy

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### Introduction

The evidence for anthropogenic climate change is now clear and convincing. The Earth's surface has warmed by more than 0.8 °C over the past century, and by approximately 0.6 °C in the past three decades.<sup>1</sup> This warming has been linked to more extreme weather conditions such as intense floods and droughts, heavier and more frequent storms, and a possible increase in frequency and intensity of the El Niño Southern Oscillation. These changes are largely caused by human activities, mainly the burning of fossil fuels releasing carbon dioxide (CO<sub>2</sub>) that traps heat within the atmosphere. These CO<sub>2</sub> emissions continue to rise, and climate models project the average surface temperature will rise by 1.1 °C to 6.4 °C over the 21st century.<sup>2</sup>

Since 1990, WHO has published a series of reports on climate change and has participated in review processes such as the Intergovernmental Panel on Climate Change. These activities have outlined four key characteristics of the health risks generated by a warming and a more variable climate. First, these hazards are diverse, global and probably irreversible over human time scales. They range from increased risks of extreme weather, such as fatal heat waves, floods and storms, to less dramatic but potentially more serious effects on infectious disease dynamics, shifts to long-term drought conditions in many regions, melting of glaciers that supply freshwater to large population centres, and sea level increases leading to salination of sources of agriculture and drinking water. Second, the health impacts of climate change are potentially huge. Many of the most important global killers are highly sensitive to climatic conditions. Malaria, diarrhoea and protein-energy malnutrition together cause more than 3 million deaths each year.<sup>3</sup> Third, these risks are inequitable, in that the greenhouse gases that cause climate change originate mainly from developed countries, but the health risks are concentrated in the poorest nations, which have contributed least to the problem.<sup>4</sup> Finally, many of the projected impacts on health are avoidable, through a combination of public health interventions in the short term, support for adaptation measures in health-related sectors such as agriculture and water management, and a long-term strategy to reduce human impacts on climate.

### Rethinking health in a changing environment

Threats to health are often cited to justify actions to mitigate or adapt to climate change; for example, United Nations Secretary-General Kofi Annan's 2006 speech in Nairobi.<sup>5</sup> For all the attention that these issues receive, however, a comprehensive strategy to support a public health response is conspicuously lacking. This strategy is urgently needed, both because the health community has a duty to counter emerging threats, and because increased attention to climate change offers opportunities to focus on the most disadvantaged populations' current needs. For example, the international community has agreed on the principle of a global climate change adaptation fund, funded by a 2% levy on a multibillion-dollar Clean Development Mechanism.<sup>6</sup> However, this opportunity to strengthen public health can be seized only if the health sector knows what it should do differently because of climate change.

The development of a comprehensive strategy will take time, but some essential principles are already clear. A global problem requires a strategy of international dimensions that can translate into regional and local actions. Just as climate change's underlying causes are global, its health implications do not respect national boundaries. Impacts in one location, such as infectious disease epidemics or population displacements caused by droughts or rising sea levels, quickly spread across national borders. Coordinated investments in preventive measures therefore contribute to the "global public good" of reducing the risk of health emergencies.

The challenge is simplified somewhat by the fact that climate change is expected to lead mainly to changes in existing health issues rather than to the emergence of new and unfamiliar diseases. An important guiding principle therefore is to increase the priority given to currently important health burdens that are likely to be worsened by climate change. Such a "no regrets" strategy will bring important public health benefits under any plausible future climate conditions.

Adaptation to climate change is essentially a matter of basic public health protection. The challenges of rapid environmental, demographic and social changes all call for greater emphasis on disease prevention, providing a better balance with the current focus on curative and reactive measures. The necessary preventive actions to deal with most climate-sensitive diseases are already quite clear. Climate change and other environmental stresses should help to refocus political and financial commitments to implement these measures.

### Preventive environmental health interventions

One emerging environmental health threat is the decline in global freshwater resources, caused mainly by increasing rates of water extraction and contamination. Climate change is expected to worsen this decline in water quality and quantity, particularly in already dry regions such as the eastern Mediterranean and north Africa. Scaling up water and sanitation services and providing point-of-use disinfection would reduce the current burden of disease and ameliorate the health impacts of decreasing water supplies. Such interventions already have a very high cost–benefit ratio;<sup>7</sup> the threat of climate change makes these preventive health measures an even wiser investment. As water stresses intensify, governments could protect health by strengthening and enforcing their regulatory frameworks to ensure the safe use of new water sources that will become increasingly important: wastewater, excreta and greywater in agriculture and aquaculture.<sup>8</sup>

### **Infectious disease surveillance and response**

Effective surveillance and response systems are essential in managing any infectious disease, but they become even more important under conditions of rapid change. These conditions include climatic shifts as well as increasing rates of movement of and contact between humans, pathogens and reservoirs. These conditions all require improved human health surveillance integrated with monitoring of climate and other environmental conditions that favour disease outbreaks, including disease in wildlife and agricultural animals. Climate change also strengthens the case for reinforcing response systems for infectious disease outbreaks, including predefined action plans and maintenance of the control resources and personnel capacity necessary to mount effective responses.

### **Environmental health in emergencies**

The impacts of current and future natural disasters could be reduced by the health sector defining integrated measures that address the root causes of vulnerability, and planning for effective responses after such events. For example, the health impacts of floods can be reduced by land management policies that reduce deforestation and conserve the integrity of watersheds and coastal zones, minimize the physical impacts of mudslides and storm surges, and decrease the chances of sewage contamination. Post-flooding health effects can be reduced by adequately planned and funded health-sector responses, including interventions to control outbreaks of vector-borne and water-related diseases.

### **Building capacity for health sector responses**

Since 2000, WHO has worked with the World Meteorological Organization and the UN Environment Programme to raise awareness of climate change's implications for the health sectors of highly vulnerable regions. The necessary next step is to inform and support national health actors in taking concrete actions to protect health. For example, WHO is addressing this need by initiating a new project in 2006 on piloting approaches to protect health in changing climates.<sup>9</sup> In partnership with the UN Development Programme and with funding from the Global Environmental Facility, this initiative is being implemented in seven vulnerable countries. In each, the national health ministry chairs an intersectoral team that has identified priority health risks from climate change given local environmental socioeconomic and health contexts. Through the course of the initiative, this team will also identify, implement, monitor and refine interventions to minimize health risks. The project will thereby support targeted interventions in these countries, strengthen institutional capacity to address health risks, involve an increasingly informed and engaged health sector in adapting to climate change, and extract lessons that are applicable to other countries. It will also develop monitoring mechanisms to ensure that resources are applied effectively in adaptation projects within the health sector, and inform evaluations of support through this mechanism as compared with more general health or development aid. This initiative is important preparation for the wider action that will be necessary to meet the worldwide challenge of adapting to health risks from climate change.

### **Strengthening alliances for sustainable development**

The actions described above represent “safe investments” for climate change adaptation funds within the health sector. However, many climatic risks to health lie at least partly outside the health sector's normal sphere of action. Perhaps most critically, climate change has the capacity to suppress agricultural yields, with the greatest risks in Africa,<sup>10</sup> where malnutrition is already the largest single contributor to disease burdens.<sup>11</sup> Some of the most effective actions by health professionals may therefore involve supporting other sectors' efforts to mitigate and adapt to climate change.

Much work still needs to be done in this area, including:

### **Protecting climate, improving health**

Ultimately, however, the public health community needs to go beyond reacting to a changing climate. A true preventive strategy needs to ensure the maintenance and development of healthy environments from local to global levels. In the long term, sustainable development and protection of ecosystem services are fundamentally necessary for human health.<sup>13</sup> This is not just a case of protecting future generations, as even in the short term development choices that protect the climate can benefit public health significantly.

The intersection of energy, transport, climate and health provides an example of this. The Stern Review of the economics of climate change argues that the long-term benefits of major investments to cut greenhouse gas emissions would vastly outweigh their costs, and that these are needed to avoid potentially catastrophic impacts on the global economy.<sup>12</sup> This coincides with a WHO assessment that feasible improvements in environmental conditions could reduce the global disease burden by more than 25%.<sup>14</sup> Much of the current burden is due to unhealthy energy and transport services. Changing these systems to reduce climate change could therefore also bring

significant and largely unacknowledged public health gains. Improving access to public and active transport would greatly reduce CO<sub>2</sub> emissions, while also cutting the 800 000 annual global deaths from outdoor air pollution, the 1.2 million annual deaths from traffic accidents, and the 1.9 million deaths from physical inactivity.<sup>11</sup> Changing the poorest communities' domestic energy technologies could reduce the 1.5 million annual indoor air pollution deaths.<sup>15</sup> The critical next stage for the health community is a more direct and assertive engagement with the environment and economic sectors to ensure that health-supporting technological and development choices are implemented.

## Conclusions

Human-induced climate change is an emerging threat that rightly commands widespread policy and public attention. Along with other rapid changes associated with global population and economic growth, climate change strains existing weak points in health protection systems and calls for reconsideration of public health priorities. The most effective responses are likely to be strengthening of the key functions of environmental management, surveillance and response to safeguard health from natural disasters and changes in infectious disease patterns, and a more pro-active approach to ensure that development decisions serve the ultimate goal of improving human health.<sup>16</sup> For the most part these are not new interventions but existing tools underutilized due to the "true killers": lack of political commitment and of financial resources.<sup>17</sup> Climate change therefore demands that we intensify our efforts in preventive public health and place that crucial task at the core of sustainable development. ■

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