

# Global Warming: Polar Bears and People—Implications for Public Health Preparedness and Disaster Medicine: A Call to Action

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Global warming has been hotly debated over the last two decades among scientists, economists, legal experts, philosophers, and politicians. Yet, the medical and public health communities are relative newcomers to understanding this global threat to humanity. As we celebrate Earth Day on 22 April 2008, there is an opportunity to educate physicians and other healthcare providers involved in mitigating, preparing for, responding to, and recovering from disasters about the medical and health implications of global warming.

How are global warming, carbon dioxide emission, ocean warming, the ice cap meltdown, and disaster medicine related? The answer is that global warming and its serious consequences to our planet have led to an enormous increase in the number of disasters and their negative effects on humans, animals, plants, livestock, and the entire ecosystem. Disasters result from deteriorating water quality, desertification, receding coastal and land boundaries, and spread of diseases by vectors.<sup>1</sup> Munich Re, one of the largest reinsurance companies of the world, estimates damages from disasters in the order of US\$100 billion per year although not all is weather-related.

By 2012, if left unchecked, the effects of global warming are predicted to “lead to 3,000 heat-related deaths from a serious heatwave, 14,000 more cases of food poisoning, an increase in skin cancers and flood-related health problems, and 1,500 extra deaths and hospital admissions from air pollution each year,” in the United Kingdom alone.<sup>2</sup> European drinking water reserves also are at risk. Some 70% of these reserves are held by the snowpack of the Alps and other mountains, which is shrinking rapidly.

Global warming can be seen as the cause of accelerated disintegration of polar ice. In early 2002, the Larsen B ice shelf broke off of the contiguous Antarctic ice shelf as a 3,250 km<sup>2</sup> iceberg (larger than Luxemburg). During its journey into the South Atlantic, it melted into five hundred billion tons of water in less than one month. In addition to melting ice in the polar and mountain regions, the world's oceans are warming, which enhances the likelihood and intensity of hurricanes. Temperature shifts affect coral reefs and fish stocks, and thousands of species are at risk of extinction. Overfishing, pollutants, and acidity from soluble atmospheric carbon dioxide are contributing to this negative trend.

Global warming has been documented; it has become a scientifically measurable phenomenon. Some controversy remains about the extent to which human influence is contributing to global warming. Human activity adds billions of tons of carbon dioxide, methane, and other gases to the earth's atmosphere. The two most important factors are: (1) burning

fossil fuels for electricity generation, transport, and heating; and (2) changes in land use. It is unknown to what degree future disasters will be rooted in human activities.

Some regions are more vulnerable to disasters than others. Bangladesh is exposed to the combined effects of glacial melting, deforestation and ensuing soil erosion in the Himalayan highland, and cyclones pressing ocean water into the deltas of the Ganges, Brahmaputra, and Meghna rivers. The US West and the Australian East suffer from extended droughts and wildfires, the Caribbean and Philippine coasts are impacted by intense hurricanes/typhoons, and Europe, China, and India have experienced an increase in heavy summer rainstorms.

Disasters are as complex as the weather and atmosphere. So are the interdependencies of nature, human behavior, science, technology, public health, and medicine. These complexities in disaster medicine and in science require a new scientific thinking and approach. We need not give up.

Both mitigation of and adaptation to global warming are possible. A quadrupling of societies' efficiencies in dealing with energy and other resources is technically possible.<sup>3</sup> To make this new technological revolution profitable in the North and South, the post-Kyoto regime of curbing greenhouse gas emissions must be tailored in a way to include binding commitments to the developing countries. They will accept commitments if we grant them per capita equal emission rights. Then, investors, engineers, and politicians will swiftly move to exploit the fantastic potential of increasing energy efficiency, which currently is not sufficiently profitable.

Adaptation is a different ballgame and is closely related to the preventive strategies of disaster medicine. A civilized society should be able and willing to anticipate what could happen during the next hurricane, drought, or flood, and take adequate precautionary measures, in terms of levies, fire alerts, disaster logistics, and medicine, etc.

Disaster medicine needs a new global language and nomenclature for healthcare workers, related technology, and the human sciences sector. Creative approaches like the PICE (potentially injury-creating event) system are needed to help researchers, practitioners, and policy-makers understand the functional impact of global warming on medical and health systems.<sup>4</sup> Global warming and disasters are related and interdependent. The academic, scientific, and healthcare communities that address climate change issues and disasters need the support of national and international leadership. This support must be in the form of resource allocation, finances, and increased emphasis on

equality and justice. Those dealing with these urgent challenges to humanity only can deliver answers and solutions if there is a radical philosophical change and will in local and global politics to solve these problems.<sup>5,6</sup> The first step is to raise awareness within the medical and public health communities so that those responsible for disaster preparedness understand the implications of global warming. To quote Margaret Chan, Director General of the World

Health Organization, "Up to now, the polar bear has been the poster child for climate change. We must use every scientifically sound and politically correct mechanism in the book to convince leaders that humanity really is the most important species endangered by climate change."<sup>7</sup> Let's make global warming more than just a focus of World Health Day on 07 April 2008. We must address the global threat climate change poses to humans now before we have insufficient resources to respond to the disasters of the future.

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