Health Facts

Climate and Your Health:
Addressing the Most Serious Health Effects of Climate Change

Science shows that climate change will affect human health across the world. From diminished air quality and degradation of food and water supplies to increasing levels of allergens and catastrophic weather events, we will experience a number of worsening health threats during our lifetimes. Scientific understanding in this area is expanding rapidly, and urgent action is needed to help us avoid the worst of these effects.

"Climate change is the biggest global health threat of the 21st century ... the impacts will be felt all around the world — and not just in some distant future but in our lifetimes and those of our children."[1]

The Lancet, 2009

There are currently no federal limits on the life-threatening carbon pollution coming from existing stationary sources like power plants and factories. The Environmental Protection Agency (EPA) is attempting to safeguard our health by reducing this carbon pollution and lessening the impact of climate change. We can protect the health of our families and communities by supporting the EPA's efforts to update the Clean Air Act to address more sources and types of the pollution that cause climate change and these associated health risks:

1. Extreme Storms Affect Health and Infrastructure: Science tells us that increases in carbon pollution have contributed to the destructive potential of Atlantic hurricanes and tropical storms in recent decades. Hurricane rainfall and wind speeds are projected to increase as the future becomes warmer.[2] More severe storms and floods can lead to drownings, injuries, drinking water contamination, community displacement, and outbreaks of infectious disease. Storms also damage basic infrastructure and result in additional health risks such as moisture leading to mold growth that can exacerbate allergies and respiratory illnesses.

2. Heat Waves Increase Death and Illness: The frequency, intensity, and duration of heat waves in the United States are projected to increase substantially because of climate change.[3] As temperatures increase, so do the number of deaths and illnesses occurring from heat stress, heatstroke, cardiovascular disease, and kidney disease. Heat waves cause the most harm among the elderly, young children, and in economically disadvantaged communities. City dwellers are also at risk because of elevated temperatures from the "urban heat island effect."

3. Air Pollution Contributes to More Smog and Respiratory Illness: Approximately 158 million Americans live in counties where air pollution exceeds national health-based standards. Rising temperatures increase ozone smog formation in many areas. Increasing levels of smog are associated with increased hospital admission rates and death for people with respiratory diseases such as asthma, and worsens the health of people suffering from cardiac or pulmonary disease.[4]

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Major known and probable health risks from climate change

Climate Change Effects on:	Adverse Climate-Health Effects:
Floods, storms	Deaths; injuries; infectious disease outbreaks; mental health impacts on affected communities
Heat waves	Deaths; hospitalizations; emergency department visits; heat-related illnesses
Air pollution	Increased concentrations of ground-level ozone smog and fine particulate matter; increasing premature mortality and hospitalizations
Airborne allergen production	Increased allergic illnesses (hay fever, asthma) due to longer pollen season and increases in the amount of pollen produced
Vector-borne infections	Insect-borne infections and spread of other diseases into new areas
Water-borne infections	Extreme rainfall events are associated with increased risks of *cryptosporidium* outbreaks; risk of cholera could increase as coastal/estuarine waters warm
Water and food supplies	More frequent drought; reduced drinking water supplies and crop yields; increased world food insecurity; fishery declines contributing to food shortages; increased risks of food-borne illnesses
Sea-level rise, storm surge, flooding	Contamination of coastal soils and drinking water supplies; increased storm surges and floods; large numbers of displaced people

Table adapted from McMichael et al. (2006)

4. Pollen Allergies Proliferate: Higher temperatures in the United States have been linked to longer allergenic ragweed pollen seasons.[5] Today's increased levels of carbon dioxide can cause ragweed to produce twice as much pollen; by 2075, that could be four times as much. With increased airborne pollen, those who suffer from seasonal allergies could experience worsening symptoms, including hayfever and asthma. This could be unbearable for the 23 million children and adults with asthma in the United States and would compound today's $32 billion price tag for allergies and allergen-driven asthma.[6]

5. Mosquito- and Tick-Borne Infectious Diseases Spread More Widely: Climate change will affect patterns of diseases such as dengue fever, West Nile virus, and Lyme disease. Increasing temperatures and rainfall have been associated with increased occurrence and transmission of insect-borne diseases like West Nile virus.[7] Hotter temperatures can lead to more rapid development of dangerous pathogens within insect carriers and allow these diseases to expand their range into new, once cooler, regions.[8] Approximately 173 million Americans in at least 28 states live in counties with mosquitoes that can carry dengue fever, a painful viral illness that's increased globally 30-fold in the last 50 years.[9]

6. Drinking Water Becomes Increasingly Contaminated: Outbreaks of water-borne diarrheal diseases caused by parasites like *Giardia* and *Cryptosporidium* have been associated with heavy rainfall events and flooding, which are likely to become more frequent due to climate change.[10] Although climate change threatens the safety of water supplies worldwide, the impact will be most severe where water infrastructure and treatment is less available.[11]

7. Water and Food Supplies Threatened: Climate change is expected to worsen both floods and droughts, threatening the availability of water for drinking and irrigation. Droughts harm crops, diminishing food variety, nutritional content, and availability—all of which can contribute to malnutrition and the spread of infectious diseases. Furthermore, warming ocean temperatures bring shifts in the geographic range of fish populations that can severely impact local food supplies. And climate change's higher temperatures increase the risk of food-borne illnesses.[12]

8. Large Numbers of Environmental Refugees: Sea level rise and subsequent flooding will leave some coastal regions uninhabitable, forcing people to flee their homes. Experts estimate there will be up to 50 million "environmental refugees" by 2020—people forced to migrate by a range of climate change-related environmental disasters like floods, droughts, and desertification—resulting in health threats such as increases in urban crowding, trauma, social unrest, lack of clean water, and transmission of infectious diseases.

Protecting Ourselves from the Worst Effects of Climate Change

The range of potential threats to health posed by climate change has never been clearer. At the same time that temperatures are rising the numbers of heat-vulnerable older Americans are growing at the fastest rate in a century. There are now 40 million Americans age 65 plus; that number will soar to over 86 million by 2050. Other vulnerable groups include children and economically disadvantaged communities. We now have record numbers of Americans living in poverty—at least 43.6 million people, the highest number since the 1960s. Combining this with an aging municipal infrastructure, we are a nation increasingly vulnerable to climate change.

NRDC strongly supports the EPA's efforts to limit life-threatening carbon pollution. We must also prepare the national and local public health system to respond to this range of anticipated threats that will accompany climate change.

For more information, see NRDC's fact sheet titled, "Preparing for Global Warming" at www.nrdc.org/globalwarming/preparedness.pdf.

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[2] Karl TR, Meehl GA, Peterson TC, et al. 2008. US Climate Change Science Program (CCSP) SAP 3.3: Executive Summary: *Weather and Climate Extremes in a Changing Climate. Regions of Focus—North America, Hawaii, Caribbean, and US Pacific Islands* (TR Karl, GR Meehl, CD Miller, et al (eds.). Washington, DC.

[3,4,8,10,12] Karl TR, et al. 2009. Global Climate Change Impacts in the US. Karl TR, Melillo JM, Peterson TC (eds.). Cambridge University Press.

[5] Ziska LH, et al. 2011. Recent warming by latitude associated with increased length of ragweed pollen season in central North America. PNAS Early Edition Feb 21 2011.

[6] Staudt A, et al. 2010. *Extreme Allergies and Global Warming*. National Wildlife Federation. http://www.nwf.org/extremeweather.

[7] Soverow JE, et al. 2009. Infectious disease in a warming world: how weather influenced West Nile virus in the United States (2001-2005). *Environ Health Perspect* 117:1049-1052.

[9] Knowlton K, et al. 2009. *Fever Pitch*, Available at: http://www.nrdc.org/health/dengue/files/dengue.pdf.

[11] McMichael AJ, Woodruff RE, Hales S. 2006. Climate change and human health: present and future risks. *The Lancet* 367:859-869.

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