

Health in the Balance: Climate Change and Public Well-Being

Every action matters in the global effort to mitigate climate change and protect human health

Climate change poses significant threats to the health and well-being of all humans. It impacts the quality and availability of our food, air, and water, as well as the safety of our homes. Moreover, it increases the frequency and severity of extreme weather events, facilitating the spread of pests and diseases that further jeopardize our health and well-being.



Understanding Climate Change

Climate change refers to significant and lasting alterations in the Earth's climate, particularly over extended periods of time. Climate change occurs due to **Greenhouse Gas Emissions (GHGs)** from human and natural resources. Key GHGs include carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O).

The combustion of fossil fuels (such as coal, oil, and natural gas) by humans for energy, deforestation, which decreases the number of trees that absorb CO₂, and increases the concentration of Greenhouse gases in the atmosphere, changes in land use for agriculture and urban development and byproducts related to industries such as the

medical and arms and defense industries all contribute to climate change.

Greenhouse gasses can trap heat from the sun in the Earth's atmosphere, creating a "blanket" effect. While this process is essential for maintaining the planet's temperature, excessive GHGs can lead to more heat being trapped, resulting in global warming or the **Green House Effect**. As temperatures rise, polar ice caps and glaciers melt and with less ice, more sunlight is absorbed by the ocean, further raising temperatures. Greenhouse gasses are also emitted through natural processes like volcanic eruptions and the respiration of plants and animals, solar radiation.

How Climate Change Impacts Health

Climate change significantly affects human health in both direct and indirect ways. The effects of climate change are wide-ranging, exacerbating existing health issues and creating new challenges. Key impacts include:

Climate Change/Greenhouse Gas Emissions Health Impacts

- **Social Determinates**
- **Older Adults**
- **Children**
- **Pregnant People**
- **People with Chronic Conditions**

- **Vector Ecology**
- **Air Quality**
- **Extreme Heat**
- **Water/Food Supply**
- **Severe Weather**

Impacts on Vulnerable Populations



Extreme Heat and Heat-Related Illness

Rising global temperatures increase the frequency and intensity of heat waves, leading to heat exhaustion, heatstroke, dehydration, and even death—especially among the elderly, children, and those with pre-existing conditions. Elevated heat temperatures force the body to work harder to cool itself down, leading to increased heart rate, blood vessel dilation, and dehydration, which can strain the heart and lungs worsening cardiovascular and respiratory conditions like asthma, chronic obstructive pulmonary disease (COPD), and heart disease.



Air Quality and Respiratory Issues

Warmer temperatures exacerbate air pollution. This occurs through chemical reactions in the atmosphere, particularly the formation of ground-level ozone, a key component of smog. Smog occurs when pollutants like nitrogen oxides and volatile organic compounds react with sunlight and heat, leading to increased levels of harmful air particles during hot weather. In addition, high temperatures can also exacerbate wildfire activity, further adding to air pollution levels and leading to more smog, particulate matter, and allergens in the atmosphere. This elevates the risk of respiratory diseases such as asthma and bronchitis.



Vector Ecology and Vector-Borne Diseases

Climate change expands the habitats of disease-carrying vectors like mosquitoes and ticks. This increases the spread of diseases such as malaria, dengue fever, and West Nile virus. Warmer temperatures enable disease vectors to thrive for longer periods, leading to longer transmission seasons, and heightening the risk of infection.



Impacts on Water and Food Supply

Altered weather patterns including droughts and floods threaten crop yields and food security, leading to food shortages causing malnutrition and weakened immune systems in populations. Droughts and melting glaciers limit access to clean drinking water causing water scarcity, dehydration, and increasing the risk of waterborne diseases like cholera. Rising temperatures may enhance the growth of pathogens in food leading to food safety issues and raising the likelihood of foodborne illnesses.



Severe Weather Events

They also strain healthcare systems and infrastructure. Chronic exposure to climate-related stressors, such as extreme weather and displacement, can lead to mental health impacts causing anxiety and depression, particularly in vulnerable populations. By intensifying existing health issues and introducing new risks, climate change poses a grave threat to public health, especially for vulnerable groups such as children, the elderly, and low-income communities. Addressing these health challenges is essential in climate adaptation and mitigation efforts.

Impact on Vulnerable Populations

Certain groups are particularly susceptible to the health impacts of climate change due to social and economic factors such as income, education, access to healthcare, and housing. In the U.S., socially vulnerable groups include low-income communities, communities of color, individuals with limited English proficiency, older adults, children, people with chronic medical conditions, and pregnant people.

Social Determinants

Populations that reside in areas prone to climate-related health hazards such as flooding, extreme heat, and air pollution are geographically vulnerable to climate change. Those who live in areas with poorly maintained or aging infrastructure, which may not withstand climate-related events, and have limited access to resources and care during emergencies are also at risk. Limited financial resources and barriers related to culture, language, or citizenship can hinder access to healthcare, social services, and nutritious food.

Older Adults

Older adults are especially vulnerable to the health impacts of climate change. Many older adults have existing health conditions that make them sensitive to climate hazards, such as heat and air pollution. Limited mobility increases risks before, during, and after extreme weather events. Aging and certain medications can affect the body's ability to respond to heat, heightening the risk of heat-related illnesses and death. Lastly, weakened immune systems make older adults more susceptible to severe illnesses from insect- and water-borne diseases.

Children

Children are particularly at risk of the health impacts related to climate change due to their developing bodies and unique vulnerabilities. As they tend to spend more time outdoors than adults, their risk of exposure to extreme weather and allergens is increased. In addition, their smaller size means they consume more water per pound of body weight, increasing the likelihood of ingesting contaminants. Their developing brains make them more susceptible to emotional stress from climate-related events, and the stress of relocation can further impact their mental health. Children rely on adults for safety, making them more vulnerable during extreme events.

People with Chronic Medical Conditions

Certain chronic conditions can amplify the severity of the health effects related to climate change. Extreme weather events can disrupt regular medical care and create barriers to treatment. Some medications may alter heat response, making individuals more susceptible to heat-related illnesses. Weakened immune systems increase vulnerability to severe reactions from climate-related hazards. Those with mental health conditions may experience heightened trauma from extreme weather events and disruption to their support systems.

Pregnant People

Pregnant people are also at increased risk from climate change due to several factors. Extreme heat and climate-related events are linked to serious health issues, such as low birth weight and preterm birth. Disrupted access to healthcare and transportation during extreme weather can pose risks to maternal health. Biological changes during pregnancy increase susceptibility to illnesses linked to climate change. Pregnant and postpartum people may experience heightened mental health challenges after natural disasters.



Resources

1. [Coalition for a Resilient and Inclusive Waterfront – CRIW](#)
2. [Climate Resilience | Boston.gov](#)
3. Climate Ready Boston's **Map Explorer** – Click "launch the explorer" to see a map of Boston layered with projections of stormwater and coastal flooding, sea level rise, and extreme heat alongside maps of social vulnerability in the city. Enter your address to see projections of potential flooding and heat near your home.
4. Sign up for the Office of Emergency Management's **AlertBoston program**. Get a text and email when the city issues an emergency alert or a parking ban near your location.
5. The Boston Public Health Commission's **Get Ready. Be Safe. Stay Healthy.** Initiative – Check out this comprehensive set of preparedness information and opportunities from the Boston Public Health Commission's Office of Public Health Preparedness. Join the **Boston Medical Reserve Corps**, learn how to make a "Go Kit," and see a list of Twitter handles and hotlines you can follow to get information on Boston-area emergencies.
6. **Ready Boston's Emergency Shelter Map & Website** – Know where the closest designated emergency shelter is in case you are told to evacuate your home. Note –these shelters are not in constant operation, and you should not go to them unless told to by the Office of Emergency Management.

References

- <https://www.epa.gov/climateimpacts/climate-change-and-human-health>
- <https://www.mass.gov/climate-and-health>
- https://www.climatecrew.org/ma_resources#Gather-data
- <https://www.boston.gov/departments/climate-resilience>
- <https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health>
- https://www.cdc.gov/climate-health/media/pdfs/2024/05/349210-A_Regional-Impacts-Climate-Change_3508.pdf