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Improving Interprofessional Environmental Health Education Using the Leave No One Behind Framework

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In the midst of the Anthropocene, two questions continue to confront humanity: (1) How can technology be used to help us to continue to thrive when faced with the limitations of the global carrying capacity of the natural world? (2) How can social contracts be improved to promote justice, equity, diversity, and inclusion as the financial benefits—and environmental consequences—of thriving are apportioned among individuals, communities, and countries? Training future environmental health professionals with the tools they will need to solve these questions is a challenge for educators.

ENVIRONMENTAL HEALTH IN PUBLIC HEALTH NURSING

The environment—where people live, learn, and labor—is a critical determinant of health. The practice of environmental health—undertaken by sanitarians,

nurses, physicians, and engineers, among others—originated in the mid-19th century as humanity congregated increasingly in dense urban environments such as London, England.¹ During the Great Sanitary Awakening, Edwin Chadwick's efforts to revise the English Poor Laws (i.e., the social contract of the time) were as important as Joseph Bazalgette's efforts to design and construct London's sewers (i.e., the technology of the time). Both the work of Chadwick and the work of Bazalgette were influenced by the chief nurse theorist of the time, Florence Nightingale.

Nightingale's environmental theory—the normal state of a human is one of health, and the chief purpose of the nurse is to modify the environment to restore health—continues to guide research, education, and practice of environmental health into the 21st century.¹⁻³ The human rights-based approach foreshadowed by Nightingale—"everyone has the right to a standard of living adequate

for the health and well-being of himself and of his family"^{4(Article25)}—underlies the conceptual framing of modern sustainable development. The consensus meaning of sustainability was introduced globally in the seminal report, "Our Common Future,"⁵ which set the stage for the 1992 United Nations Conference on Environment and Development (also known as the Earth Summit) and the signing of the United Nations Framework Convention on Climate Change.

Although many public health nurses (PHNs) will recognize the definition of sustainable development as "meet[ing] the needs of the present without compromising the ability of future generations to meet their own needs,"^{5(paragraph27)} fewer may be familiar with the entirety of paragraph 27 from the Overview section of the report.⁵ In particular, *poverty is no longer accepted as inevitable* [emphasis added], and the report notes that the true limitations on development arise from the twin challenges of (1) current social organization and available technology and (2) nature's ability to attenuate the effects of human activities.

Within the reality of a planet undergoing massive environmental challenges brought about by the actions of humanity (i.e., the Anthropocene), the central question facing educators of PHNs is, how do we implement interprofessional environmental health education to achieve effective collaboration beyond the bedside and into the community?⁶ As a proposed answer to this question, we suggest that the "leave no one behind" framework of the United Nations Sustainable Development Goals (SDGs) is an important piece of the puzzle, which may be highlighted using examples of nurses and engineers working together to achieve SDG

number 2, zero hunger, as well as SDG number 11, sustainable cities and communities.⁷

TWO EDUCATIONAL EXAMPLES

The SDGs include 17 goals, which are underpinned by three universal values: (1) the necessity of a human rights-based approach, (2) the commitment to leave no one behind, and (3) the central role of gender equality and women's empowerment. The UN's *State of the World's Nursing – 2020* report highlighted the fact that many members of the global nursing workforce are women, and therefore elevating and promoting nursing has an additional benefit of contributing to gender equality and women's empowerment.⁸ Nightingale's environmental theory foreshadows a human rights-based approach to development. But what about the commitment to leave no one behind, and how does nursing bring a unique contribution to interprofessional environmental health education?

According to the Missouri Department of Health and Senior Services, "public health nursing is the practice of promoting and protecting the health of *populations* [emphasis added] using knowledge from nursing, social, and public health sciences" (<https://bit.ly/3LEpNjb>), whereas the code of ethics for nurses highlights "the care of *individuals* [emphasis added], families, groups, and communities" (<https://bit.ly/3Jc18tU>). Among those professionals who practice environmental health—including sanitarians, physicians, and engineers—PHNs bring the unique perspective of formal preservice education *both* [emphasis added] in patient health (i.e., at the bedside) and in population health (i.e., beyond the bedside and into

the community). By contrast, the preservice education of physicians focuses primarily on bedside care of individual patients (i.e., an MD or DO working in public health often obtains additional training such as the MPH when working with populations in the community), whereas sanitarians and engineers share an ethical obligation to protect "the public" (and thereby lack specific training on caring for individuals). This unique preservice education of PHNs—patient care plus population health—is highlighted in two examples of coteaching engineers and nurses in Missouri.

The first example of interprofessional environmental health education includes the cross-training of students of engineering to adopt qualitative research methods often used by PHNs, such as interpretive phenomenology, when engineers interview stakeholders from within heterogeneous communities.^{9,10} This novel approach to interprofessional environmental health education among engineers and PHNs is particularly useful when engineering students undertake open-ended, project-based learning such as the redesign of local food systems, which consider the twin goals of improving nutrition and reducing the environmental footprint.¹¹ Using the framework of leave no one behind means that aspirations of SDG 2, zero hunger, may be met "when *all people* [emphasis added], at all times, have physical and economic access to sufficient, safe, and nutritious food that meets their needs and food preferences for an active and health life."^(12paragraph1) Thus, students of engineering studying how to redesign the local food system for Phelps County, Missouri, have learned from PHNs how to address the issues of food and nutrition security for all

people, which results in achieving no one left behind.

The second example of interprofessional environmental health education includes the cross-training of students of nursing to understand the engineering design of government-funded housing projects such as the federal Housing Act of 1949. This novel approach to interprofessional environmental health education among engineers and PHNs is particularly useful when nursing students undertake community-embedded windshield surveys. Using the framework of leave no one behind means that aspirations of SDG 11, sustainable cities and communities, may be pursued as PHNs begin to understand how the intersection of policies—such as redlining—and the work of engineers—designing and building housing funded by federally backed home loans—contributed to the poor health outcomes observed in the cities of today.¹³ Thus, students of nursing studying the "Delmar Divide"¹⁴—a boulevard that runs from east to west through St. Louis, Missouri, demarking a socioeconomic and racial border between the northern and southern regions of the city—have learned from engineers how the use of technology to implement biased policies contributed to health inequities that impact modern cities.

CONCLUSION

These two examples of coteaching engineers and nurses in Missouri highlight the importance of maintaining a global perspective while addressing the health of local populations.^{1,15} In particular, the importance of leveraging the three universal values of the SDGs—human rights, no one left behind, and gender equality—are centered to improve

interprofessional environmental health education. As described previously, nurses have an important leadership role to play as humanity confronts the important questions of the Anthropocene and convergence research is used to develop new solutions to these ongoing challenges.¹⁶ For example, engineers and sanitarians can practice alongside and learn with nurses (i.e., revisiting the collaborative period of Bazalgette, Chadwick, and Nightingale using modern technologies and social contracts such as leaving no one behind). Translators, developing the materials necessary for interprofessional education,¹⁶ have an explicit opportunity to leverage the unique contribution nursing brings to interprofessional environmental health education through the use of the leave no one behind framework. **AJPH**

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CONFLICTS OF INTEREST

The authors have no conflicts of interest to declare.

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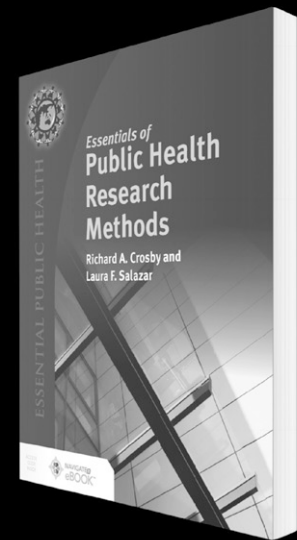
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