

RESPONDING TO

THE CLIMATE CHANGE AND HEALTH CRISIS

A FRAMEWORK FOR ACADEMIC PUBLIC HEALTH

OCTOBER 2022



ASPPH
CLIMATE CHANGE
AND HEALTH

EXECUTIVE SUMMARY



Climate change is possibly the greatest public health challenge of the 21st century; its effects are already felt around the world and predicted to only intensify. The interconnected nature of ecosystem, animal, and human health – all harmed by a degrading climate – results in complex and compounding adverse consequences. The search for solutions needs to be a systems-based, whole of society approach involving extensive collaboration across disciplines, sectors, borders, and all levels of government. To optimize our collective capacity, efficiency, and impact, we will need to clearly, and thoughtfully, define the roles and responsibilities of various fields, including understanding the essential functions performed by public health professionals and systems that are related to climate change and health. Public health has a vital and unique role to play in both mitigating further climate change and helping communities adapt to unavoidable outcomes, particularly for those at greatest risk. Success will rely on advancing our understanding, building partnerships, securing funding, and advocating for change.

Recognizing the urgency of climate change and damage to public health, the Association of Schools and Programs of Public Health (ASPPH) established the Task Force on Climate Change and Health, bringing together leaders in academic public health to develop this report, *Responding to the Climate Change and Health Crisis: A Framework for Academic Public Health*. The framework examines climate change and health (CCH) in four primary domains – Education and Training, Research, Practice, and Policy and Advocacy – and considering three cross-cutting themes: Environmental Justice, Social Justice, and Health Equity; Interprofessional and Interdisciplinary Collaborations; and Partnerships for Impact (Fig. 1).

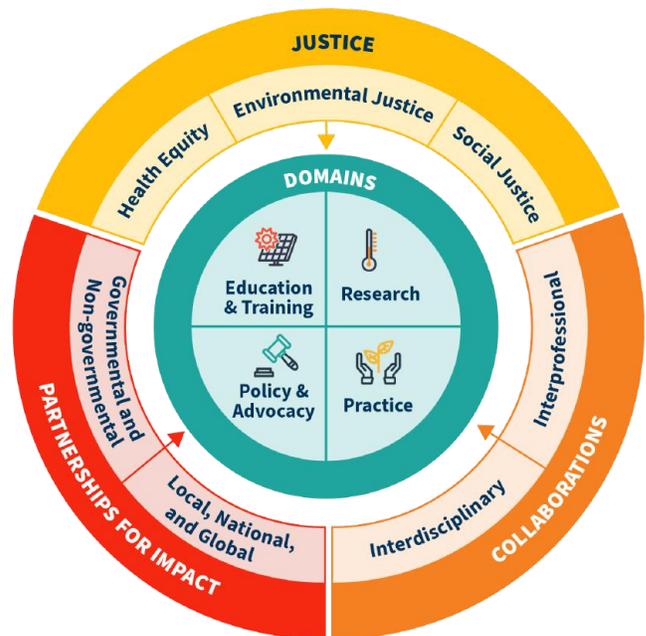


Figure 1.
Relationship Between Domains and Cross-Cutting Themes

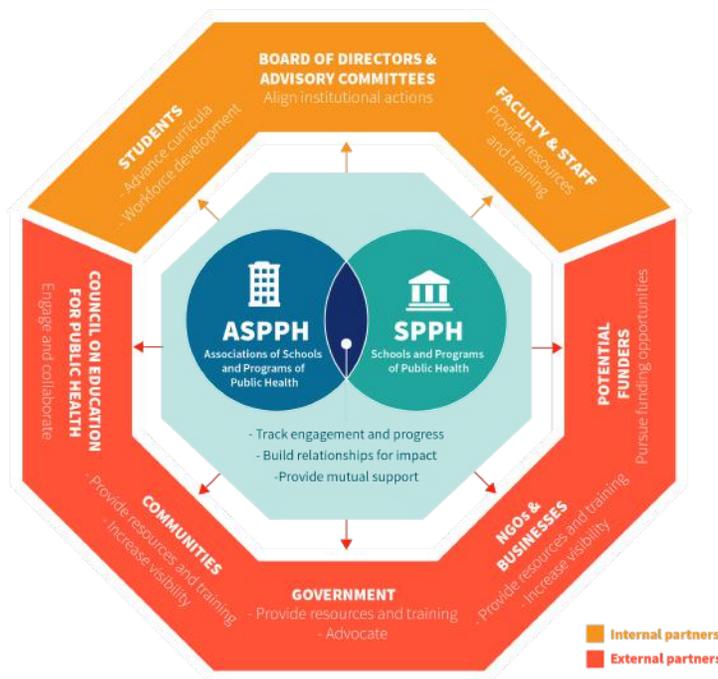


Figure 2.
Relationships and Recommended Actions of the ASPPH Climate Change and Health Framework

The framework concludes with a set of evidence-based principles and recommendations – for both schools and programs of public health (SPPH) and ASPPH as a whole – to take collective action and work with vested partners to reduce the impacts of climate change on population health (Fig. 2). We hope that this framework will serve as a call to action for ASPPH members and SPPH around the world. In the coming years, ASPPH will take steps to implement the recommendations for the association and support our members in developing the resources and capacities needed to implement the recommendations for SPPH.



EDUCATION AND TRAINING

Educating and training a public health workforce capable of tackling challenges posed by climate change is critical. Effective training will capture the innately interdisciplinary nature of this challenge, clearly articulate the unique role of public health, and provide practical approaches, including the development of standardized competencies related to climate change and health. Prioritizing cross-disciplinary collaborations, capitalizing on partnerships for increasing impact, and integrating issues of environmental justice and health equity will be vital for success. There is a growing demand from both students and employers for CCH preparedness. A mismatch remains, however, between the training that students currently receive, and the knowledge and skills required of them as public health professionals to take on CCH. Addressing this mismatch will involve identifying appropriate competencies, better understanding the functions of the public health workforce around CCH, and facing barriers to implementation of needed training, including ensuring capacity in faculty and funding, prioritizing of CCH among SPPH, and offering resources for the approach and process of integrating related content and skills into curricula.



RESEARCH

Research in climate change and health serves a critical purpose in providing the scientific basis for developing policy, formulating approaches, and taking action in the fields of education, practice, and advocacy for public health. Objectives for SPPH will include quantifying the risks and benefits of mitigation and adaptation strategies; examining health disparities resulting from climate change; innovating to better manage the complexities of CCH using modeling, big data, large scales of space and time, systems thinking, and more; building technical and financial capacity; and improving the coordination and communication of data between SPPH, policy makers, and communities. Given the scope and urgency of addressing climate change and its impacts, CCH research has been notably limited and poorly funded. However, recent federal commitments to CCH including an NIH-wide initiative, unprecedented engagement by the medical community, burgeoning resolve to address CCH at SPPH, and increasing funding opportunities, make this a timely moment to mobilize a national effort.



PRACTICE

Given the relationship between science, policy, and practice, the translational process of supporting action at all levels is pivotal in implementation of strategies and interventions. Engaging directly with communities therefore serves more than one crucial purpose in the translational process: it simultaneously gives voice to those impacted while ensuring that potential benefits are actualized in a thoughtful and impactful way. There has been limited CCH practice-based scholarship and an absence of robust evidence on translation science within this context. As a result, we are without a strong and tested framework to guide implementation and inform the development of tangible action steps or their standardization at a national level. Fortunately, SPPH have acquired expertise, effective tools, and methods for partnership that can serve as a starting point from which to build. Important objectives will include performing risk assessments and planning, directing funding to practice-based scholarship, increasing visibility of community experience, taking urgent action on environmental justice, better documenting and connecting resources, and becoming savvy at addressing the needs and areas of traction across a range of levels and partners.



POLICY & ADVOCACY

With evolving research and community engagement, the opportunity to advocate for and implement relevant CCH policies continues to gain traction. Climate change has been recognized as a major global health threat by organizations such as the World Health Organization and the United Nations and has been recently addressed in the U.S. by Executive Order 14008, which established a National Climate Change Task Force and a government-wide action plan. Major challenges remain including political polarization, uncertain conditions, poor incentive structures, and reconciling the long-term challenge of CC with the intrinsically short-term appointments of political leaders. To combat this, all of public health needs to engage in ways that balance interests and promote complementary, rather than redundant, roles. We must come together to recognize the power and potential of collective action, reaching across the political divide to form collaborations that integrate diverse perspectives and priorities. We raise the alarm concerning the need for action now, balancing ambition with ability, and remaining cognizant of how framing issues of CCH will have a major effect on how policy and advocacy are received and responded to.

ACADEMIC PUBLIC HEALTH LEADERSHIP IN CLIMATE CHANGE AND HEALTH

ASPPH and SPPH can and should serve as leaders in addressing the climate change and health crisis.



PRINCIPLES

- Member SPPH are diverse in their capacity to act
- ASPPH commits to partnering with organizations working on CCH
- SPPH have unique characteristics and needs
- Environmental justice and health equity should be foundational
- ASPPH and SPPH will advocate for policies that address CCH
- ASPPH and SPPH can offer evidence, best practices, and guidance

OVERARCHING RECOMMENDATIONS

ASPPH

- coordinate internal CCH efforts
- advocate for CCH-specific competencies for training programs
- foster interdisciplinary SPPH engagement
- develop a broad CCH statement and action plan
- develop a platform or resource bank for SPPH

ASPPH and SPPH

- establish relationships with local, national, and global partners
- advocate for interdisciplinary training

EDUCATION AND TRAINING

ASPPH

- Identify a core curriculum in environmental justice and CCH
- Develop curricular resources for SPPH
- Help SPPH to update and/or expand CCH curricula
- Develop training for ASPPH staff on CCH
- Continually refine curricula and training materials
- Collaborate with other leaders in CCH

SPPH

- Join the GCCHE
- Integrate CCH and EJ into curricula
- Inventory faculty expertise on CCH and address key gaps
- Lead in advocating for institutional CCH plans
- Continue to integrate CCH in curriculum
- Identify and train frontline community members as collaborators
- Build intergenerational partnerships on CCH education

RESEARCH

ASPPH

- Ensure dissemination of research findings to policymakers
- Develop guidance and action steps for CCH research
- Inventory and track CCH research at SPPH
- Support interdisciplinary CCH research
- Seek collaborative consortium research applications

SPPH

- Advocate for funding of training programs for CCH researchers
- Support faculty in CCH research collaborations
- Expand and improve upon data sharing
- Expand training for future CCH researchers across disciplines

PRACTICE

ASPPH

- Inventory potential funders
- Advocate for funding locally and nationally
- Collaborate with funders to include practice in grants
- Develop a toolkit for CCH work with communities
- Aid publication of community-based CCH case studies
- Increase visibility of grey literature
- Advocate for sustainable pathways for a CCH workforce

SPPH

- Build relationships with local community partners
- Reward faculty generating practice-based CCH scholarship
- Use the ASPPH platform as a resource bank for asset sharing
- Develop a guide of collaboration between SPPH and policymakers
- Provide resources and expertise to the broader community
- Build sustainable pathways for a CCH workforce

POLICY AND ADVOCACY

ASPPH

- Respond to and support legislation affecting this agenda
- Track member progress on fossil fuel divestments
- Advocate CCH research and amelioration funding
- Work with SPPH on carbon neutrality, creating viable solutions
- Support policies that speed the transition to clean energy

SPPH

- Engage with state and local policymakers on CCH
- Support divestment from climate-harmful endowments
- Use the ASPPH platform to share models of engagement
- Develop sustainability and climate action policies and platforms
- Align university actions with health-based institutional actions
- Ensure climate resilience is considered in risk assessments
- Use the ASPPH platform to share universities' best practices

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APPENDIX II

ACRONYMS



ASPPH	Association of Schools and Programs of Public Health
CEPH	Council on Education for Public Health
CDC	Centers for Disease Control and Prevention
CCH	Climate Change and Health
EH	Environmental Health
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
GCHE	Global Consortium on Climate and Health Education
IPCC	Intergovernmental Panel on Climate Change
NASA	National Aeronautics and Space Administration
NIEHS	National Institute of Environmental Health Sciences
NIH	National Institutes of Health
NOAA	National Oceanic and Atmospheric Administration
NSF	National Science Foundation
PAHO	Pan American Health Organization
SPPH	Schools and Programs of Public Health
UN	United Nations
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
WHO	World Health Organization

FOREWORD

Climate change is possibly the greatest global challenge of the 21st century, with the potential to irrevocably alter the planet and severely threaten population health unless sufficient and immediate action is taken. The work of mitigating and adapting to the impacts of climate change demands a multisectoral, multidisciplinary effort involving all fields and all people.

The harms to human, animal, and ecosystem health are already keenly felt. Mitigating climate change to reduce additional impacts on health, and adapting to changes that are already entrenched, is a fundamental responsibility of the field of public health—for the current and future workforce. Understanding and communicating the need for both mitigation and adaptation is among the first of many steps. The public needs to have a clear picture of the adverse health consequences of climate change and the urgent need for action. Public health has a central role in facing the challenge of climate change and engaging with the public broadly.

At the [Association of Schools and Programs of Public Health \(ASPPH\)](#), our mission is to advance academic public health by mobilizing the collective power of our members to drive excellence and innovation in education, research, and practice in order to bring about improved health and well-being for everyone, everywhere.

We represent

130+ member schools and programs of public health

accredited by the [Council on Education for Public Health \(CEPH\)](#), or in applicant status to become accredited, that are located across the United States as well as in Grenada, Lebanon, Hong Kong, Mexico, and Taiwan. Our member schools and programs are responsible for training the current and future public health workforce and ensuring they are prepared to meet existing and emerging public health challenges.

In August 2021, recognizing climate change and health (CCH) as a critical public health challenge, ASPPH established the Task Force on Climate Change and Health to develop recommendations for collective action to reduce the impacts of climate change on population health

—for both ASPPH and our member schools and programs of public health (SPPH).

This work aligns with [ASPPH's Strategic Plan 2030](#) and our goal to advance solutions to the critical public health challenges facing society. It is one of four interrelated task forces whose recommendations will drive the work of the association for the coming years.



The Task Force addressed **four primary domains** relevant to ASPPH members:



It also identified **three cross-cutting themes** in the context of each domain:



(See Fig. 1). The Task Force analyzed existing literature (peer-reviewed publications and grey literature), identified needs, and developed recommendations targeted not only to SPPH, but also to ASPPH as a whole, in that the organization can have impact beyond that of its individual members.

Figure 1. Relationship Between Domains and Cross-cutting Themes





The recommendations presented in this framework cover all of the above domains comprehensively and should all be implemented to have the greatest benefit. However, SPPH have different focuses, needs, and capabilities, and their communities are impacted by climate change in different ways, which will affect which recommendations are desirable and feasible for a particular institution. Therefore, the recommendations should be considered as befits each SPPH’s context.

This framework represents the beginning of our commitment to addressing climate change and health. In the coming years, we will take steps to implement the recommendations of the Task Force for ASPPH and support our members in developing the resources and capacities needed to implement the recommendations for SPPH.

On behalf of ASPPH, I would like to thank the Task Force members (Appendix I), domain workgroup leads, and especially the co-chairs, Deans Lynn Goldman and Jonathan Samet for their extraordinary commitment to this important work. I would also like to acknowledge all those who reviewed and provided valuable feedback on previous drafts. We are proud to present this framework as a guide for our member SPPH and also for academic public health institutions globally, to inform their actions related to CCH.

Laura Magaña, PhD, MS
 President and CEO
 Association of Schools and
 Programs of Public Health



LETTER FROM THE CO-CHAIRS



As population health continues to be damaged by climate change, the unique and powerful role of academic public health becomes increasingly important. As schools and programs of public health, we can lead in many ways, including through education, research, community engagement, advocacy, capacity building, collaborative partnerships, and by driving forward social and environmental justice.

There is a passion among our students and a call from the professional world for those in public health to be better prepared to face the health impacts of climate change in comprehensive, interdisciplinary, and innovative ways. Educating and training the next generation of public health leaders to address climate change and health (CCH) must be fundamental to the purpose of all SPPH.

This will require us to be comprehensive in our thinking and focused in our actions. We must recognize the value in providing both substantive content and skills devoted to CCH as well as access to the wide variety of applicable disciplines beyond those traditionally associated with public health and environmental health.

Given the critical contribution research will have in advancing and guiding action, building capacity among SPPH and investing in CCH-related objectives will be crucial. Directing funds to this cause at both the institutional and national levels has fallen short in supporting the research and researchers needed to advance understanding and solutions. SPPH can both directly advocate for this cause and indirectly accomplish it. While issues of uncertainty, prioritization, and political polarization will pose challenges, SPPH can lead the charge in rising above such obstacles.

We can rally together as a scientific and academic community to evolve our data, build relationships, and support open communication and resource sharing to maximize our capacity and impact.

We can serve to integrate diverse perspectives, frame the issue effectively, and operate as trusted sources of information, helping to bolster and compliment governmental and organizational efforts.

As with any wicked problem in public health, balancing urgency with inspiration is key and will challenge us to be strategic, empowering, and mindful of context when communicating on issues of climate change and health. While there does not yet exist a robust, evidence-based framework for implementation, SPPH have valuable expertise and partnerships to guide how we engage affected communities and execute recommendations.



We can and should leverage relationships with communities and local and state governments, identifying areas of greatest need and potential progress.

It must also be recognized that equity, as a fundamental necessity for any public health initiative, must be considered and promoted across regions, disciplines, sectors, and activities, including in curriculum reform, the conduct and dissemination of research, community-based practice, policy design, and engagement in advocacy.

This is the moment to act, not only due to the accelerating urgency of the problem, but also given advancing innovation in solutions. The National Institutes of Health is launching new initiatives on CCH and the National Academies are approaching climate change, including CCH, as a major emphasis. The current administration has given climate change priority and there is a window of possibility for collective action backed by federal support. SPPH should be ready, in whatever ways feasible, to act at this opportune time.

We are grateful for the dedication of the Task Force members to this important work and thank them for their ongoing leadership in this field. We also thank ASPPH for its commitment to addressing issues of climate change and health and for the staff support throughout the process of developing this framework.



Lynn R. Goldman

Lynn R. Goldman, MD, MS, MPH
Michael and Lori Milken Dean

George Washington University Milken Institute School of Public



Jonathan Samet

Jonathan Samet, MD, MS
Dean and Professor

Colorado School of Public Health

INTRODUCTION

“Human-induced climate change, including more frequent and intense extreme events, has caused widespread adverse impacts and related losses and damages to nature and people, beyond natural climate variability... across sectors and regions there are large numbers of vulnerable people who are already disproportionately affected. The rise in weather and climate extremes has led to some irreversible impacts as natural and human systems are pushed beyond their ability to adapt” (IPCC, 2022).

The evidence is clear and undeniable—

climate change is directly harming human, animal, and ecosystem health:

global average temperatures are increasing; landscapes and urban regions are subjected to unprecedented fire risks; sea levels are rising; extreme weather events are increasing in frequency and severity; drought is impairing water supplies and food security; populations are being displaced; disease patterns are changing; ongoing loss of biodiversity is exacerbated, leading to loss of health-promoting ecosystem services; and humans have escalating exposures to some infectious agents, particularly those causing vector-borne, water-borne, and foodborne illnesses as well as emerging zoonotic organisms (A. Jay, 2018)

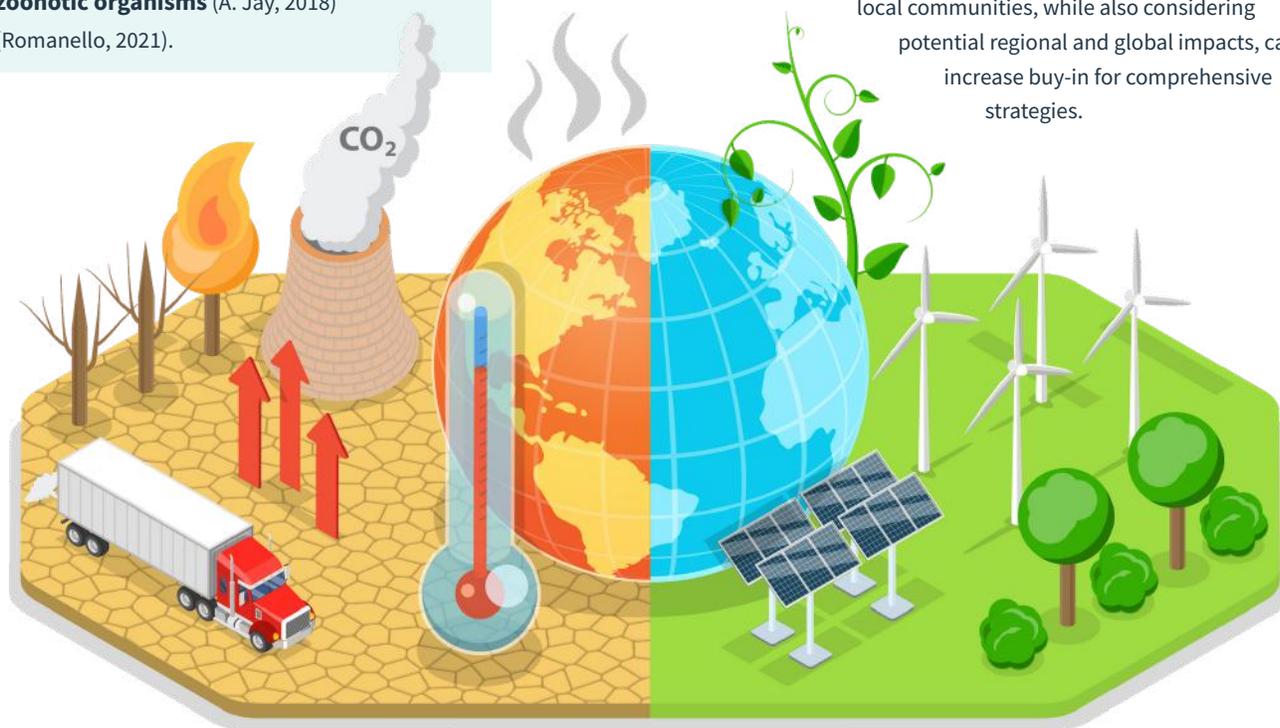
(Romanello, 2021).

Population health has been and will continue to be harmed, and the public health sector will play a critical role in reducing that inevitable harm.

While mitigating climate change (reducing emissions and stabilizing levels of greenhouse gases in the atmosphere) is essential, some of the damages done are already irreversible (NASA, 2022). Therefore, strategies to adapt to the consequences of climate change are also critical, particularly for minority and economically disadvantaged communities.

Partnerships are crucial to ensuring the success of mitigation and adaptation strategies

that protect the public’s health. Collaborations across health professions and including other disciplines, such as climate science, engineering, architecture, urban planning, law, and many more can help to ensure this success. Establishing coordination of strategies and operations between the healthcare sector and public health has is critical to combatting population health threats; especially the health impacts of climate change. Adopting a whole of society approach that incorporates the perspectives of government at all levels, businesses, NGOs, and local communities, while also considering potential regional and global impacts, can increase buy-in for comprehensive strategies.





SPPH need to embrace the innately interdisciplinary nature of this challenge

(Campbell-Lendrum, 2009). Public health students must be trained in a range of relevant disciplines, and academic research and practice initiatives on CCH should span across departments, which too often operate in a siloed manner (Kotcher, 2021). We need to begin to frame the issue of CCH for decision-makers and the public as extending well beyond the scope of environmental health (EH). We must identify what institutional mechanisms are – or need to be – in place to fund and implement comprehensive CCH research (U.S. DHS, 2021) (Kotcher, 2021), curricular changes that support cross-disciplinary education and competencies related to CCH, and community engagement initiatives to mitigate and adapt to the impacts of climate change. Fulfilling this broad goal will involve looking to existent systems-based and pedagogical models to provide clarity and direction.

Systems based models should include impacts of climate stressors on other species; these impacts in turn may directly or indirectly affect human health. The “One Health” paradigm recognizes that human health depends on the health of the environment, including all of biodiversity—plants, animals, and microbes—as well as the abiotic components, such as air, water, and climate. These relationships exist as part of dynamic and inter-dependent systems.

Climate change poses complex One Health challenges: interactions between human activity, the changes we observe – climatic shifts, decreased water and air quality, negative effects on biodiversity – and the resultant health impacts reveal the relevance and value of considering this perspective.

The political and social considerations related to climate change have complicated research on the topic and implementation of evidence-based solutions. Because of the enormous scope of the problem and the multitude of vested partners involved, including unengaged nations and powerful corporations, scientific understanding of the issue has been questioned, as has the need for action. For many years in the United States, the reality of climate change has been politicized, unfortunately and inappropriately, creating a schism between those accepting the science as a basis for action and those dismissing the science and opposing action. The recognition of climate change as a health threat, as well as the tangible evidence of its consequences in communities, have shifted the political landscape such that in the US there is now a broad acceptance that the climate is changing and that human activities are causing the change (Hamilton LC, 2015) (Lynas, 2021). However, consensus has not yet been reached on priorities among the many actions that need to be taken and, unfortunately, misinformation on climate remains prevalent.

Public health will need to inform these discussions on the pace of action and the options that are most likely to benefit human health, starting with a focus on communities that are already experiencing significant negative health impacts. All communities, regardless of location or current impact status, will need to develop adaptation strategies to protect the health of their populations in preparation for future impacts. The reach of such communications needs to be broad and relevant to the intended audience in order to motivate the desired outcomes. Thus,

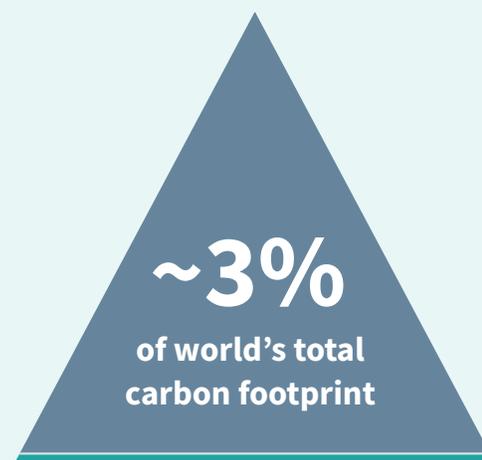
there is a mandate for an expanded and clear definition of the essential roles of public health systems and public health professionals

to protect population health in the face of climate change. While generally public health professionals are in consensus that climate change is an urgent threat primarily caused by human actions, most lack the knowledge and skills needed to engage, whether through education, research, practice, or policy (Kotcher, 2021). There remains a widespread underappreciation for the range and degree of impact climate change is having, and will continue to have, on population health. Barriers to action include inadequate research to inform how best to achieve benefits for public health while addressing climate change; underdeveloped knowledge on the direct and indirect links between climate change and human health; lack of funding to support research and training; and fear of professional repercussions from engaging in what has been seen as a politicized issue. Generally, a lack of awareness around the tools and knowledge that are already available for climate-related scholarly activity delays timely action (Fox, 2019). For climate change, like COVID-19, public health professionals are frustrated and fatigued reflecting the struggle to gain recognition of the issue and the need for action. The state of the public health workforce will be a key contextual factor in addressing climate change and health.

Importantly, those addressing climate change and health need to appreciate and address the inherent inequities of the risks to health posed by climate change globally, nationally, and locally.

In the US, the most vulnerable groups, such as children, the elderly, people of color, and people with low income, are at higher risk for climate-related health impacts. For example, low-income families are at greater risk of physical and mental illnesses during and resulting from flooding and in crowded shelter conditions, and some vulnerable communities living in risk-prone areas face cumulative exposures to multiple pollutants (NOAA, 2022).

**Globally, the poorest
1 billion people account for**



**yet climate-related deaths are
almost entirely confined to the
world's poorest populations**

(Friel, 2008).

This inequitable distribution of risks calls for communication and collaboration between those who are most affected and those who make decisions. Public health scholarship on CCH can deepen our understanding of the inequities of CCH and identify levers for reducing those inequities. Likewise, public health should advocate for equitable solutions, protecting those populations most affected while facilitating their voices. ASPPH and SPPH will need to partner with and work to empower affected communities, and embed environmental justice in its slate of activities.

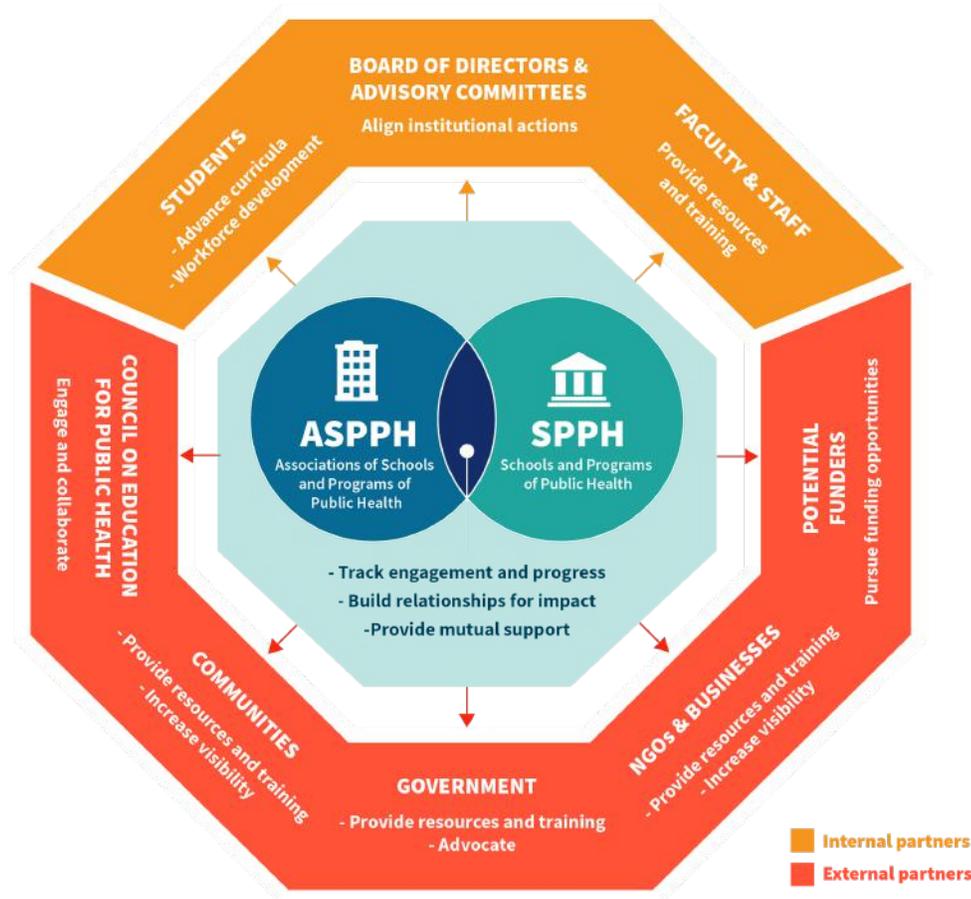
For SPPH to have impact, our efforts to tackle the health consequences of climate change will benefit greatly from the establishment of an authoritative voice – one from within the academic public health community – to help identify key challenges, priorities, resources, and feasible action steps so that we might address CCH issues with collective effort.

This framework lays out principles and recommendations for ASPPH and SPPH to act on issues of CCH through education and training, research, practice, and policy and advocacy, while approaching all issues through the lens of social justice and taking advantage of interdisciplinary collaborations and partnerships at all levels of society. (See Appendix II for organizational framework structure.) The Task Force asserts that ASPPH and SPPH can and should serve as leaders in this area by:

- educating and training public health students and professionals, as well as decision-makers and the public on the health impacts of climate change and how they can be reduced;
- improving alignment of the public health and healthcare sectors, including education and training of public health practitioners and healthcare providers, capitalizing on opportunities for cross-disciplinary efforts;
- conducting research into the impacts of climate change on health and how those impacts are disproportionately experienced by certain populations;
- Innovating and creating effective, adaptive approaches to prevent adverse impacts of climate change on health;
- employing public health communications science and expertise to create more effective approaches to inform about health consequences of climate change and options for addressing climate change;
- engaging with and empowering communities, especially those heavily impacted by climate change, to mitigate and adapt to those impacts;
- advocating for policies that will help to reduce the health impacts of climate change, especially for those most at risk;
- championing social and environmental justice;
- convening across disciplines and sectors to foster cross-training and collaboration; and
- partnering with communities, businesses, non-profit organizations, and government agencies at local, national, regional, and global levels to achieve the greatest impact.

(See Fig. 2)

Figure 2. Relationships and Recommended Actions of the ASPPH Climate Change and Health Framework



EDUCATION AND TRAINING

FOUNDATION



Several recent studies have documented the mismatch between the training provided and the knowledge deemed necessary for public health professionals to adequately address CCH.

In 2019, Hendrix et al. examined CEPH-accredited graduate programs for courses related to climate and health.

Of the 90 institutions evaluated, only



offered a course on climate change.

An evaluation of the course syllabi indicated that all courses relating to CCH were electives and were more likely to focus on foundational aspects of climate change in a national or global context (APHA, 2020).

A 2019 study of CEPH-accredited MPH programs during 2018-19 examined courses that contained climate change content. No school was found to offer a climate change track for the MPH or require a course in climate change, although the majority did offer at least one session on climate change through EH courses. Climate change courses appeared at some universities in disciplines outside of public health, but in some cases there was no option for MPH students to take these classes (APHA, 2019). Many SPPH across the US have faced implementation challenges and lack the support of a strong, national voice to help motivate these efforts, standardize curricula, or rally for organized, collective action.

Results from a 2020-2021 survey of SPPH conducted by the Global Consortium on Climate and Health Education (GCCHE) reveal inconsistencies across institutions that place in stark contrast the gap between the desire to integrate these issues and the capacity to do so, primarily due to a lack of funding, staff time, space within the standing curriculum, and other competing institutional priorities (Shea, 2020).



There are signs, however, that the tides are changing; there are several known existing climate and health certificate programs that began either before or after this study was published. According to Shea et al. (2020), many schools now have climate change content present within the curriculum, primarily as part of a required course (76%). In addition, the majority of SPPH are considering adding content and are seeing positive interest from students, faculty, and other vested partners.

Numerous schools and institutions are currently setting precedents through the creation of climate-health centers, certificates, curricular projects, and fellowships.

While many SPPH on a global level have actively begun efforts — and many more have voiced interest and intent — to integrate CCH education into current curricula, they continue to face implementation challenges (Shea, 2020). Education and training needs to expand beyond the classroom, targeting learners across the spectrum of professional level, from public health students, to pre- and mid-career professionals, to public health leaders.



There is also increasing demand from employers that public health professionals have CCH training, with CDC and NIH both identifying CCH as an urgent issue for public health to address.

A recent study examining employment opportunities for public health graduates found that almost

92% of survey respondents

believed there was a need for climate-trained public health specialists within their organizations (Krasna H, 2020).

The need for a systems approach, the challenges already enumerated in motivating engagement, and the opportunity to capitalize on health, economic, social, and environmental co-benefits of mitigative and adaptive strategies demand new ways of thinking, communicating, and acting (Frumkin, 2008). Successful preparation of the public health workforce will also rely on our evolving understanding of the work itself.

As emergencies, severe weather events, and other acute threats to human health increase, US state, local, tribal, and territorial (SLTT) public health agencies will be expected to prepare for and appropriately respond to the need for public health emergency preparedness and response (PHEPR) practitioners in ways not yet defined, standardized, or adequately funded. Such strategies require an implementation process in which communities function in a co-partnership role, building capacity to assess their specific climate change-driven health hazards, and helping to identify, implement, and evaluate interventions. Further, sustainable adaptation strategies and programs are critical.



As emergencies, severe weather events, and other acute threats to human health increase, US state, local, tribal, and territorial (SLTT) public health agencies will be expected to prepare for and appropriately respond to the need for public health emergency preparedness and response (PHEPR) practitioners in ways not yet defined, standardized, or adequately funded. Such strategies require an implementation process in which communities function in a co-partnership role, building capacity to assess their specific climate change-driven health hazards, and helping to identify, implement, and evaluate interventions. Further, sustainable adaptation strategies and programs are critical.

Acknowledging this need, the CDC charged the National Academies of Sciences, Engineering, and Medicine with developing and conducting a systematic review of PHEPR practices to identify gaps and provide evidence-based recommendations (NASEM, 2020). Emergency preparedness is a critical issue and yet is only one example of the skills relevant to addressing climate change and its impacts on health. The World Health Organization (WHO), in its recently released roadmap, lays out a conceptual approach for defining and building workforce capacity related to the delivery of essential public health functions (EPHFs) (WHO, 2022).

The WHO model identifies three interrelated areas:

1. defining the specific functions, subfunctions, and services related to EPHFs;
2. identifying the competencies necessary to perform EPHFs and how associated materials ought to be designed and delivered;
3. determining how to map and measure the range of occupations which perform EPHFs.

These action areas should provide a starting point by which we can begin to parse out and address the CCH needs of the future public health workforce.

SPPH have a long history of excellence in the area of EH, which is the natural home of CCH education in public health, although the number of schools and programs that offer degrees in the EH area has decreased over time. In the 2016 **accreditation criteria**, CEPH lays out foundation competencies that all MPH students must demonstrate, but none of these specifically address issues related to EH (CEPH, 2016). The criteria do require foundational knowledge in EH and One Health principles, but the knowledge requirements are insufficient to ensure that graduates will have the skills needed to analyze and address issues related to EH or CCH.

In an effort to provide guidance for SPPH to address CCH, ASPPH and GCCHE developed a toolkit which provides resources to incorporate CCH content into their curricula, design a CCH concentration, and a sample syllabus for a CCH course.

While this serves as an important resource, a long-term strategy for incorporating EH and CCH competencies into the next iteration of CEPH criteria is essential (ASPPH & GCCHE, 2022).

EDUCATION AND TRAINING

NEED

The needed **training in CCH will not only entail intensifying and expanding climate-based curricula but also fostering new ways of thinking that are better suited to navigating and communicating the complexities involved, including:**

- systems approaches;
- integration of data over long timeframes and large spatial scales;
- recognition of the multitude of health, environmental, economic, and social implications of climate change and its proposed solutions; and
- developing capacity to communicate effectively to the broad range of vested partners.

(Frumkin, 2008)



There is a clear need to educate and prepare an interdisciplinary workforce with the knowledge and skills to protect human health from the adverse impacts of climate change.

This effort can, and should, help align CCH education and training with the broader, nation-wide objective of developing and fortifying the public health workforce. To lead in addressing CCH, public health professionals need capabilities that span from research to integration of evidence for decision-making, along with the skills to facilitate the translation of evidence into action and implementation of solutions at scale.

Climate change-engaged professionals need to be flexible and comfortable in transitioning from the academic to the policy environment. They must also be capable of shifting from the “scientific voice” to employing multimodal strategies to provide accessible, credible, and digestible information that captures the urgency of the issue while remaining cognizant of the influence that emotions evoked by climate change, such as hopelessness, anger, and denial, may have on public perceptions and willingness to take action (Clayton, 2017).



For public health, it will be crucial to:

- clearly demonstrate the myriad connections between the disciplines involved with CCH;
- articulate the unique role of public health, placing it within the greater health system to identify complementary functions, responsibilities, and redundancies when formulating solutions;
- ensure training programs consider and integrate issues of environmental and social equity;
- support the development of a robust CCH curriculum with the integration of common, standardized competencies in our schools and programs;
- seek to extend the reach of education and training to the existing public health workforce; and
- create optimism around implementing adaptation strategies.

Ultimately, given the fact that climate change will persist into the distant future, all ASPPH graduate and professional training programs as well as its affiliated undergraduate programs should offer comprehensive CCH education at all academic levels. The programs developed by ASPPH institutions should be strategically tailored to differences in expectations and learning environments to adequately prepare the next generation of researchers, advocates, and entrepreneurs needed to tackle the threats posed by climate change (Shaman, 2018).



CCH *must* be given a far higher priority status in ASPPH member schools and programs than where it currently stands.

This status should be reflected in education, elevating the fields of global and public health, and helping communicate to the public, our nation, and the world at large our commitment to this challenge. To accomplish this, we need to consider the following:

1 The policy context

Public health educators need to develop students' understanding not only of the human and ecological impacts of climate change but also:

- health policy aspects such as the social, political, behavioral and experiential contexts;
- the impacts on healthcare systems;
- the roles of public health systems;
- economic feasibility;
- potential positive (and negative) health impacts of proposed solutions; and
- the relationship(s) between non-health policies and the health impacts of climate change.

2 Curricular requirements

Integrating CCH competencies into education in public health would be greatly facilitated if they were a required and highly prioritized component of competency frameworks, such as that of CEPH. Unfortunately, this need for education related to CCH comes at a moment when CEPH has no competencies in place specific to EH, a situation that merits reconsideration in light of the new emphasis on CCH and the persistence of EH problems as a general public health threat.

3 Implementation

Given the need to translate education into action, teachings must begin to go beyond the theoretical and provide a comprehensive explanation of the practical approaches and steps which may be taken to diminish the impact of climate change on health.

EDUCATION AND TRAINING

ROLE OF ASPPH

With member schools and programs of public health across the US and internationally,

ASPPH is uniquely positioned to coordinate efforts on integration of CCH curricula into education in public health, to provide both resources and recommendations to its members, and to serve as a resolute voice on their behalf in advocating for action.

Through existing and novel partnerships, ASPPH can:

- **assist in curriculum design;**
- **support the development of competencies related to CCH as well as more broadly for occupational and environmental health;**
- **advocate for the designation of core curricular requirements related to CCH;**
- **establish open and ongoing lines of communication within and between its members to support the exchange of ideas and best practices; and**
- **consider collaborations with community partners, including undergraduate and community college programs, as well as K-12.**

As a leader in the arena of public health academia, ASPPH should also look inward, promoting a clear expectation of what knowledge and skills should be developed, both personally by its staff members and institutionally, demonstrated through the association's priorities and actions. This will include dissemination of programs already developed by ASPPH members, such as online certificates (example: <https://ysph.yale.edu/CCHcert/>) and Massive Open Online Courses (MOOCs).



RESEARCH FOUNDATION



Climate and health research is foundational to providing the knowledge that is the basis for health promotion, practice and advocacy for action. The adverse impacts of climate change directly affect the regions of ASPPH members, yet most SPPH have an underdeveloped research capacity to inform and motivate actions of mitigation or adaptation.

Climate and health research is in its infancy — with fewer than 500 PubMed indexed publications on “climate change and health” through May, 2022

and badly needs support to better inform policy, practice, and education in public health. Given the magnitude of the challenge, federal support for research in the CCH sector has been surprisingly limited until recently.

In spite of this, it must be noted that, while there is certainly more that can and should be done, **the work of studying adaptation strategies to address climate change has already begun.** The CDC’s 2017 technical report, “Climate and Health Intervention Assessment” details examples of intervention assessment, based on the BRACE model, across a wide range of climate-based risks, including changes to air quality, heat-related illness, flood and drought, vector-borne illness, mental health, and more, providing valuable evidence of effectiveness across a subset of potential interventions (Anderson H, 2017). In addition, in 2020, the CDC published a report entitled, “Preparing for the Regional Health Impacts of Climate Change in the United States”, which provides a roadmap to the health effects, adaptation approaches, and numerous resources developed by health departments funded through the CDC’s Climate and Health Program (Centers for Disease Control and Prevention, 2020).

Today, there is an historic opportunity to influence federal programs, mobilize SPPH on funding options, and energize a national effort to tackle climate and health risks.

In September 2021,

200+ medical journals

issued an unprecedented joint statement that urges world leaders to cut heat-trapping emissions to avoid “catastrophic harm to health that will be impossible to reverse” (Atwoli et al., 2021).



The Biden Administration has recently designated the National Institute of Environmental Health Sciences (NIEHS) as the lead for a new NIH-wide Climate Change and Health (CCH) Initiative ([nih.gov](https://www.nih.gov)). The NIH has noted the complex set of known and unknown factors contributing to health and that the impacts of climate change touch upon the mission areas of potentially every Institute, Center, and Office at NIH.

Several initial funding opportunities have been announced in what should be viewed as a first preliminary step toward recognition of the importance of climate and health research at the federal level. This new program will need to be funded at a level of 100s of millions of dollars to match the scale of the climate and health research challenge. In addition to this NIH initiative, there will be important roles for other agencies that fund research, including the CDC, EPA, NSF, NASA, and NOAA. Auspiciously, several foundations that historically have not supported work in climate and health are now coming forth with funding opportunities. SPPH need to be prepared to make use of these new opportunities.



RESEARCH NEED

As articulated by the NIH, climate and health research is important to reduce health threats across the lifespan and build health resilience in individuals, communities, and nations around the world, especially among those at increased risk from, or disproportionately affected by, the impacts of climate change.

The following are important research objectives for SPPH.

- Research that can quantify public health risks and benefits from actions to mitigate or adapt to climate change. This research needs to provide results at a scale that can be utilized by the many populations relevant to the missions of the SPPH.
- Research that addresses health disparities and vulnerabilities created, or widened, by climate change.
- Development of the necessary research infrastructure and workforce within schools to enable the generation of timely and relevant knowledge, including rapid response research to study climate-related disasters, and to enable collaborations across disciplines and across schools and programs.
- Research into the rapid implementation of effective actions to mitigate and adapt to climate change and maximize the equitable impacts of these actions.
- Evaluation of implementation actions to support wider, more streamlined adaptation across communities.
- Enabling public health researchers to create partnerships with communities at all levels to address the concerns of those who are most vulnerable.
- Innovation to advance public health science.
- Behavioral and communications research addressing the challenges around the complexity of climate health impacts and potential solutions; short- and longer-term health issues; the diversity of communities that need information; and to counter misinformation.
- Clear, credible, actionable, and effective communication of research results to communities and policy makers as well as the academic community.
- Coordination and sharing of research resources across schools and programs.

Broad gaps remain in the scientific research conducted to date. Generally, there is a critical need for assessments of current and future impacts of climate change on health, particularly the benefits, co-benefits, unintended harms, and equity issues associated with mitigation and adaptation strategies (Berrang-Ford, 2021) (Robbins, 2017). For example, data are relatively sparse for many of the climate-health impacts that drive the global burden of disease – e.g., diarrheal diseases and undernutrition. Evidence is needed in many areas, including:

- translation of climate-health data into active advocacy, health protection programs, and policy; (Overland, 2020) (Banwell, 2018);
- development and tracking of valuable and dynamic impact (Fox, 2019) (U.S. DHS, 2021)
- improvements in modeling, surveillance, forecasting, and decision-making tools (Fox, 2019) and assuring that results are provided at scales relevant to all levels of decision-making; and
- conduct of balanced economic assessments to guide cost-benefit analyses (Campbell-Lendrum, 2009).





Importantly, the consideration of equity and environmental justice could help leverage implementation approaches that tackle the impacts of climate change while simultaneously addressing historically inequitable burdens of environmental exposure and risk (Campbell-Lendrum, 2009). Public health researchers must learn how to consider equity in decisions about the types of data we collect, and how the results of the research are communicated to the public and policy makers. Vested partners can be helped to understand the value of collecting robust public health evidence to underpin the increasing number of climate resilience and mitigation programs and strategies being implemented at the local, state, and regional scales. Researchers need training and adequate funding to encourage and actively develop relationships with vested partners, recognizing the value of partnerships both local and global, to ensure that capacity, equitable access, and synergistic efforts are well-supported. This broad-reaching approach will help to ensure that research on CCH considers a high diversity of environmental and social conditions.

New biostatistical, epidemiological, and data science methodologies will be needed to manage the complexities and large spatial/temporal scales of CCH pathways and data. These include:

- the translation from short- to long-term timescales and from macro to micro geographic levels (Jay, 2018);
- identifying ecological processes and handling systems-based phenomena in climate science such as feedback loops, nonlinearity, and heterogeneity in space and time (Frumkin, 2008);
- capturing the interplay between infrastructure and the built environment; and
- addressing the uncertain and unpredictable nature of modelling future risks and benefits (Banwell, 2018).

The substantial proliferation of data we see around CCH offers a tremendous opportunity,

but to capitalize on it the aforementioned challenges need to be tackled and research capacity expanded (Berrang-Ford, 2021). In this regard, there is a need to build technical capacity for managing, analyzing, and extracting information and for understanding the origins of the data on CCH and how to use them for evidence-based advocacy and policy (Haines, 2009). There are also other challenging data issues to be addressed including adequate reporting, sharing, and standardization to enable research discovery by metadata (Overland, 2020) (Berrang-Ford, 2021); ethical and effective collection of digital data (3-D Commission, 2021); and improving machine learning to facilitate risk assessment modeling and big data applications (Fox, 2019).

Finally, the instabilities and uncertainties inherent in climate change itself and in predicting its varied and complex impacts pose a challenge, particularly when examining interconnected systems or ecological effects where even slight miscalculations can derail model accuracy (Frumkin, 2008). Identifying and addressing such gaps and barriers will be integral to strengthening the kinds of evidence needed to guide critical policy decisions, keep the public informed, and motivate action. With newly established governmental offices devoted to issues surrounding climate change, engagement by the CDC and NIEHS in relevant research and support of local health departments, and an increasing number of academic institutions implementing CCH programs, this is a timely opportunity for progress. In this regard, cross sectoral collaboration is key, as summarized by the CDC in its 2019 report: “Climate and health: a guide for cross sector collaboration” (National Center for Environmental Health (U.S.), 2019).

In a myriad of related disciplines, there is tremendous potential value of assessing trends in data that are passively collected and could be mined for patterns in relation to climate and health. For example, such analysis revealed that the healthcare system itself, including medical schools and health facilities, is a major contributor to greenhouse gas emissions and is now open to intervention by ASPPH institutions (Tennison I, 2021) (Eckelman MJ H. K., 2020) (Eckelman MJ S. J., 2018) (Eckelman MJ S. J., 2016). The current and historical funding allotment to CCH research at both the institutional level of our member SPPH as well as the national level via agency grants has been inadequate to develop the many fields of investigation that could illuminate such issues, and we should advocate for more research support and prepare to pivot to a more resource-adequate environment.

RESEARCH

ROLE OF ASPPH

With member SPPH across the U.S. and abroad,

ASPPH is well-positioned to aid in the establishment and expansion of research opportunities, collaborations and partnerships – both domestic and global.

This effort should extend to:

- **improvements in data sharing among and between health scientists in ASPPH schools and programs and beyond;**
- **the development of recommendations for best practices at SPPH to bolster access and guide academic research related to CCH;**
- **publicly advocating for a substantial increase in funding for CCH research from governments, not-for-profit organizations, and institutions; and**
- **supporting efforts to demonstrate the profound need for, and appropriate designation of, funding for CCH research including across disciplines, in partnerships with communities locally and globally, and to address the inequitable impacts of climate change on health.**

ASPPH can also serve an essential role as a leader and convener of necessary conversations around CCH research, including by supporting workshops and conferences to stimulate interdisciplinary collaborations, participating in counsels and other opportunities to give voice to public health issues, and opening discussion on how to house and centralize responsibility over CCH research.



PRACTICE FOUNDATION



There is a dynamic relationship between science, policy, and practice – one that directly influences how data-driven recommendations get implemented. This translational process can have critical ramifications as to whether a policy is borne out with a measurable, positive impact.

SPPH have expertise in practice-based partnerships, technical assistance, education, and scholarship

and can muster tools that can be used effectively: community-based participatory research; program design, monitoring and evaluation; and implementation science. We have developed methods for not just engaging but for creating partnerships across multiple vested partners in communities, including those most vulnerable to climate change.

Current recommendations within the field are diverse and creative, including:

- strategic framing of language to motivate behavioral change (Frumkin, 2008), including framing climate change issues around health impacts to improve relatability (The Lancet, 2018);
- avoiding overly complex language to reduce helplessness and subject avoidance (Fox, 2019);
- empowering individuals and communities by providing clear, actionable steps for behavior change (Kotcher, 2021);
- leveraging figures from popular culture and community leaders to function as climate health liaisons (Fox, 2019);
- engaging communities in decision-making processes (3-D Commission, 2021), or adaptation planning (Clayton, 2017) to increase self-efficacy; and
- improving technology by increasing access and capturing susceptibility and exposure data (Salas, 2021).

These, and many other proposed interventions and approaches show great promise. However, **there is an absence of robust evidence on how to transition climate change policy and best practices from theoretical to tangible actionable steps in a standardized manner.**

PRACTICE

NEED



At this time, practice-based scholarship on climate and health is sparse. We do not yet have an adequate framework to confidently guide how we translate our amassing knowledge on CCH into practice, while engaging those communities most impacted by its effects. At the time of publication of the third **National Climate Assessment (NCA3)** in 2014, risk assessment and planning were underway across the U.S., but real-world implementation remained limited (Jay, 2018). While the scale and scope of these efforts have both increased since that time, their commonality and uniformity remain low.

There exists very limited practical guidance on how best to implement approaches, including with whom to engage, how to engage them, and for how long (Glandon, 2017). As such, there is a clear need to actively direct funding to community-partnered approaches. CCH education, research, and community engagement efforts are needed to support the development of practice-based scholarship. There is also a critical role to be played in developing partnerships and improving coordination across sectors, particularly with community-based organizations and state, territorial, local, and tribal health officials. Research is particularly relevant to practice through the demonstration of current climatic impacts and best practices for the implementation of mitigative and adaptive strategies as well as innovative communications strategies that reach a broad and diverse audience. This will mean expanding funding and capacity to advance our knowledge of how to translate findings into practical responses (Fox, 2019). It also involves the development and dissemination of robust community-based case studies and a push for grey literature to be published in peer-reviewed journals where it might have a larger impact. Community engagement requires active inclusion of a wide range of vested partners, bringing often unheard voices to the table and helping funders understand the critical need for financial support of those most impacted by climate change.

Vested partners in the fight against climate change range from the truly local to the broadly global; ASPPH, its member SPPH, and other leaders in public health need to identify potential areas of traction. The global implications from a destabilizing climate are undeniable, providing an impetus for achieving collaborations and impact at the local or state-wide scale (Bozzi L, 2020).

The necessity for urgent action is also evident in the context of environmental justice concerns. Given the deeply inequitable nature of climate change impacts across populations, determining how best to engage, collaborate with, and advocate for diversely impacted communities will be critical.

Channels need to be established for publication of practice-based research in the peer-reviewed literature to facilitate sharing and to drive the work forward across academic institutions. There is much value in those resources which do exist, including community-based case studies, pre-established community-academic partnerships in environmental justice, and increasing sources for dedicated climate-health funding. However, these assets are currently neither well-documented nor well-connected. Public health will need to adaptively manage the impacts of climate change given the uncertainties of future impacts at local scales. As regional patterns of climate-related risk evolve, approaches to practice will need to shift accordingly (Jay, 2018) and the threat of degrading infrastructure or other economic stressors must be taken into account (Costello, 2009). This importance of considering population, timing, and environmental context will require the expanded data and interprofessional relationships previously discussed (3-D Commission, 2021).

This **importance of considering population, timing, and environmental context** will require the expanded data and interprofessional relationships previously discussed (3-D Commission, 2021).

PRACTICE

ROLE OF ASPPH

ASPPH can bring together SPPH that have strong partnerships with communities and/or state and local health agencies, including Academic Health Departments, to expand practice activities to include climate change considerations. In the context of the educational mission of schools and programs, ASPPH can promote the inclusion of practice-based experiences and education, particularly as new curricula and competencies that include CCH are developed and within guidance provided by the CEPH.

In the context of research, ASPPH can advocate for funding that supports community-based and participatory research as well as capacity building, and develop and disseminate a practice-based toolkit to support faculty efforts within SPPH. In addition, the association can facilitate the wider publication of community-based studies, which can help both enrich our understanding of the diverse impacts of climate change across populations and guide our decision-making on mitigation and adaptation approaches.

As a leader in the public health arena, ASPPH must act as such, providing a guiding voice for how to build partnerships and evolve our understanding in practice-based scholarship to tackle climate change and its damaging human health consequences.



POLICY AND ADVOCACY

FOUNDATION



Public health has only recently gained visibility within the field of climate change policy,

as the implications of climate change on health have been better characterized (Fox, 2019). The annual **Lancet Countdown on health and climate change** reflects a consensus in the public health and medical communities that “climate change is the greatest global health threat facing the world in the 21st century.” (Romanello, 2021). WHO has issued resolutions and taken actions to reduce the health impacts of climate change, and taking urgent action to combat climate change and its impacts is one of the United Nations’ Sustainable Development Goals. Accordingly, there exists a growing base of science on the issues of CCH, providing a strong evidentiary basis for policy development and advocacy and helping provide a meaningful frame of reference – a “health lens” – for engaging on these issues (Banwell, 2018).

Beyond research, activities are underway in key institutions in the United States: **the recently issued Executive Order 14008 established a National Climate Change Task Force and set forth a government-wide approach to tackling the climate change crisis** (The White House, 2021). Since publication of the **third National Climate Assessment (NCA3)** in May of 2014, private companies have increasingly reported their greenhouse gas (GHGs) emissions and implemented actions to reach reduction targets.

Climate-risk assessment measures are being integrated into many areas including investment, engineering, military, and land-use planning. Advancements in sectors such as energy have helped curb projected emissions (Jay, 2018).

Substantial challenges face ASPPH and its members in responding to these opportunities:

- Political polarization has occurred around issues of climate change and it undermines a sense of urgency and the potential for collective mobilization (Clayton, 2017).
- Limited time and misaligned incentive structures within academia and health care constrain the involvement of the health workforce in policy and advocacy (Kotcher, 2021).
- Decision-making under conditions of unavoidable uncertainty may falter from a lack of security and confidence that interventions are needed or that they will work as intended (Costello, 2009).
- Tension between having leaders who have short-term political appointments and the long-term challenge and impacts of climate change creates a barrier to strengthening political will among decision-makers (3-D Commission, 2021).

However, some promising approaches to overcoming these concerns have been identified based on the following findings:

- Establishing direct, personal ties to the impacts of climate change, i.e., showing that individuals are affected, can motivate involvement.
- Community engagement can bolster trust in decision-makers whose experiences may be far removed from the realities of those populations most affected (3-D Commission, 2021).
- Better demonstrating the myriad adverse effects that an unstable environment is having on human health and the positive health benefits of mitigation and adaptation may inspire hope and allow for collaboration across the current political divide (Clayton, 2017).



POLICY AND ADVOCACY

NEED

These efforts are only a part of what is needed to make a meaningful difference in CCH policy, and

complementary engagement of *all* components and functions of public health will be necessary to develop and implement evidence-based strategies for mitigation and adaptation.

Implementing such broad-reaching approaches will benefit greatly from the establishment of partnerships – within countries and internationally – to increase capacity and efficiency as well as shared access to necessary resources. Such **collaborations will also serve the important function of bringing together diverse perspectives and interprofessional priorities necessary to create well-designed mitigation and adaptation policies**, ones which simultaneously confer health as well as economic benefits, outweighing initial investments and demonstrating the value of aligning policy agendas (Hamilton, 2021) (Haines, 2009).

The urgency of the situation requires recognition of **the power and potential of collective action**; despite impressions that climate change is a priority only for one US political party, nationwide surveys reveal **bipartisan recognition of climate change as a reality, as primarily caused through human activity, and as a current threat to human health**. These results imply that there is an opportunity to garner support from across the political aisle (Lynas, 2021). There is a need to approach this challenge by balancing stakeholder interests and ensuring that the multiple actors already involved in the climate change field serve complementary rather than redundant roles.

There are undeniable differences in the public position, breadth of action, and appropriation of resources that may be adopted by an organization – such as ASPPH – compared to individual member SPPH.

Therefore, there is a responsibility among such organizations to address the challenges of both mitigation and adaptation, which are complementary but unique in approach and impact (Berrang-Ford, 2021). By their nature, mitigation efforts may appear more comparable across regions of the world. Adaptation, however, is likely to highlight the differences between regions across the US and around the world as the specific exposures, risks, and resources for building resilience vary greatly (Berrang-Ford, 2021). This challenge will require that institutions in positions of political influence strike a careful and considerate balance between the necessity for aggressive ambition and the realities of inequitable capacities for adaptation. It will also involve a more transparent and informed representation of the trade-off between positive and negative health impacts of approaches within their given context (Haines, 2009) (Robbins, 2017). Ultimately, how we proceed will rely on critical evolution in our data, the development of interprofessional collaborations, and the integration of factors such as environmental and distributive justice (Friel, 2008), regional diversity, and cost-benefit analyses.

We must come together as a scientific and academic community to raise the alarm on these issues in an effective manner; how we choose to frame the problem and the evidence that underlies it will play an instrumental role in how policy changes are ultimately taken up

(3-D Commission, 2021).



POLICY AND ADVOCACY

ROLE OF ASPPH

We are too far into the climate crisis to continue investing our collective attention, energy, and resources solely into raising awareness about the looming crisis;

there is a need to move towards robust and thoughtfully planned climate-health actions across the full solution space, from mitigation to adaptation.

From an educational perspective, this implies that our institutions must not only take practical steps to reduce their carbon footprints and waste output but must also recognize their crucial roles in preparing a public health workforce that can protect health in the face of climate change. Health professionals, academics, and multidisciplinary groups from within higher education can also help engage community leaders, civil society organizations, the private sector, and students in debates on how best to empower local government and community-level action.

ASPPH can play a key role in the public health agenda for climate change

by recognizing its place among the many players to provide focused, practical recommendations that avoid redundancies while still addressing gaps in policy and advocacy action. Its potential roles include:

- **fostering engagement at the local and institutional levels to mobilize health professionals to advocate for beneficial policy;**
- **educating the public;**
- **actively advocating for mitigative and adaptive strategies (Kotcher, 2021);**
- **providing recommendations, best practices, and priority guidance to SPPH; and**
- **pursuing agency partnerships.**

A particular strength of ASPPH is guiding the use of data sciences and systems thinking to better define interventions that will reduce the public health consequences of climate change and that will help the most vulnerable to prepare and adapt to the catastrophic changes that are looming.



ASPPH should attempt to navigate the contentious debates at hand, striving to provide a “true North” for our members

on how to approach issues and actions related to CCH. The association can design and disseminate recommendations at different time scales with consideration of the political, social, and institutional environments of our member institutions in order to provide tangible, feasible action steps. ASPPH can also directly advocate for issues related to CCH and communicate its dedication to this cause by taking a strong and evidence-based public stance. Given its national standing, its member SPPH across the US and abroad, and its direct involvement in the evolution of public health, ASPPH is well-positioned to coordinate and develop partnerships with agencies both domestic (i.e., CDC, NIH, EPA, FEMA) and international (i.e., WHO, PAHO, UN, UNICEF, UNDP) as well as to support the efforts already in motion.

ASPPH cannot limit its scope to direct actions from the central offices. Rather, **we must engage more broadly, be vocal about our position on policies and assisting member schools and programs to act locally to maximize societal impact.** As well, individual programs and schools can serve as sources of trusted, authoritative information during and following regional climate disasters, complementing CDC or state and local agencies that may be constrained by politics or other limitations while also holding them to account. The association can work to create alliances in policy within its member universities, seeking to clarify best approaches at various levels of these organizations

to function as an ally to the students, alumni, faculty, staff, and university administrations.

This process can begin with engaging key ASPPH liaisons, such as CEPH-appointed councilors, early in 2023 to consider next steps. ASPPH can survey its members for incorporation of their priorities to guide the timetable. ASPPH can strategically structure its efforts moving forward by prioritizing goals categorically (academically-based, politically- or legally-based, and research- or collaboration-based) each year to achieve greatest efficiency and impact. Given the scope of issues and the volume of policies relevant to CCH, the association can work to establish a sustainable online catalogue to collect materials, best practices, and examples as a resource for its members.

In summary, ASPPH and its members seek to address the existential crisis of global climate change, emphasizing the role of public health in helping humans prepare, adapt, and respond to this accelerating emergency. **In this brief, we have outlined elements for education and training, research, public health practices, and policy and advocacy that will represent among the highest priorities for action in our association.**

We welcome community partners in this effort.

PRINCIPLES AND RECOMMENDATIONS

PRINCIPLES	
ASPPH	to recognize the diversity in size and scope of member programs and schools in relation to their capacity to address CCH
	to acknowledge and commend the many organizations that are tackling this existential challenge of CCH; we commit to partnering to make our collective voice more effective and influential for policy making and political action to mitigate climate damage and help populations adapt to current and future climate harms
ASPPH and SPPH	to acknowledge that SPPH are housed in communities with unique geographies, populations and vulnerabilities to climate change that invoke a range of climate-related health threats and necessitate a wide range of approaches as well as potential partners
	to make environmental justice, social justice, and health equity foundational to all CCH initiatives, embedding health equity in CCH research, education, and practice
	to advocate for policies that will advance urgent action on CCH, especially policies that address environmental justice and the pathways by which it amplifies the impact of climate change on health
	to contribute evidence, best practices, and expert guidance to conversations about addressing CCH within US, regional (North American), and global public health systems

OVERARCHING RECOMMENDATIONS	
ASPPH	to coordinate its efforts on CCH with the Board of Directors and across its established Advisory Committees
	to advocate strongly for CEPH to adopt broad occupational and environmental health competencies with companion CCH-specific competencies into accreditation standards
	to foster models for interdisciplinary engagement of its schools and programs, recognizing that research on CCH is highly multidisciplinary, involving not just public health and medicine, but also atmospheric and climate scientists, ecologists, environmental engineers, economists, social scientists, regulatory scientists, and more
	to continue to advocate for CCH policies and funding on behalf of its members including taking a firm position through development of an action plan and public statement on the need to address the impact of climate on public health
	to develop a sustainable platform to serve as a resource bank and facilitate the exchange of ideas, experiences, and best practices among member SPPH
ASPPH and SPPH	to establish relationships with partners to advance work in CCH: local, national, and global; governmental and non-governmental; interprofessional and interdisciplinary
	to advocate for interprofessional, intersectoral and interdisciplinary training in CCH, including integration of relevant competencies into standing curricula



DOMAIN: EDUCATION AND TRAINING

	ASPPH	SPPH
Immediate (1-2 years)	Identify a core curriculum on CCH that provides needed background and leads to basic competencies in CCH justice	Join the Global Consortium on Climate and Health Education
		Consider how CCH and health justice will be integrated into public health curricula
	Develop curricular resources to be made available for faculty at the schools and programs	Inventory faculty expertise on CCH with the goal of identifying training needs and relevant faculty while addressing key gaps
	Lead by example by developing organizational expectations and training for ASPPH staff to acquire foundational knowledge and skills in CCH	Serve as campus leaders in advocating for institutional plans and actions related to climate mitigation
Intermediate (3-4 years)	Assist SPPH in updating and expanding their curricula in CCH	Continue to integrate CCH as fundamental in the public health curriculum
		Identify and train citizens and health professionals from frontline communities as collaborators to support climate action in the health sector
Long Term (5+ years)	Continually refine curricula and other training materials as the consequences of climate change for health evolve	Build intergenerational partnerships on CCH education to educate all people across age groups
	Continue to collaborate with other leaders in CCH education and training to strengthen collective action	

DOMAIN: RESEARCH

	ASPPH	SPPH
Immediate (1-2 years)	Develop guidance and action steps for research on CCH addressing the issues of local vested partners, including public health	Support faculty in engaging with and developing new collaborations to support CCH research
	Inventory and track CCH research at member SPPH to reveal informative trends, gaps, and opportunities	
	Support the implementation of workshops and/or conferences designed to stimulate interdisciplinary CCH research	
Intermediate (3-4 years)	Seek opportunities for consortium research applications from multiple SPPH working together	Expand and improve upon data sharing between institutions and investigators to allow for adequate access and use of the massive data sets relevant to CCH
		Expand training for future researchers to encompass the broad range of disciplines needed to adequately prepare students for climate change research
		Advocate for the funding of training programs for CCH researchers in SPPH
Long Term (5+ years)	Help ensure dissemination of research findings to vested partners, including policymakers, health providers, educators, advocates, the media, and members of the public	

DOMAIN: PRACTICE

	ASPPH	SPPH
Immediate (1-2 years)	Inventory potential funders for collaborative work of SPPH with communities	Support faculty in engaging with and developing new collaborations to support CCH research
	Advocate for funding support for work with communities and community leaders at local to national levels	Acknowledge faculty who are successful in generating practice-based scholarship in CCH via appointments and promotions practices and decisions
	Collaborate with NIH and other major funders to include components of practice, i.e., dissemination, policy translation, technical assistance, and community engagement, within grants focusing on CCH	
Intermediate (3-4 years)	Develop a toolkit to guide those working with communities on CCH	Be aware of and, where needed, use the platform established by ASPPH to serve as a resource bank and a conduit for asset sharing among member SPPH
	Advocate for and help facilitate continued and expanded publication of community-based case studies relevant to CCH	Develop examples of both products and processes of collaboration between SPPH and local/state-level policymakers; provide/utilize as a guide across schools and programs
	Increase visibility of grey literature through peer-reviewed publications and/or the development of reference lists in student capstones and theses	Provide resources and expertise to the broader community at the capacity feasible for the institution
Long Term (5+ years)	Advocate for developing sustainable pathways for a CCH workforce	Build sustainable pathways for CCH workforce

DOMAIN: POLICY AND ADVOCACY

	ASPPH	SPPH
Immediate (1-2 years)	Respond rapidly and support action for legislative proposals directly affecting this agenda, including funding and opportunity growth, especially those focused on SPPH	Engage with vested partners, including state and local policymakers, health providers, educators, advocates, the media, and members of the public in relation to CCH issues
	Track progress on fossil fuel-related divestments across member institutions	Support faculty and student efforts toward divestment of university endowments that are supporting climate-harmful activities
	Advocate for increased funding from NIH, EPA, CDC, and others for research on implications of CCH and specific approaches to amelioration	Use the platform established by ASPPH to disseminate successful models of university engagement with local and state activities in climate change mitigation and adaptation
	Support policies that speed the transition from fossil fuels to clean energy sources in order mitigate the worst impacts of climate change at local, state, national, and international levels	
Intermediate (3-4 years)	Work with member SPPH to commit to carbon neutrality, tracking of the problem, and the creation of viable solutions for universities themselves	Develop model sustainability and climate action policies and platforms for SPPH
		Align university-wide actions with health-focused institution/program actions
		Ensure that climate resilience is considered in regular risk assessments by universities and that action plans integrate action towards campus climate resilience
		Use the platform established by ASPPH to share best practices in oversight and ownership within the university of CCH issues: including model policies, articulation of issues at hand, and strategies crafting responses
Long Term (5+ years)	Continue to support and inform new policies that speed the transition from fossil fuels to clean energy sources in order mitigate the worst impacts of climate change at local, state, national, and international levels	

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APPENDIX I

TASK FORCE MEMBERS



Lynn Goldman, MD, MS, MPH, co-chair
Michael and Lori Milken Dean
George Washington University
Milken Institute School of Public Health



Jonathan Samet, MD, MS, co-chair
Dean
Colorado School of Public Health: University of
Colorado | Colorado State University | University of
Northern Colorado



Muge Akpınar-Elci, MD, MPH
Dean
University of Nevada,
Reno School of Public Health



Ron Brookmeyer, PhD, MS
Dean
UCLA Jonathan and Karin Fielding
School of Public Health



Linda Fried, MD, MPH
Dean
Columbia University
Mailman School of Public Health



Wayne Giles, MD, MS
Dean
University of Illinois at Chicago
School of Public Health



Jeremy Hess, MD, MPH
Professor of Environmental and Occupational Health
Sciences, Global Health and Emergency Medicine
University of Washington
Schools of Medicine and Public Health



Pat Kinney, ScD, MS
Professor of Environmental Health
Boston University School of Public Health



Tom LaVeist, PhD
Dean
Tulane University School of
Public Health and Tropical Medicine



Maureen Lichtveld, MD, MPH
Dean
University of Pittsburgh
School of Public Health



Amber Lyon-Colbert, MS, PhD
Assistant Professor
University of North Dakota
Master of Public Health Program



José Seguinot-Barbosa, PhD, JD
Dean
University of Puerto Rico
Graduate School of Public Health
Medical Sciences Campus



Alex Travis, VMD, PhD
Director; Professor, Chair,
Department of Public & Ecosystem Health
Cornell University MPH Program



Sten Vermund, MD, PhD
Dean and Anna M.R. Lauder Professor of Public
Health
Yale School of Public Health



Sacoby Wilson, MS, PhD
Associate Professor, Maryland Institute for Applied
Environmental Health
University of Maryland School of Public Health



Chang-Fu Wu, MS, PhD, CIH
Professor
Department of Public Health, Institute of
Environmental Health, Institute of Occupational
Medicine and Industrial Hygiene
National Taiwan University

ASPPH STAFF



Laura Magaña, PhD, MS
President & CEO



Dorothy Biberman, MPH, CPH
Director of Global Engagement
and Executive Initiatives



Rebecca Fournier, MPH
Climate Change and Health
Fellow

APPENDIX II

ASPPH CLIMATE CHANGE AND HEALTH FRAMEWORK STRUCTURE

Actors	Domains	Education and Training	Research	Policy and Advocacy	Practice (Climate-impacted Communities)
Schools and Programs of Public Health		Strategies: Immediate (1-2 years) Intermediate (3-4 years) Long-term (5 years or longer)			
ASPPH					
Cross-Cutting Domains		Health Equity, Environmental Justice, and Social Justice			
		Partnerships for Impact: Local, National, and Global; Governmental and Non-governmental			
		Interprofessional and Interdisciplinary Collaborations			

