

Rhizomatic Assemblages: Connecting Climate Change to Nursing Action

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Abstract

Calls for nursing action to address climate change are resounding throughout the nursing community, yet many nurses feel ill-prepared to engage in climate action. As a collective practice discipline, nursing is beginning to take steps to address climate change. However, we argue that an obstinate internalized rigid view of what nursing is continues to be reinforced within the profession. This reinforcement happens through self-disciplining practices and the active policing of nursing knowledge and practice to conform within a bounded domain, which fails to view global issues, such as climate change, as being within the scope of nursing. To build nurses' climate action capacity, we draw on Deleuze and Guattari's (1987) concept of rhizomatic assemblages to make an explicit connection between health and climate change, as well as planetary health, but also how climate action is a moral imperative within the scope of nursing education and practice. Using examples in the four domains of nursing - education, practice, research, and policy - we present how nurses can engage in coordinated and collaborative efforts both within and outside of 'traditional' nursing practice to address the connecting and complicated pathways of a changing climate.

Keywords: climate action, climate justice, planetary health, nursing knowledge, rhizomatic assemblages

Introduction

Despite continued warnings that climate change poses a significant threat to human health, the nursing profession has been slow in engaging with this health threat and has yet to reach its full potential in climate action (Kalogirou et al., 2020; Leffers & Butterfield, 2018). While many nurses are aware of climate change's impacts on public health, most nurses do not believe that their work can effectively contribute to mitigating climate change (Xiao et al., 2016). The scale and challenge that climate change poses are daunting for nurses, who are already navigating a complex and overburdened health care system. Adding the formidable feat of climate action to nursing's scope of practice can

be intimidating, especially considering that the very act of learning about the ramifications of a changing climate can cause ecoanxiety and ecoparalysis. Nurses, who are the largest global health care workforce, hold considerable potential to make strides in mitigating a climate catastrophe and have a professional obligation to engage in preventing the health effects of climate change. To reach our full capacity in climate action, we must understand and dismantle the self-imposed barriers preventing nurse engagement. In this paper, we assert that an obstinate internalized rigid view of what nursing is remains. This view continues to be reinforced through self-disciplining practices and active policing of nursing knowledge and practice to conform within a bounded domain

that fails to view global issues, such as climate change, as being within the scope of nursing.

Background

While the human population is healthier than ever before, the environmental cost of attaining this standard results in unprecedented climate change (Kurth, 2017). Human activity (i.e., burning fossil fuels, deforestation, urbanization, and industrial processes, among others) substantially contributes to the accumulating dense layer of greenhouse gases between the earth and the sun. This accumulation impacts the balance between the incoming solar rays and outgoing infrared radiation, ultimately leading to a warming planet (Mora et al., 2018; Whitmee et al., 2015). If humans can reduce their greenhouse gas emissions and capture atmospheric carbon, the changing temperature could remain below two degrees Celsius from pre-industrial levels (Whitmee et al., 2015). In 2018, the Intergovernmental Panel on Climate Change (IPCC) asserted that the target recommendation should be no higher than a 1.5-degree temperature rise if we want to avoid expected poor health outcomes (Ebi, Berry, et al., 2018; Ebi, Campbell-Lendrum, & Wyns, 2018). Regardless of what we can achieve in reversing the trend towards climate catastrophe, we already see the health effects of a changing climate. As the earth's temperature rises, we are only beginning to bear witness to the resulting deleterious health impacts associated with increasingly erratic and severe weather patterns, increasing levels of air pollution, rising sea levels, and ocean acidification (Whitmee et al.,

2015). Without emergent action, our current unsustainable trajectory may result in the reversal of health progress made to date (Kurth, 2017), which is why nurses have an obligation to rise to this challenge.

Calls for nursing action to address climate change are resounding throughout the international professional community from nurses' unions, professional bodies, scholars, nurse activists, and networks (see Table 1). Yet, many nurses view climate change as a global issue with limited opportunities for local action, or they feel ill-prepared and report they lack the capacity and support to engage in climate action (Adlong & Dietsch, 2015; Álvarez-Garcia et al., 2018; Anåker et al., 2015; Elison-Bowers et al., 2011; Polivka et al., 2012; Ryan et al., 2020; Xiao et al., 2016). While nurses realize that climate change is a global threat, many are uncertain or unaware of the local contributions to and impacts from a changing climate. The structural constraints and disciplinary practices of nursing education have effectively prioritized an individual-level health orientation resulting in many nurses perceiving global challenges as being outside of nursing's scope of practice. While such orientation fills the immediate employment needs for acute care health care settings, it fails to provide a future-proofing approach to nursing that capitalizes on engaging the largest health care workforce in climate action.

Table 1: Nursing and Health Organizations Calling for Nursing Climate Action

Prominent Nursing and Health Organizations and Networks Calling on Nurses to Address Climate Change

Professional Organization and Networks	Geographic Area
Australian College of Nursing (ACN)	Australia
Canadian Association of Nurses for the Environment/Association d'infirmières et infirmiers pour l'environnement (CANE/AIIE)	Canada
Canadian Federation of Nurses Unions (CFNU)	Canada
Canadian Nurses Association (CNA)	Canada

Green Nurse Network	England
European Federation of Nurses Associations (EFN)	Europe
International Council of Nurses (ICN)	International
Nurses Drawdown	International
Planetary Health Alliance	International
Radical Nurses	International
Sigma Theta Tau International (STTI)	International
The Nursing Manifesto	International
Royal College of Nursing (RCN)	United Kingdom
Alliance of Nurses for Healthy Environments (ANHE)	United States
American Association of Colleges of Nursing (AACN)	United States
American Nurses Association (ANA)	United States
Catholic Health Association of the United States	United States

Disciplining Practices

Michel Foucault described discursive practices as mechanisms of power that produce discourse formation – the institutionalized ways of being in the world that define how we think and act (Clarke et al., 2018; Foucault, 1977). Dominant discourses are reinforced through institutional systems, such as laws, media, industry, and education, which gain power through disciplining practices that organize space, time, and everyday activities. For example, from the outset of a nurse’s education, nurses are socialized/disciplined to base their practice from an individual health and biomedical orientation (Butterfield, 2017; 1990; Chandler et al., 2016; Schim et al., 2007; Thorne et al., 1998; World Health Organization [WHO], 2016). Many undergraduate nursing programs emphasize developing clinical skills and competencies through curricula designed to prepare nursing students for the standardized NCLEX-RN® exam. According to the National Council of State Boards of Nursing’s (NCSBN) 2019 test plan, this exam includes minimal to no material on macro-level determinants of health (NCSBN, 2018). Thus, developing nursing students’ capacity to engage in climate action has not been recognized as a priority within many nursing schools, effectively perpetuating a discourse that

nursing must focus on an individual health perspective.

The discursive ways in which many theorists describe nursing theory also serve as a disciplining practice that effectively constrains one’s ideas of what nursing is and what it can address. Fawcett’s (1984) metaparadigm captured the core concepts of nursing – person, health, environment, and nurse – and is widely considered to have provided the unifying focus of nursing as a discipline. Fawcett’s metaparadigm became the orienting structure that defined nursing’s agenda and practice domain. Furthermore, the metaparadigm initiated the hierarchical organization of nursing knowledge (metaparadigm, grand theories, middle-range theories, and practice theories) inherited from founding nurse theorists (Dillard-Wright et al., 2020; Kalogirou et al., 2020). While this structuring of nursing knowledge was foundational in nursing professionalization, it is also responsible for nursing’s tentative engagement and presence in global issues as a unified profession, especially climate action.

The conceptualization of nursing dictates its questions, priorities, and practice areas (McEwen & Wills, 2014). This conceptualization also has significant implications on the relationship between the

boundaries of nursing as a discipline and the profession's scope (Risjord, 2010). We argue that the current way we perceive the structuring of nursing knowledge and how it is taught constrains views of what nursing is, the types of questions and challenges nurses can address, and the methods used to address them. Nurses are socialized into these discourses, which can be viewed as disciplining practices that produce subjects who internalize these discourses. Through technologies of the self, nurses continue to perpetuate them in their practice and thought.

Becoming What the World Needs

With a hierarchical organization of theory, abstract concepts are placed at the top of the pyramid (metaparadigm) and serve as the unifying focus for nursing. This view asserts that the discipline of nursing governs the profession, providing practice directives and the content of nurses' expertise (Risjord, 2010). This view also constricts nursing knowledge and practice within predefined boundaries, limiting thinking and hindering creativity. The rigidity of this organizational system contributes to the profession's self-disciplining practices that facilitate gatekeeping and the policing of what counts as nursing knowledge and practice. While the hierarchical structuring of nursing knowledge was a foundational step in professionalization, it is time to recognize the limitations imposed on current understanding and practice.

To emancipate our understanding of what nursing is and become what the world needs, we must collectively view nursing as a practice discipline where nurses derive the problems and questions for nursing research from the issues nurses encounter in practice. Thus, the task of the profession is to develop, refine, and extend nursing knowledge to inform and expand the intellectual experience of practicing nurses (Risjord, 2010). In this way, nursing remains responsive to the needs of society, and nurses can judge the progress and successes of nursing science based on the degree that it has helped address significant health issues. Therefore, the

boundaries of nursing are dynamic and shaped by the social, economic, environmental, and political pressures within specific contexts. As nurses fulfill a variety of roles to meet the health needs of society, they encounter new problems. These problems task the discipline with developing the intellectual expertise needed to address them. Practicing nurses can then use this knowledge and continue to identify further issues threatening human health and well-being. In this way, both the practice and theorizing are intertwined in a dynamic relationship to shape the boundaries of nursing. By conceptualizing nursing as a dynamic practice discipline, we open the conditions for nursing to view climate change as within the profession's scope and a demanding issue requiring extensive nursing engagement. Finally, we must draw attention to the disciplining practices of our health care system and the impacts on nursing education and practice in a changing climate.

Role of Macrosystems on Health

There has been long-standing recognition of the role of economics, globalization, and political systems in health and well-being (Commission on Social Determinants of Health, 2008; Marmot et al., 2012; Ottersen et al., 2014; Wilkinson & Marmot, 2003). There is, for example, a wide literature base around the effects of poverty and economic downturns on health (Bryant & Raphael, 2013; Labonté & Stuckler, 2016; Ruckert & Labonté, 2014), linkages between health and ecological systems (Bunch, 2016; Cunsolo & Ellis, 2018; Goodman, 2015; Hancock et al., 2015; Parkes et al., 2019), the political origins of health (Montez et al., 2020; Ottersen et al., 2014; Rochford et al., 2019), and the impacts of transnational corporations and industry on health (Anaf et al., 2019; Baum & Anaf, 2015). Despite the known importance of these conditions on health, challenges surround what they are, how they work, and what nurses can do about them.

Connecting Climate Change and Nursing

Nurses have long considered the environment a central domain of nursing practice; however, this

conceptualization of the environment is now myopic in today's world. Rather than centering the focus on the individual's surrounding environment, we must shift our focus to understanding how the environment, from a local to global scale, impacts society at large and vice versa (Kalogirou et al., 2020). To do so, we need to engage in systems thinking to recognize the complex interdependencies influencing our patients' health.

Understanding the World as a Rhizome

In line with systems thinking, Deleuze and Guattari's (1987) concept of rhizomatic assemblages provides a post-structural way of viewing and understanding the world. A rhizome is a network of connections where any point can connect to any other. There is no beginning or end, only a middle dimension in motion, continually growing and forming new connections with separate pieces that can give rise to new entities. Rhizomes are multiplicitous, adventitious structures connected in nonlinear assemblages in dynamic and fluid relations (Jackson, 2003). Assemblages are *gestalts* – heterogeneous combinations of entities greater than the sum of their parts. The conceptualization of rhizomatic assemblages shifts our view of the world from tree-and-root structures, which have a chronological start and end, and hierarchical organizations to viewing the world from 'in the middle,' at one moment in history (Deleuze & Guattari, 1987). This conceptualization shifts our view to focus on relations and spatiality to understand that everything comprising the situation is co-constitutive (Clarke et al., 2018). Within any given situation, entities become the way they are through their relations with all other entities in the situation (Clarke et al., 2018).

This post-structuralist perspective makes space for new questions and nursing roles while pushing nurses to engage with issues from a systems-level perspective. We recognize, however, that implementing a systems perspective through climate action can be challenging, but tools exist to assist in overcoming this challenge. The Planetary Health

Alliance's (n.d.) *Planetary Health Education Framework* embodies a systems perspective while also grounding this conceptualization in an organized yet dynamic interpretation of planetary health. The framework includes the following five interdependent domains: (i) Interconnection with nature; (ii) the Anthropocene and health; (iii) Equity and social justice; (iv) Movement-building and systems change and (v) Systems thinking and complexity.

As nurses begin to engage in systems thinking by conceptualizing the world as a rhizome, the *Planetary Health Education Framework* can serve as a valuable tool to develop one's understanding of climate change and address the health challenges that patients, communities, and society face. While human health has improved over the 21st century, *The Lancet* 2015 special report, *Safeguarding Human Health in the Anthropocene Epoch* (Whitmee et al., 2015) and the IPCC Assessment Reports (Ebi, Berry et al., 2018; Ebi, Campbell-Lendrum, & Wyns, 2018), summarize concerns that if we continue our current unsustainable trajectory, we could see a reversal of health progress. And considering recent health outcomes during the COVID-19 pandemic, such as more people dying in 2020 than were born in Alabama, United States, for the first time in recorded history (Clark, 2021), these concerns are valid. Therefore, including perspectives and frameworks like planetary health and systems thinking expands thinking from a biomedical health perspective to one that includes external systems and cumulative thinking about the conditions that sustain or threaten human health. And in line with Deleuze and Guattari's (1987) worldview of 'in the middle' of a moment in history, a planetary health lens focuses on relations and spatiality of external systems and cumulative thinking on human health.

Currently, nurses are already witnessing the immediate effects of climate change in every practice setting as patients who are impacted by climatic emergencies seek care. However, we must expand our understanding of the impacts of climate change, much like the rhizome. Not only

is there physical harm that can result from climate emergencies, but there are also resounding social, economic, ecological, and political impacts that patients will face. By working from a systems perspective, nurses can begin to engage in upstream interventions to prevent climate emergencies and build system resiliency.

Political Debate in a Rhizomatic World

Despite the scientific consensus, the politicization of climate change has resulted in Canadians remaining resistant to decisive and comprehensive action. The public remains divided, often along political party lines, on the proper approaches to addressing climate change and sometimes even on the very legitimacy of the climate emergency. In an era where science communication is taking a backseat to personal opinions and beliefs, nurses are needed now more than ever to advocate for evidence-based interventions and communicate climate science to the public and political leaders.

Climate change can be a polarizing topic, especially when discussing it within a political context. Due to this, health professionals may feel reluctant to engage in public discussions and political debates. Too often, but with exceptions, health professionals assert that they are not concerned with the politics of climate change but rather only its science. However, all research, theory, and practice are political because they are inextricably linked to society's social, economic, and political conditions, which impact human and planetary health (McGibbon & Lukeman, 2019). Therefore, nurses have an obligation to be civically engaged and work towards achieving optimal societal health, which involves recognizing that the causes of climate change are global, all the while there are real, local impacts that affect where people work, live, play, and learn (Fox et al., 2019). Additionally, the bulk of climate adaptive policy will be implemented at the local level where the impacts occur (Fox et al., 2019). In this local space of rhizomatic assemblages, nurses can

begin to focus on the most significant public health threat of our time.

As nurses work and think within the mobile middle space of the rhizome, they may grow their perspectives and form new health-to-planet knowledge connections, which may create relations and spatiality to political and system entities. A rhizomatic planetary health nurse will continually grow and form new relationships with separate pieces of the rhizome that can give rise to new entities, hopefully relevant to one's local practice setting, enabling the nurse to begin to understand and engage in climate action. By viewing and understanding climate action rhizomatically, we understand that local actions proliferate to form an assemblage, meaning that each local climate action increases the dimensions and multiplicity of the rhizome, effectively changing its nature and expanding its connections yielding global outcomes. This view rejects the local-global dichotomy and emphasizes that climate actions occurring at the local level creates constant movement which transforms the global context.

Nurses' Place in the Rhizome

Nursing's presence plays a critical role in nearly every facet of health care delivery, health promotion, and patient care, which positions nurses to witness the everyday impacts of climate change. Nurses are essential personnel in disaster response and knowledgeable stewards of health-related resources. These roles and experiences assert nursing's capacity in bringing specific health data, communication skills, and planning and implementation expertise to vital conversations regarding local climate action strategies. Nurses can and must help to build resilient health systems through not only their practice but also through political advocacy. Furthermore, nurses need to consider health beyond health care and step into expanded roles by working with other sectors and individuals to focus on sustainable health outcomes in all policies (Kurth, 2017). Nurses can offer powerful voices urging industry, governments, educational institutions, hospitals, and clinics to adopt climate-centred policies. Nurses'

intentional actions, whether a nurse is beginning to learn about climate change or a local union member is lobbying for climate in-all-policies, represent creating rhizomatic assemblages. These assemblages are visible in the larger rhizomatic entity of nurses taking climate action because climate change is a health risk pertinent to their practice.

Building Nursing Engagement in Climate Action and Resiliency

Nurses play essential roles in public health and acute care, education, research, advocacy, and policy through their work to reduce and respond to the health consequences of climate change. In this and the following section, we outline how nurses can plan and act to mitigate and respond to the health consequences of climate change in the four domains of nursing: education, practice, research, and policy. This multidimensional climate change and health assessment we present here requires coordinated and collaborative efforts both within and outside of 'traditional' nursing practice to address connecting and complicated pathways.

Education

Nursing education and nurse educators play a fundamental role in preparing current and future registered nurses to address the wide-reaching health impacts of a changing climate. We organize the following recommendations according to three populations: nursing students, practicing nurses, and patients.

Generally, nurses and nursing students feel unprepared to address climate change (Álvarez-García et al., 2019; Elison-Bowers et al., 2011; Ryan et al., 2020). With nursing students' feelings of unpreparedness, nurse educators and curriculum developers are responsible for filling this gap and educating students about current practice issues related to planetary stewardship. We offer a broad set of nursing education recommendations that address critical perspectives, approaches, topic areas, and strategies. Recommendations are as follows:

- In alignment with the *Planetary Health Framework*, education should emphasize the reliance of human health on local and global ecosystems and build undergraduate students' eco-health literacy about Ecological Determinants of Health (EDoH), by depicting the links between climate change, human health, and planetary health (Maxwell & Blashki, 2016; Planetary Health Alliance, n.d.; Vold et al., 2020). We offer examples of such tools throughout this paper and the work we reference.
- Integrate and layer the 17 United Nations (UN) *Sustainable Development Goals* throughout education and course design while also emphasizing the need for sustainable health systems (Rosa & Upwall, 2019; United Nations, n.d.).
- Articulate how nursing's code of ethics and standards of practice necessitate active citizenship and professionalism. Then, translate these standards to nurses' responsibility to engage in advocacy and policymaking. By using transdisciplinary approaches that emphasize planetary health, adapting nursing standards of practice to incorporate systems thinking will assist in improving planetary health competencies (Lopez-Medina et al., 2019; Vold et al., 2020).
- Develop nursing students' critical appraisal and science communication skills to articulate the connection between health and local and global ecosystems to translate planetary health knowledge effectively. This education can develop in complexity and analysis throughout all nursing education levels and delivery modalities (Leffers et al., 2017; Vold et al., 2020).

Secondly, once nurses transition to practice, their education opportunities are usually through continuing education training for license renewal or left to individual aspirations. Public health nurses cite the lack of time and interest at work to seek out and incorporate environmental health in their practice (Hill et al., 2010), highlighting

the importance of organizational support for planetary health continuing education opportunities. For climate change and health praxis, frontline nurses require support from their nurse managers. Still, professional bodies and networks are also responsible for supporting this work within their professional standards.

Recommendations for organizations and managers in health care settings are as follows:

- Provide specialized mental health first aid that includes climate change-related *psychoterratic* syndromes (Hayes et al., 2018), which provides nurses with an accurate diagnosis that reflects their patient's lived experience and is quantifiable for admission data collection.
- Continuing education programs should be free or inexpensive and offered through online platforms and staff in-services, which target the EDoH of the communities in which nurses provide care (Hill et al., 2010; Vold et al., 2020).
- Build upon, update, share, and implement the work that is already being done by the nursing community, such as the discussion and position papers from the Canadian Federation of Nurses Unions (CFNU) and Canadian Nurses Association (CNA) (CNA, 2008a, 2008b, 2017a, 2017b; Martin & Vold, 2019).
- Develop and complete practice setting eco-audits, create greening workplace committees or sustainability offices in health care settings. Alberta Health Services (AHS) Environmental Sustainability office is a Canadian example of this (AHS, 2020). These options may include identifying the carbon footprint of a workspace to identify areas for improvement and provide a benchmark from which goals can be set to reduce the setting's carbon footprint.

Thirdly, as patient education and health promotion are central to daily nursing practice,

we offer essential perspectives and strategies for nurses to educate their patients, as follows:

- Climate change and health communication strategies should be explicit, locally, and temporally informed, and promote the co-benefit of mitigation strategies to resonate with the target population in their deliverables (Hayes et al., 2018; Hayes & Poland, 2018; Kitt-Lewis et al., 2020). This communication skill requires that nurses 'know their patients.' Within the context of climate change, this includes knowing the histories of communities in their geographical region.
- Nurses can start to use mental health climate change terminology, such as 'ecoanxiety,' 'ecoparalysis,' and 'solastalgia' or 'ecological grief,' as a way of articulating human emotional, spiritual, and psychological impacts to reduce stigma (Albrecht, 2011; Albrecht et al., 2007; Bourque & Willox, 2014; Hayes & Poland, 2018; McCue, 2018). We encourage nurses to start using this terminology in their verbal and written communication with their patients and colleagues to create a sustainability work culture.
- In addition to engaging with patients, nurses should regularly engage in critical discussions with friends, family, and colleagues to provide evidence-based information on climate change and action. This form of public advocacy is urgently needed to advance climate change awareness and action.

Practice

While most current nursing representation in climate action is in downstream approaches (Polivka & Chaudry, 2018; Sullivan-Marx & McCauley, 2017), important upstream nursing work is being done to ensure the best possible health outcomes for future generations (Leffers & Butterfield, 2018). To mitigate the consequences of climate change on health and harness the full collective potential of the

profession, we include both downstream and upstream responses.

Downstream

- Participate in creating disaster response and management and climate change adaptation plans, but also frequently revisit these plans post climatic events. As nurses develop strategies for agencies, health authorities, or communities, they should seek out and include local knowledge, Indigenous knowledge, interprofessional engagement, and community involvement in shaping the implementation of mitigation and adaptation strategies (Adger et al., 2012; Burrows & Kinney, 2016; Rosa & Upvall, 2019; Walker et al., 2021; Willox et al., 2012).
- Promote individual behavioural actions. Wynes and Nicholas (2017) found that eating a plant-based diet, avoiding air travel, living car-free, and having smaller families were significant high-impact personal actions (saving at least 0.8 tons of carbon dioxide equivalents (tCO₂e) per person per year) and were consistently high-impact behavioural actions across industrialized nations.

Upstream

- Promote environmental sustainability. Nurses can do this through pollution reduction strategies, building resilient communities, actively divesting from fossil fuels while supporting a just transition, and increasing the public's understanding of the connection between their health and planetary health. Nurses can advocate for these measures across sectors through advocacy and voting, and inside the health care system to engage in efforts to reduce the environmental footprint of the health care sector (Hayes et al., 2018; Hayes & Poland, 2018).

- Employ mapping tools to screen communities for environmental health risks. Mapping tools can assist in measuring exposure and changes associated with exposure, and potentially uncover mechanisms of exposure-related disease or adverse health outcomes (Amiri & Zhao, 2019), such as pollution risks living near manufacturing facilities and industrial plants.
- Apply systems thinking and multidisciplinary perspectives. Nurses can begin to shift their individual health-oriented paradigms to one that expands the understanding of health to include interdependent human, animal, environment, and overall planetary well-being. Together, these may recalibrate nurses' future roles and responsibilities in addressing climate change to develop sustainable health services and programs (Hansen-Ketchum et al., 2009; Vold et al., 2020; Walker et al., 2021).

Research

Nurse scientists and scholars are uniquely situated to conduct climate change and health research. Nurse scientists and scholars should leverage their trusted position in society (Insights West, 2018; Reinhart, 2020) in translating their scientific literature to the public as trusted knowledge brokers (Heinsberg & Conley, 2019). These qualities will assist nurse researchers in the climate change domain with the following recommendations, directions, and strategies:

- Develop climate change-related metrics. These metrics may include emergency and primary care diagnosis coding and using different omics to identify climatic-related metabolites. These metrics and omics can offer nurse scientists a tool to measure exposure, demonstrate molecular phenotypic changes associated with exposure, and potentially uncover mechanisms of exposure-related disease or adverse

health outcomes (Heinsberg & Conley, 2019).

- Map timing and triggers of climatic insults. Researchers can learn more about the timing and triggers of health outcomes related to climate change hazards and disasters (e.g., initial versus delayed impacts, both positive and negative; Hayes & Poland, 2018).
- Locally informed, innovative, and disruptive research. Conduct place-based research with various stakeholders to inform preparedness plans and policy decisions while also introducing novel and disruptive research that asks fundamental and uncomfortable questions. This research is essential to mitigate the potential health impacts of climate change (Burrows & Kinney, 2016; Walker et al., 2021).
- Model eco-ethical leadership and research. Researchers can approach climate change-related research grounded in critical theory and a social justice orientation. Using a critical theory, social justice, and intersectional lens will assist researchers in incorporating an equity- and trauma-informed approach that considers the nuances of the interactions of different identities of people and explores climate change impacts, ethically (Nicholas & Breakey, 2019; Rochette, 2016; Walker et al., 2020; Walker et al., 2021; Williams, 2018; Williams et al., 2018).
- Expand subpopulation-specific research. Especially for population-specific nurse researchers, their expertise can offer their specialized insights into the experiences of unique demographics such as older adults or children (Leyva et al., 2017; Rosa & Upvall, 2019).
- Explore the environmental impacts of nursing practice, including product evaluation, comparisons of the carbon impacts of care methodologies, carbon assessments of materials used for nursing care, and efficacy assessments of current nursing climate initiatives.

Policy

Nurses have prolonged and frequent close interactions with patients, giving them invaluable insight and appreciation of their patients' needs and the conditions that brought them together. This firsthand experience of multiple patient experiences gives nurses expert knowledge of how macro conditions impact patient health. Therefore, nurses have insider knowledge that can significantly contribute to the policies shaping health and the lived experience of policy outcomes. Given this insider knowledge and experience, nurses have a moral imperative to intervene in health policy to address structural and macro conditions (McGibbon & Lukeman, 2019), which for climate action, includes the following recommendations:

- Engage in public discussions, debates, town halls, or forums about climate change and communicate evidence-based climate science to the public and public policy debate.
- Assert the need for nursing roles in conversations and decisions concerning local climate-adaptive policies while advocating for organizational climactic event response strategies.
- Advocate for climate-friendly policies in nursing work settings, communities, and municipal government and call for professional organizations' engagement.
- Engage with local organizations to assist in climate-proofing policies or implement planetary-health-in-all-policies (i.e., engaging with mental health organizations to prepare providers for responding to extreme climate events; Hayes et al., 2018; Hayes & Poland, 2018).
- Demonstrate support for climate-oriented policies through physical presence at climate demonstrations or raising awareness through various avenues such as social media, calls to action, or policy briefs.

Conclusion

The Canadian health care system is already straining with an aging population, an opioid-poisoning and problematic substance use crisis, growing health and income disparities, economic constraints, resource-intensive infrastructure, and now, a global pandemic. These strains create distinct and visible challenges that nurses experience working in the health care system. The exacerbation and compounding health impacts of climate change may not be as visible, however. Nonetheless, the worsening health outcomes will continue and become more acute. Assessing vulnerability, outcomes, and resilience amid the impacts of climate change is new for many health care providers. Still, Canadian nurses need to be prepared to help patients and communities and be strong advocates for improving our environment. As a frequently most trusted profession (Insights West, 2018; Stone, 2019), there is excellent potential in mobilizing a collective effort and action in a unified voice for change. Global and local movements should build resilience and adaptation to climate change. Canadian nurses have a moral and professional obligation to engage in climate action, and nurses can take the lead in mobilizing action on a local and large scale.

The historical discursive traditions of nursing knowledge and practice have institutionalized the ways nurses think and act, which, due to their training to meet practice standards and pass the standardized NCLEX-RN® exam, have been limiting nursing capacity to engage in climate action. While the nursing metaparadigm has been foundational in nursing professionalization, we find it restrictive in engaging with global issues as a unified profession, especially climate action. Alternatively, viewing nursing using Deleuze and Guattari's (1987) concept of

rhizomatic assemblages makes space for new questions and nursing roles while pushing nurses to engage issues from a systems-level perspective. Orienting the nursing agenda and practice domain as a gestalt – a heterogeneous combination of entities greater than the sum of its parts – shifts nurses' view of their practice boundaries to one that focuses on relations and spatiality to understand climatic change health impacts.

We are in the middle of a profoundly and potentially irreversible climate catastrophe at this moment in history. As outlined in this paper, every nurse in any field or setting can begin to engage in disciplining practices to internalize their role in addressing climate change and push the boundaries of nursing knowledge and practice. As nurses are positioned squarely at the center of patient care activities, we have the capacity, skills, and knowledge to be set at the centre of climate action – which is firmly grounded in the social justice and moral imperatives of nursing practice. Now is the time to get comfortably uncomfortable within the rhizome – to grow beyond the self-imposed barriers and nurture the links to further our collective action.

Ethical Permissions

Not applicable due to the lack of human and/or animal participants.

Declaration of Conflicting Interests

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