



National Environmental Health Association

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The National Environmental Health Association (NEHA) represents more than 6,700 governmental, private, academic, and uniformed services sector environmental health professionals in the U.S. and its territories and internationally. NEHA is the profession's strongest advocate for excellence in the practice of environmental health as it delivers on its mission to build, sustain, and empower an effective environmental health workforce.

Role of Environmental Health in Addressing Climate Change

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Climate change is affecting environmental health—the quality of air, food, and water in the communities where we live, work, and play (Centers for Disease Control and Prevention [CDC], 2020). The National Environmental Health Association (NEHA) recognizes climate change as a worldwide environmental health problem that impacts the health and safety of individuals and communities. Environmental health professionals improve and protect the public's health and create and sustain healthy communities. It is NEHA's responsibility to support the capacity of environmental health professionals to address the health impacts of climate change with risk assessment, adaptation, and mitigation planning.

NEHA supports federal, state, and local funding for local and state health departments and environmental and health agencies to provide technical assistance, education, and programs to accomplish the following:

- Conduct risk assessments and establish plans to anticipate risks for adaptation and build resilience for future generations using a health equity lens to ensure all communities are prepared. Use of the audience segmentation techniques identified by Leiserowitz and coauthors (2009) can help professionals improve individual risk perceptions.
- Incorporate green space and other technologies into the built environment to help reduce urban heat island effects since urban areas are usually warmer than adjacent rural areas (Seto, Güneralp, & Hutyra, 2012; U.S. Global Change Research Program [USGCRP], 2016). In the short-term, heat waves pose the greatest threat to the environment and human health due to the impaired air quality and heat-related illnesses in vulnerable populations (older adults, individuals with chronic diseases, low income households, outdoor laborers, etc.) (Watts et al., 2015).
- Conserve and replenish water sources as they are limiting factors in all ecological cycles on Earth. In many regions, groundwater sources have been depleted and flooding and drought can affect both the level and quality of remaining surface water sources (Schewe et al., 2014). In the

intermediate-term (months or years), climate change poses increased risks of prolonged droughts with associated effects on crops and water resources. Droughts also significantly increase wildfire risks.

- Address the need for more funding and local data. In the long-term (decades or more), climate change poses an increased risk of changes in the area and volume of sea ice; of significant changes in sea levels, water temperatures, and water chemistry; of increased coastal flooding and erosion; of expansion of the range of disease vectors; and of the geographic spread of tropical diseases to new areas.

NEHA supports the following policies and actions for environmental health professionals:

- Take a multidisciplinary and global approach to addressing climate change. The Commission on Health and Climate Change has produced 10 policy recommendations that can serve as a broad reference base for environmental health professionals to make incremental change at their associated level of community (Watts et al., 2015).
- Create a “whole community” engagement approach to engage and empower the entire community, all levels of government, nongovernmental and nonprofit organizations, faith-based organizations, and private sector industries established through the Federal Emergency Management Agency and the U.S. Department of Homeland Security (Federal Emergency Management Agency, 2011).
- Strengthen community resilience to climate-related events. Due to local culture and capacity, there is no single solution to climate change adaptation. There are, however, resiliency frameworks such as the one developed by the U.S. Department of Health and Human Services that can be used by environmental health professionals (Chandra et al., 2011).
- Collect baseline rates of disease and examine exposure outcome associations to quantify the impacts of climate change on health and determine direct attribution (Marinucci, Lubber, Uejio, Saha, & Hess, 2014). Climate change hazards may exacerbate existing health disparities over time due to the changing density and demographics of a population. Support surveillance activities to monitor the changes over time. These health disparities are frequently found in communities that traditionally are marginalized and an equity lens must be used when planning adaptation and mitigation efforts. The U.S. Environmental Protection Agency’s (U.S. EPA) 30 climate change indicators can help professionals to better examine and assess these risks in their own communities (U.S. EPA, 2020a).
- Reduce barriers, share best practices, and evaluate metrics through stakeholder engagement strategies similar to those seen in “A Comprehensive Review of Climate Adaptation in the United States” (Bierbaum et al., 2013).
- Work with the Centers for Disease Control and Prevention’s Climate and Health Program to assist health departments develop climate ready states and cities. Its 5-step process framework, Building Resilience Against Climate Effects, anticipates impacts, assesses associated health vulnerabilities, and creates adaptive capacity to reduce exposures (Managan et al., 2014).

Analysis

In 1997, NEHA adopted a climate change position paper that acknowledged the gravity of climate change, as well as the need for legislation and research, concerted action and cooperation, and environmental and public health professionals to be a resource (Radtke, Gist, & Wittkopf, 1997). Since then, additional evidence of climate change has been documented and the seriousness of the policy debate over climate change has increased. This policy statement continues to address these objectives in addition to others.

This policy statement reviews current information on the status of climate change with particular emphasis on the implications for environmental and public health. It is intended to be used as a basis for environmental health professionals and their colleagues in related fields to initiate discussions within their communities in regard to the potential impacts and vulnerabilities of climate change (Radtke et al., 1997). Environmental health professionals are vital in developing climate change mitigation and adaptation measures.

NEHA recognizes climate change as a worldwide environmental health problem that may be caused in part by human influences. Climate change can cause serious health and safety impacts to individuals and communities. While sometimes referred to as “global warming,” climate change is identified as any significant change in climate trends and measures lasting for an extended period of time, such as changes in temperature, precipitation, or wind patterns (U.S. EPA, 2016). Greenhouse gases (i.e., carbon dioxide from burning coal, oil, and natural gas; nitrous oxide; and methane) in the atmosphere that absorb solar radiation and emit it back to the Earth’s surface play a significant role in triggering the climate changes observed in recent decades (U.S. EPA, 2020b).

The direct risks of climate change include extreme changes in weather, such as heat waves, storms, floods, and droughts. These extreme changes can vary across geographic regions and populations, directly impacting the quality of air, food, and water in the communities where we live and work (CDC, 2020). Indirect risks are changes in the biosphere: food availability and security, air and water pollution, land use changes, and ecological changes. The coronavirus disease 2019 (COVID-19) pandemic highlights why the potential for increased disease outbreaks cannot be overlooked. As permafrost melts and diseases are released, more individuals can be impacted by these outbreaks and as we have seen with COVID-19, these outbreaks can severely impact life. Changes in the physical environment will also put stress on social dynamics and population health (Watts et al., 2015). When these direct and indirect effects interact with social dynamics, health is impacted. The number of people who are at risk is amplified by the distribution of population, population density, and demographic changes (e.g., the distribution of age, gender, and socioeconomic status of people in a particular area) (Watts et al., 2015).

The 2016 Climate and Health Assessment (USGCRP, 2016) explains the impacts of climate change on human health giving scientific evidence for the relationship between the impacts and associated outcomes: temperature-related death and illness, air quality impacts, extreme weather events (e.g., droughts, fires, storms, flooding), vectorborne disease, water-related illness, mental health, food safety/nutrition/distribution, and populations of concern. Populations of concern are those that are disproportionately vulnerable, such as impoverished communities, migrants, children, communities of color, indigenous peoples, older adults, pregnant women, and those with disabilities and/or preexisting medical conditions (USGCRP, 2016). Climate change is a threat multiplier for these populations as they bear an uneven burden of health disparities or environmental exposures or are in under-resourced communities where exposure to climate events is more serious and recovery is more challenging. In

addition, the Fourth National Climate Assessment identifies the risks for 10 particular regions within the U.S. (USGCRP, 2018). Knowing these risks and decreasing vulnerabilities to them can be accomplished through joint collaboration and support efforts within and between regions (Watts et al., 2015).

NEHA and its Climate and Health Program Committee recognize that many policy issues must be addressed by society to effectively mitigate climate change. An increased focus on community engagement, however, will help address climate change vulnerabilities and create resiliency from the bottom-up. NEHA advocates for national, state, and local policies, regulations, research, and resources that will enhance the ability of environmental health professionals to mitigate, adapt, and prevent the environmental and health impacts of climate change and protect public health.

While the scientific information that prompted the 1997 NEHA position paper remains relevant, recent calls to action heighten the urgency to act. In 2018, the Intergovernmental Panel on Climate Change affirmed that “limiting global warming to 1.5 °C would require rapid, far reaching, and unprecedented changes in all aspects of society” that could go “hand in hand with ensuring a more sustainable and equitable society” (Intergovernmental Panel on Climate Change, 2018). The United Nations Environment Programme (2019) recommends that global greenhouse gas emissions be cut by 7.6% annually to meet the 1.5 °C target. Following decades of increasing temperatures, the National Oceanic and Atmospheric Administration (2020) declared 2019 as the second hottest year on record, moving 2016 to third.

Justification

According to the World Health Organization, climate change will adversely affect health over the next several decades with some health effects already being felt in the U.S. Federal healthcare expenditures could increase due to climate-related impacts (U.S. Government Accountability Office, 2015). One example already occurring is the increase in frequency and severity of extreme heat events and the implications for human health (USGCRP, 2016). These health effects include increased respiratory and cardiovascular disease, as well as injuries and premature death (CDC, 2020).

The U.S. average temperature has increased by 1.3 °F to 1.9 °F since 1895 with most of the increase, which is not geographically uniform, occurring since 1970 (USGCRP, 2016). The percentage of people diagnosed with asthma has increased in the U.S. from 7.3% in 2001 to 8.4% in 2010 (CDC, 2020). An annual U.S. average estimates 65,299 emergency visits for acute heat illness during the summer months, which is an underestimate of heat-related visits (USGCRP, 2016). In addition, exposure of older adults to heat waves is increasing in the US and is especially concerning given the increased likelihood of comorbidities and the growing number of older adults in the U.S. (Salas, Knappenberger, & Hess, 2019).

U.S. deaths from temperature extremes based on death records from 2006–2010 found approximately 670 deaths per year resulting from extreme heat (USGCRP, 2016). Several extreme temperature events in the U.S. have led to increases in deaths, such as Kansas City and St. Louis in 1980, Philadelphia in 1993, Chicago in 1995, and California in 2006 (USGCRP, 2016). The number of deaths associated with temperature is usually greater than those recorded as temperature-related in medical records since they often do not record how heat exacerbates the cause of death, which is usually a stroke or a heart attack. For example, excess deaths during the 1995 Chicago heat wave (approximately 700) exceeded the 465 deaths recorded as heat-related on death certificates ((USGCRP, 2016). The 2003 European heat wave caused the most heat-related deaths and was estimated to have resulted in 30,000–70,000 premature deaths (USGCRP, 2016).

The benefits outweigh the economic consequences of delaying the implementation of climate change mitigation and adaptation policies. It will be costly either way. The cost of delaying action, however, is more detrimental as higher temperatures and higher carbon dioxide concentrations continue. Furthermore, delays in policies that are implemented later will need to be more stringent and therefore more costly in future years (Furman & Podesta, 2014).

The key points to consider when determining the cost benefits include the following:

- Immediate action may reduce the cost of meeting climate targets. Mitigation costs increase by about 40% for each decade of delay.
- Delayed action may create substantial economic damages—0.9% of the estimated 2014 U.S. gross domestic product is approximately \$150 billion and the next increase of one degree in mean annual temperature would incur an additional estimated annual cost of 1.2% of global output. These costs would incur year after year because of the damage caused by additional climate change as a result of delayed action (Furman & Podesta, 2014). Researchers examined 10 climate events that occurred in 2012 and estimated \$10 billion in health-related costs, \$8.4 billion in mortality costs, and \$1.6 billion in illness and lost wages costs due to these events (Limaye, Max, Constible, & Knowlton, 2019).
- Increases in change in the climate heightens the need to act. Melting ice sheets cause sea levels to rise. Methane is released from thawing permafrost that then accelerates global warming. These and other changes could have massive consequences and costs (Furman & Podesta, 2014).
- Enacting meaningful change in climate policy is a type of climate insurance. Paying mitigation costs now reduces the odds of large-scale changes in climate. Climate policy is also an investment in cleaner air, energy security, and other benefits difficult to monetize such as biological diversity (Furman & Podesta, 2014).

Addressing climate change can be an overwhelming and daunting task. Partnerships and solutions can arise, however, when all individuals in a community engage, prepare, and collaborate on effective climate change strategies. Evaluating baseline opinions, values, core beliefs, and identities of a community's diverse population will allow environmental health professionals to better understand how and where behavior change can produce maximum results. Promoting long-term planning for climate change is important. Communities must create and be examples of more efficient and sustainable lifestyles, such as using active and mass transportation, reducing waste, and conserving energy and water.

References

Bierbaum, R., Smith, J.B., Lee, A., Blair, M., Carter, L., Chapin, F.S., III, . . . Verduzco, L. (2013). A comprehensive review of climate adaptation in the United States: More than before, but less than needed. *Mitigation and Adaptation Strategies for Global Change*, 18(3), 361–406.

Centers for Disease Control and Prevention. (2020). *Climate and health*. Retrieved from <http://www.cdc.gov/climateandhealth>

Chandra, A., Acosta, J., Howard, S., Uscher-Pines, L., Williams, M., Yeung, D., . . . Meredith, L.S. (2011). *Building community resilience to disasters: A way forward to enhance national health security*. Santa Monica, CA: RAND Corporation.

Federal Emergency Management Agency. (2011). *A whole community approach to emergency management: Principles, themes, and pathways for action* (FDOC 104-008-1). Retrieved from https://www.fema.gov/media-library-data/20130726-1813-25045-0649/whole_community_dec2011_2_.pdf

Furman, J., & Podesta, J. (2014, July 29). *New report: The cost of delaying action to stem climate change* [Web log post]. Retrieved from <https://www.whitehouse.gov/blog/2014/07/29/new-report-cost-delaying-action-stem-climate-change>

Intergovernmental Panel on Climate Change (2018). *Global warming of 1.5 °C: An IPCC special report on the impacts of global warming of 1.5 °C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*. Geneva, Switzerland: World Meteorological Organization. Retrieved from <https://www.ipcc.ch/sr15/>

Leiserowitz, A., Maibach, E., & Roser-Renouf, C. (2009). *Global warming's "six Americas": An audience segmentation*. Hartford, CT: Yale Project on Climate Change Communication. Retrieved from <https://cdn.americanprogress.org/wp-content/uploads/issues/2009/05/pdf/6americas.pdf>

Limaye, V.S., Max, W., Constible, J., & Knowlton, K. (2019). Estimating the health-related costs of 10 climate-sensitive U.S. events during 2012. *GeoHealth*, 3(9), 245–265.

Manangan, A.P., Uejio, C.K., Saha, S., Schramm, P.J., Marinucci, G.D., Langford Brown, C., . . . Luber, G. (2014). *Assessing health vulnerability to climate change: A guide for health departments* (CS249409-A). Atlanta, GA: Centers for Disease Control and Prevention, National Center for Environmental Health, Division of Environmental Hazards and Health Effects. Retrieved from <https://www.cdc.gov/climateandhealth/pubs/AssessingHealthVulnerabilitytoClimateChange.pdf>

Marinucci, G.D., Luber, G., Uejio, C.K., Saha, S., & Hess, J.J. (2014). Building resilience against climate effects—A novel framework to facilitate climate readiness in public health agencies. *International Journal of Environmental Research and Public Health*, 11(6), 6433–6458.

National Oceanic and Atmospheric Administration. (2020, January 15). *2019 was 2nd hottest year on record for Earth say NOAA, NASA*. Retrieved from <https://www.noaa.gov/news/2019-was-2nd-hottest-year-on-record-for-earth-say-noaa-nasa>

Radtke, T., Gist, G.L., & Wittkopf, T.E. (1997). *National Environmental Health Association position on global climate change*. Denver, CO: National Environmental Health Association.

Salas, R.N., Knappenberger, P., & Hess, J.J. (2019). *2019 Lancet Countdown on health and climate change: Policy brief for the United States of America, November 2019*. London, UK: Lancet Countdown. Retrieved from <https://www.lancetcountdownus.org/2019-lancet-countdown-us-brief>

Schewe, J., Heinke, J., Gerten, D., Haddeland, I., Arnell, N.W., Clark, D.B., . . . Kabat, P. (2014). Multimodel assessment of water scarcity under climate change. *Proceedings of the National Academy of Sciences of the United States of America*, 111(9), 3245–3250.

Seto, K.C., Güneralp, B., & Hutyra, L.R. (2012). Global forecasts of urban expansion to 2030 and direct impacts on biodiversity and carbon pools. *Proceedings of the National Academy of Sciences of the United States of America*, 109(40), 16083–16088.

United Nations Environment Programme. (2019). *Emissions gap report 2019*. Nairobi, Kenya: Author. Retrieved from <https://wedocs.unep.org/bitstream/handle/20.500.11822/30797/EGR2019.pdf>

U.S. Environmental Protection Agency. (2016). *Climate change: Basic information*. Retrieved from <https://www3.epa.gov/ttnamti1/basic.html>

U.S. Environmental Protection Agency. (2020a). *Climate change indicators in the United States*. Retrieved from <https://www.epa.gov/climate-indicators>

U.S. Environmental Protection Agency. (2020b). *Overview of greenhouse gases*. Retrieved from <https://www.epa.gov/ghgemissions/overview-greenhouse-gases>

U.S. Global Change Research Program. (2016). *The impacts of climate change on human health in the United States: A scientific assessment*. Washington, DC: Author. Retrieved from <https://health2016.globalchange.gov/>

U.S. Global Change Research Program. (2018). *Impacts, risks, and adaptation in the United States: Fourth national climate assessment, volume II*. Washington, DC: U.S. Governmental Publishing Office. Retrieved from <https://nca2018.globalchange.gov/> <http://nca2014.globalchange.gov>

U.S. Government Accountability Office. (2015). *Climate change: HHS could take further steps to enhance understanding of public health risks* (GAO-16-122). Retrieved from <http://www.gao.gov/products/GAO-16-122>

Watts, N., Adger, W.N., Agnolucci, P., Blackstock, J., Byass, P., Cai, W., . . . Costello, A. (2015). *Health and climate change: Policy responses to protect public health*. *The Lancet*, 386(10060), 1861–1914.

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