

## Climate Change: Preparing the Nurses of the Future

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Our climate is changing. Our home – our planet – is warming. Climate change has resulted in weather events that are more intense, frequent, and longer in duration, such as hurricanes and heatwaves (Centers for Disease Control and Prevention [CDC] 2016; U.S. Global Change Program, 2016). Record high temperatures have been recorded in cities across the United States and globally; 2016 was the 40th consecutive year with a global temperature above the 20th-century average (Steffen, Alexander, & Rice, 2017). The effects of climate change including higher temperatures, increased incidence of vector-borne pathogens, droughts, flooding, wildfires, and hurricanes threaten public and global health.

All nurses must be poised to work within their full scope of practice to minimize climate impacts on human health and participate in mitigation, adaptation, and resilience strategies to support our patients, families, and local and global communities. Nursing education is critical in ensur-

ing that nurses are adequately prepared to address the health impacts of climate change (Leffers, McDermott-Levy, Nicholas, & Sweeny, 2017).

According to the CDC (2016) and others, these weather changes are due to the accumulation of heat-trapping carbon dioxide and other greenhouse gases in our environment (Watts et al., 2017). One of the largest contributors to greenhouse gasses is the use of fossil fuels for transportation, industry, and agriculture. Health care itself utilizes significant amounts of fossil fuels for heating facilities, transporting patients, powering

equipment, and manufacturing petroleum-based products such as plastics for medical equipment including IV tubing, catheters, and oxygen delivery systems. According to the U.S. Department of Energy, health care creates more than 2.5 times the carbon dioxide emissions compared to commercial office buildings (U.S. Department of Energy, 2009) and contributes 9.8% of the national total of greenhouse gas emissions in the United States (Eckelman & Sherman, 2016). As front-line health providers, nurses are positioned to take steps in patient care to minimize practices that generate greenhouse gases.

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Heat-trapping greenhouse gases lead to rising temperatures, as well as the number of severe damaging storms such as hurricanes Maria and Harvey last year, prolonged and severe droughts, and longer wildfire seasons as seen recently in California. The World Health Organization (WHO) defines natural disasters as:

an act of nature of such magnitude as to create a catastrophic situation in which the day-to-day patterns of life are suddenly disrupted and people are plunged into helplessness and suffering, and, as a result, need food, clothing, shelter, medical and nursing care and other necessities of life, and protection against unfavourable environmental factors and conditions (WHO, 2017a).

Nurses can play an important part in participating in a community's planning and response to extreme weather events and have a significant role in healthcare response to these disasters. Nursing faculty can include this important content throughout the curriculum including in community health and leadership courses.

Climate change may lead to food insecurity due to droughts, flooding, wildfires, poor water quality, declining crop production, and an increase in crop loss because of infestations of pests such as Japanese beetles and aphids. Additionally, elevated ambient carbon dioxide levels have been associated with affecting the nutritional content of foods produced by increasing sugar content and decreas-

ing protein, calcium, potassium, iron, and zinc contained in grains, legumes, fruits, and vegetables (Meyers, et al., 2014; Seltenrich, 2017). These changes in everyday nutritious foods can increase dietary deficiencies, exacerbate cardiovascular disease and diabetes, and lead to obesity. The U.S. Department of Defense noted that climate change "will likely lead to food and water shortages, pandemic disease, disputes over refugees and resources, and destruction by natural disasters in regions across the globe" (Hagel, 2014, para. 2). This information must be considered in nutrition and therapeutic diets.

The health effects of our changing climate include heat illness (i.e., heat cramps, heat exhaustion, and heat stroke); increased respiratory illness such as exacerbations of asthma and chronic obstructive pulmonary disease due to poor air quality; water- and food-related infections; and vector-borne infections such as West Nile and Lyme disease. Vulnerable populations including children, the elderly, women of childbearing age, pregnant women, the poor, outdoor workers, and those living in urban areas are more at risk for the health effects of climate change. Climate change is also linked to a reduced sense of well-being and an increased risk for mental health problems (U.S. Global Change Research Program, 2016). Nursing faculty can address these climate vulnerabilities in the associated courses such as adult health, maternal-child health, and mental health.

Many healthcare leadership organizations including the American Public Health Association (APHA), the American Nurses Association (ANA), and the WHO have called for healthcare professionals, including nurses, to be involved in the mitigation of and adaptation and resilience to climate responses that include policy, regulations, and initiatives (APHA, 2017; Patten, 2008; WHO, 2017b). To ensure future nurses include addressing climate health impacts in all areas of nursing practice, climate science and the health impacts must be included in all areas of nursing education and threaded into simulation, laboratory practice, theory, and clinical experiences.

During the 2017 National Student Nurses Association (NSNA) conference, the resolution *Increased Nursing Student Action on and Awareness of the Effects of Climate Change on Health* was unanimously passed. The resolution calls for nursing students to "seek the knowledge and skills to address the human health effects of climate change, and the actions they can take to mitigate, respond and adapt to the effects of climate change" (Vitullo et al., 2017, p. 36). This resolution builds on previous NSNA resolutions, specifically *Increased Awareness and Assessment of Environmental Health Hazards in Nursing Education* (2015) and *Increasing Environmental Health Advocacy and Education* (2009). Both the 2015 and 2017 resolutions recommend NSNA and schools of nursing partner with other healthcare leadership organizations including the ANA,

National League for Nursing (NLN), APHA, and the Alliance of Nurses for Healthy Environments (ANHE) to prepare future nurses for the complex health risks related to climate change. Most recently, NSNA has joined on as a signatory organization to the Nursing Collaborative on Climate Change and Health to be a voice of a unified nursing force to positively influence climate change and its health impacts (ANHE, 2017).

As a nursing organization that focuses on environmental health and climate change in nursing, ANHE's goal "is to inspire nurses to help our patients, our communities, and healthcare institutions engage in climate change mitigation activities and preparing for potential effects of climate change" (ANHE, n.d., para. 3). ANHE resources include curriculum activities, publications, and resources to assist nurses to include climate change and environmental health in their nursing practice, as well as their award-winning e-textbook, *Environmental Health in Nursing* (ANHE, 2016). The peer-reviewed e-textbook was written by nurses covering a variety of topics including why nurses need to be involved with environmental health and climate change; the application of environmental health in our homes, schools, and communities; climate change and health; and advocacy. It was awarded first place in the 2017 AJN Book of the Year Awards in the Environmental Health category. Nursing faculty can use the e-textbook for professional development, share it with peers, or use it for class assignments to help prepare future nurses to work in their scope of practice. The ANHE site contains *Strategies for Incorporating Climate Change into Nursing Curricula*, which provides specific classes/general content areas in nursing curricula for information related to climate change with specific content, teaching strategies, resources, and competencies (ANHE, n.d.).

ANHE has several workgroups including Advocacy, Practice, Education, Research, and Climate Change that have monthly calls and are open to any nurse who wishes to join. Nursing faculty and students may wish to join the Practice workgroup for the application of environmental health and climate change into practice; the Advocacy workgroup for information about legislation both

locally and nationally; the Research workgroup not only to learn about the latest research and work with some of the best nurse researchers, but also as a resource for potential research projects for both faculty and students; and, finally, the Education workgroup for insertion of environmental health, including climate change, into curriculum.

Another valuable resource for nurse educators is the Columbia University Mailman School of Public Health (n.d.) Global Consortium for Climate and Health Education. This is a group of nursing, medical, and public health schools from around the world that have joined together to educate future health professionals to address the health impacts of climate change. Schools of nursing can join this consortium. The website offers resources to support climate and health in nursing education (Columbia University Mailman School of Public Health, n.d.).

Our nursing students have recognized the importance of this content area as evidenced by three significant NSNA resolutions in recent years that have called for the inclusion of environmental health and climate change into nursing curriculum. As faculty, it can be quite daunting to find time to add new material in an already content-laden curricula, but climate change must be threaded throughout the curriculum to prepare the nurses to meet the health needs of all patient populations across the country. **DN**

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