



VISIONSERIES

TRANSFORMING NURSING EDUCATION
LEADING THE CALL TO REFORM

NLN VISION STATEMENT: CLIMATE CHANGE AND HEALTH

SEPTEMBER 2022

NLN VISION STATEMENT: CLIMATE CHANGE AND HEALTH

MISSION

Promote excellence in nursing education to build a strong and diverse nursing workforce to advance the health of the nation and global community.

CORE VALUES

Caring, Integrity, Diversity & Inclusion, Excellence

INTRODUCTION

The National League for Nursing (NLN) believes that the health consequences of climate change are among the most urgent public health and health equity crises of the 21st century. This statement addresses the importance of educating current and future nurses for climate change-informed practice and policy leadership.

BACKGROUND

Poor health outcomes resulting from climate change are projected to become more severe in the future. The health impacts of climate change include heat-related illnesses, respiratory complications, vector-borne, food-borne, and water-borne illnesses, and mental health effects (Romanello et al., 2021; U.S. Global Change Research Program [USGCRP], 2018). Climate change causes extreme weather events, wildfires, food shortages, disruptions of emergency services, and supply chain challenges that have the potential to affect access to adequate water, nutrition, health-sustaining medications, and equipment (USGCRP, 2018). It is important to note that the social determinants of health (SDOH) are inextricably linked with adaptive capacity in our climate-changing world. Climate change is also linked to all of the United Nations (UN) Sustainable Development Goals—most specifically Goal 13—threatening global health at its foundation (UN, n.d.-a.). Furthermore, countries that contribute the least to the production of greenhouse gas (GHG) emissions are those most affected by the deleterious health consequences of climate change (Haines, 2022; Lemery et al., 2014).

The call for nurses to be educated about climate change and its health impacts has been made by the World Health Organization (2022). *The Future of Nursing Report 2020-2030: Charting a Path to Achieve Health Equity* (National Academies of Sciences, Engineering, and Medicine [NASEM], 2021) indicates that climate change and the myriad related health challenges must be addressed immediately by the nursing profession. This NLN Vision Statement addresses the gap in nursing education, where the adverse health consequences of climate change are generally not well integrated in curricula at any educational level. Thus, the NLN offers an urgent call to action to address this issue.

Critical attention is required to equip faculty and students with the necessary knowledge and skills to address the climate change-related health impacts that affect our patients, families, communities, and populations. This vision statement is guided by the NLN's core values of caring, integrity, diversity and inclusion, and excellence, along with Provisions 9.3 and 9.4 of the Code of Ethics for Nurses with Interpretive Statements (American Nurses Association, 2015), which underscores the profession's commitment to social justice and planetary health. Moreover, the NLN recognizes the importance of and is steadfast in its commitment to prioritizing and addressing current and emerging health impacts of climate change on the profession, health care organizations, communities, and populations globally by enhancing nursing education at all levels.

THE RELATIONSHIP BETWEEN CLIMATE CHANGE AND PLANETARY HEALTH

Critically important to achieving the NLN mission is recognizing that human health is inextricably linked with the health of our planet. Climate change is one of many signs that human behaviors are disrupting the Earth's natural systems upon which life depends. Other signs include massive loss of biodiversity; air, water, and land pollution; unsustainable consumption of natural resources; and emerging zoonotic and vector-borne diseases. It is essential to address climate change mitigation and adaptation while also looking for root causes and solutions to address all the environmental crises threatening the health of life on this planet.

Planetary health offers a framework for nursing education. It is "a solutions-oriented, transdisciplinary field and social movement focused on analyzing and addressing the impacts of human disruptions to Earth's natural systems on human health and all life on Earth" (Planetary Health Alliance, n.d., para 1). This approach aligns with nursing education, which already emphasizes interprofessional partnerships, engagement with the environments in which people live, and holistic thinking.

THE IMPACT OF CLIMATE CHANGE ON HUMAN HEALTH AND WELL-BEING

The range of climate-related health threats is significant and includes injury and mortality from extreme weather events, heat-related illnesses, respiratory illnesses, waterborne diseases and other water-related health impacts, zoonotic and vector-borne diseases, malnutrition and foodborne illnesses, and mental and psychological impacts (USGCRP, 2018). Further, the compounding effects of extreme heat and air pollution are leading to an increase in morbidity and mortality in individuals with cardiovascular or cerebrovascular disease (Chang et al., 2022). Globally, large swaths of populations are being displaced and forced to migrate because of the effects of extreme weather, including climate change-related droughts, crop failures, food shortages, and sea level rise. These stressors contribute to civil unrest, conflict, and war (Nicholas & Breakey, 2019).

Climate change has both direct and indirect health and safety impacts. Extreme weather events and fires are associated with loss of homes, schools, workplaces, infrastructure, and access to health care services with resulting impacts on entire communities. The journey to rebuilding communities is a long and expensive one and is often associated with significant loss of well-being from post-traumatic stress, suicide/suicidal ideation, historical trauma, loss of jobs and incomes, relocations, and long-term disruptions. Mental health challenges are experienced by the general population, not just those directly affected by climate disasters (Clayton et al., 2021).

In the US, where mental health services are already inadequate to address the population's needs, climate change is creating a multiplier effect on psychological stressors. Mental health impacts include post-traumatic stress disorder (PTSD), anxiety, depression, substance use disorder, and suicidality. In addition, interpersonal aggression and violence are exacerbated by high temperatures (Clayton et al., 2021). Chronic mental health impacts specific to the ongoing threat of climate change include solastalgia (Albrecht, 2005), which is defined as pain, sickness, or a sense of desolation and loss connected to the changes in the natural systems of one's home or territory. Distress related to climate change and ecological deterioration is known as eco-anxiety. These mental health impacts may affect physical health and place a strain on personal and social relationships. Younger generations are particularly vulnerable to mental health impacts. Some youth feel insecure about the future health of the planet and worry that the Earth's ability to sustain life will end in their lifetime (Gislason et al., 2021).

POPULATIONS WITH GREATER VULNERABILITY AND RISKS FOR HEALTH IMPACTS OF CLIMATE CHANGE

Climate Change Risks and Vulnerabilities Across the Lifespan

While persons worldwide share risks to human health from the changing climate, vulnerability to those risks varies across human populations. The Environmental Protection Agency (EPA) defines risk as the "chance of harmful effects to human health or to ecological systems resulting from exposure to an environmental stressor" (EPA, 2021, para 2). Climate change risk for adverse impacts on natural and human systems is distributed across geographic regions according to unique regional differences, for example, flooding in coastal areas or inland rivers. Climate change vulnerability refers to the predisposition of various population groups to be adversely affected by climate change risks. This added vulnerability is often due to social, structural, or economic factors but can also be due to physical and developmental factors (Leffers, 2022a; Surjan et al., 2016). Vulnerability across the lifespan affects people who are pregnant, developing fetuses, infants, children, and older adults due to a variety of factors. People living with chronic diseases, immunosuppressed systems, and those born with congenital anomalies have increased vulnerability to the adverse effects of climate change. Further, adolescents and employees who lack environmental workplace safety standards are at more risk for behavioral factors due to climate impacts (Leffers, 2022a). It is also important to note that those living with physical disabilities are disproportionately affected in climate disasters.

Risks for Pregnant People and Children

Due to the convergence of poor air quality and heat stress resulting from climate change, people who are pregnant have greater risk for adverse health consequences and adverse pregnancy outcomes, including low birthweight infants, preterm birth, intrauterine growth restriction, and stillbirth. Black women are disproportionately affected by these negative birth outcomes (Bekkar et al., 2020). Children are at greater risk for serious impacts from climate change due to biophysiological, behavioral, developmental, and social factors (Leffers, 2022b). For example, infants and children have rapid metabolic rates and more rapid breathing than adults. Therefore, they are at risk for greater inhalation of pollutants and are subject to biophysiological risks from the intake of toxicants through food and water, affecting their developing immune systems and body organs (Leffers, 2022b). Children who live or attend school in areas already burdened by air pollution and wildfires are more likely to have asthma and respiratory illnesses, which can be made worse by climate change. Children who live in systematically underfunded and marginalized

neighborhoods are likely to suffer greater impacts from severe weather events, such as during Hurricane Katrina in New Orleans. Social determinants of health such as systemic barriers in transportation, access to health care, and lack of adequate shelter can compound the adverse impacts of climate events. Due to their dependence upon adult caregivers, infants and small children are more at risk of injury and adverse physical and mental health impacts resulting from adverse weather events (Clayton et al., 2021).

Risks for Older Adults

Older adults have increased risk for adverse health impacts from climate change due to biophysical factors resulting from normal aging, co-morbidities, and social factors relating to where they reside. Older adults are at greater risk from the effects of extreme heat and cold due to impaired thermoregulation and to conditions such as social isolation, changes in cognition, sensory awareness, and mobility. Over the last 20 years, heat-related mortality has doubled for individuals 65 years or older (Salas et al., 2020). Moreover, older adults are more likely to be impacted by air quality, pollution, and wildfire smoke due to decreasing respiratory function or chronic illness, as well as increasing exposure to aeroallergens. Due to their altered immunity related to aging, older adults are also affected by food and water exposure and the effects of vector-borne illness (Chalupka & Trombley, 2022, McDermott-Levy & Fisk, 2020; McDermott-Levy et al., 2019).

Risks for Indigenous Peoples

Climate change impacts the health of Native American tribal communities through increases in pests and storm severity and the effects of rainfall on water management systems. Medicinal plants and ethnobotanicals, key to the culture and traditions of Native Americans, are directly threatened by changing temperatures, changes in rainfall, and increases in pests and disease and are failing to grow and becoming more scarce (Bennett, et al, 2014). Further, climate change amplifies the complex challenges faced by indigenous communities, including political and economic marginalization, loss of arable land and land resources, human rights violations, discrimination, and unemployment (UN, n.d.-b.). As noted by the UN, "Indigenous peoples who choose or are forced to migrate away from their traditional lands often face double discrimination as both migrants and as Indigenous peoples" (UN, n.d.-b., para 17).

Risks for Occupational Workers

Occupational work environments can increase climate change risk. Occupational heat stress is a critical problem in the US and globally and impacts those who work outside in the extreme heat, such as agricultural workers, construction workers, roofers, and landscape workers who may not be aware of or benefit from US Occupational Safety and Health Administration (OSHA) protections (Chicas et al., 2020; Sabo et al., 2022). Agricultural workers from historically marginalized communities are at significant risk of heat-related illness (Chicas et al., 2022). Persons who work outdoors can be physically impacted by heat and severe weather and are disproportionately impacted economically when they are unable to work (EPA, 2021). In addition, first responders, persons in the military, firefighters, nurses, and those who help to evacuate flood zones are at added risk for respiratory impacts, threats to mental health, and physical and mental trauma.

THE RELATIONSHIPS AMONG CLIMATE CHANGE, STRUCTURAL DETERMINANTS OF HEALTH, SOCIAL DETERMINANTS OF HEALTH, CULTURAL DETERMINANTS OF HEALTH, AND STRUCTURAL RACISM

The impacts of climate change are not experienced equally across all communities. Social determinants of health (SDOH), that is, environmental factors related to where people are born, grow, live, work, learn, worship, and age, play a significant role in the health of a community. SDOH influence access to healthy foods, health care, quality education, and safe and active transportation and affect housing and neighborhood conditions, including crime, income, and employment (Shubat & Sathyanarayana, 2013). SDOH, along with structural factors such as racism, redlining, and other upstream factors, play a significant role in adaptation to climate change impacts and community resilience.

Communities that have historically been marginalized due to race and ethnicity, socioeconomic status, immigrant status, gender identity, age, disability, health status, and geography are more likely to suffer greater impacts from severe weather events, extreme heat and cold, and poor air quality and air pollution (Leffers et al., 2017). These communities are impacted by climate injustice because they are often the sites of extractive and polluting industries that further exacerbate health inequities and deplete community resilience (Lane et al., 2022; Mohai et al., 2009). In urban areas, residents frequently experience higher temperatures due to the urban heat island effect from large areas of concrete, asphalt, impervious surfaces, and manmade structures as well as lack of tree canopy, green space, and shade areas. Studies demonstrate that redlining policies that barred Black, Native American/Indigenous, and other marginalized groups from moving into predominantly white communities has resulted in climate-related health disparities due to heat (Krieger et al., 2020; Maldonado et al., 2014; Savarino et al., 2021). However, racial, and ethnic disparities exist across the broader range of climate change-related health outcomes (Berberian et al., 2022).

THE IMPACT OF CLIMATE CHANGE ON THE NURSING WORKFORCE

Climate change also has an impact on the role and practice of nurses and future nurses. With the impact of the COVID-19 pandemic on the nursing workforce and the individual health and well-being of nurses still being studied, it is critical to consider the compounding effects of climate change in relation to existing nursing workforce issues. The pandemic exposed weaknesses in our health care infrastructure, which will be further weakened by stressors caused by extreme weather events, wildfires, droughts, and the disruption of supply chains. With an aging nursing workforce (Smiley et al., 2021) and the impact of nurses leaving the profession during the COVID-19 pandemic (American Nurses' Foundation [ANF] & Joslin, 2021), preparing nurses to address and manage the care of people during the era of climate change is critical. Nurses must not only be educated in nursing care related to climate change, they also must be prepared to address personal and professional needs related to their own resilience during existing and future climate change challenges.

SIGNIFICANCE FOR NURSING EDUCATION

Climate change currently impacts or will impact every aspect of nursing care. Nurses will be confronted with and will need the knowledge and skills to care for individuals, families, and communities that experience potential or actual health impacts of climate change. It is critically important that nurses know the importance of mitigation, adaptation, and resilience efforts related to climate change and its deleterious health consequences. Nurses will also need to know how to prepare for and respond to worsening and more frequent disasters and the migration of people—both from within and from outside the US—who have been displaced by climate change. Consequently, nursing educators must prepare future nurses to address climate change-related illnesses and emerging patient care needs in the era of our climate-changing world (McDermott-Levy et al., 2019). Furthermore, nurses must be ready to support and lead climate change mitigation, adaptation, and community resilience efforts (Leffers et al., 2017), including decarbonizing the US health sector, which is responsible for 8.5 percent of the nation’s greenhouse gases (GHGs) (Dzau et al., 2021).

The impacts of climate change present a challenge to public health. Nurses provide care for individuals and populations that are confronting climate challenges and experiencing climate change-related illnesses. Nurses must be prepared to respond to the health-related challenges of climate change in the diverse practice settings where nursing care is delivered. A nurse may be the only health care provider an individual encounters and must be prepared to provide anticipatory guidance, prevention strategies, and assessment for the effects of climate change on the individual’s physical and psychological health. From a climate justice perspective, the nursing profession is well positioned to lead in educating future nurses and those currently in clinical practice to embrace the challenge of caring for individuals, families, communities, and populations (Kurth & Potter, 2022; Nicholas & Breakey, 2017).

CALL TO ACTION

The 2021 *Lancet Countdown* Report notes that climate change is a *code red for a healthy future* (Romanello et al., 2021). Our house is on fire—it is not the time for incrementalism. Nurses must demand immediate, comprehensive, and bold policies at the local, state, and national levels; and the best way to harness our voices for such a demand is through nursing education and participation in nursing professional organizations. All schools of nursing must integrate climate change and planetary health content into their curricula at all levels of education. Further, curricular content must extend beyond disaster preparedness addressed in the *Future of Nursing 2020-2030: Charting a Path to Health Equity* (NASEM, 2021) report and include mitigation, adaptation, and resilience efforts. All nurses must be educated to embrace climate-informed practice and policies that ensure a healthy future for all.

RECOMMENDATIONS

A. Strategic Initiatives for the National League for Nursing

Recommend that climate change and planetary health concepts be embedded throughout curricula at all levels of nursing.

Be a strategic leader for nurses to address how health inequities in planetary health and climate change impact the work of national and international organizations and advocate globally for and support the inclusion of climate change and planetary health content in nursing education.

Provide resources to promote faculty development related to climate change and health education and strategies to engage in community organizing, policy, and advocacy.

Implement professional development programs to intentionally assist faculty to integrate climate change and planetary health concepts throughout the curriculum.

Develop faculty resources, toolkits, and asynchronous and synchronous simulated and model courses for programs to intentionally integrate climate change and planetary health concepts throughout the curriculum.

Engage in public policy initiatives that impact climate change and health,

Work with corporations and the government to provide internship opportunities for students to learn firsthand about mitigating and eliminating greenhouse gas emissions.

B. Strategic Initiatives for Deans, Directors, and Chairs of Nursing Programs

Lead nationally/internationally and globally in the development of strategic initiatives that address how nursing education advances health professions education in caring for patients, families, communities, and populations impacted by climate change.

Develop a strategic plan that ensures faculty expertise in climate and planetary health knowledge across all levels of nursing education.

Ensure that the nursing curricula across all levels of education address social and structural determinants of health and the concepts of justice, equity, diversity, and inclusion.

Develop models, strategies, and partnerships for collaborative engagement with organizations in educational initiatives related to climate and health.

Seek corporate and research funding that links with the key areas of climate change and health as well as novel, innovative funding mechanisms aimed at research on topics such as mental health, health equity, intervention research, and training and capacity building.

Provide the necessary resources, funding, and opportunities to support faculty involvement in professional development for climate change and planetary health.

C. Strategic Initiatives for Faculty

Embed learning strategies related to climate change and planetary health into didactic, clinical, and simulation learning experiences.

Advance educational strategies to ensure that students learn policy and advocacy skills specifically addressing health consequences of climate change to communicate with policy makers at local, state, national, international, and global levels.

Ensure that nursing education fully engages nursing students and professional nurses in the importance of educating individuals, families, communities, and populations to address climate change strategies of mitigation, adaptation, and resilience.

Develop community partnerships for students to work with local communities to address impacts of climate change and health.

Address bridging the gap in faculty knowledge about climate change and how it can be taught to current and future nurses.

D. Strategic Initiatives for Policy and Advocacy

Advocate for fair and equitable recovery for individuals and communities after wildfires, hurricanes, floods, and other destructive climate-related events to decrease the need for downstream health care responses.

Advocate for and engage in disaster planning and preparation related to climate change.

Engage with professional nursing organizations to advocate for accelerating local, regional, national, and international climate change mitigation, adaptation, and resilience policies.

Participate in local and national climate action plans.

Engage with environmental and environmental justice organizations engaged in addressing climate change.

Amplify the voice, influence, and authority of professional nurses among health professionals in our climate-changing world.

Position the NLN as the leader among nursing organizations in addressing education regarding the health consequences of climate change.

E. Strategic Initiatives for Nurses in Practice

Become educated about the adverse health consequences of climate change and concepts of mitigation, adaptation, and resilience.

Seek continuing professional development that addresses planetary health and the health consequences of climate change, as well as tailored climate change and health-related educational offerings that address health impacts in specific practice and specialty settings.

Make a personal commitment to sustainable living choices.

Lead in sustainability initiatives including Green Teams in all health care settings.

Engage in climate change and planetary health education of patients, families, communities, and populations.

CONCLUSION

Nursing leadership in a climate-changing world requires optimal education of nurses across all levels of academic programs to ensure that nurses are well prepared to address adverse health consequences of climate change. The NLN is uniquely positioned to lead as we confront the code red for a healthy future and a healthy planet today and its impact on individuals, families, communities, and populations in the 21st century. It is critical that the nursing profession engage in policy and advocacy efforts locally, regionally, nationally, and internationally to address the health consequences of climate change as the most urgent public health challenge of our time (Butterfield et al., 2021). The nursing profession is uniquely positioned to offer critical leadership related to climate change and health and to address this complex challenge in partnership with other health professions and policy makers.

SELECTED RESOURCES

Alliance of Nurses for Healthy Environments. Climate Justice Agenda for Nursing
<https://envirn.org/climate-justice-agenda-for-nursing/#:~:text=As%20part%20of%20our%20work,and%20teaching%20on%20climate%20justice>

Alliance of Nurses for Healthy Environments Environmental Health in Nursing (2nd edition) (etextbook)
<https://envirn.org/e-textbook/>

Global Consortium on Climate and Health Education (GCCHE) Core Competencies
<https://www.publichealth.columbia.edu/research/global-consortium-climate-and-health-education/core-competencies-0>

Health Care without Harm
<https://noharm.org/>

Health Care without Harm Practice Green Health
<https://www.noharm.org/content/us-canada/practice-greenhealth>

National Integrated Heat Health Information System
<https://www.heat.gov/>

National Institute of Environmental Health Sciences Climate Change and Health Resources
<https://www.niehs.nih.gov/news/video/climate/index.cfm>

Nurses Climate Challenge
<https://nursesclimatechallenge.org/>

Nurses Drawdown
<https://www.nursesdrawdown.org/>

Planetary Health Alliance
<https://www.planetaryhealthalliance.org/>

The 2021 report of the Lancet Countdown on Health and Climate Change: Code Red for a Healthy Future
[https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(21\)01787-6/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(21)01787-6/fulltext)

The 2021 Lancet Countdown on Health and Climate Change Policy Brief for the United States of America
<https://www.lancetcountdownus.org/2021-lancet-countdown-us-brief/>

US Department of Health and Human Services Office of Climate Change and Health Equity
<https://www.hhs.gov/ash/ocche/index.html#:~:text=The%20Office%20of%20Climate%20Change%20and%20Health%20Equity%20addresses%20the,to%20address%20this%20growing%20issue>

GLOSSARY OF TERMS

Adaptation (related to climate change): adjusting to or preparing for a new or changing environment to reduce our risk to climate impacts such as sea-level rise and extreme weather events.

Eco-anxiety: distress related to the climate and ecological crises that results in feelings such as worry, fear, grief, and despair.

Ethnobotany: systematic study of the botanical knowledge of a social group and its use of locally available plants in foods, medicines, clothing, or religious rituals.

Mitigation (related to climate change): taking action to slow the rate of global warming by limiting or preventing greenhouse gas emissions and enhancing activities that remove these gases from the atmosphere.

Resilience (related to climate change): The capacity of a community, business, or natural environment to prevent, withstand, respond to, and recover from disruption caused by climate change impacts.

Food and waterborne illness: diarrheal disease caused by pathogens in water and food that cause illnesses such as Cryptosporidiosis, Giardiasis, and Escherichia coli infection.

Solastalgia: the pain or sickness caused by the loss and sense of isolation related to the state of one's home or territory.

Vector-borne illness: diseases carried by vectors such as fleas, ticks, and mosquitoes that spread pathogens that cause illness. for example Lyme, West Nile virus, chikungunya, and Rocky Mountain spotted fever

Zoonotic diseases: diseases caused by pathogens such as viruses, bacteria, parasites, and fungi that spread between animals and people.

SOURCES

<https://www.cdc.gov/climateandhealth/effects/vectors.htm>

<https://www.cdc.gov/onehealth/basics/zoonotic-diseases.html>

<https://climate.nasa.gov/solutions/adaptation-mitigation/>

<https://www.britannica.com/science/ethnobotany><https://toolkit.climate.gov/content/glossary>

REFERENCES

Albrecht, G. (2005). Solastalgia: A new concept in health and identity. PAN: Philosophy, Activism, Nature, 3, 41-55.

American Nurses' Association. (2015). Code of ethics for nurses with interpretive statements. <http://www.nursingworld.org/codeofethics>

American Nurses Foundation and Joslin Marketing. (2021). American Nurses Foundation mental health and wellness survey report. <https://www.nursingworld.org/~4aa484/globalassets/docs/anc-c/magnet/mh3-written-report-final.pdf>

- Bekkar, B., Pacheco, S., Basu, R., & DeNicola, N. (2020). Association of air pollution and heat exposure with preterm birth, low birth weight, and stillbirth in the US: A systematic review. *JAMA Network Open*, 3(6): e208243.
- Bennett, T.M.B., Maynard, N.G., Cochran, P., Gough, R., Lynn, K., Maldonado, J., Vogesser, G., Wotkyns, S., & Cozzetto, K. (2014). Indigenous peoples, lands, and resources. In J. M. Melillo, T.C. Richmond, & G.W. Yohe (Eds), *Climate change impacts in the United States. The Third National Climate Assessment* (Chapter 12, pp. 297-317). U.S. Global Change Research Program. doi:10.7930/J09G5JR1
- Berberian, A.G., Gonzalez, D.J.X., & Cushing, L.J. (2022). Racial disparities in climate change-related health effects in the United States. *Current Environmental Health Reports*
<https://doi.org/10.1007/s40572-022-00360-w>
- Butterfield, P., Leffers, J., & Diaz, M. (2021). Nursing's pivotal role in global climate action. *BMJ*, 373, n1049 doi: <https://doi.org/10.1136/bmj.n1049>
- Chalupka, S., & Trombley, J. (2022). *Climate change and the health of older adults. Environmental Health and Nursing* (2nd edition). <https://envirn.org/e-textbook/>
- Chang, A.Y., Tan, A.X., Nadeau, K.C., Odden, M. (2022). Aging hearts in a hotter, more turbulent world: The impacts of climate change on the cardiovascular health of older adults. *Current Cardiology Reports*, 24, 749-760.
- Chicas, R. C., Elon, L., Houser, M. C., Mutic, A., Gallegos, E. I., Smith, D. J., Modly, L., Ziuhtecutli, N., Hergzberg, V. S., Flocks, J., Sands, J. M., & McCauley, L. (2022). The health status of Hispanic agricultural workers in Georgia and Florida. *Journal of Immigrant and Minority Health*, 24(5), 1129-1136. doi: 10.1007/s10903-021-01326-0
- Chicas, R. C., Xiuhtecutli, N, Dickman, N. E., Scammell, M. L., Steenland, K., Hertzberg, V. S., & McCauley, L. (2020). Cooling intervention studies among outdoor occupational groups: A review of the literature. *American Journal of Indigenous Medicine*, 63(11), 988-1007. doi: 10.1002/ajim.23175.
- Clayton, S., Manning, C.M., Speiser, M., & Hill, A.N. (2021). *Mental health impacts and our changing climate: Impacts, inequities, responses.* American Psychological Association and ecoAmerica.
- Dzau, V.J., Levine, R., Barrett, G., & Witty, W. (2021). Decarbonizing the U.S. health sector—A call to action. *New England Journal of Medicine*, 385, 2117-2119. doi: 10.1056/NEJMp2115675
- Environmental Protection Agency. (2021). *Climate change and social vulnerability in the United States: A focus on six impacts.* <https://www.epa.gov/cira/social-vulnerability-report>
- Gislason, M.K., Kennedy, A.M., & Witham, S.M. (2021). The interplay between social and ecological determinants of mental health for children and youth in the climate crisis. *International Journal of Environmental Research and Public Health*. 18(9), 4573. <https://doi.org/10.3390/ijerph18094573>
- Haines, A. (2022). Use the remaining carbon budget wisely for health equity and climate justice. *Lancet*, 400(10351), 477-479. doi: 10.1016/S0140-6736(22)01192-8
- Krieger, N., Van Wye, G., Huynh, M., Waterman, P.D., Maduro, G., Li, W.H., Gwynn, R.C., Barbot, O., & Bassett, M.T. (2020). Structural racism, historical redlining, and risk of preterm birth in New York City, 2013-2017. *American Journal of Public Health*, 110, 1046-1053. doi: 10.2105/AJPH.2020.305656
- Kurth A., & Potter, T. (2022). The public health crisis is planetary—and nursing is crucial to addressing it. *American Journal of Public Health*, 112(S3), S259-S261.
- Lane, H.M., Morell-Frosch, R., Marshall, J.D., & Apte, J.S. (2022). Historical redlining is associated with present-day air pollution disparities in U.S. cities. *Environmental Science & Technology Letters*, 9(4), 345-350.
- Leffers, J.M. (2022a). Harmful environmental exposures in vulnerable populations. In McDermott-Levy, R., Murphy, K., Leffers, J. & Cantu, A. *Environmental Health in Nursing* (2nd edition). <https://envirn.org/e-textbook/>

- Leffers, J.M. (2022b). Climate change and health of children: Our borrowed future. *Journal of Pediatric Health Care*, 36(1), 12-19.
- Leffers, J. M., McDermott-Levy, R., Nicholas, P. K., & Sweeney, C. (2017). Mandate for the nursing profession to address climate change through nursing education. *Journal of Nursing Scholarship*, 49 (6), 679-687. doi: 10.1111/jnu.12331
- Lemery, G., Williams, C., & Farmer, P. (2014). The great procrastination [Editorial]. *Health and Human Rights*, 16, 1-3.
- Maldonado, J.K., Colombi, B., & Pandya, R. (2014). *Climate change and Indigenous peoples in the United States: Impacts, experiences and actions*. New York: Springer.
- McDermott-Levy, R., & Fick, D. M. (2020). Advancing gerontological nursing science in climate change. *Research in Gerontological Nursing*, 13(1), 6-12. <https://doi.org/10.3928/19404921-20191204-02>
- McDermott-Levy, R., Jackman-Murphy, K. P., Leffers, J. M., & Jordan, L. (2019). Integrating climate change into nursing curricula. *Nurse educator*, 44(1), 43-47. <https://doi.org/10.1097/NNE.0000000000000525>
- McDermott-Levy, R., Kolanowski, A.M., Fick, D.M., & Mann, M.E. (2019). Addressing the health risks of climate change in older adults. *Journal of Gerontological Nursing*, 45(11). 41-45. <https://doi.org/10.3928/00989134-20191011-04>
- Mohai, P., Lantz, P.M., Morenoff, J., House, J.S., & Mero, R.P. (2009). Racial and socioeconomic disparities in residential proximity to polluting industrial facilities: Evidence from the Americans' Changing Lives Study. *American Journal of Public Health*, 99(Suppl 3), S649-656.
- National Academies of Sciences, Engineering, and Medicine. (2021). *The Future of Nursing 2020-2030: Charting a pathway to achieve health equity*. <https://www.nam.edu/publications/the-future-of-nursing-2020-2030>
- Nicholas, P K., & Breakey, S. (2017). Climate change, climate justice, and environmental health: Implications for the nursing profession. *Journal of Nursing Scholarship*, 49(6), 606-616.
- Nicholas, P.K., & Breakey, S. (2019). The economics of climate change and the intersection with conflict, violence, and migration: Implications for the nursing profession. *Nursing Economic\$*, 37(1), 23-34.
- Planetary Health Alliance. (n. d.). What is planetary health? <https://www.planetaryhealthalliance.org/planetary-health>
- Romanello, M., McGushin, A., Di Napoli, C., Drummond, P., Hughes, N., Jamart, L., Kennard, H., Lampard, P., Rodriguez, B.S., Arnell, N., Ayeb-Karlsson, S., Belesova, K., Cai, W., Campbell-Lendrum, P., Capstick S., Chambers, J., Chu, L., Ciampi, L., Dalin, C., Dasandi, N.... Hamilton, I. (2021). The 2021 report of the Lancet Countdown on health and climate change: Code red for a healthy future. *Lancet*, 398 (10311), 1619-1662. [https://doi.org/10.1016/S0140-6736\(21\)01787-6](https://doi.org/10.1016/S0140-6736(21)01787-6)
- Sabo, K., Starodub, R., Smoller, S., Quinn, L., Kelly, D., Flaherty, K., & Nicholas, P.K. (2022). Occupational heat stress: An overview for nurse practitioners. *Journal of the American Association of Nurse Practitioners*, 34 (3), 597-603.
- Salas, R.N., Knappenberger P., & Lester, J.J. (2020). The Lancet Countdown on Health and Climate Change policy brief for the United States of America. https://www.lancetcountdownus.org/wp-content/uploads/2021/07/2020-Lancet-Countdown-Brief_English_vFINAL.pdf
- Saverino, K. C., Routman, E., Lookingbill, T. R., Eanes, A. M., Hoffman, J. S., & Bao R. (2021). Thermal inequity in Richmond, VA: The effect of an unjust evolution of the urban landscape on urban heat islands. *Sustainability*, 13(3), 1511. <https://doi.org/10.3390/su13031511>
- Shubat, P., & Sathyanarayana, S. (2013). Importance of social determinants of health (SDoH) for children. https://www.epa.gov/sites/production/files/2016-01/documents/chpac_social_determinants_of_health_combined.pdf

Smiley, R.A., Ruttinger, C., Oliveira, C.M., Hudson, L.R., Allgeyer, R., Reneau, K.A., Silvester, J.H., & Alexander, M. (2021). The 2020 National Nursing Workforce Survey. *Journal of Nursing Regulation*, 12, S3-S96.

Surjan, A., Kudo, S., & Uitto, J.I. (2016). Risk and vulnerability. In J. Uitto & R. Shaw, R. (Eds), *Sustainable development and disaster risk reduction*. Springer. https://doi.org/10.1007/978-4-431-55078-5_3

United Nations (n.d.-a.). Sustainable development goals. <https://www.un.org/sustainabledevelopment/>
United Nations Department of Economic and Social Affairs: Indigenous Peoples. (n.d.-b.). Climate change. <https://www.un.org/development/desa/indigenouspeoples/climate-change.html#:~:text=The%20effects%20of%20climate%20change%20on%20indigenous%20peoples&text=Climate%20change%20exacerbates%20the%20difficulties,rights%20violations%2C%20discrimination%20and%20unemployment>

U.S. Global Change Research Program (USGCRP). (2018). *Fourth National Climate Assessment: Impacts, risks, and adaptation in the United States, Volume II*. doi: 10.7930/NCA4.2018

Watts, N., Amman, M., Arnell, M., Ayeb-Karlsson, S., Belesova, K., Boycoff, M. & World Health Organization. (2022). Countries commit to develop climate-smart health care at COP26 UN climate conference. <https://www.who.int/news/item/09-11-2021-countries-commit-to-develop-climate-smart-health-care-at-cop26-un-climate-conference>

NLN STRATEGIC ACTION GROUP 2022

Vision Statement: Climate Change and Health

Members

Suellen Breakey, PhD, RN, Co-chair
[MGH Institute of Health Professions](#)

Patrice K. Nicholas, DNSc, DHL (Hon.), MPH, MS, RN, NP-C, FAAN, Co-chair
[MGH Institute of Health Professions](#)

Roxana Chicas PhD, RN
[Emory University](#)

Katie Huffling, DNP, CNM, FAAN
[Alliance of Nurses for Healthy Environments](#)

Jeanne M. Leffers, PhD, RN, FAAN
[University of Massachusetts Dartmouth](#)

John Lowe, PhD, RN, FAAN
[The University of Texas at Austin](#)

Kathy Murphy, EdD, MSN, RN, CHSE
[Naugatuck Valley Community College](#)

Ruth McDermott-Levy, PhD, MPH, RN, FAAN
[Villanova University](#)

Oluwatomisin Olayinka, PhD, RN, MPH
[MGH Institute of Health Professions](#)

Teddie Potter, PhD, RN, FAAN, FNAP
[University of Minnesota](#)

Barbara Sattler, DrPH, MPH, BS, RN, FAAN
[University of San Francisco](#)

NLN Staff

Sandra Davis, PhD, DPM, ACNP-BC, FAANP
Deputy Director, [NLN/Walden University College of Nursing Institute for Social Determinants of Health and Social Change](#)

Amy McGuire
Program Manager, [NLN/Chamberlain University College of Nursing Center for the Advancement of the Science of Nursing Education](#)