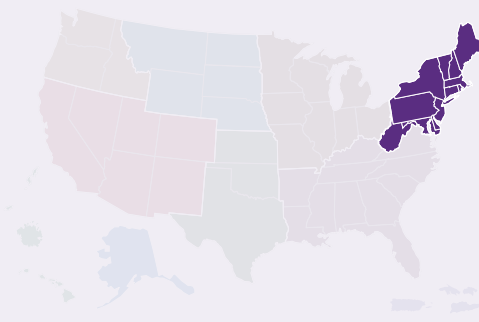


Preparing for the Health Impacts of Climate Change in **Northeast**



Temperature-Related Death and Illness

By midcentury, heat index values over 100°F are projected to increase threefold in the Northeast under an intermediate scenario. During extreme heat events, nighttime temperatures in the region's big cities are generally several degrees higher than in surrounding areas, leading to a higher risk of heat-related death. Temperature extremes are related to a larger fraction of cardiorespiratory deaths in the Northeast and industrial Midwest (compared with other regions), particularly in areas with higher urbanization, older people, fewer White residents, and lower socioeconomic status.

Air Quality Impacts

Climate change will potentially lead to higher pollen concentrations and longer pollen seasons, causing more people to suffer more health effects from pollen and other allergens. The health burden of pollen is a particular concern for the Northeast. One study found there is 20% more pollen, and the season is roughly three weeks longer in comparison to the 1990 season [2]. People with respiratory illnesses, like asthma, may be more sensitive to pollen. For those whom pollen is an asthma trigger, exposure to pollen has been linked to asthma attacks and increases in hospital admissions for respiratory illness. Already, the Northeast region has seen some of the largest counts of incremental increases in asthma emergency department visits.

Additionally, air quality in the Northeast can be dramatically worsened by distant wildfires from Canada or the Western United States. This was seen in 2023 when wildfires along the western Canada-U.S. border affected the air quality in the northeastern United States [3]. During this event, New York City saw its worst daily mean PM_{2.5} concentration in over 50 years [3]. Exposure to wildfire smoke has been shown to lead to several negative health outcomes and is a known asthma trigger. Simultaneously, warmer temperatures will worsen near-surface ozone across the United States and further exacerbate respiratory conditions.

Extreme Events

Much of the historical development of industry and commerce in New England occurred along rivers, canals, coasts, and other bodies of water. These areas often have a higher density of contaminated sites, waste management facilities, and petroleum storage facilities that are potentially vulnerable to flooding. As a result, increases in flood frequency or severity could increase the spread of contaminants into soils and waterways, resulting in increased risks to human health. When coupled with storm surges, sea level rise can pose severe risks of flooding, with consequent physical and mental health impacts on coastal populations.

Vector-Borne Diseases

Increased temperatures make some diseases more prevalent in aquatic organisms (e.g., *Vibrio* species), which are among the most important causes of seafood-borne diseases. Simultaneously, climate change is predicted to expand the geographic range of many disease-carrying insects, such as ticks. Already, there has been an increase in tick-borne illnesses, such as Lyme disease, in the Northeast with some documented spread northward into Canada [4].

Water-Related Illness

Increased soil erosion and agricultural runoff, including manure, fertilizer, and pesticides, are linked to excess nutrient loading of water bodies and subsequent food safety or public health issues. Indeed, harmful algal blooms (HABs) occur more often in the Northeast compared to other regions and are known to induce illness upon either contact with contaminated water or consumption of exposed shellfish. Simultaneously, warmer winters increase pressure from weeds and pests, driving demand for pesticides, and thus increasing the risk of human health effects from increased chemical exposures.

Food Safety, Nutrition and Distribution

In the Northeast, fish stocks are not only shifting northeastward along the continental shelf into deeper waters, but their distribution is also changing. Warmwater fish remain longer, while cold water species stay for shorter periods. This shift changes when species can be fished. Moreover, there have been documented changes in the life cycle events of the



wildlife. For instance, phytoplankton blooms occurred later in recent decades, whereas larval fish occurrence and fish migration are happening earlier.

Simultaneously, the Mid-Atlantic Bight is acidifying faster than other Atlantic coastal regions. Ocean acidification may impact fishery resources, including American lobster, scallops, oysters, clams, and mussels. In the Northeast, scallops are one of the most lucrative fisheries, and acidification will have socio-economic ramifications.



Mental Health and Well-Being

Some Tribal nations and other coastal communities may have to shift their economic or subsistence harvests to new species that are migrating into the region. However, the loss of traditional species or places will likely lead to a loss of cultural practices that will harm physical and mental health and well-being. The loss of access to culturally significant locations and wildlife will harm the physical and mental health of Indigenous peoples.



Populations of Concern

Climate impacts compound the environmental, health, and socioeconomic burdens on some communities. Older adults, those living with disabilities or chronic illness, those persons who lack access to air conditioning, living in older homes, socially isolated, or working outdoors are considered particularly vulnerable to the effects of heat.

Additionally, the combination of heat stress and poor urban air quality can pose a major health risk to vulnerable groups: young children, the elderly, socially or linguistically isolated, those who are economically disadvantaged, and those with preexisting health conditions, including asthma.

Similarly, individuals that are socioeconomically disadvantaged, elderly, historically excluded, linguistically or socially isolated, and recently immigrated individuals, as well as those with existing health disparities are more vulnerable to precipitation events and flooding due to a limited ability to prepare for and cope with such events.

CDC Success Stories

Maine Department of Health and Human Services

Vector-borne diseases and air quality issues are the primary hazards addressed through Maine's Tracking Network. Maine's program has developed a real-time data dashboard to track cases of tick-borne disease, such as Lyme disease, and tick-related emergency department visits, which helps health officials understand the spread of ticks and how a changing climate affects the tick's lifecycle. Simultaneously, they established a pollen monitoring network to provide continuous real-time data on pollen and other airborne allergens. This information is public on their Maine Tracking Network dashboard and allows residents to understand the incidence of vector-borne and aeroallergen in their region.

Massachusetts Department of Health

The Massachusetts Climate Change Adaptation Report identified a need for strengthening public health and healthcare infrastructure to promote climate-resilient communities. To help meet this need, the Massachusetts Department of Public Health (MDPH) awarded grants to local health departments and launched a vulnerability mapping tool to support climate adaptation planning. Local public health departments can assess the need for adaptation efforts, operate municipal warming and cooling centers with emergency preparedness partners, and conduct health impact assessments of climate action strategies.

New York City Department of Health and Mental Hygiene

With temperature increases, some New York City communities face a disproportionate risk of heat-related illness and death. The "Be a Buddy" program was implemented to engage residents and local organizations to check in on residents who are older, disabled, and living alone on hot days. The program

strengthened relationships between residents and local organizations to reduce the risk of extreme heat and other weather emergencies in four communities with lower incomes.

New York State Department of Health

New Yorkers experience increased heat and are especially vulnerable, as the built environment is not designed to adapt to warming temperatures. New York promotes social media messaging about specific and protective health behaviors, such as how to find a nearby cooling center and how to sign up for the state's Heating and Cooling Assistance Benefit (HEAP). These messages increased awareness of healthy behaviors during extreme heat, the use of state programs like HEAP, and locations of cooling centers. The messages also increase self-efficacy and access to state and local cooling resources.

Further, despite a lack of resources, local health departments are interested in the climate impacts on health and want to learn more. To support local health departments NYS, BRACE staff launched climate and health workshops that focused on different climate threats. The workshops increased awareness of the impacts of climate on health, led to the identification of climate change liaisons within local health departments, promoted climate and health resources, and highlighted funding opportunities.

Additionally, NYS BRACE staff have supported the Climate Justice Working Group by providing health outcome data that identifies the communities most disadvantaged. This data has guided investing and directing resources to ensure frontline and underserved communities benefit from the state's clean energy transition.

Maryland Department of Health

There is an increased risk of motor vehicle accidents, asthma hospitalizations, and food-borne diseases following extreme precipitation events in the Chesapeake Bay and Eastern

Shore communities. The Maryland Department of Health (MDH) developed education and outreach for school-age youth, minority groups, community health workers, and informal healthcare networks. They also launched the Climate Ambassador Program to provide tools for youth to educate and empower themselves to take climate action. These efforts have improved Marylander's climate literacy and ability to respond to climate threats.

New Hampshire Division of Public Health Services

Rising water temperatures increase the risk of *Vibrio cholerae* outbreaks in shellfish, which can increase the risk of food poisoning. The New Hampshire Climate and Health Program analyzed the prevalence of *Vibrio cholerae* along the seacoast and in commercial oyster beds and assessed potential interventions. Interventions were implemented to shade and cool shellfish beds to reduce the risk of food poisoning.

The Northeast Regional Heat Collaborative

Several Northeastern health departments identified that the National Weather Service (NWS) heat advisories were not being issued at times when there were significant heat-related illnesses in the region. The Northeast Regional Heat Collaborative was created in partnership with other Northeastern state health departments to analyze heat, hospitalization, and death data to inform public health policy. The Collaborative successfully changed the NWS Heat Advisory Policy for the New England area. More effective heat alerts can reduce cases of heat-related illness in the region.

Rhode Island Department of Health

In Rhode Island, the economy and culture are tied to the ocean, making the effects of climate change particularly acute. Utilizing CDC Climate and Health Program grants, the Rhode Island Department of Health assessed climate change and health vulnerabilities specific to Rhode Island, produced a Social Vulnerability Index Map, a Climate Change and Health Resiliency Report, and developed a Climate Change and Health Adaptation Plan. These projects have not only produced measurable reductions in the health burdens of climate change but have helped to further address and adapt to the many public health effects of climate change in Rhode Island.

Vermont Department of Health

The Vermont Climate and Health Program addresses many key climate-related health risks, with a particular focus on heat as it is proving to be a growing threat to Vermonters. Many homes and communities are unprepared for extreme heat, resulting in more heat-related illnesses and deaths. To combat heat illness, Vermont increased the resources to Regional Planning Commissions (RPCs) to raise local awareness about heat risks,

identify high-risk communities, locate cooling centers, and develop local hot weather emergency response plans. As a result of the RPCs, 19 local heat response plans were developed, dozens of community cooling centers were identified, and awareness about cooling centers was increased. Additionally, Vermont is piloting a "Weatherization + Health Initiative" to modify homes for climate resilience and health promotion. The program prioritizes the delivery of health benefits by including specific health and safety improvements in addition to basic weatherization strategies. The "Weatherization + Health Initiative" enhances home energy efficiency, reduces energy costs, and improves occupant health. This work has not only been supported by the CDC's Climate-ready States & Cities Initiative (CRSCI), but also through a 2020 mini-grant from the CDC via the National Environmental Health Association (NEHA).

Boston Public Health Commission

Increasing temperatures threaten Bostonians and put them at risk of developing heat-related illnesses. In 2015, there were 22 days over 90°F in Boston; by 2030, there could be up to 40 days over 90°F. With the support of a 2019 mini-grant from the CDC via the National Association of County and City Health Officials (NACCHO), the Boston Public Health Commission developed heat awareness materials and translated them into ten languages to reach particularly at-risk populations and reduce health impacts during heat waves.

Seneca Nation of Indians

Due to climate change, there is increased flooding, which elevates the risk of vector-borne disease among Indigenous communities. Utilizing a 2020 mini-grant from the CDC via the National Indian Health Board (NIHB), the Seneca Nation of Indians (located in what is now called New York) addressed the impacts of flooding by incorporating health into existing collaborative climate work. The mini-grant project focused on health communication so communities will have a better understanding of the health impacts of flooding, as well as how to prepare and respond to future flooding.

GreenRoots—Chelsea, Massachusetts

Industrial operations generate noise, traffic, and pollution, placing a heavy environmental burden on the residents of Chelsea. In 2022, GreenRoots, a community-based organization (CBO), received a mini-grant from the CDC via the National Association of County and City Health Officials (NACCHO) to distribute 200 air purifiers and collect data from existing outdoor air quality monitors maintained by the state. Through these actions, GreenRoots is not only protecting their community's air quality but also educating residents on its importance for health.

This fact sheet was prepared by the CDC Climate and Health Program, which empowers communities to protect public health from a changing climate. Information on the health impacts of climate change is provided by the Fifth National Climate Assessment. For more information on the CDC Climate and Health Program, visit <https://www.cdc.gov/climate-health/index.html>, and the Fifth National Climate Assessment, visit <https://nca2023.globalchange.gov/>.