



AFFECTING HEALTH DIRECTLY

EXTREME HEAT

Higher heat, increased humidity, and longer and more frequent heat waves can lead to

dehydration and heat stroke.

Most at Risk: Outdoor workers, athletes participating in outdoor sports, people in cities, people without air conditioning, people with chronic diseases, pregnant women, older adults, and young children

EXTREME HEAT CASE STUDY

San Francisco Department of Public Health (SFDPH), Climate and Health Program

Problem: San Francisco is built for a cool coastal climate. Many buildings lack air conditioning, making the city particularly vulnerable to the health effects of extreme heat. Rising temperatures are expected to increase heat-related illnesses unless adaptation measures are undertaken.

Approach: SFDPH established a Heat Vulnerability Index to identify factors that make neighborhoods more vulnerable to extreme heat such as the amount of heat-absorbing concrete and tree density. SFDPH used this information to develop eight adaptations for extreme heat, including establishing emergency cooling centers and alerts.

Results: SFDPH engaged San Franciscans around the health risks of extreme heat, supported the development of an extreme heat annex in the City Emergency Operations Plan, and built capacity at the city level to plan future climate and health adaptations and interventions.



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AFFECTING HEALTH DIRECTLY

AIR POLLUTION

Increased wildfires, smog, and pollen can lead to **asthma, allergy attacks,** and heart attacks.

Most at Risk: People with heart and respiratory conditions such as heart disease, asthma, or chronic lung disease

AIR POLLUTION CASE STUDY

Minnesota Department of Health

Problem: Rising temperatures and changes in wind and precipitation patterns increase risks of unhealthy air quality in Minnesota. Residents face health risks from particulate matter, ground-level ozone, and pollen in outdoor air.

Approach: The Minnesota Pollution Control Agency launched a statewide air quality forecasting program. The Minnesota Department of Health worked with the Department of Transportation and the Minnesota Pollution Control Agency to create and distribute consistent health-focused air quality alert messages with actions to protect health and improve air quality.

Results: The multi-agency collaboration engaged new audiences, reaching thousands of Minnesotans, including people who are sensitive to poor air quality. The process helped establish an ongoing multi-agency relationship that continues to develop climate-related health messaging to protect the health of Minnesotans.



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AFFECTING HEALTH DIRECTLY

EXTREME WEATHER

Increased frequency and severity of heavy downpours, floods, droughts, and major storms can lead to

injury, loss of home, and death.

Most at Risk: People who cannot easily evacuate because of financial cost, age, or disability, or who cannot understand evacuation orders

EXTREME WEATHER CASE STUDY

Wisconsin Department of Health Services, Climate and Health Program

Problem: Wisconsin's climate is becoming wetter and more variable, leading to an upward trend in wintertime precipitation and a higher likelihood of freezing rain rather than snow. Health risks include injury from dangerous travel conditions, hypothermia, and carbon-monoxide poisoning from improper home heating.

Approach: The Climate and Health Program developed nine extreme weather planning toolkits, including one for winter weather, to provide information and guidance to local governments, health departments, and citizens on how to prepare for and respond to weather events to protect public health.

Results: The toolkits' checklists, talking points, and message maps offer practical tools for planning and responding to extreme weather emergencies. Since the release, the toolkits have been viewed nearly 36,000 times, with the winter weather toolkit being viewed nearly 6,000 times.



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SPREADING OF DISEASE

INSECTS, TICKS, AND RODENTS

Higher temperatures, changes in rain patterns, and disrupted ecosystems help **spread diseases carried by insects, ticks, and rodents.**

Most at Risk: People who spend more time outdoors in places where these insects and other disease-carriers live

INSECTS, TICKS, AND RODENTS **CASE STUDY**

Arizona Department of Health Services

Problem: The Zika virus can cause serious birth defects when infection occurs during pregnancy. It is spread mostly by the bite of *Aedes aegypti* mosquitoes. Knowing these mosquitoes are present in Arizona, health officials sprang into action to prevent local spread of this disease.

Approach: An award-winning media campaign featuring “Mosquito Man” was created to raise awareness and drive the public to web-based information on how to stay safe. The statewide Arizona Arboviral Workgroup met monthly to exchange information about infected mosquitoes and human disease cases.

Results: An average of 30 partners attended the monthly Arizona Arboviral Workgroup to discuss and address mosquito-borne disease activity. A year after the campaign, Arizona did not have any Zika cases that were spread by local mosquitoes.



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SPREADING OF DISEASE

CONTAMINATED WATER

Warmer water temperatures, heavy downpours, rising sea levels, and more flooding help

spread bacteria and toxins in swimming areas, drinking water, and fish.

Most at Risk: Children, the elderly, people with weakened immune systems, people in remote or low-income communities with inadequate water systems, and people in communities that are dependent on seafood

CONTAMINATED WATER CASE STUDY

North Carolina Department of Public Health

Problem: North Carolina has 300 miles of beaches and more than 4,600 miles of shoreline along coastal rivers, sounds, and wetlands. Sea level has risen one foot over the last century, and scientists expect it to rise three feet by the year 2100.

Approach: Through collaboration with East Carolina University, the North Carolina BRACE program identified existing chemical and biological sites of concern based on sea-level rise projections.

Results: The mapping project identified vulnerable health-related infrastructure in several coastal counties, such as water treatment plants near the coast. If storm surge flooded the treatment plants, nearby communities could face environmental exposures or unsafe water.



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SPREADING OF DISEASE

CONTAMINATED FOOD

Increasing temperatures and humidity in some regions, and extreme weather events help **spread bacteria and toxins in food.**

Most at Risk: Infants, young children, the elderly, people living in poverty, agricultural workers, and people with weakened immune systems

CONTAMINATED FOOD CASE STUDY

Maryland Department of Health and Mental Hygiene

Problem: Maryland's Chesapeake Bay is a popular source of fresh shellfish, which feed by pumping water through their gills. Climate change may increase the risk of harmful bacteria, including *Vibrio*, in Bay waters where shellfish are grown and harvested.

Approach: The Maryland Department of the Environment (MDE) partnered with the National Weather Service to provide daily shellfish advisories and online maps of areas closed to harvest due to rainfall. MDE and the Maryland Department of Health issued *Vibrio* fact sheets to shellfish growers.

Results: Strategies to protect consumers from foodborne infections linked to climate change, like MDE's harvest area closure advisories, are now included in the state's climate strategy and in training courses for community health workers conducted by the University of Maryland Extension program.



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**DESTROYING AND DISRUPTING
FOOD SUPPLIES**

HUNGER AND MALNUTRITION

Increasing temperatures and humidity in some regions, and extreme weather events can lead to

spoiled food, destroyed crops, and disruptions in food production and distribution.

Most at Risk: Infants, young children, pregnant women, older adults, and people living in poverty

HUNGER AND MALNUTRITION CASE STUDY

Oregon Health Authority, Climate and Health Program

Problem: Drier summers are expected to worsen drought conditions in Oregon, affecting crop yields and threatening the way of life for Oregon's agricultural and tribal communities.

Approach: The Climate and Health Program decided to use storytelling methods, such as case studies and story maps, as a strategy to engage and learn from stakeholders. The program worked with the Confederated Tribes of Warm Springs to create videos illustrating potential climate impacts on traditional foods like roots, berries, fish, and game.

Results: The Climate and Health Program published a shared resilience plan prioritizing local food systems. Stories embedded in the plan are helping health departments learn about innovative ways to achieve climate and community health goals through partnerships and plans that build local food systems' resilience.



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DISRUPTING WELL-BEING

MENTAL HEALTH PROBLEMS

Increased frequency and severity of extreme weather events can lead to **stress, depression, anxiety, PTSD, and suicidal thoughts.**

Most at Risk: Children, older adults, pregnant and postpartum women, people with mental illnesses, people living in poverty, people who are homeless, first responders, people experiencing increased stress, and people who rely on the environment for their livelihood

MENTAL HEALTH PROBLEMS

CASE STUDY

Oregon Health Authority, Climate and Health Program

Problem: More exposure to extreme events in Oregon, such as storms and wildfires, can lead to economic stress and displacement, which can increase the risk of mental health conditions like anxiety, depression, and post-traumatic stress, even among people with no history of mental illness.

Approach: To communicate various climate impacts within a local context, the Climate and Health Program released a collection of digital stories from partners and community members. Featured mental health professionals highlighted the connection between climate change and mental health and the need for community collaboration to prepare for and respond to its effects.

Results: The Oregon Health Authority continues to embed mental health into its planning processes and maintains partnerships with mental health agencies across the state through its Public Health Emergency Preparedness program. These collaborations include health provider training to support trauma care that recognizes and responds to the effects of climate change.



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