

Nurses as Boundary Actors in Sustainable Health Care: A Discussion Paper

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Cite as: Law, J., Kalogirou, M. R., & Dahlke, S. (2021). Nurses as boundary actors in sustainable health care: A discussion paper. *Witness: The Canadian Journal of Critical Nursing Discourse*, Vol 3(2), pp 36-46 <https://doi.org.10.25071/2291-5796.105>

Abstract

The devastating global health impacts of climate change are becoming more apparent and more severe. These health impacts result in growing demands on health care systems. Paradoxically, as resource intense health care systems respond to the negative health effects of climate, they contribute to further climate change. Organizations and academics have issued a call to action for health care professionals to mitigate climate change and promote environmental sustainability. Nurses are an integral part of health care systems but have been delayed in answering this call. In this paper, we argue that nurses are particularly well suited to mitigating climate change in health care systems because of their proficiency in the articulation work that supports the primary work of patient care. The role of the nurse both in the primary work of patient care and the work of health care sustainability will be explored using the ideas of articulation work as an analytic framework.

Keywords: nursing, climate change, health care, boundary actor, articulation work

For the first time in human existence, we find our species to be the central actor influencing an epoch. The Anthropocene is a proposed epoch in which human activity influences every biophysical system on the planet (Crutzen, 2002). It is known that human activity, primarily the rapid increase in greenhouse gas emissions into our atmosphere from burning fossil fuels since 1850, is one of the main drivers of present-day climate change (Intergovernmental Panel on Climate Change

[IPCC], 2021). As of 2019, human activity is largely responsible for a 1.07°C increase in global temperatures (IPCC, 2021). Higher temperatures contribute to extreme weather and rising sea levels. These changes result in increased human exposures to air pollution, severe weather, vector-borne diseases, allergens, poor water quality, food scarcity, extreme heat, and environmental degradation (Crimmins et al., 2016; Watts et al., 2021; Whitmee et al., 2015). The human health impacts of these exposures

are already evident. The air pollution from coal-fired power that warms our planet has also resulted in over one million deaths each year; mortality resulting from heat-related exposures in those 65 years of age and older is estimated to have increased by 53.7% in the past 20 years (Watts et al., 2021). The World Economic Forum (2021) suggests climate change is one of the highest impact risks in the world and urges immediate action.

Much of the demand of these negative health impacts is placed on global health systems. However, health systems also contribute 4.4% of global greenhouse gas emissions and if assessed as a single country, they would be the fifth highest producer of emissions (Health Care Without Harm & ARUP, 2019). Canada is one of the world's top four emitters of greenhouse gasses with over one metric tonne of CO₂ emissions per capita (Health Care Without Harm & ARUP, 2019), which is associated with 23,000 disability adjusted life years lost (Eckelman et al., 2018). It is critical that health care systems, and the health professionals within them, take urgent and immediate action to reduce its harmful impact on climate change and health.

Nurses are health professionals that are integral to our health systems. They are bound by both planetary citizenship and nursing ethics to take specific actions and leadership roles in mitigating climate change and promoting environmental sustainability. In this paper, we argue that nurses are ideally suited to engage in this essential work because of their proficiency and expertise in articulation work. Articulation work can be defined as the background work that is necessary for the primary work of nursing to be accomplished (Strauss et al., 1985). We will first identify changes that can be made within health care systems and the nursing profession's perception of climate change and health care. Next, we discuss reasons for nurses to be involved in climate change mitigation and explain how they are well suited to do so. Finally, we discuss how nurses can engage in promoting environmental sustainability in health care systems.

Changes that Could be Made in the Health Care System

We can better understand the importance of nurses' involvement by exploring changes health care systems can make towards greater sustainability. The biggest source of health care sector emissions originates from the burning of fossil fuels to power, heat, and cool facilities (Health Care Without Harm & ARUP, 2019). To address this, facilities can invest in renewable energy sources, energy recovery, energy efficient devices, maximize natural ventilation, and use evaporative or underground earth-pipe cooling (Practice Greenhealth, 2018). Specific actions may include upgrading or replacing existing filters or chillers, and installing energy efficient LED lighting and variable frequency drives (Shi et al., 2021). Waste management is another mainstay of greening health care. First, waste can be reduced by creating circular economies which focus on durability, reuse, repair, refurbishment, and reduced material use (Practice Greenhealth, 2020). Second, waste needs to be diverted from the landfill through effective sorting, recycling, and composting (Practice Greenhealth, 2021c). Water can be sustainably managed by using automatic low-flow fixtures, onsite water treatment and storage, rainwater harvesting, and greywater recycling (Practice Greenhealth, 2018). Changes to health care associated transportation, such as investing in electric fleet vehicles (Practice Greenhealth, 2021b) and encouraging public and active transportation, would help to reduce emissions (Practice Greenhealth, 2018). Facility food services can also contribute to greening initiatives by purchasing local (Canadian Coalition for Green Health Care, 2021) and replacing meat-based meals with plant-based meals (Practice Greenhealth, 2021a). This is not a comprehensive list of actions that health care systems can take to decrease their emissions, but it provides a summary to illustrate the involvement of all parts of the system in greening actions.

Nursing's Perceptions of Climate Change and Health Care

Academics have published numerous calls for climate action, explored the role of

nursing in addressing climate change (Adrian, 2020; Harris et al., 2009; Li et al., 2021; Pocock, 2019; Sayre et al., 2010), discussed the need for and developed a planetary health framework in education (Faerron Guzmán et al., 2021; Kalogirou et al., 2020b; Kurth, 2017; Leffers et al., 2017), and investigated nurses' perceptions of climate change and health care (Kallio et al., 2020; Kalogirou et al., 2020a; Polivka et al., 2012). Both the International Council of Nurses (ICN) (International Council of Nurses [ICN], 2018) and the Canadian Nurses Association (CNA) (Canadian Nurses Association [CNA], 2009, 2017) have issued position statements identifying the need for nurses to address climate change at micro, meso, and macro levels.

Nursing organizations, such as the Alliance of Nurses for Healthy Environments (ANHE) (Alliance of Nurses for Healthy Environments, 2021) in the United States of America and the Canadian Association of Nurses for the Environment (CANE) (Canadian Association of Nurses for the Environment/Association d'infirmières et infirmiers pour l'environnement, 2021), are taking leading roles in answering this call through awareness and advocacy. ANHE is presently working with Project Drawdown on the *Nurses Drawdown* project (Nurses Drawdown, 2021) and collaborating with Health Care Without Harm on the *Nurses Climate Challenge* project (Health Care Without Harm, 2021). Both projects are aimed at educating nurses about climate change and health care and providing resources and direction about how to take action. CANE has collaborated with the Canadian Association of Schools of Nursing to create educational guidelines and a free educational e-resource called "Nursing and Climate Driven Vector-Borne Disease" (Canadian Association of Schools of Nursing, 2020; Kalogirou et al., 2019). CANE is also working on developing an environmental health education program for family nurses in Manitoba (Kalogirou et al., 2019). Ross-Kerr and Wood's *Canadian Nursing Issues & Perspectives* (McCleary et al., 2021) is the first textbook of its kind in Canada to identify climate change as a determinant of health inequity (Rempel, 2021) and promote planetary health

(Astle, 2021). Locally, nurses are working as part of multidisciplinary teams to make environmentally sustainable changes in their workplaces. Two nurses in Toronto are part of their clinic's green team. They have started a new recycling process, improved waste sorting, and completely eliminated exam table paper waste (Al Sammarai, 2020).

Many nurses understand that climate change resulting from human activity is a major issue (Anåker et al., 2015; Kalogirou et al., 2020a). In one study, 90% of the nurses believed that humans are the cause for either part or all of climate change and 66% believed that climate change is concerning (Polivka et al., 2012). However, most nurses still lack understanding, clarity, and perceived connection between their role as nurses, or the role of nursing work, and climate change. For example, many nurses are unsure if nursing has a role in climate change mitigation and view it as a higher-level issue that exists outside of the scope of patient care within a hospital, and as such, outside of their own nursing scope (Kalogirou et al., 2020a). Some nurses who do understand nursing's responsibility to address climate change doubt their ability to affect change (Polivka et al., 2012) or feel unable to translate that knowledge into action (Anåker et al., 2015).

Adding to the complexity of the situation are the nurses who do not recognize that climate change is a major health crisis that will impact all health systems. In a study conducted by Polivka et al. (2012), 25% of the nurses completing the study survey did not agree that humans are abusing the environment. Moreover, in another study, some of the participants either did not see a link between nursing and climate change, or only began to see a link as a result of their participation in the study (Kalogirou et al., 2020a). The *Nurses Climate Challenge* addresses this issue by aiming to educate 50,000 health professionals about climate change and health care by 2022 and providing nurses with comprehensive resources to start educating their colleagues (Cook et al., 2020; Health Care Without Harm, 2021). Unfortunately, nurses' uncertainty about their role in addressing climate change may have contributed to the slowed response to organizational and academic calls to action.

Actions are now being taken to create greater clarity and understanding of why and how nurses should be involved in addressing climate change.

Reasons for Nurses to get Involved

Scholars have attempted to bridge the gap in nurses' understanding and perceived ability to engage in climate action by coupling calls to action with the reasons for which nurses have a responsibility to be involved. The social mandate for nurses to promote health, which includes reducing the negative health consequences of climate change, is cited in the literature as a significant reason for nurses to become involved (CNA, 2009; Leffers et al., 2017; Nicholas, 2019; Saber, 2020). The ICN (2017, 2018) argues that climate change is an issue of social justice. Since nurses also have an obligation to promote social justice through their work, they are obligated to intervene. Being the largest group of health care professionals has also been used as a rationale for nurses to engage in climate change mitigation (Adrian, 2020; Cook et al., 2020; Harris et al., 2009; Kurth, 2017). Health promotion, social justice, and the ability to enact mass change due to sheer numbers are more than sufficient reasons to address any health issue.

Nurses' Unique Ability to Affect Change

Now that there are clear, compelling, and logical reasons for nurses to be involved in climate change mitigation in health care, nurses must understand and truly believe that they have the ability to affect change. Much of the literature lists skills and competencies of the nurse to demonstrate their suitability for climate action. The CNA (2017) states that nurses' scientific knowledge, communication skills, and experience with health promotion and behaviour change make them ideal for the task. Nurses' skills and experience in assessing and addressing health impacts and inequalities through advocacy and policy work makes them uniquely prepared to be at the forefront of climate change mitigation efforts (Divakaran et al., 2016; Nicholas et al., 2021). Certain specialized nurses, such as perioperative nurses, are said to have knowledge, skills, and judgement abilities around organization, management, and

leadership that equip them to be involved in health care sustainability (Adrian, 2020). Nurses' role as educators to patients and families, new staff, and students primes them to also be educators about climate change (Harris et al., 2009). These nursing skills and competencies will certainly help nurses address health care sustainability among other issues, but one could argue that these skills are not unique to nurses.

Allen (2014) argues that nurses are unique in being obligatory passage points through which all others in the system must pass. Health care is a complex, temporally and spatially distributed system (Allen, 2014) with heterogeneous social networks and diverse underlying paradigms (Keshet et al., 2013). In their position at obligatory passage points, nurses perform as boundary actors (Arnon et al., 2018). The term 'boundary actor' was developed by analysis of the sociological concept of a boundary object in the context of integrative health care (Keshet et al., 2013) and refers to a person who is able to function in, mediate across, and create coherence among multiple social spheres (Arnon et al., 2018). Sustainability work in health care systems requires action across professional, organizational, and departmental boundaries. Nurses, as boundary actors, are ideally situated to mediate these relationships and translate knowledge and actions across these boundaries.

Articulation work is another aspect of nursing that includes the work of a boundary actor (Allen, 2014). Strauss et al. (1985) developed the concept of articulation work, which is the work done in the background to support the primary work. Allen (2014) categorized articulation work into temporal, material, assigning action, and integrative. The mediation and translation work nurses do as boundary actors is part of integrative articulation. Articulation work is essentially the work done to align the right people with the right understanding and the right materials to do an assigned task at the right time in the right sequence to mobilize patient trajectories in a dynamic environment. Others have categorized articulation work into intraprofessional, interprofessional, and lay worker (Postma et al., 2015). Intraprofessional articulation work

involves the work necessary for the individual nurse to care for the patient. Interprofessional articulation occurs when nurses bring other actors across boundaries into the patient care network. Lay articulation work involves the nurse organizing social supports for the patient and providing education to try and minimize the amount of professional care required. Nurses proficient in articulation work could adapt the skill to climate change mitigation ensuring that the right people and departments are involved at the right time, in the right sequence, and with the right materials to create sustainable changes.

The decentralized nature of health care sustainability creates the need for boundary actors and articulation work to enact change. Facility operations, finance, marketing, purchasing, infection control, environmental services, food services, laboratory, diagnostic imaging, health care professionals, and patients and their families all need to be involved in greening health care. Nurses already work with all these departments and people as boundary actors to create and maintain patient trajectories through the system. For example, nursing is involved in mobilizing an entire network around a patient's meal. They must ensure the physician has written appropriate diet orders for the patient, which may involve the nurse bringing a dietitian or speech language pathologist into the network to assess the patient's nutritional needs and swallowing safety. Once this is complete, the nurse brings food services into the network by transmitting the physician orders so that the correct diet can be provided to the patient. This may also entail interaction with the supply chain by locating and inserting a feeding tube and contacting diagnostic imaging to confirm correct tube placement. The nurse interacts with the patient and family by providing patient-specific nutritional education. After the patient has consumed the meal, the nurse then interacts with environmental services by sorting disposable waste into the appropriate receptacle and tracking how much food was consumed (and by extension, wasted). A simple meal might result in the translation of the patient need to eight different actors in the system and mediating interactions between them as they are rarely present at the same time in the same place.

As nurses are already working as boundary actors to ensure a patient receives something as seemingly simple as the right meal, they are well situated to mediate relationships and translate knowledge across boundaries for the purpose of creating environmentally sustainable change. Nurses can translate knowledge and actions between facility operations and clinical care (Sattler, 2011) by providing information and education as new green measures are implemented (Harris et al., 2009). Whether viewing a patient meal from a patient care perspective or an environmental sustainability perspective, there are many people, departments, and organizations that must be involved. A sustainable patient meal starts with dietitians working to create balanced, locally sourced, plant-based meals and menus. Then finance and purchasing are involved in locating and procuring food from local producers and reusable or compostable tableware. Nutritional services must learn about the new meals and recipes. Environmental services will need to develop a composting program or work with existing municipal programs. Nurses, health care aides, and food service workers would need to be educated on how to properly prepare and dispose of food and tableware items. Finally, nurses would ideally provide patient education on healthy plant-based meals. A nurse leader in health care sustainability will be able to translate and mediate among all these various departments and professions to reach the goal of sustainable food services just as they would to reach the goal of an appropriate patient meal.

The work of a boundary actor is part of integrative articulation work. Nurses are also proficient in other types of articulation work, which makes them uniquely suited for sustainability work. Nurses have a keen understanding of how the disparate actors and mechanisms of the hospital come together and interact. One of the first steps in patient articulation work is to bring the patient into the system. The triage nurse gathers assessment data from various sources to understand the patient's problems and then connects them with the appropriate care network (Allen, 2014). In a similar way, nurses are able to identify sustainability issues on their units such as

unnecessary energy consumption and poor waste management (Harris et al., 2009; Kangasniemi et al., 2014). For example, nurses may notice lights being left on in unused rooms or unused electronics not being switched off. Identification of sustainability issues is enhanced by nurses' involvement in material articulation. Nurses are responsible for ensuring the supply chain meets patient demands as well as the use and disposal of items for patient care. They are at the forefront of recognizing shortages and excesses of supplies and dealing directly with packaging and waste sorting. Nurses are well situated at the obligatory passage point between the realm of patient care and supply chain management, waste reduction, and waste diversion. Not only are nurses valuable in identifying these issues, but they are also necessary to identify solutions and implement them in ways that are congruent with the workflow of the system and with optimal patient care. The same systems knowledge and skills nurses use in the articulation work that supports patient care will enable nurses to take a leadership role in climate change mitigation in health care, effectively advocate for appropriate policies, and implement meaningful change.

This discussion focuses on hospital settings because hospitals are particularly resource intense parts of health care systems and because 67.4% of registered nurses work in hospitals (Canadian Institute for Health Information, 2020). However, all nurses in all practice environments are critical to advancing sustainability in health care. One way that nurses in all practice environments can get involved is by creating or joining a green team. Green teams are multidisciplinary groups of people who work towards creating sustainable changes through awareness, education, and initiating and supporting green initiatives. More information on health care sustainability, green teams, and what individuals and groups can do to get started is available in the Appendix.

Conclusion

It is important for nurses to understand that their professional role in creating sustainable health care systems is critical. Nurses experience confusion and feelings of powerlessness related to climate change (Anâker

et al., 2015; Kalogirou et al. 2020a; Polivka et al., 2012). However, there are increasing calls to action by nursing organizations, research and education on the topic, and initiatives at local, national, and international levels. By recognizing the unique, yet often unseen, skills of nurses as boundary actors and in articulation work, nurses can be enabled to realize their potential as leaders of climate action. Nurse proficiency in mediating and translating between networks and mobilizing these networks of people and supplies to be in the right place at the right time is critical to quality patient care and to climate change mitigation in health care systems. This work adds a discussion to the developing body of literature about the role of nursing in climate action. A better understanding of this role will encourage greater inclusion of climate change mitigation in nursing curricula and empower nurses to take action towards sustainability in their practice environments. Future studies need to explore the current picture of Canadian health care from a climate perspective, the efficacy of green initiatives including the work of green teams and nurses, and how to best engage nurses to become involved in climate action. This research will help to support and guide nurses in their role as mitigators of climate change and promoters of health.

The authors declare no potential conflict of interest, associated funding nor need for any ethical permissions.

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Appendix

Sustainability Resources for Nurses

General Resources

Canadian Coalition for Green Health Care <https://greenhealthcare.ca/>

- excellent information on climate change and health care specific to Canada
- Green Hospital Scorecard reports describe what leading Canadian facilities are doing to mitigate their environmental impact
- map of green teams in Canada

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

- provides information on health care climate mitigation strategies
- describes ways that individuals and groups can start enacting changes
- presents information on current and past projects

Practice Greenhealth <https://practicegreenhealth.org/>

- access to webinars and online courses
- provides information about health care climate mitigation strategies
- has excellent information on how to get started
- networking opportunities with other health care professionals, experts, and leaders

Alliance of Nurses for Healthy Environments (ANHE) <https://envirn.org/>

- free e-textbook
- provides information on about various environmental issues and actions to take with links to supportive resources
- mentorship/fellowship program (only available in the United States of America)
- access to webinars and podcasts

Canadian Association of Nurses for the Environment <https://cnhe-iise.ca/>

- information on events and access to webinars
- focus on issues specific to Canada

Specific Tools

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

- collaboration between ANHE and Healthcare Without Harm
- access to resources about how to get started
 - how to engage with colleagues or talk to hospital administration
 - what specific changes you can make as an individual or as a team
 - how to start a green team
 - links to information about sustainable changes specific to healthcare

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

- focuses on five sustainability topics: energy, gender equity, food, mobility, and nature
- provides background information on each topic
- describes ways nurses can take actions individually and collectively with links to helpful resources