Global Consortium on Climate and Health Education (GCCHE) Climate & Health Key Competencies for Health Professions Students

> "...climate change exacerbates existing climate-sensitive health threats and creates new challenges, exposing more people in more places to hazardous weather and climate conditions."
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> —*Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II*, Chapter 14: Human Health

Preamble: "Climate and health" is defined as the health impacts of climate change; while weather and climate have always influenced human health, climate change is exacerbating these impacts. This set of competencies reflects foundational climate and health knowledge, skills, abilities, and attitudes for health professions students to mitigate the health impacts of climate change. Intended as a guide for developing climate and health education in health professions schools' curricula, the set can be applied as needed and included in a variety of formats and over different timescales, such as in slides over several years of teaching, a series of lectures, or an entire course. The following set of competencies offers an overview

of the different domains, units, and elements of competency recommended for all health professions students, as well as specific competencies for public health and clinical practices.

GCCHE Knowledge Bank: To support health professions institutions' development of locally tailored educational opportunities, GCCHE provides links to learning resources. These resources are indexed by climate change impact area and include:

- Slides
- Online courses and Massive Open Online Courses (MOOCs)
- Videos
- Syllabi and program plans

The original GCCHE competencies set was developed and adopted in February 2018 by the GCCHE Advisory Council and Coordinating Committee. This revised version was developed by the GCCHE Coordinating Committee in November 2020, which includes: John Balbus, Anneliese Depoux, Robyn Gilden, Dana Haine, Jay Lemery, George Luber, Gilma Mantilla, Ruth McDermott Levy, Teddie M. Potter, Todd L. Sack, & Caroline Wellbery.

Competencies for All Health Professions:

Domain: Knowledge and Analytical Skills		
Unit of Competency	Suggested Elements	Sample Resources
Define climate drivers (both natural and human-caused), weather, climate change, and climate variability.	-Describe the measurement and evidence base of climate drivers. -Distinguish between "climate" and "weather," and between climate change and climate variability. -Explain the general mechanism of the greenhouse effect. -Explain the social dimensions of climate drivers, including population growth and economic growth.	Online Course: Yale, "Climate Change and Health: From Science to Action Specialization", Coursera
Identify the health impacts of climate change and effective responses on the part of specific health services.	-Describe major health outcomes associated with climate events, including both direct and indirect impacts, and their mechanisms. Impacts include: ▪ asthma and cardiovascular disease from air pollution from increasing levels of CO2; ▪ spread of viruses and infectious diseases; ▪ increases in respiratory allergies and asthma due to increasing allergens; ▪ water quality impacts; ▪ impacts to water and food supplies; ▪ environmental degradation (forced migration; exacerbation of socioeconomic, demographic, political, cultural or conflict-related threats to health security; heightening of existing health and economic inequities and their effects on the delivery of health care; consequences for mental health); ▪ impacts of extreme heat including heat-related illness and death, and cardiovascular failure;	1. MOOC: Centre Virchow-Villermé, "Climate Change and Health", Iversity (Chapters 1 & 2) 2. Article: Pool Aguilar León, "Climate Change and Health in South America", The Global Climate & Health Alliance, 2018

	▪ and, injuries, death, and mental health impacts from severe weather. -Explain how the health impacts of climate variability/change will vary within and among different communities and regions, and give examples of how climate change may interact with other environmental changes, such as land degradation and biodiversity shifts, to affect health. -Identify resources to guide action in response to the health impacts of climate change.	
Apply knowledge of levels of prevention, climate mitigation and adaptation, and explain health co-benefits of actions.	-Distinguish between climate mitigation and adaptation. -Distinguish between primary, secondary and tertiary prevention levels. -Describe the near-term health co-benefits (e.g. improved air quality) that arise because of climate mitigation at the individual, local, and global scales. -Provide examples of sectoral policies that can reduce greenhouse gas emissions and improve health.	Article: Markandya, A., Sampedro, J., Smith, S. J., Van Dingenen, R., Pizarro-Irizar, C., Arto, I., & González-Eguino, M. (2018). Health co-benefits from air pollution and mitigation costs of the Paris Agreement: a modelling study. The Lancet Planetary Health, 2(3), e126-e133.
Describe public health and its determinants.	-Define public health, population health, health security, climate-health vulnerability, and climate resilience. -Identify social and environmental determinants of health that make individuals and communities more vulnerable to climate-related health threats. -Describe the concept of environmental justice.	Article: Raworth, K. (2017). A Doughnut for the Anthropocene: humanity's compass in the 21st century. The Lancet Planetary Health, 1(2), e48-e49.
Apply knowledge of emergency planning skills.	-Identify the risks and vulnerabilities to critical health infrastructure from	1. Resources: International

	extreme weather events and other climate impacts. -Use emergency planning skills to plan for and respond to climate-related extreme weather events and disasters, including workforce surge needs, and distinguish the roles of and interactions between agencies involved in emergency care.	Federation of Red Cross and Red Crescent Societies, Climate Center, 2020 2. Toolkit: U.S. Climate Resilience Toolkit, "Building Health Care Sector Resilience", 2016
Access and interpret relevant local, regional, national, and global information about climate change effects on health.	Demonstrate how to access accurate science about local, regional, national, and global environmental conditions (e.g., air quality).	Toolkit: International Research Institute for Climate and Society Maproom, Climate and Health, The Earth Institute: Columbia University
Apply knowledge of the ethical, professional, and legal obligations relevant to climate and health.	-Demonstrate how to supplement theories of collective ethics, transgenerational ethics, and ethical obligations (see the nursing and public health codes of ethics) to the natural world with more individual-oriented, present-oriented, and human-centered frameworks of climate and health ethics. -Describe professional and legal obligations of health professionals related to climate and health.	Article: Hobden, L. (2017). AMA Journal of Ethics. "Health Care Ethics and Professionalism in the Era of Climate Change", 19(12), 1151-1240
Demonstrate understanding of the scientific consensus on climate change and concept of evolving science.	Practice communicating about the scientific consensus on climate change and concept of evolving science, and give examples of interactions between environmental changes that may affect public health.	Article: van der Linden, S. L., Leiserowitz, A. A., Feinberg, G. D., & Maibach, E. W. (2015). The scientific consensus on climate change as a gateway belief: Experimental

		evidence. PloS one, 10(2), e0118489.
Domain: Communication and Collaboration		
Demonstrate effective communication with stakeholders about climate and health topics.	-Demonstrate the ability to communicate climate and health topics to different groups (incl. patients, families, professional colleagues, communities, and policymakers). -Practice and refine existing recommendations from the George Mason Center for Climate Change Communication for effective communication strategies and tools in disseminating climate and health information to key stakeholders, including information on the health co-benefits of climate actions. -Identify challenges to climate communication (e.g. climate skepticism and special interest lobbying). -Identify lessons derived from local or regional climate change threats and disasters that can serve as opportunities for communication about climate change.	Article: Maibach, E., Nisbet, M., & Weathers, M. Conveying the Human Implications of Climate Change: A Climate Change Communication Primer for Public Health Professionals. Fairfax, VA: George Mason University Center for Climate Change Communication; 2011.
Work collaboratively and across disciplines on climate and health issues.	-Determine members of the "climate team" or related group at your institution and their roles, for example community leaders, policy makers, hospital administrators, and other stakeholders. -Recognize and respect the unique roles and scopes of practice of other health professionals. -Describe best practices in interprofessional collaboration: information-sharing, collegial cooperation, and collective action. -Promote health profession-specific expertise around climate change. -Identify ways to engage in transdisciplinary and	1. Article: Watts, N., Adger, W. N., Ayeb-Karlsson, S., Bai, Y., Byass, P., Campbell-Lendrum, D., ... & Depoux, A. (2017). The Lancet Countdown: tracking progress on health and climate change. The Lancet, 389(10074), 1151-1164. 2. Article: Ford, J. D. (2012). Indigenous

	interprofessional climate responses to maximize impact.	health and climate change. American journal of public health, 102(7), 1260-1266.
Domain: Policy		
Explain the role of subnational, national and global policy frameworks and governance structures to address health risks associated with climate change.	-Explain the role of current frameworks for understanding and responding to climate-health challenges, such as the United Nations Sustainable Development Goals and the Paris Agreement. -Describe the role of governance as it relates to health policy and climate change.	Article: Watts, N., Adger, W. N., Agnolucci, P., Blackstock, J., Byass, P., Cai, W., ... & Cox, P. M. (2015). Health and climate change: policy responses to protect public health. The Lancet, 386(10006), 1861-1914.
Explain climate-health activism and policy engagement roles of health professionals.	-Identify ways to act on climate and health policy solutions, including health co-benefits. -Describe how health professionals can partner with health care institutions, professional organizations, and advocacy groups to reduce health care sector greenhouse gas footprint.	Article: Sköld, B., Baltruszewicz, M., Aall, C., Andersson, C., Herrmann, A., Amelung, D., ... & Sauerborn, R. (2018). Household preferences to reduce their greenhouse gas footprint: a comparative study from four European cities. Sustainability , 10(11), 4044.

Domain: Public Health Practice Competencies:

Unit of Competency	Suggested Elements	Sample Resources
Apply climate and health knowledge to improve decisions about public health services, and adapt and improve population health.	-Identify measures that can be taken to provide health security and foster climate resilience at the individual, local, or global scales. -Provide examples of how climate-health impacts in one location can affect public health, including	Case studies: World Meteorological Organization, "Climate Services for Health Fundamentals and Case Studies for

	through contagion, economic repercussions, and psychosocial well-being, in another, considering impacts across regions and scales. -Use information on regional impacts to analyze the relationship between climate and public health data, deliver and improve local health services, and support public health impact assessment and political engagement.	improving public health decision-making in a new climate", 2018
Apply knowledge of the connection between habitat and biodiversity loss and infectious diseases.	Provide examples and describe the links between habitat loss, impacts on species, and potential for zoonotic transmission.	1. Fact sheet: World Health Organization and the Secretariat of the Convention on Biological Diversity, Biodiversity and Infectious Diseases: Questions and Answers, 2020 2. Free online book (Español): Gligo, N., Alonso, G., Barkin, D., Brailovsky, A., Brzovic, F., Carrizosa, J., ... & Marino de Botero, M. (2020). La tragedia ambiental de América Latina y el Caribe.

Domain: Clinical Practice Competencies:

Unit of Competency	Suggested Elements	Sample Resources
Describe ways that health care professionals and facilities can prepare for and respond to climate-related health risks.	-Describe the roles and responsibilities of health providers in relation to the health impacts of climate change. -Identify ways in which health care facilities can become more resilient in the face of increasingly severe and/or frequent climate-related weather extremes.	Online resources: My Green Doctor

	-Identify vulnerabilities related to the size and purpose of health care facilities and their ability to respond in the event of severe weather events and/or disasters. -Develop strategies for reducing the carbon footprint of health care delivery, from the hospital setting to the outpatient setting, based on "green health care" principles.	
Apply knowledge of climate and health to clinical care of patients.	-Identify medical diagnoses and other health determinants that make patients vulnerable to climate-related health threats (e.g., extreme heat). -Explain how medication use might aggravate climate-related exposures, such as extreme heat. -Identify particularly vulnerable patients and families and teach about risk mitigation, such as having access to a cooling center during heat crises, or limiting outside work and recreation during heat episodes or days with poor air quality related to wildfires. -Identify and describe patient symptoms and triage considerations as manifestations of direct and indirect weather and climate-related vector changes. -Describe vulnerabilities in the patient care coordination process between hospital and community services that can be impacted by severe weather events and/or disasters. -Promote healthy and more sustainable behaviors during patient education, such as plant-based diets and active transportation. -Recognize climate impacts at-risk communities disproportionately, therefore more attention needs to be given to improve diagnosis and appropriately step-up treatment intensity.	Online resources: Harvard T.H. Chan School of Public Health, "Climate MD", 2020

Sources:

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