

16. Climate Change and Human Health

Introduction

The sustained health of human populations requires the continued integrity of Earth’s natural systems. Climate change is likely to have wide-ranging and mostly adverse impacts on human health, with significant loss of life. These impacts would arise by both direct and indirect pathways, and it is likely that the indirect impacts would, in the longer term, dominate. The most vulnerable populations to the impacts of climate change will be those already under pressure from social, economic and existing climate stresses. These will include those in developing countries, in the lower income groups, residents of coastal lowlands and islands, populations in semi-arid grasslands, and the urban poor. Increased exposure to natural hazards, such as coastal or river flooding, drought, landslides, storms and hurricanes, will prove detrimental to those most at risk. This fact sheet looks at some of the human health effects resulting from climate change.

Direct and Indirect Health Impacts

Direct health impacts from climate change are likely to arise from the increased occurrence and magnitude of extreme weather events. As well as these, effects from the related concerns of air pollution and stratospheric ozone depletion may also impact upon human health. Such direct effects may include:

- heat stress, and in the extreme, death;
- cold-related illness and death (although global warming may on average diminish this risk);
- death from flooding and landslides;
- respiratory diseases from enhanced local and regional air pollution;
increased risk of cancer and other genetic disorders due to stratospheric ozone depletion.

Indirect effects arising from climate change may include:

- changes in the range of vector-borne diseases such as malaria;
- infectious diseases such as diarrhoea and cholera;
- malnutrition and hunger;
- poorer sanitation due to social and economic dislocations.

Global warming is expected to lead to more cardiovascular, respiratory, and other disease. Injuries, psychological disorders, and deaths would result from a greater intensity and duration of heat waves and perhaps of floods, storms, and other extreme climatic events. While warmer temperatures in colder climates should reduce cold-related deaths, such positive effects are not likely to offset the negative ones. In the longer term, however, the indirect effects may be more important.

**Heat-Related Deaths**

An increased frequency or severity of heat waves would cause an increase in mortality and cardio-respiratory illness. Studies in selected urban populations in North America, North Africa and East Asia indicate that the number of heat-related deaths would increase several-fold. In very large cities, this would represent several thousand extra deaths annually. However, the number of cold-related deaths may decrease, partially offsetting deaths due to heat waves.

**Vector-Borne Diseases**

Warmer temperatures would enable insects and other disease carriers to expand their range. Organisms such as malarial mosquitoes and schistosome-spreading snails will be well positioned to spread to higher latitudes and higher altitudes. For example,
around 350 million new malaria infections now occur every year, resulting in two million deaths. Approximately 45% of the world’s population presently lives in the climate zone where mosquitoes transmit malaria; models predict that this will increase to about 60% by the year 2070. Most of the extra 50 to 80 million annual cases resulting from climate change would occur in tropical and subtropical zones, those temperate zones currently at the margins of infected areas, and areas where people are less well protected. Such impacts could initiate large migrations of people, causing substantial disruptions of settlement patterns and social instability.

**Non-Vector-Borne Diseases**

Increases in non-vector-borne food- and water-related infections could also occur, particularly in tropical and subtropical regions. Warmer temperatures, reduced water supplies, and proliferating micro-organisms would lead to a higher incidence of cholera, salmonellosis, and other such infections. For example, cholera bacteria can survive by sheltering beneath the mucus outer coat of various algae and zooplankton; warmer water may increase algal blooms, helping *Vibrio cholerae* to multiply and perhaps even promoting the emergence of new genetic strains.

**Other Health Impacts**

Local reductions in food production could increase malnutrition and hunger, with long-term health consequences, particularly for children. Asthma, allergic disorders, and cardio-respiratory diseases could result from climate-induced changes in the formation and persistence of pollens, spores, and certain urban pollutants. The incidence of photochemical smog episodes in large cities may
increase, particularly in areas experiencing reduced rainfall and increased amounts of sunshine as a result of climate change. Changes in the production of both aquatic pathogens and biotoxins may jeopardise the safety of seafood. Stratospheric (upper atmosphere) ozone is being depleted concurrently with greenhouse gas accumulation in the troposphere (lower atmosphere). A sustained 10-15% depletion of stratospheric ozone over several decades would cause increased exposure to ultra-violet radiation and an estimated 15-20% increase in the incidence of skin cancer in fair-skinned populations. Cataracts (lesions of the eyes) may also increase in frequency, as might vulnerability to infectious diseases due to weakened immune systems and genetic disorders.

Adaptation

Poorer communities will be more vulnerable than richer ones. However, richer countries will also be increasingly vulnerable as their populations age. Health risks can be addressed through various adaptation strategies. Adaptive options to minimise health impacts include:

- improved and extended medical care services;
- environmental management;
- protective technology (housing, air conditioning, water purification, vaccination);
- public education;
- research and training.

The lack of resources will be a constraint in many regions, but negative health effects can be minimised through a transfer of technological, educational and medical expertise from the more developed nations to the less developed nations. As for other impacts of climate change, it will be the poorest and most vulnerable people of today that will suffer the most as a result of future man-made global warming.