

# Global warming kills trees, and people

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In 1992 a provocative editorial in *The Lancet* questioned that while environmental pollution kills trees, does it kill people? (1). As was to be expected, it stimulated a series of letters documenting a clear link to human health, primarily via ambient air pollution, which was a major concern at the time. In the last decade, increasing evidence has accumulated on the impacts of “environmental change” — often large-scale changes such as biodiversity loss, climate change and desertification. These changes are known to kill trees, and a recent article attributes an increase in the spruce bark beetle population to the warmer climate in Alaska (2).

But does climate change or biodiversity loss really kill people? This is a difficult question because global environmental changes involve a multitude of direct and indirect exposure pathways. While public health practitioners may feel they lack the tools to assess risks or to implement necessary interventions, new scientific insights are beginning to provide a clearer view of future health risks and options for prevention.

One type of environmental change that has received attention and led to clear interventions has been the increase in ultraviolet radiation resulting from the depletion of stratospheric ozone (3). Epidemiological studies show a straightforward dose–response relationship between sun exposure and skin cancer (4) and cataracts (5). Public health campaigns to reduce sun exposure, particularly in vulnerable groups and at critical time periods, have resulted from this scientific finding.

However, the health consequences of many environmental changes occur through less direct mechanisms, and this fact makes their study more difficult. It is easier to envisage a cancer death associated with ultraviolet radiation exposure than death as the result of climate change or biodiversity loss. Heat-related mortality is an exception, because it is

clearly a direct health effect of climate extremes. In 2003 an unprecedented heatwave hit France, causing more than 14 800 excess deaths and representing a 60% increase in expected mortality (6).

Other health outcomes (mostly adverse) stemming from climate change may occur through more complex pathways including, for example, malnutrition, diarrhoeal diseases, respiratory illness, some vector-borne diseases, and flood-related injuries (7, 8). WHO has quantified some of these population-wide health risks. Based on detailed temperature and precipitation data globally, WHO estimates that approximately 150 000 deaths in 2000 can be attributed to changes in global climate experienced over the preceding decade (9).

Climatologists and the Intergovernmental Panel on Climate Change (an international group of scientists dedicated to the study of climate change and its implications) are predicting an accelerated worsening of heatwaves and extreme storms. The inertia of the process is such that, even if emissions of greenhouse gases are reduced today, the disruption to the climate system and ecosystems will occur over several decades, and indeed for several centuries in the case of ocean warming. Moreover, impacts are expected to be worse in already impoverished areas of the world — a major threat to those who can least afford an added environmental insult and who are least responsible for the source of the problem: fossil fuel burning (10).

It is clear that a two-pronged approach is required: a reduction or mitigation of the underlying hazardous exposure of global warming; and prevention or “adaptation” to exposures that — because of the inertia of the globe’s climate system — are unavoidable (11). In the first instance, reducing fossil fuel emissions to slow long-term global warming will have an immediate “co-benefit” by lessening local air pollution.

As for the second approach, “adaptation” in public health terms refers to the identification and reduction of vulnerabilities through strategic and visionary interventions. The vision comes from taking account, in proposed interventions, of future changes in places already vulnerable to environmental health risks (e.g. regions with water scarcity, low-production land, or highly variable epidemics of vector-borne diseases).

The heatwave in Europe should serve as a wake-up call, as it demonstrates our failure to anticipate such extreme variations in temperature. If this could happen in Europe, of even greater concern is what could ensue in more vulnerable, impoverished regions of the world. Even as countries continue to negotiate greenhouse gas mitigation measures to reduce global warming, a concomitant question to the health sector is, can we afford *not* to “adapt”? ■

## References

Web version only, available at: <http://www.who.int/bulletin>

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