

# Global Warming and Human Health<sup>‡</sup>

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**G**lobal warming is a specific example of climate change. In common usage the term refers to the increase in the average temperature of the Earth's near-surface environment in recent decades and its projected continuation as a result of increasing levels of greenhouse gases attributed to human activity. As the amount of greenhouse gases in the atmosphere increases, more of the infrared radiation emitted from the Earth's surface is being trapped and the planet loses less heat. The result is global warming.

Carbon dioxide produced by the burning of fossil fuels is the largest single source of greenhouse gas emissions from human activity; deforestation is the second largest source of carbon dioxide. The second-most important greenhouse gas after carbon dioxide, methane, is produced by domestic animals, e.g., cattle, buffalo, sheep, pigs and horses, from enteric fermentation of food by microbes in their digestive tract. Other sources are the decomposition of animal manure and anaerobic garbage decomposition, and emissions from coastal sediments. Fertilizer use increases nitrous oxide emissions from the natu-

ral processes of nitrification and denitrification that are carried out by microbes in the soil.

Developed in the 1920s, chlorofluorocarbons (CFCs) have been used as propellants in aerosol cans, in the manufacture of plastic foams, in the cooling coils of refrigerators and air conditioners, as fire extinguishing materials, and as solvents for cleaning.

An increase in global temperatures can cause many changes, including sea level rise, changes in the amount and pattern of precipitation, the frequency and intensity of extreme weather events, agricultural yields, glacier retreat, reduced summer stream flows, potential species extinctions, increases in the range of disease vectors, and other adverse impacts on human health.

Heat waves, flooding, storms, and drought can cause death and injury, famine, the displacement of populations, disease outbreaks, and psychological disorders. Local declines in food production would lead to more malnutrition and hunger, with long-term health consequences. Higher temperatures may alter the geographical distribution of species that transmit disease. In a warmer world, mosquitoes, ticks, and rodents could expand their range to higher latitudes and higher altitudes. The seasonal transmission and distribution of many diseases that are transmitted by mosquitoes (malaria, dengue, yellow fever) and by ticks (Lyme disease, hantavirus pulmonary syndrome, tick-borne encephalitis) may be accentu-

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ated by climate change.

In addition, climate-induced changes in the formation and persistence of pollens, spores, and certain pollutants could promote more asthma, allergic disorders, and cardio-respiratory diseases. Warmer seas could influence the spread of disease, i.e., there is a correlation between cholera cases and sea surface temperature, an association between El Niño and epidemics of malaria and dengue, enhanced production of aquatic pathogens and biotoxins, jeopardizing the safety of seafood, and the increasing occurrence of toxic algal blooms.

#### Further Reading

1. Crutzen PJ. The stratospheric ozone hole: a man-caused chemical instability in the atmosphere: What to learn from it? A public lecture on air pollution in Asia and the impact on regional and global climate delivered at Chulalongkorn University on Tuesday, December 2, 2003. Bangkok: Environmental Research Institute, Chulalongkorn University (ERIC); 2003. 9 pages.
2. ECO Centre Staff. Global warming, the ozone layer and acid rain 1996. Available from: <http://www.ecocentre.org.uk/global-warming.html>. Accessed August 18, 2007.
3. Epstein PR. Climate change and human health. *New Engl J Med* 2005;353:1433-6.
4. Medical News Today. Alarming health effects of global warming. Available from: <http://www.medicalnewstoday.com/medicalnews.php?newsid=33768>. Accessed July 12, 2007.
5. Meehan M, Epstein P. Making noise on global warming - The Boston Globe. Available from: [http://www.boston.com/news/globe/editorial\\_opinion/oped/articles/2006/12/21/making\\_noi...](http://www.boston.com/news/globe/editorial_opinion/oped/articles/2006/12/21/making_noi...) Accessed July 12, 2007.
6. NASA GISS: Research News: NASA study finds world warmth edging ancient levels. <http://www.giss.nasa.gov/research/news/20060925/> Accessed July 15, 2007.
7. Pushpakom R, Bovornkitti S. Global warming and illnesses. *Siriraj Hosp Gaz* 1996;48:1137-9.
8. U.S. Global Change Research Information Service. Environmental effects of ozone depletion. Interim Summary September 1997 United Nations Environment Programme. Available from: <http://www.gcric.org/OnLnDoc/unep97summary.html>. Accessed January 1, 2003.
9. Wikipedia, the Free Encyclopedia. Global warming. Available from: [http://en.wikipedia.org/wiki/Global\\_warming](http://en.wikipedia.org/wiki/Global_warming). Accessed May 22, 2007.