

## **Symposium on Climate Change and Health**

### **Introduction: Mitigating, Adapting, and Suffering: How Much of Each?**

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The emergence of historically rapid climate change in the twenty-first century adds new and urgent dimensions to the age-old challenges of public health due to poverty, inequity, ignorance, complacency, counterproductive personal behavior, conflict, infection, and environmental stress. Climate change threatens to enhance existing risks at every level of development, from heat stress in Barcelona to malaria in Botswana.<sup>1</sup> In terms of absolute burden, however, it seems clear that it most threatens the poorest and most vulnerable populations in all societies, probably in close inverse proportion to income, wealth, and power (4). The rich will find their world to be more expensive, inconvenient, uncomfortable, disrupted, and colorless—in general, more unpleasant and unpredictable, perhaps greatly so. The poor will die.

To date, the attributable burden of diseases from climate change for which quantified evidence is available has been modest by comparison with the traditional threats to public health (2). Over time, however, the burden will rise, even with major additional mitigation and adaptation efforts. Most of this increase will occur in the form of enhancing existing health risks (malnutrition, adverse weather, vectorborne disease, poor water supplies, etc.), which implies that public health efforts to reduce these traditional hazards should be granted even greater urgency because of their impending enhancement by climate change (3).

Society has three basic options for responding to human-caused climate change.<sup>2</sup>

- **Mitigate** by reducing greenhouse gas (GHG) emissions from energy and land use or capturing them from the atmosphere to retard or, perhaps, reverse the extra heating of Earth caused by GHG build-up in the atmosphere.
- **Adapt** by reducing the negative effects of climate change through such measures as protecting coastlines, moving populations away from impacted areas, increasing efforts to control climate-related vectorborne diseases, and insulating cities from heat stress.
- **Suffer** because climate changes already seem to be underway and that efforts in the first two arenas above are moving slowly. Even with major mitigation and adaptation efforts, suffering will likely increase, perhaps considerably in poorer parts of the world, because of the climate change committed already.<sup>3</sup>

By taking concerted action, society can significantly control the relative size of each of these options, although none can be avoided entirely.

In this context, the public health community has a large professional stake in the emerging restructuring of global concerns and policies related to climate change. Public health science plays major roles in each of the options above, here discussed in reverse order:

- **Suffering.** Apply and adapt well-developed methods in public health research to identify and quantify the size, distribution, type, and probability of health impacts caused by climate change to better gauge the value and urgency of mitigation and to direct adaptation efforts.
- **Adaptation.** Prepare the health community to handle the expected impacts and, in its traditional prevention role, to urge people and institutions to take mitigation steps.
- **Mitigation.** Guide mitigation measures such that they avoid public health impacts through negative side effects and, even better, actually help achieve other health goals—this in the realm of co-benefits, in which activities are designed to maximize the joint product of GHG mitigation and health, and ancillary benefits, in which health improvement is a side product of activities focused mainly on reducing GHGs.

The five review articles in this short symposium, which are written by major investigators in the fields represented, illustrate important approaches within each of these public health realms.

Under suffering, the teams led by Kovats and Patz review the methods for assessing the effects of heat stress on urban populations through time-series analyses and for estimating the total burden of disease from climate change, both subjects of considerable research activity and method development and both critical to society's understanding of how climate change affects health.

Under adaptation, Jackson & Shields outline the roles U.S. public health professionals can play in responding to the impacts from climate change and prevention-promoting activities.

Under mitigation, Walsh reviews the trends in the efficiency of the world's automobile fleets that will be critical for reducing GHG emissions and the resulting ancillary health benefits from control of health-damaging air pollution. Smith & Haigler suggest scoping methods for conducting co-benefits analysis of interventions in the energy sector to achieve GHG reductions and health benefits derived from standard methods developed separately in the climate-change and international health communities.

## CONCLUSION

Perhaps the most telling simple definition of public health is that it is the science and art of making people healthy before they are wealthy (and then keeping them that way).

Although altering both the rules and the stakes in as yet uncertain ways, the emergence of climate change on the world stage reinforces this vision of public health's mission. The profession will need new infusions of methods, strategies, and resources to prevent climate change from slowing or reversing progress toward acceptable standards of global population health.

## Footnotes

<sup>1</sup> See the six articles in the 2007 Series on Energy and Health (Lancet 370:1–83).

<sup>2</sup> Here the terms mitigation and adaptation are used in the way adopted by the Intergovernmental Panel on Climate Change (IPCC) in its assessments, which are the most authoritative evaluations of the science, impacts, and policies related to climate change. Its latest set of reports, the Fourth Assessment, was released in 2007. See <http://www.ipcc.ch/>.

<sup>3</sup> The trade-off of mitigation and adaptation activities with “suffering” was proposed by Holdren (1).

## LITERATURE CITED

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