



Physicians for
Social Responsibility



United States Affiliate of International Physicians for the Prevention of Nuclear War

Health Implications of Global Warming: Heat's Deadly Effects

Global warming is acknowledged by scientists around the world to be a reality and to be caused primarily by human activity, especially the burning of fossil fuels. As the earth warms, the delicate balance of climate, weather events and life is disrupted. Consequences emerge that threaten human health and, ultimately, survival.

This is one of several fact sheets produced by Physicians for Social Responsibility that examine recent scientific evidence of global warming's impact on health.

Global warming is likely to increase the frequency of “extreme heat events” or heat waves.

- For the twenty-first century, the IPCC projects with “high confidence” that extreme heat events will intensify in magnitude and duration over portions of the U.S. where they already occur.ⁱ
- We cannot attribute a specific heat wave to global warming; however, the effect of global warming on the probability of occurrence of a heat wave can be determined. In the case of the European heat wave of 2003, a group of scientists publishing in the journal *Nature* estimated with a greater than 90% confidence level that human influence on climate more than doubled the probability of its occurrence.ⁱⁱ

Heat-related illnesses are serious and can lead to death.

- The most common heat-related illness is heat exhaustion, whose symptoms include intense thirst, heavy sweating, anxiety, dizziness, fainting, nausea or vomiting, and headache.
- Heat exhaustion may progress to heat stroke, which is a severe illness. Its clinical definition includes a core body temperature of 105°F or more, accompanied by hot, dry skin and central nervous system abnormalities such as delirium, convulsions, or coma.
- Mortality from heat waves is often related to cardiovascular, cerebrovascular, and respiratory causes, especially preexisting illnesses.
- Air pollution concentrations may rise during heat waves, especially as people turn on air conditioning, thus increasing their use of electricity (which if generated by burning coal is a major source of pollution). This pollution may exacerbate preexisting conditions such as angina and asthma and may lead to increased death rates.ⁱⁱⁱ

Extreme heat events are already a significant public health problem in the U.S.

- In fact, extreme heat events are responsible for more deaths annually than hurricanes, lightning, tornadoes, floods, and earthquakes combined.^{iv}
- The health impact of extreme heat events will likely be exacerbated by the synergistic effects of a warming climate, urbanization, and an aging population.^v

Heat waves are already increasing.

- A roughly 20% overall increase in the number of heat waves – a “significant” upward trend -- has been observed for the eastern and western U.S. for the period 1949 to 1995.^{vi}
- In the European heat wave of 2003, an estimated 22,000 people died across Britain, France, Italy, the Netherlands, Portugal and Spain.^{vii} Other mortality estimates run as high as 35,000.^{viii}
- In Paris, sustained extreme high temperatures (including high night-time minimum temperatures), unique in the recorded history of Paris, together with housing designed for cooler summers, caused a major public health crisis. Deaths increased by 140%.^{ix}

The elderly are at particularly high risk.

- Advanced age represents one of the most significant risk factors for heat-related death in the U.S.
- **Elderly people have** diminished ability to regulate body temperature and to adapt physiologically to heat. In addition, they generally experience poor health. The elderly are also more likely to live alone and have reduced social contacts, which further increases their vulnerability.^x
- This vulnerable population will grow as the elderly become an increasingly large proportion of the U.S. population.

Other populations are also highly vulnerable to extreme heat exposure.

- People without access to air conditioning are a vulnerable population. The urban poor are particularly vulnerable, due to the “urban heat island” phenomenon. City environments hold more heat and routinely experience ambient air temperatures from 2° - 10°F warmer than the surrounding rural and suburban areas.^{xi}
^{xii} The urban heat island also absorbs heat during the daytime and radiates it out at night, raising nighttime minimum temperatures, which has been linked epidemiologically with excess mortality.^{xiii}
- People with certain pre-existing medical conditions are vulnerable. These conditions include cardiovascular disease, respiratory illnesses, obesity, neurologic or psychiatric disease.
- Also vulnerable are people receiving medications that interfere with salt and water balance (e.g., diuretics, anticholinergic agents, and tranquilizers that impair sweating).^{xiv}

Wildfires are an increasing threat.

- Higher temperatures combined with extended periods of drought and decreased soil moisture raises the risk of wildfires and the death and damage they inflict. In New Mexico, the wildfire season has grown by 78 days during the past three decades.^{xv}
- Another health-related impact from more frequent and larger fires: the increase in fine particulate air pollution, both in the immediate vicinity of fires and in areas downwind.^{xvi}
- Forest fires create more global warming. Trees normally serve as a reserve or “sink” of carbon, absorbing and holding carbon in place. When they burn, instead of acting as carbon sinks, trees release their carbon to the atmosphere, increasing the greenhouse effect.^{xvii}

Global warming will worsen air quality and the risk of respiratory disease.

- The formation of ozone is known to increase with increasing temperature. A positive association has been found between temperatures above 90°F and ground-level ozone production. This is true even without increases in the concentration of volatile organic compounds and nitrogen oxides (ozone’s “precursor” pollutants).
- Increasing evidence suggests that ozone and high temperature affect mortality synergistically.^{xviii}
- Research suggests that ozone concentrations in the U.S. may increase between 5–10 percent over the next 50 years purely as a result of climate change. This is projected to be true even if anthropogenic precursor emissions and global background concentrations are held constant.^{xix}
- A new study (March 2009) indicates that ozone exposure is associated with the risk of death from respiratory causes, and that long-term, low-level exposure can be lethal.^{xx}

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