

Climate Change and Health

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What emerging public health threat is complex, multifaceted, dynamic, has the potential to get much worse, and won't be eliminated any time soon? If you answered "terrorism", you'd be right. But you'd also be right to answer "climate change." And in fact, climate change has killed more people than terrorism has—a lot more. It's perhaps understandable that terrorism generates much more attention and concern, yet public health responses should be proportionate to actual, not perceived, threats.

The World Health Organization estimated that increases in three health risks (diarrhea, malnutrition, and malaria) caused by climate change were responsible for about 150,000 deaths per year as of 2000.¹ Because it deals with only three specific risks, it is a partial accounting of total mortality from climate change. Like many impacts of climate change, human mortality is largely unrecognized to be a consequence of climate change because it takes the form of exacerbations of long-standing phenomena. In this case, climate change causes small percentage increases in amounts of mortality that are very high to begin with, which makes it especially difficult to recognize.

For example, WHO estimates that climate change as of 2000 resulted in an increase of 1 to 2% in mortality from diarrhea in developing countries. That's a small increase in percentage terms, but the baseline mortality is high enough that it represents 47,000 deaths a year.

An analysis performed at Lawrence Livermore National Laboratory of terrorist events between 1968 and 2004 estimates a total of 25,408 related fatalities during that period, or an average of about 700 deaths a year.²

If these numbers are right, then even a partial accounting of mortality from climate change indicated that it kills nearly 6 times more people in one year than terrorists did in 37 years. No doubt there is significant room for error in the epidemiology behind these numbers, and also for disagreements over what exactly constitutes terrorism. But even allowing for these considerations, it seems inescapable that climate change has been much more lethal than terrorism.

The health impacts of climate change come in many forms. Some are well-known: heat stress mortality is the most obvious and can be very significant. The European heat wave of 2003, for example, is estimated to have killed as many as 70,000 people.³ It is estimated that climate change doubled the likelihood of the weather conditions that caused this disaster, and that these conditions will become the "new normal", with half of summers in Europe being as warm as that of 2003, by the 2040s.⁴ Other forms of extreme weather that are intensified by climate change, for example drought and hurricanes, also have health impacts, especially in poorer regions. It is well-known that vector-borne diseases have spread into new regions as a result of shifting climatic zones.⁵ Through several mechanisms, warmer conditions can result in deteriorated air quality (especially increased tropospheric ozone)⁶ and associated illness.

Some of the health consequences of climate change are perhaps more obscure, and others are surprising. For example, increases in food insecurity (resulting from decreased crop yields and other factors) have important health consequences. Violence at all scales (ranging from street

crime to large-scale wars) is associated with extreme heat events and with warmer overall temperatures.⁷⁻⁹ On a smaller scale, an anthrax outbreak in Russia in 2016 was attributed to the release of spores previously frozen in permafrost.¹⁰ This raised the possibility of other frozen pathogens being activated, including those from the 1918 flu epidemic, which are known to be frozen in Alaskan tundra.¹¹

Besides reducing direct health impacts of climate change, policies that mitigate climate change have additional health benefits by reducing the health consequences of fossil fuel use. For example, although particulate pollution from coal still kills roughly 13,000 Americans annually,¹² this number has been greatly reduced by lessening use of coal and increasingly effective air quality regulations. If one should doubt the value of those regulations, a ton of coal burned in China—where regulation is much lighter—apparently produces nearly 20 times the mortality of the same quantity of coal burned in the US.¹³ In China, estimated mortality from poor air quality due to coal burning is enormous (estimated at 366,000 in 2013).¹⁴

By contrast, the health impacts of renewable and non-fossil energy production are minimal, despite some claims to the contrary. The primary documented health effect of wind turbines, for example, is “annoyance,”¹⁵ and for all of the concern about the safety of nuclear power, harms from nuclear power have been dramatically less than from coal, especially in the United States.¹⁶

Mortality from climate change is projected to increase to 250,000 per year globally in the period 2030-2050.¹⁷ Partly as a result of unrealized effects of already-emitted greenhouse gases, projections of future climate for that near-term time window show relatively little sensitivity to future greenhouse gas emissions¹⁸; i.e. to future climate policies. This means that there’s little that can be done to prevent the climate and weather conditions responsible for this mortality. If this outcome is to be avoided, therefore, it will be up to the public health community to mobilize the resources to prevent it. To do this in the most cost-effective manner will require anticipating as much as possible the nature and location of emerging impacts. As is so often the case, socio-economically disadvantaged communities are at more risk and have fewer coping resources.

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