AMERICAN PUBLIC HEALTH ASSOCIATION
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Public Health Opportunities to Address the Health Effects of Climate Change

APHA Policy statement 20157

Abstract

Climate change poses major threats to human health, human and animal populations, ecological stability, and human social, financial, and political stability and well-being. Observed health impacts of climate change include increased heat-related morbidity and mortality, expanded ranges and frequency of infectious disease outbreaks, malnutrition, trauma, violence and political conflict, mental health issues, and loss of community and social connections. Certain populations will experience disproportionate negative effects, including pregnant women, children, the elderly, marginalized groups such as racial and ethnic minorities, outdoor workers, those with chronic diseases, and those in economically disadvantaged communities. Climate change poses significant ethical challenges as well as challenges to global and health equity. The economic risks of inaction may be significant, yet many strategies to combat climate change offer near- and long-term co-benefits to health, producing cost savings that could offset implementation costs. At present, there are major political barriers to adopting strategies to mitigate and adapt to climate change. Recognizing the urgency of the issue and importance of the public health role, APHA, the Centers for Disease Control and Prevention, and others have developed resources and tools to help support public health engagement. APHA calls for individual, community, national, and global action to address the health risks posed by climate change. The public health community has critical roles to play, including advocating for action, especially among policymakers; engaging in health prevention and preparedness efforts; conducting surveillance and research on climate change and health; and educating public health professionals.

Relationship to Existing APHA Policy Statements

This policy statement builds upon and replaces existing policies 20078 (Addressing the Urgent Threat of Global Climate Change to Public Health and the Environment) and 9510 (Global Climate Change). It is also consistent with the following APHA policies that reference climate change:

- APHA Policy Statement 8911: Resource and Solid Waste Management
- APHA Policy Statement 9206: Toxic Reduction as a Means of Pollution Prevention
- APHA Policy Statement 2004-06: Affirming The Necessity of a Secure, Sustainable and Health Protective Energy Policy
- APHA Policy Statement 200712: Toward a Healthy Sustainable Food System
- APHA Policy Statement 20089: Strengthening Health Systems in Developing Countries
- APHA Policy Statement 20093: Food Crises: Addressing the Current Crisis and Preventing the Next One

- APHA Policy Statement 20094: Ensuring the Achievement of the Millennium Development Goals: Strengthening US Efforts to Reduce Global Poverty and Promote Public Health
- APHA Policy Statement 20095: The Role of Public Health Practitioners, Academics, and Advocates in Relation to Armed Conflict and War
- APHA Policy Statement 20099: Improving Health Through Transportation and Land-Use Policies
- APHA Policy Statement 200913: Building Code Development, Adoption, and Enforcement Problems Affecting Injury Prevention in, and Usability of, Homes and Other Buildings
- APHA Policy Statement 20107: Intrastate and Interstate Transportation of Spent Nuclear Fuel Is a Public Health Risk
- APHA Policy Statement 20125: The Environmental and Occupational Health Impacts of High-Volume Hydraulic Fracturing of Unconventional Gas Reserves
- APHA Policy Statement 20126: Anticipating and Addressing Sources of Pollution to Preserve Coastal Watersheds, Coastal Waters, and Human Health
- APHA Policy Statement 20137: Improving Health and Wellness through Access to Nature
- APHA Policy Statement 20147: Preventing Environmental and Occupational Health Effects of Diesel Exhaust

Problem Statement

Climate change presents, according to the UCL-Lancet Commission, "an unacceptably high and potentially catastrophic risk to human health."[1] It represents a major global and intergenerational ethical challenge and calls upon public health leaders, researchers, and practitioners to act to protect those most vulnerable to climate change's effects.[2,3] Scientific certainty about climate change continues to grow, and the impacts of climate change are increasingly visible.[4,5] At the same time, addressing climate change offers important opportunities not only to protect the public's health from its current and future impacts but to improve health through mitigation and adaptation strategies that offer significant health co-benefits (benefits to health above and beyond the health benefits of protection from climate change itself).[1,4,6,7] APHA, in concert with other health organizations, recognizes an urgent need for immediate and substantial action to mitigate climate change, together with action to adapt to the impacts to which we are already committed, in order to protect and promote human health.[8]

Scientific understanding of climate change, including its implications for health, has grown substantially. According to the fifth assessment report from the Intergovernmental Panel on Climate Change (IPCC), warming of the earth over the past century is "unequivocal" and is "unprecedented over decades to millennia."[5] Average temperature increases are already occurring: across all regions of the United States, 2001 to 2012 was warmer than any previous decade.[4] The long-term threat of global climate change to health is both serious and urgent, and the IPCC fifth assessment report, the third US National Climate Assessment, and other scientific documents demonstrate convincingly that anthropogenic greenhouse gas emissions are primarily responsible for this threat.[4,5,9]

Climate change has occurred and is projected to continue through this century, even with significant reductions in future emissions[4]; however, projected impacts differ substantially under different scenarios, ranging from "business as usual" to significantly reduced greenhouse gas emissions.[5,10] Public health risks associated with even moderate degrees of global warming (premised

on significant emissions reductions) include increases in heat-related morbidity and mortality,[4,6,11] the health consequences of more frequent and stronger extreme weather events,[12]and the impacts of drought, flooding, and rises in sea levels.[13] Health risks may arise from changes in the intensity and range of transmission of vector-borne and other infectious diseases,[14] and increases in ground-level ozone air pollution and aeroallergens related to higher ambient temperatures increase the risk of respiratory and cardiovascular illnesses.[15–17] There is risk of malnutrition due to threatened agriculture and fisheries (especially in developing countries)[18] and to reduced nutritional content of foods.[19] Worker health and safety are at risk as a result of the physiological limits to coping with heat exposure while working, creating potential economic impacts through reduced work capacity and reduced labor productivity.[20] Climate change can result in trauma, mental health issues, and loss of community and social networks resulting from dislocation, loss of livelihood, or environmental uncertainty[21,22]; mass dislocation or migration in response to extreme weather or other climate change consequences has already occurred and would compound other risks.[4,14] Interpersonal violence and political violence or armed conflict in response to climate change pose direct threats to human well-being,[23,24] and political violence involves indirect threats as well through its impact on resources, political structures, and social stability.[24]

Many climate-related health impacts are already occurring, as noted by the World Health Organization (WHO).[25] However, disadvantaged populations with limited resources with which to adapt will experience disproportionately greater impacts to health and well-being.[6,26] WHO projects that between 2030 and 2050, at least 250,000 additional deaths per year will be attributable to climate change, noting that this count omits difficult-to-estimate mortality pathways such as heat waves and water scarcity.[27] However, the interactions of poverty and climate change, together with demographic changes such as aging populations, urbanization, and migration, may place substantially greater numbers of people at risk.[1,27] Both globally and within the United States, adverse health impacts are and will be especially severe among susceptible population groups, including pregnant women, children, the elderly, some categories of workers, individuals with underlying chronic diseases or disabilities, economically disadvantaged communities (including the rural and urban poor), and marginalized communities such as indigenous peoples and certain racial and ethnic minorities.[4,6,28] Within and across nations, the disproportionate impacts and risks of climate change among disadvantaged and marginalized populations pose a substantial threat to social and health equity; moreover, climate change puts at risk several decades' worth of gains in global development and global health.[1]

Climate change thus presents significant global ethical challenges; it presents, as well, intergenerational and interspecies ethical challenges. Even with significant emissions reductions, climate change threatens the health of future generations, while the benefits of activities producing such emissions have accrued to current and previous generations.[2] Climate change compounds the effects of other environmental impacts such as habitat fragmentation and ecosystem degradation and thus contributes to species vulnerability and extinction and the emergence of infectious diseases.[6,14] Moreover, disparities in climate impacts and risks between developed and developing nations represent a political challenge to global agreements addressing climate change, a challenge made particularly acute by the responsibility of developed nations for the preponderance of historical greenhouse gas emissions.[2,3,29] Meanwhile,

the direct and indirect impacts and risks of climate change, including resource scarcity and environmental migration, represent threats to global security.[1,23] There is a need to develop a multidisciplinary ethical framework to inform climate change strategies and decision making.[30]

Unchecked climate change is projected to impose a substantial economic burden. The United States alone will see an estimated $5 trillion in cumulative property damage and losses due to sea level rise and storm surges by 2100.[31] From 2000 to 2009, just six climate change–related extreme weather events in the United States are estimated to have cost more than $14 billion in lives lost and added health care costs.[32] Globally, climate change has been projected to reduce the gross domestic product (GDP) by between 5% and 20% annually; meanwhile, the cost of climate change mitigation premised on prompt, effective intervention was estimated in 2006 at 1% of the global GDP.[33] This mitigation estimate does not take into account the economic benefits of mitigation strategies that offer health co-benefits, which would offset costs or in some cases offer positive returns on investment.[1,7,29,34] Delayed action will significantly increase mitigation and adaptation costs.[33] Importantly, with attention to global equity and mechanisms to ensure it, addressing climate change is compatible with global development goals essential to improving the health of populations in low- and middle-income countries.[1]

There will be severe limitations in the ability to adapt to many of the health manifestations of the rapid and severe climate change we may face without robust mitigation, including the consequences of population displacement and increasingly severe weather extremes.[1,4,6,14] Significant reductions in greenhouse gas emissions must take place for humans to have a chance to curtail warming and to sustain and advance hard-won gains in population health.[1] However, significant opportunities to improve global health while offsetting mitigation and adaptation costs reside in well-chosen mitigation and adaptation strategies.

Evidence-Based Interventions and Strategies

Public health has a critically important role to play in addressing environmental threats to human health.[26] Given the complexity of projecting future climate change, the magnitude and diversity of its threats to health, and the wide range of possible strategies to address it, interventions to protect human health will continue to involve uncertainties.[14,26] The precautionary principle, which guides public health action in the face of scientific uncertainty when failure to act would threaten health and safety, should be brought to bear.[14,26] Intervention strategies must include both those designed to mitigate greenhouse gases so as to prevent worsening and potentially catastrophic climate change and those designed to adapt to and manage, to the extent possible, impacts of climate change that cannot be avoided.[4,6,26] Mitigation and adaptation strategies that offer the greatest health co-benefits and health cost savings while achieving critical mitigation targets should be preferred over other solutions.[35] While a range of viable and promising mitigation and adaptation strategies exist, political barriers remain significant.[1] Thus, communicating the importance and urgency of addressing climate change is itself a key strategy.[14,26,36] The health and public health sectors have important roles to play in protecting and promoting health in relationship to both mitigation and adaptation strategies as

well as in communicating to the public and decision makers the health threats and opportunities associated with climate change and strategies to address it.

To quickly and substantially reduce greenhouse gas emissions, mitigation efforts must prioritize interventions in those sectors responsible for the greatest proportion of current and projected greenhouse gas emissions,[1] including energy production, transportation, and forestry and agriculture.[37] All of these sectors offer opportunities for health co-benefits and health cost savings that can offset implementation costs.[1,31] The greatest global greenhouse gas contributor is energy production through the extraction and burning of carbon-based fuels.[29] WHO estimates that, currently, 7 million deaths annually can be attributed to indoor and outdoor air pollution, mostly from coal, wood, and biomass-based cooking and heating (indoor) and fossil fuel–based electricity generation and transportation (outdoor).[38,39] Shifting to low carbon energy production through increased energy efficiency and low carbon renewable energy technologies, with a particular emphasis on eliminating use of coal, is technically feasible and would offer significant health co-benefits.[1,40] This effort must include technical and other support to lower-income countries so that they can move directly to the use of renewables and meet goals related to access to energy (and the health benefits thereof) while also meeting mitigation targets.[1] Access to clean energy for low-income countries supports adaptation goals as well, reducing vulnerability by decreasing poverty and increasing community socioeconomic resilience.[1]

Critical roles for the health and public health sectors in advancing priority mitigation strategies include assessing and comparing the health risks and costs of failure to mitigate climate change with the costs and benefits of proposed mitigation strategies, communicating those relative risks and costs to policymakers and the public, promoting mitigation activities that enhance community resilience, promoting equitable mitigation approaches by identifying vulnerable populations and disparate impacts of climate change and mitigation strategies, and partnering across sectors to ensure that health considerations are addressed in all approaches.[1,7,26,41] Public health ethics resources may help agencies, groups, and communities discuss moral and ethical values from various points of view. In addition, the health care sector, which is responsible for 8% of greenhouse gas emissions in the United States,[42] has an ethical responsibility to play a leadership role by reducing its own emissions.

Adaptation strategies must address the direct and indirect effects of climate change, including storms, floods, sea level rise, droughts and heat waves, air pollution, infectious diseases, food insecurity, loss of livelihoods, and dislocation or migration and their attendant impacts on human health.[4] Adaptation processes may also intersect and interact with mitigation processes and should support sustainable development.[41] Given the pace of change, adaptation planning cannot rely upon past climate as a guide but must look to future projections, including possible tipping points and “tail risks”: the low probability but high consequence risks at the outer edges of projected impacts.[6,7,14,26] Moreover, to address impacts as they manifest locally, adaptation must be place and context specific.[1,4,41] Adaptive management provides an approach that is flexible, iterative, and able to address inherent uncertainties and complexities; also, it allows interventions to be tailored to specific contexts.[6,7,14,26,35,41] Because vulnerability to climate change impacts depends not only on exposure to climate change hazards but also on community and individual resilience, increasing general

resilience (through addressing social determinants of health such as poverty, educational level, social capital, and access to health care), in addition to implementing specific climate change–oriented resilience measures, is critical to reducing vulnerability.[35,41]

The current progress of adaptation efforts nationally and globally is nascent and varied; adaptation efforts to date are not sufficient to address the risks of climate changes.[4]Proactive adaptation will be more effective and less costly than delayed action.[4] Important lessons and promising practices are emerging in some localities, regions, and nations and in some sectors,[4,41] but a robust evidence base is still lacking.[4]Nevertheless, recommendations are emerging to help guide health adaptation planning processes.[35,41,43] The Centers for Disease Control and Prevention (CDC) provides a useful framework for adaptation planning and action: with stakeholder engagement throughout, (1) forecast climate impacts and assess vulnerabilities, (2) project the disease burden, (3) assess public health interventions, (4) develop and implement climate and health adaptation plans, and (5) evaluate impacts and improve the quality of activities.[43] Public health adaptation efforts should be based on the best available science and should include strengthening public health infrastructure, incorporating climate change into health sector planning and management, linking with other sectors, participating in climate change planning and management processes to ensure attention to health, and prioritizing strategies that protect the most vulnerable.[4,6,7,35,41] Ecosystem-based adaptation and community-based approaches that improve community resilience are “low regrets” strategies that offer substantial promise for providing health co-benefits, and therefore such approaches should be prioritized whenever appropriate.[1,7,35]

Public health involvement in addressing climate change can help ensure that health co-benefits are realized. For example, urban planning to create more energy- and water-efficient cities with improved green space, public transit, and active transportation options can reduce greenhouse gas emissions and chronic disease while increasing resilience, physical activity levels, and social cohesion.[1,4,7] Shifts to more plant-based diets in high-meat-consuming countries would decrease demands on fresh water and methane emissions while also reducing heart disease.[7] Provision of modern family planning services to all women and men who want them can support climate mitigation, adaptation, and resilience while decreasing maternal and infant mortality and enhancing opportunities for women.[7] The US Clean Power Plan is projected to provide a 4:1 return on investment in health costs averted.[34] Health sector involvement in climate change decision making at all levels, from local to global and including both the public and private sectors, is needed to ensure that health co-benefit opportunities are identified, fully considered, and optimized and that health and social equity are protected.

A number of tools and resources have been developed to facilitate public health engagement in line with evidence-based interventions and strategies. Examples include APHA’s Climate Change: Mastering the Public Health Role[8]; resources from the CDC’s Climate and Health Program[44]; the Association of State and Territorial Health Officials’ Extreme Weather and Climate Readiness toolkit[45]; the U.S. Climate Resilience Toolkit[46]; Conveying the Human Implications of Climate Change, published by George Mason University’s Center for Climate Change Communication[36]; and resources from WHO’s Department of Public Health and Environment.[47] Public health practitioners also have access to several important and comprehensive recent or forthcoming reports to guide their work, including the IPCC fifth assessment report,[5,6,29,48] the US National Climate Assessment,[4] the report of the 2015

Lancet Commission on Health and Climate,[1] and a forthcoming climate and health assessment from the U.S. Global Change Research Program.

Opposing Arguments

While 97% to 98% of climate scientists agree that climate change is happening and is caused by human actions,[9] a minority of scientists dispute one or both points. Despite the preponderance of agreement about anthropogenic climate change, the few contravening studies have received disproportionate media coverage,[49] and funded campaigns that promote these opposing studies have presented a major ongoing challenge to passage of evidence-based policies by creating a perception of scientific uncertainty.[50]

Alternative Strategies

Significant research is under way into strategies that, collectively, are referred to as geoengineering. Such strategies include carbon dioxide removal, achieved by stimulating or augmenting ocean or land uptake of CO_2, and solar radiation management, deflecting solar radiation by seeding the upper atmosphere with reflective substances. Some of these strategies rely on technologies that cannot be tested at the scale of their proposed use in advance of deployment, that significantly alter global ecosystems, and that would require global governance mechanisms that would be challenging, at best, to develop. They raise the risk of significant unintended consequences, including as yet unknown impacts on human health.[4]

Action Steps

Therefore, APHA:

1. Calls upon national, state, and local health agencies and organizations to develop climate change adaptation and mitigation strategies and policies to prepare for and manage the health risks of climate change, doing so in ways that promote equity and sustainable development. Public health departments and health care systems should incorporate climate vulnerability assessments, planning, tracking, and interventions into public health strategies and health care provision. APHA also calls upon policymakers and public administrators to actively include community members when developing climate change strategies and policies at the local, regional, state, and national levels.

2. Calls upon the public health and health care communities to communicate the critical importance of mitigating and adapting to climate change, including advocating for reducing emissions of heat-trapping greenhouse gases, communicating the impacts of climate change on human health, promoting community resilience and adaptation to changes in climate that cannot be prevented, and promoting strategies to address climate change that maximize benefits and co-benefits to health.

3. Calls upon federal, state, and local governments to provide health agencies and organizations with the mandate, leadership, and adequate resources to support climate change activities; calls

upon leaders within the CDC and the US Department of Health and Human Services (DHHS) to strengthen CDC and DHHS climate change programs; calls upon Congress to provide the necessary funding; and further calls upon Congress to increase funding to the National Institutes of Health for climate change research.

4. Calls upon all health agencies and organizations to demonstrate leadership by adopting firm commitments to reduce greenhouse gas emissions and increase energy efficiency related to their activities and to communicate publicly about the reasons for adopting such practices.

5. Calls upon all training programs for health professionals, including public health, medical, and nursing programs, to include climate change in their curricula. APHA also urges postsecondary education programs in all relevant earth sciences to include instruction on the public health consequences of climate change; K–12 science instruction to incorporate climate change, the health consequences of climate change, and climate change preparedness; and public education on prevention and preparedness for climate change to address health impacts.

6. Exhorts US policymakers to immediately take necessary steps to reduce US greenhouse gas emissions, including carbon dioxide and methane, as called for in the President's 2013 Climate Action Plan, setting mandatory economy-wide limits on emissions with successive reductions over time to create incentives for energy efficiency and alternative energy production with an emphasis on renewable energy approaches. APHA thus calls for robust implementation of the Environmental Protection Agency's Clean Power Plan as an important step toward emissions reductions.

7. Calls upon public health departments and health providers to incorporate climate vulnerability assessments, planning, tracking, and interventions into emerging population health approaches that integrate health care provision with public health strategies.

8. Tasks the public health community with helping to ensure more equitable, community-based approaches to disaster risk reduction and with ensuring that these processes address the risks of climate change and that health co-benefits from disaster risk reduction measures are emphasized and realized.

9. Urges the United States and the international community to promote economic and social equity to increase adaptability and resilience to climate change–induced population stressors.

10. Urges the United States and international partners to substantially increase funding for sustainable development projects that promote economic and social equity, reduce or minimize greenhouse gas emissions, and result in co-benefits to communities while building health system capacity and infrastructure in developing countries, as well as funding for climate change adaptation projects that increase the resilience of individuals living in poverty to help protect against adverse climate effects.

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