National Environmental Health Association

Integrating Environmental Justice and Climate and Health

Examples for Environmental Public Health Programs

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Integrating Environmental Justice and Climate and Health

State, territorial, local, and tribal (STLT) environmental public health professionals play a critical role in addressing the health and well-being of their communities and environment and are well-positioned to address health inequities that are exacerbated by climate change and environmental injustice. These professionals can directly engage with at-risk communities to integrate climate change and environmental justice considerations into their core environmental public health (EPH) programs and services. Climate change is impacting the health and well-being of humans, with the most vulnerable bearing a large portion of the burdens.

This guide provides examples of how environmental justice and climate and health can be integrated into core environmental public health programs and services to improve health outcomes.

Climate Change Impact on Human Health

Climate change is recognized as one of the greatest threats to global health in the 21st century (Watts et al., 2015). It affects human health through a myriad of direct and indirect factors. Climate change amplifies the effect of health risks through extreme heat, drought, wildfires, air pollution, extreme storms, floods, and changing local weather patterns. Climate change also adversely impacts biodiversity and ecosystems by disturbing natural habitats and species, which threatens human health. Human health risks include increased heat-related strokes, pulmonary and cardiovascular disorders, foodborne and waterborne illnesses, central nervous system diseases, vectorborne diseases, mental health illness, and many more (Block & Calderón-Garcidueñas, 2009; Crimmins et al., 2016; Ebi et al., 2021; Lewis, n.d.; U.S. Environmental Protection Agency [U.S. EPA], 2022a).

Environmental Justice Impact on Health Equity

Though global, the effects of climate change are inherently local and vary depending on local and regional factors. All people are susceptible to physical and mental health impacts; however, certain groups carry a heavier burden. These groups include children, people of color, older adults, people with disabilities, immigrants, Indigenous Peoples, at-risk occupational groups, people who lack access to healthcare, people with preexisting or chronic physical and mental health conditions, and low-income people (U.S. EPA, 2022b). Low-income communities and communities of color are most burdened by climate change due to decades of disadvantages stemming from environmental injustices and social discrimination (Ndugga and Artiga, 2022). Environmental justice deals with a variety of historical circumstances that continue to affect vulnerable populations, including colonization, historical trauma from policies such as removing children to attend boarding schools, and discrimination based on race and ethnicity (National Academies of Sciences, Engineering, and Medicine, 2022). These circumstances contribute to health inequities in vulnerable communities and constrain their ability to address the immediate impacts of climate change and build resilient infrastructure to address future events (National Academies of Sciences, Engineering, and Medicine, 2022).

Incorporating Environmental Justice Into Core Programming

To ensure the health and safety of all communities, environmental public health organizations need to incorporate diversity, equity, inclusions, access, and justice into their internal and external operations (Environmental Health & Equity Collaborative, 2023). STLT health departments can begin to address health equity and environmental justice broadly by formally acknowledging structural racism and the role of public health in addressing its impact. Environmental public health programs should access culturally and linguistically appropriate approaches to address social determinants of health, partner with social justice organizations and communities impacted by environmental injustice, and use equitable practices to allocate resources.

CORE Strategy

The Centers for Disease Control and Prevention (CDC, 2022a) CORE Health Equity Science and Intervention Strategy (Cultivate comprehensive health equity science, Optimize interventions, Reinforce and expand robust partnerships, and Enhance capacity and workforce engagement) can be used to address health equity by systematically integrating environmental justice and climate and health into the design of local environmental public health programs and services.

Considering that the environmental public health profession is built on relationships, cooperation, and collaboration, EPH officials should understand the costs and benefits of their actions by using community-based participatory research, citizen science initiatives, and the political economy of decisions to successfully incorporate CORE strategies into environmental health programs.

CHAMP

Jurisdictions can review our Climate Health Adaptation and Mitigation Partnership (CHAMP) and strategic framework and use it to identify their community's unique climate-related health risks, develop responsive climate adaptation plans, and implement targeted adaptation actions to protect their communities from environmental health risks related to climate change.

The program provides an opportunity to share lessons learned, stories of impact, and resources to help environmental public health professionals respond to the health effects of climate change in their jurisdiction. The program also helps communities make progress toward meeting Healthy People 2030 objectives, raises

awareness about how climate change disproportionately impacts the health of communities and groups, and incorporates the CDC Building Resilience Against Climate Effects (BRACE) framework.

Air Quality (Ambient and Indoor)

Climate Change Impact

- Rising temperatures, increasing extreme weather events, and air pollution during and after disasters can increase ground-level ozone and/or particulate matter air pollution and increased allergens (Nolte et al., 2018).
- Poor ambient air quality exacerbated by climate change infiltrates into indoor environments, increasing pollutants, allergens, smoke, etc.
- Increased use of portable generators that can lead to carbon monoxide poisoning from improper use (U.S. EPA, 2022c).

Health Equity Impact

- People with lower incomes and people from racial and ethnic minority groups are exposed to higher concentrations of air pollutants due to zoning, transportation, commercial, and industrial policies (Hajat et al., 2015).
- Higher concentrations of air pollutants near communities of color and low-income communities limit their opportunities to outdoor recreation, which is beneficial for overall well-being and health (The Center for American Progress, 2020).
- People that work outdoors could be at greater risk due to air pollution.
- Children, older adults, and people with a compromised immune system are more susceptible to the health impacts of air pollutants (Royal College of Paediatrics and Child Health, 2020).

Examples of Integrating Environmental Justice and Climate and Health

Ambient Air Quality

Assessment and Policy	Cross-Sectoral Engagement	Education and Outreach
Assess local air pollution data and investigate current community health needs by identifying air hazards and their effect on human health. For example, monitoring daily pollen count or particulate matter and contributing factors	Engage members of vulnerable communities, environmental justice groups, and other community groups to design early warning systems and appropriate messaging to alert communities about poor air quality events associated with climate change	Design culturally and linguistically appropriate education materials and outreach to alert the public about the effects of poor air quality to individuals at highest risk for health

(National Environmental Health Association [NEHA], 2021a).	(e.g., wildfires, droughts) (Rudolph et al., 2018).	complications from poor air quality. Utilize outlets such as social media, television, phone messages, and daily paper media (NEHA, 2021a).
Analyze poor air quality and the effect on health by identifying sources and pathways of exposure (e.g., extreme weather events, industries) and plan interventions for vulnerable communities (NEHA, 2021a).	Collaborate with agencies, nongovernmental organizations (NGOs) and the private sector to enhance land use and active transportation options and promote sustainable development (e.g., by reducing heat islands and increasing green space) to improve air quality and reduce the impacts of pollution on respiratory health (US EPA, 2022d).	
Add climate and air quality health adaptation to current organizational structures and implement mitigation practices to reduce air pollution (NEHA, 2021a).		

Indoor Air Quality (IAQ)

Cross-Sectoral Engagement	Education and Outreach
Collaborate with federal health agencies, NGOs, and local community partners to reduce the impact of and prevent respiratory illnesses, focusing on root causes, improvement of surveillance, and elimination of health conditions related to IAQ (Rudolph et al., 2018).	Prepare culturally and linguistically appropriate education materials and outreach about climate change's impact on IAQ-related health conditions and preventative measures residents can take to minimize symptoms.
Work with local schools to improve IAQ by upgrading filtration systems, placing air intakes away from pollutions sources, not placing garbage in HVAC rooms, selecting less- or non-toxic art materials, and educating school occupants about IAQ issues (U.S. EPA, 2023a).	Promote the use of green building methods and products to support high IAQ environments.

Emergency Preparedness and Response

Climate Change Impact

- Climate change increases the frequency and severity of individual extreme weather events such as wildfires, high heat, and storms and the risk of compound (concurrent) and cascading hazards. These events increase the need for emergency response (U.S. Global Change Research Program, 2018) (AghaKouchak et al., 2020).

Health Equity Impact

- Low-income communities are at higher risk of health impacts due to climate-related disasters due to preexisting poor environmental and social conditions (Birkmann et al., 2022).
- First responders, such as firefighters and health workers, are at higher risk for climate-related mental and behavioral health consequences due to the increased occupational demands from more frequent extreme weather events and disasters (Krisberg, 2020).

Examples of Integrating Environmental Justice and Climate and Health

Assessment and Policy	Cross-Sectoral Engagement	Education and Outreach
Conduct a climate, health, and equity vulnerability assessment (CHEVA) in collaboration with other local partner agencies (e.g., epidemiology, emergency management, planning) and local community members to identify high-risk populations and structures (Rudolph et al., 2018).	Collaborate with healthcare professionals, including federally qualified health centers and free clinics, to prepare for extreme weather events by encouraging surge capacity planning and training (Hostetter & Klein, 2022).	Create culturally and linguistically appropriate educational materials and outreach about emergency preparedness and planning and post-disaster hazards.
Ensure that the public health emergency preparedness and mitigation plans include CHEVA information (e.g., prepare for longer vector or wildfire seasons, more cooling or heating centers) (Rudolph et al., 2018).	Fully engage residents in building and supporting climate resilience in their community through active engagement of vulnerable residents and supporting the integration of health equity and sustainability in local government planning for disasters and post-disasters (Rudolph et al., 2018).	Engage residents from all neighborhoods in emergency training and exercises (Rudolph et al., 2018).
Weave climate and extreme storm adaption into community design plans to adjust to current climate change conditions and mitigation policies to reduce flooding, injuries,		

and fatalities (NEHA, 2021b).		
Prepare extreme weather shelters protocols that address vulnerable population needs. For example, children; older adults; people with disabilities or compromised immune systems; lesbian, gay, bisexual, transgender, queer (LGBTQ) communities (National LGBT Health Education Center, 2014).	Make intersectoral partnerships to assess community vulnerabilities and develop plans to address vulnerabilities. Example of partners include healthcare, public works, planning, parks departments, sanitation agencies, water utilities, etc. (Rudolph et al., 2018).	Encourage participation in local climate action planning meetings by providing financial support for vulnerable residents (City of Tacoma, 2020).
		Share culturally and linguistically appropriate education materials and resources with the community and first responders about the importance of maintaining mental health and wellness during and after disasters.

Food Safety

Climate Change Impact

- Rising temperatures and more frequent extreme weather events cause increased pathogens (e.g., *Salmonella*, *Campylobacter*, *E. coli*) and conditions that lead to food contamination and risk of foodborne illness (Hellberg & Chu, 2016).
- Extreme weather events can disrupt food supply chains and cold chains, which increases the risk of food spoilage and food contamination (Malik et al., 2022).
- Extreme weather events can reduce access to clean water for sanitation, which might increase foodborne illnesses (National Institute of Environmental Health Sciences, 2022).

Health Equity Impact

- Low-income people, children, older adults, pregnant and postpartum individuals, and people with compromised immune systems are more susceptible to the health impacts of foodborne illness (Gremillion & Roper, 2020).

Examples of Integrating Environmental Justice and Climate and Health

Assessment and Policy	Cross-Sectoral Engagement	Education and Outreach
Food safety programs should assess retail food establishments to develop targeted food safety educational programs based on the audience's ethnicity, level of acculturation, and educational attainment. Programs should consider need-directed, participatory, and process-oriented approaches (Po et al., 2011).	Collaborate with emergency preparedness professionals to ensure a plan is in place to protect the food system during extreme weather events.	Design culturally and linguistically appropriate food safety education materials and targeted public outreach to prevent foodborne illness during extreme weather events and after a disaster.
Implement a risk-based inspection system for retail food establishments and inspect establishments based on facility risk categories (Food and Drug Administration, 2022). Plan to adjust inspection frequencies if the risk category changes.	Collaborate with local agencies and community groups to support sustainable local food systems (Rudolph et al., 2018).	Inform retail food establishments about food waste reduction, liability protections, and the benefits of sending surplus foods to local nonprofit hunger relief organizations (Rudolph et al., 2018). See the comprehensive guidance the Conference for Food

Use the FoodNet Program (CDC, 2021) to conduct active surveillance of foodborne illnesses. Use the National Environmental Assessment Reporting System (CDC, 2022b) to help analyze data to identify trends and sources and follow up through planning interventions for vulnerable communities.	Collaborate with retail food establishments on developing an emergency action plan during extreme weather events and post-disaster. See the *Emergency Action Plan for Retail Food Establishments* (Conference for Food Protection, 2014) and *After a Disaster: Reopening a Retail Food Establishment* (Boulder County Public Health, 2016).	Protection (2023) provides on food recovery programs.
Set protocols that minimize food safety risks associated with disruptions in the food cold chain related to extreme weather events (Rudolph et al., 2018).	Partner with the federal government and private industry to promote a culture of food safety in the workplace (e.g., the importance of paid sick leave to limit spread of foodborne illness from sick food workers) (Gremillion & Roper, 2020).	

Hazardous Materials and Waste Management

Climate Change Impact

- Extreme weather events can damage hazardous waste storage sites and shut down refineries and chemical manufacturing facilities that can lead to community exposures to hazardous materials and toxic emissions (Rudolph et al., 2018).
- Extreme weather events can damage solid waste infrastructure and disrupt waste transportation (Rudolph et al., 2018).

Health Equity Considerations

- Low-income people and some people of color are at higher risk of adverse health impacts because hazardous waste facilities are disproportionately placed in their communities (Mohai & Saha, 2015).
- Children and pregnant individuals are more susceptible to adverse health outcomes when exposed to hazardous waste or improper waste management (Shrader-Frechette & Biondo, 2020).

Examples of Integrating Environmental Justice and Climate and Health

Waste Management

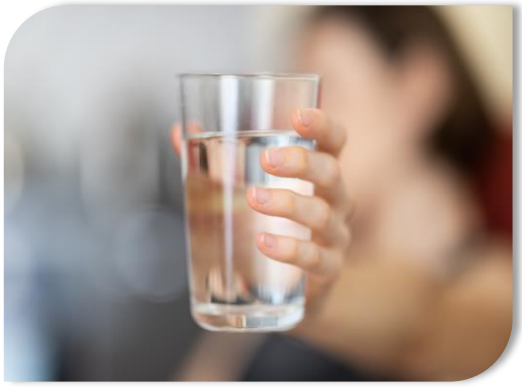
Assessment and Policy	Cross-Sectoral Engagement	Education and Outreach
Assess the extreme weather event impacts on local waste management and landfill sites and associated potential public health risks that might occur if these facilities are compromised. Follow up through planning interventions for vulnerable communities (Rudolph et al., 2018).	Collaborate with local agencies and community organizations to support and promote reuse and recycling programs to reduce waste streams and to assess if existing programs can be scaled to handle disaster-related wastes (U.S. EPA, 2022f).	Prepare culturally and linguistically appropriate messages about exposure to waste contamination in advance of extreme weather events and post-disaster.
Develop strategies to expedite the removal of disaster-related waste during extreme weather events and disasters (U.S. EPA, 2022f).	Maintain key waste management storage infrastructure features through multidisciplinary partnerships with civil engineers or urban planners (NEHA, 2021b).	
Integrate climate impacts into the siting and approval of solid waste facilities (Rudolph et al., 2018).		

Identify opportunities to reduce and mitigate waste generation and potentially problematic wastes prior to extreme weather events (U.S. EPA, 2022f).		
Support state mandates that divert organic waste and food waste to recycling facilities (Rudolph et al., 2018).		

Hazardous Materials

Assessment and Policy	Cross-Sectoral Engagement	Education and Outreach
Assess the location of storage, treatment, and disposal of hazardous materials in the community with particular emphasis on the locations of Superfund hazardous waste sites and their risks. Follow up through planning interventions for vulnerable communities (Rudolph et al., 2018).	Collaborate with federal agencies and facility operators to integrate climate projects and risks in the management of hazardous materials (Rudolph et al., 2018).	Prepare culturally and linguistically appropriate messages about toxic contamination from hazardous materials in advance of extreme weather events and post-disaster.
	Maintain key hazardous materials storage infrastructure features through multidisciplinary partnerships with civil engineers or urban planners.	
Find opportunities to eliminate or reduce the generation of hazardous wastes (e.g., retrofitting PCB transformers to reduce PCB-contaminated wastes) (U.S. EPA, 2022f).	Collaborate with community organizations to communicate and educate residents effectively on potential health risks of hazardous contamination and preventative measures. See the guidance provided by the National Association of County and City Health Officials (2023) on building collaboration at hazardous waste sites.	
Include potential climate impacts in the review of permitting applications for hazardous waste sites and facilities (Rudolph et al., 2018).		

Water Quality



Climate Change Impact

- Climate change increases the risk of exposure to contaminated water due to more frequent heavy rainfalls, flooding, and droughts. Water is contaminated from rising surface water temperatures that creates more hospitable environments for harmful algae and other microbes that grow in water (Levy et al., 2018).

Health Equity Impact

- Low-income people and some communities of color are more likely to be exposed to unwanted health effects of unsafe drinking and recreational waters (Pullen Fedinick et al., 2019).

Examples of Integrating Environmental Justice and Climate and Health

Assessment and Policy	Cross-Sectoral Engagement	Education and Outreach
Assess local weather and precipitation data and investigate current community health needs by identifying environmental hazards and the effect on human health. For example, monitoring daily precipitation and tracking water quality for drinking and recreational waters (NEHA, 2021c).	Participate with local and regional water agencies and suppliers and community members on adaptation planning. For example, collaborate with these groups to provide alternate water supplies in vulnerable communities during drought and flooding (U.S. EPA, 2022e)	Create culturally and linguistically appropriate public educational materials and outreach about safe and healthy water conservation.
Develop emergency response plans, including adjusting the frequency of monitoring water quality during and after extreme weather events and follow up through planning interventions for vulnerable communities (U.S. EPA, 2022e).	Collaborate with water district and water utilities to garner support for “indirect potable water reuse” that replenish groundwater with recycled wastewater (Rudolph et al., 2018).	Prepare culturally and linguistically appropriate messages and outreach for boil water and do not drink orders in advance.
Increase permitting of water conservation methods (e.g., rainwater catchment systems) (Rudolph et al., 2018).	Collaborate with local water agencies and suppliers to establish protocols to prevent water shutoffs during droughts (Rudolph et al., 2018).	Provide real-time alerts about health threats to recreational water users.

Support improvement of existing water systems to ensure that safe drinking and recreational water is accessible for the whole community (Rudolph et al., 2018).	Collaborate with local governmental agencies (e.g., planning) to design and develop healthy community design features to reduce negative effects on community health factors like municipal drainage systems, dams, and levees (NEHA, 2021c).	

Vector Control

Climate Change Impact

- Changes to local weather patterns and ecosystems due to climate change have increased vectors and the risk of vectorborne disease, including Lyme disease, West Nile virus, and Zika virus in communities (Caminade et al., 2019).

Health Equity Impact

- Low-income communities are at higher risk for vectorborne diseases due to poor environmental and social conditions and the lack of access to preventative health and treatment services (Nigusie et al., 2021).

Examples of Integrating Environmental Justice and Climate and Health

Assessment and Policy	Cross-Sectoral Engagement	Education and Outreach
Assess and investigate current community health needs by identifying vector trends and vulnerabilities across jurisdictions. For example, trace and monitor prevalent vectors and assess emerging threats (NEHA, 2021d). Follow up through planning interventions for vulnerable communities.	Collaborate with other local agencies (e.g., communicable disease, vector control, preparedness) to expand surveillance programs and create plans for rapid notification and case management protocols for novel vectorborne diseases. (Rudolph et al., 2018).	Develop a culturally and linguistically appropriate alert system of high-risk locations and seasons for vector exposure, parks, lakes, rivers, playgrounds, and other natural areas. Communication can be done through signage, social media updates, and blocking off unsafe communal areas (NEHA, 2021d).
Enhance surveillance and response during and after extreme weather events.	Collaborate with other local agencies (e.g., housing, zoning) to add requirements and protocols for structures and businesses that would reduce vectorborne disease risk (e.g., require screens on windows) (Rudolph et al., 2018).	Engage community members to help identify local sources of vector habitats (e.g., reporting dead birds and nuisance mosquito problems) (CDC, 2022d).
Prepare and budget for shifting or longer vector seasons based on data from monitoring and surveillance.		
Add vector breeding habitat inspection and abatement protocols to routine environmental public health service inspections.		
Address precipitation and standing water trends through		

local legislation to prevent habitats that support vectors. For example, develop a policy to eradicate standing water within 48 hours of reporting (NEHA, 2021d).		

Definitions

These definitions will help you make the most use of this guide and effectively communicate key environmental public health messages with decision makers and the public using an inclusive and equity-informed approach.

- **At-risk vulnerable populations:** These populations include children, people of color, older adults, people with disabilities, immigrants, Indigenous Peoples, vulnerable occupational groups, persons with preexisting or chronic medical conditions, and people in low-income communities.
- **Biodiversity**: The World Health Organization (2015) defines biodiversity as the "biological variety in all its forms, from the genetic makeup of plants and animals to cultural diversity. People depend on biodiversity in their daily lives, in ways that are not always apparent or appreciated. Human health ultimately depends upon ecosystem products and services (such as availability of fresh water, food and fuel sources) which are requisite for good human health and productive livelihoods. Biodiversity loss can have significant direct human health impacts if ecosystem services are no longer adequate to meet social needs."
- **Climate and health**: Health impacts of climate change on human health. CDC (2022c) states that in conjunction with natural and human-made health stressors, climate change impacts human health and disease through various mechanisms. Existing health threats might increase and intensify, and new health threats will emerge.
- **Creating and maintaining healthy, sustainable communities:** A vision for combining these concepts. One Health illustrates the intersection of animals, environment, and human health.
- **Diversity:** Practice of including individuals representing more than one national origin, race or ethnicity, religion, socioeconomic level, sexual orientation, etc.
- **Ecosystem services:** U.S. EPA (2021) states that ecosystems "provide humans with food, clean water, and a variety of other services that can be affected by climate change." Climate change can affect ecosystems including changing patterns of wildfires, plant growth, wildlife population, etc.
- **Environmental justice:** U.S. EPA (2023b) defines environmental justice as the "fair treatment and meaningful involvement of all people, regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. This goal will be achieved when everyone enjoys the same degree of protection from environmental and health hazards, and equal access to the decision-making process to have a healthy environment in which to live, learn, and work."

Resources

The following resources can support your effort to incorporate environmental justice and equity into your environmental health programs and services.

- **Air Quality—Emergency Preparedness and Response to Climate Change: The Role of Environmental Health Professional:** An overview of the role of environmental public health professionals in emergency preparedness and response to poor air quality exacerbated by climate change. It also provides actions environmental public health professionals can take to address these issues while considering vulnerable populations. https://2022.neha.org/sites/default/files/Air%20Quality.pdf
- **Climate Change and Social Vulnerability in the United States: A Focus on Six Impacts:** Information on how vulnerable populations defined by income, education, race, ethnicity, and age might be exposed to the highest impact of climate change effects. https://www.epa.gov/system/files/documents/2021-09/climate-vulnerability_september-2021_508.pdf
- **Climate Change, Health, and Equity: A Guide for Local Health Departments:** Detailed information on how local health departments can address climate change, health, and equity. It includes steps that environmental health services can take to address these issues. https://www.apha.org/-/media/files/pdf/topics/climate/climate_health_equity.ashx
- **Floods—Emergency Preparedness and Response to Climate Change: The Role of Environmental Health Professional:** An overview of the role of environmental public health professionals in emergency preparedness and response to floods exacerbated by climate change. It also provides actions environmental public health professionals can take to address these issues while considering vulnerable populations. https://2022.neha.org/sites/default/files/Floods.pdf
- **Foodborne Illness: Another Way the Poor Pay More:** Information on how individuals with low-income are more likely to suffer foodborne illness due to the nature of the current food system. It also provides steps that can be taken by environmental public health professionals and health departments to protect vulnerable population from foodborne illnesses. https://consumerfed.org/wp-content/uploads/2020/11/Foodborne-Illness-and-Poverty-Report-11-17-20.pdf
- **Preparing for the Regional Health Impacts of Climate Change in the United States:** A description of the health impacts that climate change will have on different regions of the U.S. and actions taken by health departments to prepare for and respond to climate change. Includes examples of how health departments have addressed these issues and their impact on vulnerable populations. https://toolkit.climate.gov/reports/preparing-regional-health-impacts-climate-change-united-states
- **Vector Borne Illness—Emergency Preparedness and Response to Climate Change: The Role of Environmental Health Professional:** An overview of the role of environmental public health

professionals in emergency preparedness and response to vectorborne illness exacerbated by climate change. It also provides actions environmental public health professionals can take to address these issues while considering vulnerable populations.
https://2022.neha.org/sites/default/files/Vectors.pdf

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