Climate Impacts on Human Health in the Puget Sound Region

Heat waves, floods, and episodes of poor air quality are all examples of how weather and climate affect our health. Certain groups of people are disproportionately affected by these events, often as a result of the environmental characteristics of where they live, their age, pre-existing health conditions, or access to health care. As Pacific Northwest climate changes, the disproportionate health impacts on susceptible populations are likely to become more obvious. Climate change adaptation strategies that address the health needs of vulnerable individuals can help alleviate some of these impacts, enhancing our preparedness.

Connecting Health to Climate

Health impacts are shaped by the health of an individual and the types and severity of changes in climate that a person is exposed to, such as more extreme heat events and heavier rainfall events.\(^1\) The built environment also matters. For example, neighborhoods that are low-lying or have problems with drainage will be more vulnerable to flooding than areas at higher elevation or with adequate drainage. In addition, personal and social factors matter. Individuals with pre-existing health conditions are more likely to experience impacts sooner, or experience more severe impacts. Similarly, individuals and communities with limited access to quality health care will also be disproportionately affected by climate stressors (Figure 1).

Impacts to Consider in Planning

Health impacts already occur with our current climate. There is strong evidence that some of these impacts will be worsened by climate change.\(^1\)

Heat-Related Illness and Mortality: As temperatures rise, more stress is placed on the body, which increases the risk of heat exhaustion and heat stroke.

During heat waves, there is an increase in the number of emergency calls, hospitalizations, and heat-related deaths, as was found in King County during extreme heat events between 1990–2010.\(^3\) Increases in the frequency and intensity of heat wave events are likely to cause more heat-related illness and mortality. Future heat waves are anticipated to cause nearly 60 additional heat-related deaths in King County by the mid-21st century.

Figure 1. An illustration of some of the connections among climate change, environmental factors, socio-economic factors, and health impacts. Source: Modified from the U.S. Global Change Research Program.\(^2\)
Floods and droughts can also threaten public water supplies. Floods can introduce hazardous and toxic substances to water ways, while droughts can concentrate harmful substances in streams or wells. Extended or intense droughts can impact smaller surface water and shallow groundwater systems by significantly reducing the quantity of water available for use. While impacts on individual water supply systems will vary, the projected increase in both flooding and drought could increase risks to drinking water quality and quantity.

**Respiratory Problems from Poor Air Quality:** When droughts occur, the risk of wildfire increases. The smoke produced by wildfires increases the number of respiratory-related complications and hospital admissions. While people with pre-existing respiratory illnesses like asthma are most affected, anyone exposed to large quantities of smoke can have resulting health problems. Since warmer temperatures and drier summers are anticipated in the future, drought and fire risks are likely to increase.

Warmer summer air temperatures are expected to increase ground level ozone in and around urban areas. Increased ozone levels have the potential to exacerbate allergy symptoms and cause respiratory illnesses.

Warmer temperatures have been linked to longer growing seasons for plants, including those that produce allergens. For those with asthma or allergies, the lengthening of future allergy seasons may lead to more severe and longer-lasting symptoms.

**Threats to Water Quality:** Warmer temperatures set the stage for algal blooms, which can harm fish and shellfish populations as well as humans if contaminated shellfish are ingested (see Figure 2). For example, in 2015, the waters off the west coast from California up to Washington experienced one of the largest observed toxic algal blooms in recent decades when the neurotoxin domoic acid formed and spread. In the future, higher temperatures create a longer harmful algal bloom season and increase the potential for these algal blooms to develop. Paired with ocean acidification, it is also likely that algal blooms will be more toxic.

**Mental Health Issues from Disasters:** When major weather-related disasters occur, such as floods or forest fires, people are often emotionally and financially impacted, especially if they are displaced from their homes. The emotional impact of these major weather events can become a public health concern.

**Populations Potentially At-Risk**

Some populations are more susceptible to weather- and climate-driven health impacts than other groups. The very young and old tend to be more sensitive to weather and climate conditions and may have difficulty caring for themselves.
People with pre-existing health conditions, such as diabetes or a suppressed immune system, are also at a higher risk of experiencing health complications. Outdoor laborers are more exposed, placing them at a relatively higher risk as well.

Other communities, whether based on wealth, race, ethnicity, religion, or geographic location, can also face a greater risk of negative climate-related health impacts. For example, poor communities, rural communities, or communities of color may have limited access to health services, or may lack adequate care for pre-existing medical conditions. Additionally, individuals living in particularly at-risk areas, such as a low-lying floodplains or regions prone to wildfire, may be more exposed to impacts.

Adapting to Climate Change to Protect Health

Many county and state agencies in and around the Puget Sound recognize the ways in which climate change affects health risks, as well as the need to better plan and prepare for current and future extreme weather events.

• The Washington State Department of Health hosts information detailing the links between climate and agriculture, air quality, and drinking water, and potential impacts on human health.  
  
• The Washington State Department of Labor and Industries shares tips to help protect outdoor laborers and others often exposed to the heat.

• The Washington Department of Ecology created a website dedicated to the connection between human health and climate change.

• Public Health Seattle and King County is working to effectively respond to the health impacts of heat waves as part of its Strategic Climate Action Plan. For example, the department is conducting a heat wave emergency response drill to inform people what to do when a major heat wave strikes.

To learn more about climate change in the Puget Sound region and the link between climate change and health, check out the Climate Impact Group’s recent State of Knowledge Report.  

For More Information

For more information on climate impacts on Puget Sound and what agencies, organizations, and communities are doing to prepare for climate change, see State of Knowledge: Climate Change in Puget Sound (Mauger et al. 2015) or contact the University of Washington Climate Impacts Group (https://cig.uw.edu/; cig@uw.edu).

Acknowledgments

This document was prepared by Maggie Beetstra at the University of Washington Climate Impacts Group.

Sources


