Nursing Practice and Context: The Relationship Between the Hospital Setting and Environmentally Responsible Practice

by

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Abstract

Aim: The purpose of this study was to answer the following question: What are Albertan nurses' beliefs related to climate change, health, and nursing practice, and how is their ability to practice in an environmentally responsible manner influenced by their workplace setting? **Background:** Climate change is a global crisis. Besides having implications for Earth's natural systems, climate change also has negative consequences for human health. The health sector finds itself in a unique position where its purpose is to deliver healthcare services and keep populations healthy, however, it is also a significant emitter of greenhouse gases; these gases contribute to the climate crisis. Nurses comprise the largest group of healthcare practitioners around the world and their work is guided by their mandate to promote health. As such, they are well-positioned to be leaders in addressing climate change. However, little is known about how Albertan nurses understand climate change or its relationship with health and nursing practice. Moreover, it is not well understood how working in the hospital setting, where most Canadian nurses are employed, influences nurses' abilities to practice in environmentally responsible ways. **Methods:** A focused ethnography was conducted at a large western Canadian hospital. Nurses working in three medicine units and the emergency room participated (n=22). Semi-structured interviews were conducted, and observations were collected. A document analysis of policies outlining how staff should utilize, spare, or waste hospital resources was also conducted. **Results:** Three manuscripts resulted from this work. 1) The first manuscript presents the findings from the document analysis, in which the hospital did not integrate climate change into its workplace policies, thus suggesting that this was not an organizational priority. 2) The second manuscript answers the first half of the research question and identifies nurses' perspectives on climate change, health, and nursing practice. 3) The final manuscript answers the second half of the research question.

Findings show that nurses felt unable to prioritize environmentally responsible practice (ERP) or climate change because they did not feel like their organization supported them in doing so.

Conclusion: First, nurses had diverse understandings of climate change, health, and nursing practice. This could be an indication that climate change is not widely viewed to be a professional nursing concern yet. Second, nurses did not feel supported by their workplace setting to promote ERP or prioritize climate change and wanted to see change coming from the top-down. Although top-down change is important, and partnership between nurses and their workplace is essential, nurses must also enact change from the bottom-up. Climate change is a complex problem, and nurses must take on a leadership role to address it.

Preface

This thesis is an original work by Maya Kalogirou. The research project, of which this thesis is a part, received research ethics approval from the University of Alberta Research Ethics Board, title: "The Relationship Between the Hospital Setting and Environmentally Responsible Practice," Pro00087129, April 12, 2019.

Chapter Three of this thesis has been published as Kalogirou, M R., Dahlke, S., Davidson, S., & Yamamoto, S. (2020). Nurses' perspectives on climate change, health and nursing practice. *Journal of Clinical Nursing*. doi:10.1111/jocn.15519. I was responsible for the study conceptualization, data collection and analysis, and the manuscript composition. S. Dahlke and S. Davidson were my supervisors and contributed to the study conceptualization and manuscript editing. S. Yamamoto was a member of my thesis committee and assisted with editing and refining the manuscript.

Dedication

"Two Muses"
There are, it seems, two muses: The Muse of Inspiration, who gives us inarticulate visions and desires, and the Muse of Realization, who returns again and again to say, 'it is yet more difficult than you thought.' This is the muse of form. It may be then that form serves us best when it works as an obstruction, to baffle us and deflect our intended course. It may be that when we no longer know what to do, we have come to our real work and when we no longer know which way to go, we have begun our real journey. The mind that is not baffled is not employed. The impeded stream is the one that sings.
- *Wendell Berry*

It is with great pride and pleasure that I dedicate this dissertation to my family, friends, and partner. To my parents and brother, thank you. This experience would not be possible without your endless love and support and it is a privilege to dedicate this work to you. Abba, thank you for always being curious about my work, the endless hours of career coaching, and for reminding me that there is, in fact, a light at the end of the tunnel. Ima, thank you for your never-ending optimism and for being my greatest cheerleader. Thank you for always being present and loving me unconditionally. Amir, thank you for not only being my brother but for also being my friend. You have inspired me to persevere and fight for the things that are important to me. To my Sabbas and Savtas, it is an honour to dedicate this work to you. I wish you were here to share this experience with me. To the Kalogirous and the Klippensteins, thank you for all the love and support you have all shown me throughout this process. I feel privileged to call you my family and am grateful for your presence in my life.

To the friends who have carried me through these past five years and beyond, thank you. This experience would not be possible without your endless love and support and it is a privilege to dedicate this work to you. Thank you for believing in me, for genuinely trying to understand what it is that I study, and for offering perspective by reminding me that there is a world beyond the thesis. Thank you for the countless weekends of dancing and laughter, and thank you for understanding when I was unavailable and out of sorts. I am so grateful for all the good (and the

hard) times with you. They say friends are the family you choose, so thank you for continuing to choose me.

Finally, to my beloved Nicholas, thank you. This experience would not be possible without your endless love and support and it is a great privilege to dedicate this work to you. You have been a pillar of stability, love, and compassion throughout this experience and words simply cannot express my gratitude for you and the life we are building together. Dedicating this dissertation to you, a culmination of the last five years of my work, seems hardly comparable to the emotional support, generosity, encouragement, kindness, and love that you have dedicated to me during this time. Thank you for constantly reminding me that I can achieve my dreams, for loving me in the ways I need to be loved, and for seeing me for who I am and what I am capable of. Thank you for always holding me accountable to a high standard, for pushing and challenging me, and for helping me grow and become the person that we can both be proud of. Thank you for striving in love with me; I love you deeply and forever.

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I would also like to acknowledge my supervisory committee. Dr. Shelby Yamamoto, thank you for providing your invaluable perspective and expertise throughout the different phases of this dissertation. You have helped advance both my work and my critical thinking, and I am grateful for all the constructive feedback you have offered over the years. Working with you has been a pleasure. Finally, I would also like to acknowledge Dr. Solina Richter and Dr. Hannah O'Rourke for helping me develop my doctoral work. Your input and feedback were essential, and I know that the final work is stronger because of you.

Table of Contents

List of Tables

List of Figures

Chapter One: Introduction

At the time of writing, this period is the warmest in the history of modern civilization; over the last 115 years, global average surface air temperature has increased by about 1.0ºC (U.S. Global Change research Program). This warming is attributed to climate change, a phenomenon that the Intergovernmental Panel on Climate Change defines as "a change in the state of the climate that can be identified… by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer" (Matthews, 2018). Alternatively, the United Nations (2011) defines *anthropogenic* climate change, the primary focus of this work, as: "… a change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is in addition to natural climate variability observed over comparable time periods" (p. 2). While there are various drivers that contribute to the changing climate, human activity has been the most impactful; burning of fossil fuels specifically has been linked to the emission of greenhouse gases, which accelerates climate change (Intergovernmental Panel on Climate Change [IPCC], 2014; National Aeronautic Space Administration, n.d.). "Human influence on the climate system is clear, and recent anthropogenic emissions of green-house gases are the highest in history" (IPCC, 2014, p. 2).

The Earth is warming, and Canada is warming at about double the magnitude as the rest of the world; greater increases in temperatures have been noted in the North, the Prairies, and northern British Columbia (Government of Canada, 2019). Changes are being noted in precipitation levels, and many parts of Canada receive less snowfall in the winter and more rainfall in the summer (Government of Canada, 2019). Extreme temperatures are also being affected, where warmer temperatures are becoming hotter and colder temperatures are becoming

less cold (Government of Canada, 2019). Summer sea ice is disappearing, glaciers are thinning, permafrost is melting, freshwater availability during summer is being reduced, the oceans are warming and becoming more acidic, sea-levels are rising, and coastal flooding is expected in many coastal regions across Canada (Government of Canada, 2019). These changes are threatening our natural world and systems, and moreover, our health.

Climate change has major consequences towards human health (Berry et al., 2014; IPCC, 2014). The IPCC states that climate change can increase the frequency of cardio-respiratory disease, death, disease, injury due to heatwaves, levels of malnutrition (which has severe consequences towards child development), and ultimately increase the global costs of healthcare services. In Canada, the health risks relate to concerns in air quality, food and water quality, zoonoses and vector-borne diseases, natural hazards, and ultraviolet radiation (Berry et al., 2014). Given the increasing pressures that climate change is placing on human health, healthcare practitioners around the world are being called upon to re-define climate change as an emerging health crisis (Adlong & Dietsch 2015; Whitmee et al., 2015).

Nurses especially play a key role in handling environmental issues. First, nurses are the largest group of healthcare practitioners around the world (World Health Organization, 2016), and they have a professional mandate to promote health in all domains (International Council of Nurses, 2012). Given climate change's negative effects on health, one can argue that nurses have a professional and ethical duty to address the phenomenon. Second, nurses are well positioned to become leaders in this field because they work closely with patients, understand the processes of resource usage, waste management, and energy consumption (Kangasniemi et al., 2013). Finally, almost 64% of nurses are employed in the hospital setting in Canada (Canadian Institute for

Health Information, 2017). Thus, in Canada it is especially important to understand how nurses working in the hospital setting can address climate change.

Background

Several nursing groups have been addressing climate change for some time at the ground level (for example, the Canadian Association of Nurses for the Environment, the Alliance of Nurses for Healthy Environments, or the Nurses Health Study 3). These groups coordinate on-the-ground efforts to advance the subject of climate change in nursing through policy development, nursing education, research, and advocacy. Through the work of these groups and other nursing scholars, a growing body of literature is starting to emerge that defines nursing's role is in addressing climate change. Nurses working in the hospital setting can address climate change by: 1) serving as essential workers during climate disasters, help manage and prepare their facilities for such events, and can lead efforts that prepare for the incoming surge in demand for emergency services (Cook et al., 2019; Kurth, 2017; Leffers & Butterfield, 2018; Sayre et al., 2010); 2) working with patients and their families and are trusted communicators of critical climate health information (Allen, 2015; Kurth, 2017; Sayre et al., 2010); 3) getting involved in hospital decision-making, an arena they have important influence on (Cook et al., 2019); and 4) designing and implementing climate health strategies for the hospital (Leffers & Butterfield, 2018). Despite these advancements, a gap in the academic literature still remains regarding nursing and climate change (Lilienfeld et al., 2018).

The lack of academic research is problematic as nurses are critical actors in promoting environmentally responsible practice (ERP) and addressing climate change (Kangasniemi et al., 2013). The purpose of ERP is to: 1) reduce energy consumption, primarily electricity; and 2) encourage responsible consumption of products and materials, specifically ensuring responsible

purchasing as well as appropriate waste management (Kangasniemi et al., 2013). Scholars identified that "research studies, [both] qualitative and quantitative, were poorly represented in the literature and are needed to further understand the knowledge and attitudes of nurses regarding climate change, sustainability, and nursing" (Lilienfeld et al., 2018, p. 489). Only three studies were found when searching for studies that relate to nurses' attitudes on climate change and nursing.

The first study was conducted in the United States by Polivka et al. (2012). In this work, public health nurses across the country were surveyed on their attitudes towards climate change and the role of public health nursing in addressing the health-related impacts of climate change. The researchers found that participants, while understanding that nurses did have a role to play in addressing climate change, did not feel equipped to do so due to limitations within their division (limited resources and personnel). The second study was conducted in Sweden by Anåker et al., (2015) with nurses working in hospitals, primary care, and emergency medical services. Once again, participants in this study recognized that nurses had a responsibility to address climate change, yet they also did not feel equipped to prioritize the environment when there were other pressing demands placed on them. As such, climate change and the environment were not prioritized. The third study was conducted by Laan (2014), who studied public health nurses in Ontario, Canada, and similar results were identified.

Although one study on the subject was completed in Ontario, more work is still needed to understand Canadian nurses' perspectives on climate change. It is even more essential that this work be conducted in Alberta, where there are no studies examining Albertan nurses' perspectives on climate change. Alberta has a complex relationship with its oil sands; on one hand, the oil sands provide financially for the province and its citizens, yet on the other, they are

major drivers of climate change. The Albertan oil sands are the third largest oil reserves in the

world, and in 2017 the sector employed over 140 000 people and accrued almost $1.5 billion in

revenue (Government of Alberta [GOA], n.d.). Alternatively, the oil and gas sector also

accounted for 26% of Canada's overall GHG emissions (Environment and Climate Change

Canada, 2018). As such, it is important to recognize that the Albertan nurse may hold a different

perspective on climate change than a nurse working in another part of Canada.

Overall, more work is needed to understand how nurses can address climate change, and

furthermore, how their ability to do so is impacted by their place of work. This is especially

significant for nurses who work in Albertan hospitals and how this setting influences their ability

to practice in environmentally responsible ways. As such, the purpose of this study was to

answer the following research questions: What are Albertan nurses' perspectives on climate

change, health, and nursing practice, and how is their ability to practice in an environmentally

responsible manner influenced by their workplace setting? See Appendix A, B, C, and D for the

interview guide, information letter, consent form, and demographic information form.

Sub-Questions

The following sub-questions were also used to help guide this study:

1. How does a healthcare organization incorporate ERP into its policies? What do the
   policies related to the procurement, utilization, conservation, and disposal of workplace
   resources reveal about the organization's perspectives on climate change?

2. How do nurses practicing in an Albertan hospital understand climate change and its
   relationship with health and nursing practice?

3. How does working in the hospital setting influence nurses' abilities to promote ERP in
   the workplace or practice in environmentally responsible ways?

Dissertation Papers

This dissertation is comprised of three papers that directly relate to each of the guiding sub-questions. The first paper, *Integrating Planetary Health into Healthcare: A Document Analysis*, helps answer the first research sub-question. This work offers an analysis of all relevant organizational policies that dictate how staff should utilize, spare, or waste hospital resources. Although this paper is not specifically aimed at nurses (many of these policies impact other hospital employees as well), its primary purpose is to represent the organization. This paper helps describe the workplace context of the participants and offers a supporting framework for participants' perspectives. Overall, it was found that the healthcare organization did not prioritize climate change, and instead, the organization prioritized the safety of employees, patients, and the public. While these are important functions of any healthcare organization, there was a lack of consideration to global safety and health. This paper identifies that hospitals, and generally all healthcare systems, also have a role in addressing climate change. Furthermore, this paper offers recommendations for how hospitals can integrate a planetary health perspective into their settings.

The second paper, *Nurses' Perspectives on Climate Change, Health and Nursing Practice*, helps answer the second research sub-question and part of the primary research question. This work utilized participant and observational data to develop themes related to nurses' perspectives on climate change, health, nursing practice, and the relationships between these concepts. Ultimately, it was found that participants had differing knowledge levels on climate change and its relationship to both health and nursing practice. As such, they were also uncertain about nursing's role in addressing climate change. Although the area is being developed, this paper demonstrates that more work is needed before climate change is widely

viewed to be a professional nursing concern. The findings from this paper and the one prior both offer important background context necessary to answer the final research question.

The third paper, *The Impact of Context on Practice: How the Hospital Setting Influences Nurses' to Practice in Environmentally Responsible Ways*, helps answer the final research sub-question and the other portion of the primary research question. Like the second paper, this work utilized participant and observational data to develop themes related to how the hospital setting influenced nurses' abilities to practice in environmentally responsible ways. Findings suggest that nurses felt unable to promote ERP in the workplace or consider climate change and other environmental concerns for two main reasons. First, participants felt too overwhelmed by their current workload that caring for the environment alongside their patients seemed unachievable. Second, participants felt unsupported by their hospital organization; when the hospital did not prioritize climate change, it was difficult for nurses to also do so. This paper concludes that hospitals and healthcare systems must work in partnership with nurses and other healthcare professionals to address climate change in the workplace. This paper, in conjunction with the first two, help answer the primary research question as well as important research gaps.

Chapter Two:

Integrating Planetary Health into Healthcare: A Document Analysis

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Abstract

Background: Anthropogenic climate change poses a major health risk to humankind. The healthcare sector both contributes to climate change and is vulnerable to its impacts. Healthcare's greenhouse gas emissions are primarily derived from its supply chain: the production, transport, and disposal of goods. **Methods:** Document analysis was used to investigate the workplace policies of one large, western Canadian healthcare organization. Policies that indicated how employees should engage with resources were reviewed through the lens of environmentally responsible practice and planetary health. Content and thematic analysis were applied. **Results:** Four themes were identified: procurement of resources, resource utilization, resource conservation, and waste management. **Conclusion:** There was little evidence of environmental or climate impact consideration within the organization's policies. **Implications:** Healthcare organizations could benefit from integrating a planetary health perspective into their policies to deliver healthcare that considers the health and safety of both humans and the climate.

Key words: Climate change, healthcare, policy analysis, planetary health

Integrating Planetary Health into Healthcare: A Document Analysis

Some suggest that we are living in the Anthropocene epoch – an era defined by a global environment dominated by human activity (Scranton, 2015; Steffen et al., 2007; Steffen et al., 2011; Zalasiewicz et al., 2008). Anthropogenic climate change is a term given to the global warming effects caused by human activity, predominantly through the rise of greenhouse gases (GHGs), and is a global crisis affecting all present and future generations of humanity (Klein, 2014). According to the Government of Canada's (2019) climate change report, Canada is warming at about double the magnitude as the rest of the world, and greater increases in temperature have been observed in the North, the Prairies, and northern British Columbia. This has resulted in major changes in precipitation where many parts of Canada receive increased amounts of rainfall and generally less snowfall, as well as changes in extreme temperatures where warmer temperatures have become hotter and cold temperatures have become less cold (Government of Canada, 2019). This warming has led to decreases in summer sea ice, thinning glaciers, warming of permafrost, and decreases in freshwater availability during summer (Government of Canada, 2019). The oceans surrounding Canada have also warmed, become more acidic, and less oxygenated (Government of Canada, 2019). The melting ice caps are causing sea-levels to rise, and coastal flooding is expected to increase in many areas of Canada (Government of Canada, 2019). While climate change is threatening our natural systems, another major concern is the negative impacts it has on human health.

Background

Globally, climate change is associated with increasing levels of malnutrition (with even greater consequences towards child development), death, disease, injury due to heatwaves, a growing frequency of cardio-respiratory disease, and increasing costs of healthcare services

(Intergovernmental Panel on Climate Change, 2014). While climate change impacts each country differently, Canada is at risk of 1) worsening air quality due to air pollution, wildfires, and environmental allergens; 2) increases in water-borne diseases due to contamination of drinking and recreational water; 3) increases in food-borne illness due to changes in marine environments that result in algal blooms and higher levels of toxins in fish and shellfish; and 4) increases in vector-borne and rodent-borne diseases (including increases in diseases native to Canada, introduction of new diseases, and possible re-emergence of diseases previously eradicated) due to changes in biology and ecology of disease-carrying insects, ticks, and rodents (Berry et al., 2014). The impacts on health are becoming so severe that healthcare organizations and practitioners around the world have been called upon to re-define climate change as an emerging health crisis (Adlong & Dietsch 2015).

Figure 1:

Impacts of Climate Change on Health
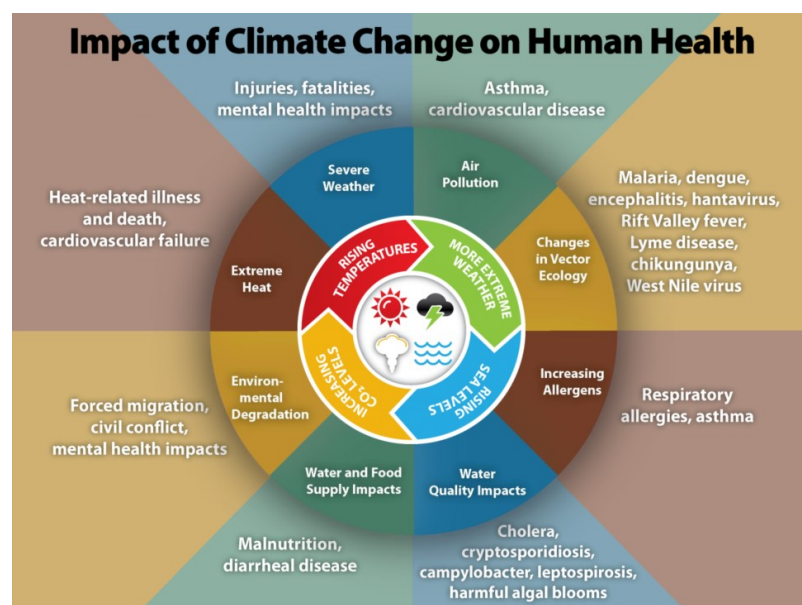
Source: Centers for Disease Control and Prevention (CDC), 2020. Use of this image does not imply endorsement of this work by the U.S. Government, Department of Health and Human Services, or CDC. This image is available on the CDC website, free of charge.

Healthcare systems are substantial contributors to GHG emissions, and if the global healthcare sector were a country, it would be the fifth-largest emitter on the planet (Health Care Without Harm [HCWH] & Arup, 2019). Moreover, "[the] lion's share of emissions — 71% are primarily derived from the health care supply chain… through the production, transport, and disposal of goods and services, such as pharmaceuticals and other chemicals, food and agricultural products, medical devices, hospital equipment, and instruments" (HCWH & Arup, 2019, p. 5). Paradoxically, healthcare systems are also highly vulnerable to the effects of climate change, including; damaged hospital infrastructure, adverse effects on human health, disrupted supply chains, and threatened resource security (Chung & Meltzer, 2009; Costello et al., 2009; McGain & Naylor, 2014; Weaver et al., 2010). Given this paradoxical relationship, a planetary health perspective is needed. Planetary health has been defined as:

> ... the achievement of the highest attainable standard of health, wellbeing, and equity worldwide through judicious attention to the human systems—political, economic, and social—that shape the future of humanity and the Earth's natural systems that define the safe environmental limits within which humanity can flourish. (Whitmee et al., 2015, p. 1978)

A planetary health perspective suggests it is important to understand how healthcare organizations around the world can deliver high quality healthcare services while also considering the health and safety of the environment and the climate. One significant consideration is addressing the supply chain of hospital resources**.**

Purpose

This document analysis is part of a larger study aimed at understanding how working within the hospital setting influences nurses' ability to practice in an environmentally responsible

manner. The first part of that study investigated nurses' perspectives on climate change, health, and nursing practice. This work reflects the second part, where we examined how an organization promoted environmentally responsible practices. Specifically, we investigated how the organization dictates employees should procure, utilize, conserve, and dispose of resources. The purpose of this study was to answer the following: How does a large western Canadian healthcare organization incorporate environmentally responsible practice and planetary health into its policies, and what do policies related to the procurement, utilization, conservation, and disposal of workplace resources reveal about the organization's perspectives on climate change?

Method

Document Analysis

"Documents are 'social facts,' in that they are produced, shared, and used in socially organized ways" (Atkinson & Coffey, 2004, p. 58). When analysed, documents can provide valuable information about the settings being studied, their wider contexts, and details on the key figures of the organization (Hammersley & Atkinson, 2007). A document analysis was conducted on policies dictating how and when employees should utilize resources, and the following sub-questions were asked: 1) How does the organization guide the procurement, utilization, conservation, and disposal of resources? 2) What environmental and/or climate change priorities, attitudes, and perspectives can be identified though organizational policies' related use of resource?

Data Collection

Inclusion Criteria

Policies were included if they outlined how hospital resources were procured, utilized, disposed of, or conserved. Policies were included if they were relevant to the acute care setting

(where nurses participating in the larger study were employed) or related to the organization's Waste Management System. This meant that some policies outlined resource-usage but were not necessarily aimed only at nursing staff. For example, some policies were meant to direct staff working in the Medical Device Reprocessing department, and although these policies did not directly influence nursing practice, they were deemed to be relevant in identifying the organization's perspective on workplace resources. If policies discussed infection control and utilization of resources, they were included. Select supportive and supplemental resources were included if they related to utilizing and disposing of resources and helped support staff in these practices.

Screening Process

On March 10, 2020, the organization's public-facing website was accessed, and their policies and guidelines were located. These were regional policies and guidelines that every organization within the province utilized. Policies and guidelines were divided into 16 different groups, so a preliminary scan of group titles was conducted. Groups were included if they seemed likely to include policies that directed employees in how to procure, utilize, or dispose of workplace resources. If there was uncertainty about whether a group contained such policies, it was included. Headings that were clearly irrelevant to workplace resources were excluded (e.g., nutrition guidelines). From the 16 original groups, only three were included: clinical policies and procedures (n=220), corporate policies and procedures (n=108 – 3 (repeats)=105), and influenza: general reference documents and guidelines (n=52). A total of 377 policies were initially identified.

A second search was conducted on March 11, 2020, to examine infection control policies that were housed on a different part of the organizational website. Infection control was divided

into nine groups. A preliminary scan of group titles was conducted, and groups were included only if they appeared to contain relevant policies. Seven groups were originally included but one was removed because it contained repeated policies. The final groups included were: resource manuals (n=31), routine practices (n=7), best practice recommendations (n=47), hand hygiene (n=7), personal protective equipment (n=5), equipment cleaning and device re-processing (n=34). This second scan resulted in an additional 131 infection control policies. In total, 508 policies were included in the original screening process.

The remaining 508 policies were screened by title and a first-pass read-through. Based on the above inclusion/exclusion criteria, 85 policies and guidelines were included while 423 policies were excluded. The 85 policies that were included were read in-depth, and 44 were removed for not meeting inclusion criteria. This left a total of 41 policies included in the final analysis (clinical practice policies, n=5; corporate policies, n=5; infection control, n=30). See Appendix for adapted Preferred Reporting Items for Systematic Reviews and Meta-Analyses diagram (Moher et al., 2009).

Data Analysis

Documents were analysed using content and thematic analysis. According to Bowen (2009), "[document] analysis involves skimming (superficial examination), reading (thorough examination), and interpretation. This iterative process combines elements of content analysis and thematic analysis." (p. 32). Content analysis is the process of organizing data into categories, and thematic analysis is a form of pattern recognition that leads to the final themes (Bowen, 2009). For a document analysis, thematic analysis involves the "careful, more focused re-reading and review of the data" (Bowen, 2009, p. 32). All 44 of the included policies were re-read multiple times to ensure pattern recognition.

Rigour

Lincoln and Guba (1985) established four criteria as the benchmarks for rigour: credibility, transferability, dependability, and confirmability. Credibility was maintained through multiple and rigorous discussions among the researchers throughout the work. Processes, policies, codes, and themes were all discussed and agreed upon by the team. Transferability was enhanced by the creation of a detailed and transparent analytical decision trail; inclusion criteria, tracked policies as they were either included or excluded, and a coding framework were all recorded. Dependability and confirmability were met through frequent meetings and check-ins with the research team to discuss and verify findings and themes.

Ethical Considerations

Ethical approval was obtained from the research ethics board of a western Canadian university. Organizational policies and guidelines were found on the organization's website, as these are available for public access. All policies have been given codes to protect the identity of the organization, and these codes are used in citations.

Findings

The major themes from this study relate to the resource life cycle stages: procurement of resources, resource utilization, resource conservation, and waste management.

Procurement of Resources

The policies described three main types of procurement: competitive, non-competitive, and emergency. Whenever possible, competitive procurement was preferred. Non-competitive procurement was only permitted when contracts fell below a certain dollar threshold (considered low risk), were approved of by exception, or the vendor was the sole source of a certain product. Emergency procurement was only meant for emergency situations and required authorization. By

and large, it appeared the procurement of resources policies followed free market values;

voluntary exchange of goods and services, laws of supply and demand, and the absence of

coerced transactions or conditions on transactions (Chappelow, 2020). The main objective of

procurement was:

> *To ensure that goods and services are acquired by [the organization] in a manner that: results in a safe and clinically acceptable product or service for the delivery of patient care; uses public funds in a prudent manner which ensures optimal cost, quality, and service; and ensures the procurement process is fair and equitable in the context of transparency and efficiency.* (P7, 2016, p. 1)

This excerpt made it clear that the organization prioritized: safety, procuring items that were

clinically acceptable, the budget, and free and equitable trading. Besides safety and efficacy, the

main goal behind these procedures seemed to be supporting vendors and manufacturers so that

they all had equal opportunity to obtain a contract with the organization. Not only was this

aligned with the free-market values, but it was also beneficial for the organization as it gave

them the opportunity to select contracts based on what was deemed to be the best quality and

value.

Regardless, it appeared the organization was bound to this type of market-style

procurement due to broader governmental regulations and legal trade laws. There was a great

emphasis on legality and liability due to the outside influence and power of government

regulation and trade agreements. The procurement process had some inherent risk to the

organization if not done correctly – both legal and financial – so strict and explicit processes

were in place for employees to follow. The more expensive the contracts, the more legalities and

organizational policies surrounding the process.

Within the Medical Device Reprocessing (MDR) policies, there was another set of requirements for when procuring supplies for the organization that differed from the previously mentioned processes. This process, in conjunction with the previous ones, dictated how MDR departments were to purchase "*reusable medical devices, single-use devices and general reprocessing supplies such as, wrapping materials, sterilization indicators, and Process Challenge Devices*" (SOP39, 2020, p. 1). These requirements depended on employees reading the manufacturer's instructions and ascertaining that the reprocessing procedures were legible, specific, and feasible (SOP39, 2020, p. 1). This placed an enhanced responsibility on the employee to determine the products in question met the additional guidelines and on manufacturers to ensure their products or devices were able to be re-processed efficiently.

These additional guidelines were included to ensure the safety of staff, who reprocess the devices and materials, as well as the safety of patients, who would ultimately be the end-users. As another safety measure, these policies stated the organization encouraged the purchasing of single-use devices/components when considering devices with sharp components or devices that cannot be cleaned safely of effectively (SOP39, 2020). Overall, the procurement process highly prioritized: the safety of staff and patients, the legal safety of the organization, abiding by free-market values and legal frameworks, and providing safe, efficient, and cost-effective healthcare services.

Resource Utilization

Most policies outlining how staff should utilize resources were found in the infection control section. This policy grouping made it clear that, above all else, the organization encouraged employees to utilize resources in a manner that keeps them, the patient, and the public safe. While the policies did offer some guidelines on resource utilization (e.g., policies

stating that when a soiled item should be thrown away, when one should use and dispose of gloves, or when medical equipment was reusable or single-use and non-reusable), the resource-user was mostly encouraged to employ their own discretion and base decisions on their personal assessment of each situation. For example, although there were guidelines outlining which personal protective equipment staff should don for certain scenarios, what should be worn in any given scenario also relied on the employee's assessment of the situation of the risk involved.

Interestingly, there were passages within the policies that outlined when hospital staff could choose to use reusable items rather than the single-use version, however, it was not clear whether this was for environmental purposes as this was not specifically referenced. For example, the organization stated that reusable water jugs may be filled and given to patients, who could then use them to re-fill their own glasses of water. Overall, the resource utilization policies identified a shared responsibility between the organization and the employees; although some guidelines were offered, it was up to the employee to consider how best to utilize organizational resources.

Resource Conservation

Despite a greater focus placed on how resources should be utilized, the organization also attempted to reduce the misuse of supplies. In these policies, the organization briefly referred to the conservation of non-reusable supplies and meticulously described the reprocessing of reusable ones. For example, of the nine different policies that dictated how, when, and why employees should wear non-reusable gloves, three of them discussed when employees should not wear gloves (IC12, 2018; IC13, 2016; IC22, 2016); this was discussed once more in a cleaning and disinfection policy (IC19, 2014). The predominant reason to not wear gloves was to increase

safety and reduce the spread of disease through possible cross-contamination of dirty gloves and clean supplies.

Given the focus on health and safety, strict procedures also existed for how employees were supposed to reprocess (i.e., clean, disinfect, or re-sterilize) reusable items. All reusable items had to be categorized based on how difficult they were to reprocess and the degree of risk for infection they carried. The reprocessing policies illustrated how reusable devices possessed an inherent level of risk from the organization's perspective, and because of this, they required increased special attention in comparison to the non-reusable resources.

Several policies also described the procedures for when an emergency arose, and one common option provided was to use single-use items. To ensure safety, it was stated that "*if devices [were] determined to be difficult to clean, [single-use] devices should be considered*" (SOP29, p. 2, 2020). Alternatively, reusable resources were suggested for lower risk scenarios, like packaging medical devices. Reusable packing containers were suggested because they provided an efficient and cost-effective way to transport reprocessed items. Although the organization sometimes encouraged single-use items and at other times reusable ones, the environment or the climate were not mentioned as considerations.

Waste Management

In total, there were three policies outlining how staff should handle and dispose of waste. Of all the reviewed policies, only these three waste management policies directly mentioned the organization's responsibilities towards environmental stewardship. It was explicitly stated in this set of policies that the organization *"…is committed to responsible and sustainable waste management and recognizes the importance of developing an effective and integrated [Waste Management System] to reduce our impact on the environment…"* (W5, 2019, p. 1). These

policies went on to define sustainable waste management as *"… being responsible to reduce environment impacts associated with the generation, handling and disposal of waste materials in order to ensure the benefit of future generations"* (W5, 2019, p. 6).

These policies outlined the different waste types and emphasized safety related to the handling and disposal of them. Although the environment was mentioned, and avoiding significant environmental impact was a stated goal, it seemed as though the organization only considered waste from a downstream perspective. In other words, waste was viewed as something that required managing once is was created, as opposed to seeing waste as something that should be reduced or avoided in the first place. Managing waste predominantly meant avoiding toxic spills and workplace or environmental contamination.

Discussion

There are two key discussion points arising from this document analysis. First, the organization's conceptualization of safety (the local conceptualization) and how this interacts with the idea of planetary health. Second, how healthcare organizations can integrate a planetary health approach into their policies related to the resource life cycle. While healthcare organizations often focus on keeping their patients, staff, and selves safe, there seems to be a gap in organizational thinking related to planetary health. If human health is to be maintained and enhanced in the face of increasingly harmful environmental trends, then challenges that must be addressed are "… implementation failures (governance challenges), such as how governments and institutions delay recognition and responses to threats, especially when faced with uncertainties, pooled common resources, and time lags between action and effect" (Whitmee et al., 2015, p. 1973). Since healthcare systems are highly affected by the effects of climate change, (Chung & Meltzer, 2009; Costello et al., 2009; McGain & Naylor, 2014; Weaver et al., 2010),

healthcare policy developers need to recognize climate change as a threat to healthcare organizations and those they serve, and develop appropriate policy responses.

Local Conceptualization on Safety

It is evident from the policies that maintaining safety is the healthcare organization's greatest priority; maintain safety for the patients, the public, employees, and even the organization itself. Resources are procured with this safety-focus in mind, they are utilized in a way that promotes and protects health and safety, and they are ultimately disposed of, or reprocessed, with a similar attitude. However, this perspective on safety reflects an insular positioning; the organization is predominantly concerned with the safety of relevant actors insofar as they are either accessing and utilizing organizational services or are helping maintain them. This local perspective on safety lacks a broader application to surrounding communities, populations, and the planet. While not found in the policies, the organization's mission and vision statements refer to the organizational goals of promoting the health of communities and of all provincial citizens. Given the organization's goals, there is a risk to those same communities and citizens if the supply chain's influence on the environment and the climate are not considered.

The view on health and safety is demonstrated throughout each step of the resource life cycle. Those in charge of the procurement process are encouraged to find vendors who offer fiscally responsible contracts that deliver safe and effective goods. From what is written in the policies, the procurement process does not seem to consider the emissions produced by the supply chain or if there are other alternative resource sources that have a lower environmental and climate impact. Procurement policies that do not explicitly consider the environmental impact of the supply chain – the production, transport, use, and disposal of goods and services

consumed by the sector – may lead to the organization having difficulties reducing its GHG emissions. The local conceptualization of safety is also present within the utilization and conservation steps of the resource life cycle. How staff should utilize resources is generally based on their personal assessment of the situation, the risk involved, and the level of safety or protection required. This is evident when the policies discuss the use of personal protective equipment. Although there are organizational guidelines provided, employees must use their own judgement to assess the situation for what needs to be done and the risk involved. They then select the appropriate equipment for the job. Each situation is unique and one-size-fits-all guidelines are not ideal. However, what is missing from the policies are any guidelines or recommendations that encourage staff to be mindful of resource-usage for planetary health reasons.

Despite several policies outlining when staff should not use gloves, again due to safety concerns, there were no groupings of policies encouraging staff to consider conserving resources overall. A lack of policies in this area could inadvertently develop an organizational culture of employees not concerning themselves with how much or when they use supplies, and a culture that does not consider how healthcare work impacts the environment and the climate. When the policies discuss reducing use of resources, they typically do so in the confines of safety and budget. Previous research demonstrated that nurses felt they were unable to prioritize planetary health in their own daily practice due to a lack of organizational support (Anåker et al., 2015). Solving this policy gap could help staff feel empowered to better use resources, and ultimately, reduce emissions.

Finally, the local conceptualization of safety is also present within the last step of the resource life cycle, waste and disposal. However, this section uniquely demonstrates a planetary

health perspective because sustainable waste management is clearly identified as an organizational priority. Part of the organization's definition for sustainable waste management includes reducing the impact associated with generating, handling, and disposing of waste, and there is explicit reference to the consideration of future generations (W5, 2019, p. 6.). Although these are the stated overarching goals of the organization's waste management systems, the policies themselves tend to reflect the local conceptualization of safety. The waste policies outline how staff should handle, transport, and waste hazardous materials, or how they should deal with contamination or toxic spills. Waste reduction (i.e., reduction in resource usage), however, was never mentioned in these policies. Reduction is critically important in decreasing emissions and reducing healthcare's overall environmental impact, and managing this impact was an explicitly stated organizational goal. In other words, the organization minimizes its impact on the environment by not contaminating it with the healthcare waste *already* produced but reducing the initial consumption of resources was only discussed once.

The same concern related to local versus global conceptualization of safety can also be noted when examining the organization's healthcare accreditation standards. A brief review was completed on the organization's accreditation standards and there were no mentions of environmental or climate impacts as an aspect of healthcare organizations that is monitored or assessed (Health Standards Organization, n.d.). While promoting health and safety were easily identified as important features of these standards, a broader and more planetary view on health was not observed. Developing health accreditation standards that reflect planetary safety would be one way to encourage healthcare organizations to view health and safety more broadly. It would also encourage practices that critically reflects on resource reduction, reuse and procurement practices that encourage planetary health. More work is needed in this area.

Further complications arise when one starts to consider cost and budget. Healthcare organizations continue to be plagued by a decades-old challenge related to cost containment (Cohen, 2012; Henderson et al., 2016). Countries around the world are struggling to meet demand and delivering high quality healthcare services at the lowest possible cost continues to be a considerable concern (Aiken et al., 2013; Aiken & Sermeus, 2012). In Canada, the healthcare sector is responsible for about 4.6% of the nation's total GHG emissions and an estimated 200,000 tons of other harmful pollutants; it has been estimated that these emissions result in 23,000 disability-adjusted life years lost annually (Eckelman et al., 2018; Howard et al., 2019). Moreover, it has been estimated that between the years 2010-2016, there was an average of 700 extreme climate-related events around the world that resulted in an average of $127 billion annual loss (Watts et al., 2018a). Healthcare organizations' work to address climate change would also address the financial and human health cost of the phenomenon. A planetary health perspective is suggested to aid healthcare organizations in addressing climate change.

Integrating Planetary Health into Healthcare

While planetary health is important to understand from a broader perspective, it is also crucial to incorporate it into local healthcare organizations in practical ways. If healthcare organizations wish to reduce their climate and environmental impact, there are several ways to do so. Some guidelines have already been in circulation for over a decade, and they outline how hospitals can integrate planetary health and promote environmentally responsible practice within their workplace settings (World Health Organization & HCWH, 2009). Important categories where organizations can measure, manage, and reduce GHG emissions are taken from the Greenhouse Gas Protocol (2013) scope categories: 1) Scope 1, all direct emissions from owned or controlled sources, such as company facilities or company vehicles; 2) Scope 2, indirect

emissions from the generation of purchased electricity, steam, heating, and cooling consumed by the company; 3) Scope 3, includes all other indirect emissions that occur in a company's value chain. Upstream Scope 3 categories include: purchased goods and services, capital goods, fuel and energy related activities, transportation and distribution, waste generated in operations, business travel, employee commuting, and leased assets. Downstream Scope 3 categories include: transportation and distribution, processing of sold products, use of sold products, end of life treatment of sold products, leased assets, franchises, and finally, investments (Greenhouse Gas Protocol, 2013). While the scope categories are extensive and outline many different areas where healthcare organizations can reduce their emissions and impact, this study primarily focuses on those related to the resource life cycle.

Procurement

This study found that healthcare organizations follow market values and legal trading laws when it comes to procuring resources. This provides an opportunity for healthcare organizations to utilize their purchasing powers to encourage manufacturers and vendors to produce and sell resources that are safe and promote health for both humans and the planet. By seeking out manufacturers and vendors who are willing to work with the organization to decarbonize the supply chain, the healthcare organization can simultaneously reduce its GHG emissions and environmental impact, and encourage more manufacturers and vendors to develop innovation in this field. Currently, there are no considerations for planetary health within the policies related to the procurement of resources. Adding these would be an important step towards helping healthcare organizations protect themselves and others against the impacts of climate change.

Resource Utilization and Conservation

Organizational policies that discussed the utilization or conservation of healthcare resources did not mention the climate or environmental impact of these activities. These policies were primarily concerned with the health and safety of those utilizing the resources, the patient, and the public, and while promoting safety is a critical function of these policies, it is possible to structure them to include a planetary health perspective. For example, the organization could direct employees to reduce unnecessary resource consumption and promote resource conservation whenever possible. This includes outlining appropriate utilization of both workplace supplies and resources such as electricity or thermal power. By doing so, the organization would be demonstrating to employees a supportive stance towards planetary health. This is an essential first step in developing a culture whereby employees and healthcare areas consider the environment and the climate in conjunction with the patients they serve. According to the policies, it is up to employees to assess a situation and execute professional judgement on how they should utilize resources to best help them conduct their work. If the organization promotes a planetary health stance, employees might would feel more supported in practicing in a more environmentally responsible manner.

This is especially important because healthcare professionals also have an important role in promoting planetary health and helping society confront the challenges of climate change (Landrigan et al., 2017). Landrigan et al. (2017) suggest ways that healthcare professionals can help their organizations in reducing GHG emissions by reducing them in their own lives. Professionals can support local, regional, and national planning efforts and emphasize the connection between GHGs, other pollutants, and health. Moreover, they can develop and implement new transdisciplinary educational material that teach other healthcare professionals

and the public on the increasing connection between climate change and health. Finally, they can support research in the field that will help progress human understanding about the health impacts of climate change (Landrigan et al., 2017). By supporting planetary health, the organization supports healthcare professionals in these crucial activities.

Waste Management

The waste management policies were the only ones that explicitly prioritized the reduction of healthcare's environmental impact. Specifically, these policies aimed to reduce the potential for toxic chemical spills or other scenarios where possible environmental contamination could occur. One planetary health approach to these policies could encourage the reduction of waste produced in the first place. A second could include the assessment and monitoring of organizational waste and even GHG emissions, which could help organizations promote both climate and human safety. When it comes to promoting a planetary health perspective within healthcare, accountability is of paramount importance and "high quality metrics that monitor pollution and track progress towards national and local pollution prevention and disease control goals are essential to the success of any health and pollution action plan" (Landrigan et al., 2017, p. 35). This means that healthcare organizations must monitor and continuously assess their emissions and environmental impact, because according to Watts et al. (2018a), monitoring healthcare emissions is an essential step towards accounting for their climate and environmental impacts. One strength of the healthcare sector is its expertise in utilizing monitoring systems, assessments, and tracking methods as essential tools to understand and diagnose problems, predict the future impact of the problem, identify vulnerable and at-risk populations, develop and prioritize responses, and evaluate the effect of interventions (Watts et al., 2018b). Healthcare

organizations would be incorporating a strong planetary approach to healthcare if they develop policies that monitor, assess, and track the waste and GHG emissions they produce.

Limitations

There are several limitations to this study. First, it is possible that the healthcare organization in this study promotes environmental and planetary health and safety through other means that are outside of their policies. These efforts were not captured. Second, policies included in the final analysis were limited to only those that could be found online by members of the public. If there are organizational policies that are housed elsewhere, they were unable to be included. Finally, this paper discusses planetary health purely from the perspective of healthcare, however, true planetary health approaches are interdisciplinary, multi-sectoral, and cross the boundaries of nation-states.

Conclusion

This paper has offered a document analysis on one healthcare organization's workplace policies as they relate to the life cycle of resources: the procurement, utilization, conservation, and waste of resources. The findings suggest that the organization's top priority was the delivery of efficient and safe healthcare. Furthermore, the concept of safety was so pervasive that it permeated every step of the resource life cycle. The organization's conceptualization of safety was limited to employees, patients, and the public, and little mention was made towards planetary health. Given the paradoxical relationship healthcare systems have with climate change, where they both contribute to the crisis yet are especially vulnerable to its impacts, a planetary health approach to healthcare is encouraged and ways to integrate this approach into workplace policies are suggested.

References

Adlong, W., & Dietsch, E. (2015). Environmental education and the health professions: Framing climate change as a health issue. *Environmental Education Research, 21*(5), 687–709. http://doi.org/10.1080/13504622.2014.930727

Aiken L. H., & Sermeus, W. (2012). Patient safety, satisfaction, and quality of hospital care: Cross sectional surveys of nurses and patients in 12 countries in Europe and the United States. *British Medical Journal, 344,* 20. https://www.jstor.org/stable/41551711

Aiken, L. H., Sloane, D. M., Bruyneel, L., Van den Heede, K., & Sermeus, W. (2013). Nurses' reports of working conditions and hospital quality of care in 12 countries in Europe. *International Journal of Nursing Studies, 50,* 143-53. http://dx.doi.org/10.1016/j.ijnurstu.2012.11.009

Anåker, A., Nilsson, M., Holmner, Å., & Elf, M. (2015). Nurses' perceptions of climate and environmental issues: a qualitative study. *Journal of Advanced Nursing, 71*(8), 1883-1891. doi: 10.1111/jan.12655

Atkinson, P. A. & Coffey, A. (2004). Analysing documentary realities. In D. Silverman (Ed.), *Qualitative research: Theory, method and practice* (pp. 56-75) (2nd ed.). Sage Publications.

Berry, P., Clarke, K., Fleury, M. D., & Parker, S. (2014). Chapter 7: Human health. In F. J. Warren & D. S. Lemmen (Eds.), *Canada in a changing climate: Sector perspectives on impacts and adaptation* (pp. 191-232). Government of Canada.

Bowen, G. A. (2009). Document analysis as a qualitative research method. *Qualitative Research Journal, 9*(2), 27–40. doi:10.3316/QRJ0902027

Centers for Disease Control and Prevention. (2020, September 9). *Climate effects on health.*

    https://www.cdc.gov/climateandhealth/effects/default.htm

Chappelow, J. (2020, April 28). *Free market.* Investopedia.

    https://www.investopedia.com/terms/f/freemarket.asp

Chung, J. W., & Meltzer, D. O. (2009). Estimate of the carbon footprint of the US health care

    sector. *Journal of the American Medical Association, 302*, 1970–1972.

    doi:10.1001/jama.2009.1610

Cohen, A. B. (2012). The debate over health care rationing: Déjà vu all over again? *Inquiry,*

    49(2), 90-100. doi:10.5034/inquiryjrnl_49.02.06

Costello, A., Abbas, M., Allen, A., Ball, S., Bell, S., Bellamy, R., Friel, S., Groce, N., Johnson,

    A., Kett, M., Lee, M., Levy, C., Maslin, M., McCoy, D., McGuire, B., Montgomery, H.,

    Napier, D., Pagel, C., Patel, J., … Patterson, C. (2009). Managing the health effects of

    climate change. *The Lancet, 373*, 1693–1733. https://doi.org/10.1016/S0140-

    6736(09)60935-1

Eckelman, M. J., Sherman, J. D., & MacNeill, A. J. (2018). Life cycle environmental emissions

    and health damages from the Canadian healthcare system: An economic-environmental-

    epidemiological analysis. *PLoS Medicine, 15*(7), 1–17.

    https://doi.org/10.1371/journal.pmed.1002623

Government of Canada. (2019). *Canada's changing climate report.*

    https://www.nrcan.gc.ca/climate-change/impacts-adaptations/what-adaptation/canadas-

    changing-climate-report/21177

Greenhouse Gas Protocol. (2013). *Technical guidance for calculating Scope 3 emissions (version*

    1.0): Supplement to the corporate value chain (Scope 3) accounting and reporting

standard.

https://ghgprotocol.org/sites/default/files/standards/Scope3_Calculation_Guidance_0.pdf

Hammersley, M., & Atkinson, P. (2007). *Ethnography* (3rd ed.). New York, NY: Routledge.

Health Care Without Harm [HCWH] & Arup. (2019, September). *Health care's climate footprint: How the health sector contributes.* https://noharm-uscanada.org/ClimateFootprintReport

Health Standards Organization. (n.d.). *Standards.* https://healthstandards.org/standard/

Henderson, J., Willis, E., Toffoli, L., Hamilton, P., & Blackman, I. (2016). The impact of rationing of health resources on capacity of Australian public sector nurses to deliver nursing care after-hours: a qualitative study. *Nursing Inquiry, 23,* 368-76. doi:10.1111/nin.12151

Howard, C., Buse, C., Rose, C., MacNeil, A., & Parkes M. (2019, November). *The Lancet Countdown on health and climate change: Policy brief for Canada.* Lancet Countdown: Tracking progress on health and climate change. https://www.lancetcountdown.org/2019-report/

Intergovernmental Panel on Climate Change. (2014). *Climate change 2014: Synthesis report.* Cambridge University Press.

Klein, N. (2014). *This changes everything: Capitalism vs. the climate.* Simon and Schuster Paperbacks.

McGain, F., & Naylor, C. (2014). Environmental sustainability in hospitals - A systematic review and research agenda. *Journal of Health Services Research & Policy*, *19*(4), 245–252. doi:10.1177/1355819614534836

Landrigan, P. J., Fuller, R., Acosta, N. J., Adeyi, O., Arnold, R., Basu, N., Baldé, A. B.,
	Bertollini, R., Bose-O'Reilly, S., Boufford, J. I., Breysse, P. N., Chiles, T., Mahidol, C.,
	Coll-Seck, A. M., Cropper, M. L., Fobil, J., Fuster, V., Greenstone, M., Haines, A., …
	Zhong, M. (2017). The Lancet Commission on pollution and health. *The Lancet, 391*,
	462-512. https://doi.org/10.1016/S0140-6736(17)32345-0

Lincoln, Y. S. & Guba, E. G. (1985). *Naturalistic Inquiry*. Sage Publications.

Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., & The PRISMA Group (2009). Preferred
	Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement.
	PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

Scranton, R. (2015). *Learning to die in the Anthropocene: Reflections on the end of a
	civilization.* City Lights Bookstore.

Steffen, W., Crutzen, P. J., & McNeill, J. R. (2007). The Anthropocene: Are humans now
	overwhelming the great forces of nature? *AMBIO: A Journal of the Human Environment,
	36*(8), 614–621. https://doi.org/10.1579/0044-7447

Steffen, W., Persson, Å., Deutsch, L., Zalasiewicz, J., Williams, M., Richardson, K., Crumley,
	C., Crutzen, P., Folke, C., Gordon, L., Molina, M., Ramanathan, V., Rockström, J.,
	Scheffer, M., Schellnhuber, H. J., & Svedin, U. (2011). The Anthropocene: From global
	change to planetary stewardship. *AMBIO: A Journal of the Human Environment, 40*(7),
	739–761. https://doi.org/10.1007/s13280-011-0185-x

Watts, N., Amann, M., Ayeb-Karlsson, S., Belesova, K., Bouley, T., Boykoff, M., Byass, P., Cai,
	W., Campbell-Lendrum, D., Chambers, J., Cox, P. M., Daly, M., Dasandi, N., Davies,
	M., Depledge, M., Depoux, A., Dominguez-Salas, P., Drummond, P., Ekins, P., …
	Costello, A. (2018a). The Lancet Countdown on health and climate change: From 25

years of inaction to a global transformation for public health. *The Lancet,* 391, 581–630. https://doi.org/10.1016/s0140-6736(17)32464-9

Watts, N., Amann, M., Arnell, N., Ayeb-Karlsson, S., Belesova, K., Berry, H., Bouley, T., Boykoff, M., Byass, P., Cai, W., Campbell-Lendrum, D., Chambers, J., Daly, M., Dasandi, N., Davies, M., Depoux, A., Dominguez-Salas, P., Drummond, P., Ebi, K. L., … Costello, A. (2018b). The 2018 report of the Lancet Countdown on health and climate change: Shaping the health of nations for centuries to come. *The Lancet, 392*, 2479–514. https://doi.org/10.1016/S0140-6736(18)32594-7

Weaver, H. J., Blashki, G. A., Capon, A. G., McMichael, A. J. (2010). Climate change and Australia's healthcare system – Risks, research and responses. *Australian Health Review, 34*(4), 441–444. doi:10.1071/AH09829

Whitmee, S., Haines, A., Beyrer, C., Boltz, F., Capon, A. G., Ferreira de Souza Dias, B., Ezeh, A., Frumkin, H., Gong, P., Head, P., Horton, R., Mace, G. M., Marten, R., Myers, S. S., Nishtar, S., Osofsky, S. A., Pattanayak, S. K., Pongsiri, M. J., Romanelli, C., … & Yach, D. (2015). The Rockefeller Foundation–Lancet Commission on planetary health: Safeguarding human health in the Anthropocene epoch: report of The Rockefeller Foundation–Lancet Commission on planetary health. *The Lancet, 386,* 1973-2028. http://dx.doi.org/10.1016/S0140-6736(15)60901-1

World Health Organization & Health Care Without Harm [HCWH]. (2009). *Healthy hospitals, healthy planet, healthy people: Addressing climate change in healthcare settings.* World Health Organization. https://www.who.int/globalchange/publications/healthcare_settings/en/

Zalasiewicz, J., Williams, M., Smith, A., Barry, T. L., Coe, A. L., Bown, P. R., Brenchley, P.,

    Cantrill, D., Gale, A., Gibbard, P., Gregory, F. J., Hounslow, M. W., Kerr, A. C.,

    Pearson, P., Knox, R., Powell, J., Waters, C., Marshall, J., Oates, M., … Stone, P. (2008).

    Are we now living in the Anthropocene? *Geological Society of America Today, 18*(2), 4-

    8. doi:10.1130/GSAT01802A.1

Appendix

Adapted PRISMA Statement
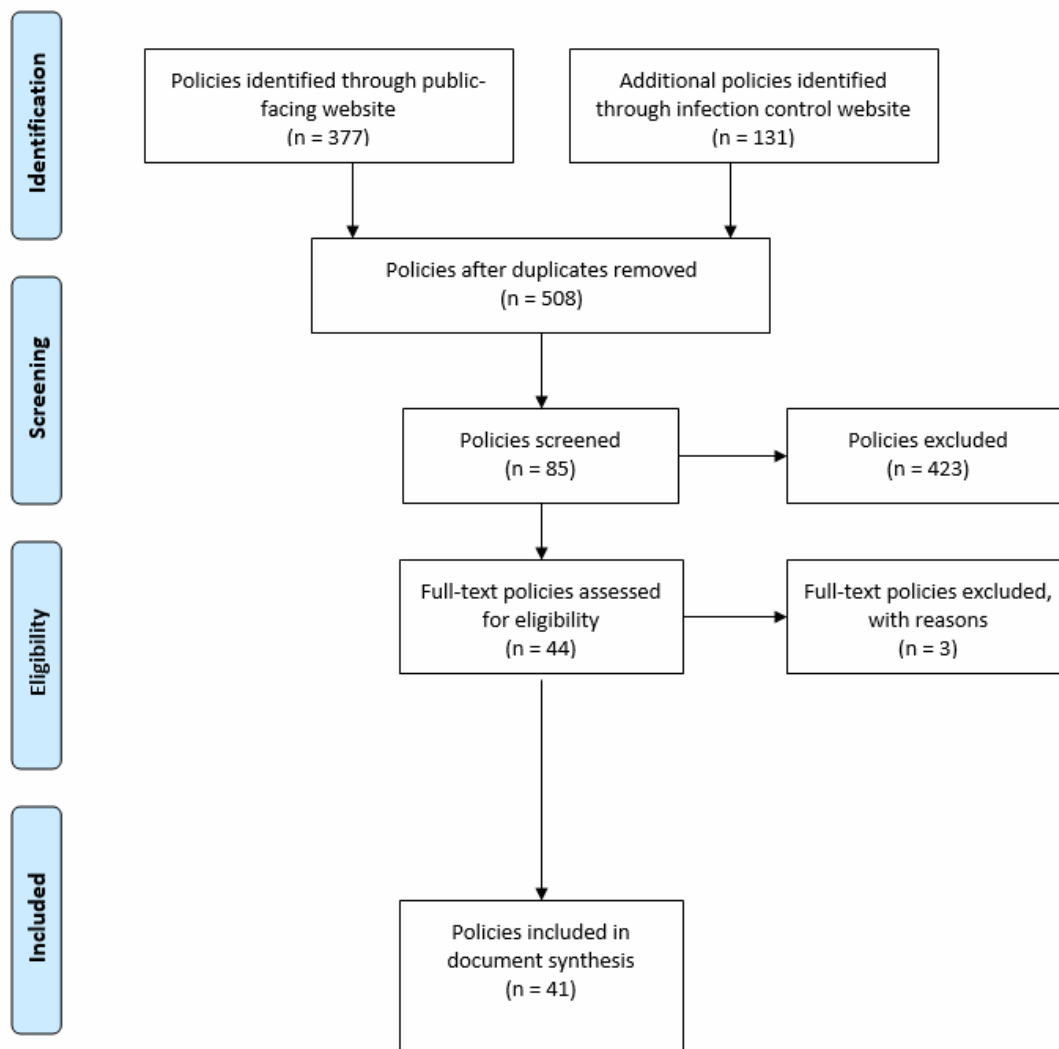
Note. This image is adapted from Moher et al. (2009).

Chapter Three:

Nurses' Perspectives on Climate Change, Health, and Nursing Practice

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Abstract

Aim: The purpose of this study was to explore Canadian nurses' perspectives on climate change, health, nursing practice, and the relationships between these concepts. **Background**: Climate change negatively impacts human health. With a mandate to promote health, nurses have a professional and ethical responsibility to address climate change. Little is known about Canadian nurses' perspectives on climate change or how they perceive of their professional responsibility towards addressing it. **Methods**: A focused ethnography was conducted in three medicine units and the emergency room at a Canadian hospital. Nurses (n=22) participated in semi-structured interviews and observations were collected. Data were analysed via thematic analysis. Reporting is in accordance with the COREQ guideline. **Results**: Three themes were identified: muddled terminology, climate change and health, and nursing's relationship to climate change.

Conclusion: Participants had varying levels of knowledge about climate change and its relationship to health or practice. Climate change was a personal concern and nursing's role in addressing it was not understood. **Relevance to Practice:** This study highlighted that practicing nurses did not readily recognize their role in addressing climate change. More work is needed to clarify this role and bring it into the consciousness of every-day nursing practice. Furthermore, more work is needed to examine how healthcare organizations can better support environmentally responsible nursing practice.

What Does This Paper Contribute to the Wider Global Clinical Community?

- Nurses have a professional responsibility to address climate change, however, participants in this study were uncertain of the nature of this role

- Results from this study indicate that nurses need ongoing education on climate change, its impact on health, and nursing's role in addressing the issue

- There are many ways for clinical nurses to address climate change. To do so, nurses must first consider how the influence of their practice stretches beyond the local care of patients and impacts global health

Nurses' Perspectives on Climate Change, Health and Nursing Practice

The United Nations (2011) defines climate change as a change in climate that can either be directly or indirectly attributed to human activity. It alters the composition of the atmosphere and is considered in addition to the natural climate variability observed over comparable periods of time (United Nations [UN], 2011). Our climate is changing at an accelerated rate. "Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia" (Intergovernmental Panel on Climate Change [IPCC], 2014, p. 2). While it can be argued that there are several causative factors, scientific evidence indicates human activity is one of the main drivers (IPCC, 2014; National Aeronautic Space Administration [NASA], n.d.). The burning of fossil fuels results in the emission of greenhouse gasses, and these gasses result in a changing climate (IPCC, 2014; NASA, n.d.; U.S. Global Change Research Program, 2018). "Human influence on the climate system is clear, and recent anthropogenic emissions of green-house gases are the highest in history" (IPCC, 2014, p. 2).

We are experiencing the warmest centennial of our time, and scientists anticipate (and are already recording) increases in extreme weather, prolonged periods of high temperature, heavy rainfalls, floods, droughts, increased glacier melts, rising sea levels, and acidification of our oceans (U.S. Global Change Research Program, 2018). The United Nation's (n.d.) Sustainable Development Goal 13 states "climate change is affecting everyone, especially the poor and vulnerable, as well as marginalized groups like women, children, and the elderly" (UN, n.d., para. 3). Climate change a social justice issue because it disproportionately affects lower socio-economic status people and countries; those who contribute the least to the problem are being impacted the most (Department of Economic and Social Affairs, 2016; Smith et al., 2014; World Health Organization, 2011, 2014).

Climate change is also a major health concern because it is predicted (and already being recorded) that a warming world will result in increasing levels of malnutrition (with even greater consequences towards child development), death, disease, injury due to heatwaves, a growing frequency of cardio-respiratory illness, and increasing costs of healthcare services (Smith et al., 2014). Healthcare professionals are being asked to re-define climate change as a major health concern (Adlong & Dietsch 2015), and in recent decades, concern for how climate change impacts health, and how healthcare practices impact climate change, has increased (World Health Organization & Health Care Without Harm, 2009).

Background

Healthcare has a significant climate impact; "if the health sector were a country, it would be the fifth-largest emitter on the planet" (Health Care Without Harm & Arup, 2019, p. 4). Healthcare contributes to the problem through its emissions and is then conversely tasked with caring for those whose health is negatively impacted by the changing climate. Given this dilemma, all health professionals are responsible for understanding how their own practice contributes to the problem, critically examining their role in how they can (both individually and collectively) address climate change, and practicing in an environmentally responsible manner. Health professionals can use their collective or individual voices to promote climate advocacy and outreach and can help mobilize a wide community of actors (Whitmee et al., 2015). To achieve such influence, health professionals should be well informed about climate change, its impacts on health, and healthcare policies and practices that are needed to help the health sector deliver environmentally responsible care (Whitmee et al., 2015). As the largest group of the global healthcare team (World Health Organization, 2016), nurses must be part of healthcare's climate response.

Health promotion is at the heart of nursing's social mandate (Fawcett, 1984), thus it can be asserted that nurses also have an ethical duty to address climate change. Although groups of nurses have been involved in addressing environmental health concerns for some time (such as the Canadian Association of Nurses for the Environment and the Alliance of Nurses for Healthy Environments), a review conducted by Lilienfeld et al. (2018) showed a gap in research on nursing and climate change. They found that "research studies, [both] qualitative and quantitative, were poorly represented in the literature and are needed to further understand the knowledge and attitudes of nurses regarding climate change, sustainability, and nursing" (Lilienfeld et al., 2018, p. 489).

Only a small body of literature exists. One American study surveyed public health nursing administrators and found that, although most respondents were not fully informed on all of climate change's negative health impacts, most still agreed that some degree of climate change has occurred and half felt that public health nursing had a responsibility to address these negative health impacts (Polivka et al., 2012). They found that less than 40% of participants felt their division could make a difference (Polivka et al., 2012). Another study conducted in Sweden found that nurses had a local understanding of environmental issues but did not have a well-developed global perspective (Anåker et al., 2015). In other words, nurses were more aware of environmental concerns that directly surrounded or impacted their patients than climate change as a global health concern. These participants had a good understanding of what their roles as individual nurses were in addressing environmental issues but also noted that this understanding was influenced by personal opinion and beliefs (Anåker et al., 2015).

These limited studies indicate the presence of several concerning issues. First, while individual nurses might possess some knowledge on climate change and its impacts on human

health, this is not yet a wide-spread professional concern. Second, nurses recognize they have a responsibility to address climate change but do not feel well-equipped to do so. Third, more research is still needed on nurses' perceptions on climate change, health, and nursing practice. This is concerning because "from a global perspective, environmentally responsible nursing is needed to protect humans, protect the ecosystem and slow down global warming" (Kangasniemi et al., 2013, p. 1475). It is not well understood how nurses in Canada understand these issues. Thus, the purpose of this study was to explore Canadian nurses' perspectives on climate change, health, nursing practice, and the relationships between these concepts.

Method

Design

This study utilized focused ethnography (FE) to study the culture of nursing related to environmentally responsible practice (ERP) and perspectives on climate change. FE attempts to discover and understand a culture's beliefs and practices by observing behaviours, actions, interactions, and social situations (Cruz & Higginbottom, 2013; Knoblauch, 2005; Roper & Shapira, 2000). FE is especially useful for studies that are limited in scope and when the researcher is studying a question or phenomenon that has little or no formal information on it, trying to enhance nursing practice, or answering questions that are important to the profession (Cruz & Higginbottom, 2013; Roper & Shapira, 2000).

Site and Sample

Purposive and snowball sampling were used to recruit nurses and nursing managers across four units located in a large Albertan hospital: three internal medicine units and the emergency room. Posters advertising the study were hung on bulletin boards around the units and the first author was present during shift-change to share details about the study with unit

staff. Unit managers were asked to forward email invitations to nursing staff. Nurse managers, nurse educators, Licensed Practical Nurses (LPNs), and Registered Nurses (RNs) were all invited to participate; 22 nurses participated (n=22).

Data Collection

Ethics was approved through the research and ethics board at a large western Canadian university. The first author, a doctoral candidate at the time, conducted individual interviews between May and August 2019, either in-person (in the hospital or the nearby university campus) or via telephone. Participants and the first author had no previous connection or relationship prior to interviews. Prior to the interview, participants were provided with the information letter and consent form and were given time to ask questions. At the start of each interview, the pertinent concepts of consent, confidentiality, and data usage were reviewed. With consent provided, interviews were audio recorded and later transcribed verbatim. Interviews were semi-structured with questions and prompts offered by the interviewer. A general interview guide was utilized, interviews lasted 40-90 minutes, and field notes were taken during the interviews as well as afterwards. All participants were assigned pseudonyms.

Data were also collected through observations on each participating unit. Unit managers assisted in setting up research days for observing how nursing staff engaged with hospital resources (where resources were located, how often nurses accessed these spaces, amounts nurses required to complete their daily tasks, amounts of waste generated, how many resources were re-used, and use of electricity, water, and indoor climate control), the workplace's daily routines, and how the physical layout of each unit impacted nurses' abilities to practice in an environmentally responsible way (where was the recycling, how many recycling bins versus garbage bins, what was recycled and what was wasted, challenges to climate controlling patient

and staff spaces). Staff were notified at the start of each shift of the researcher's presence and no personal information was collected during these times.

Data Analysis

Thematic analysis was used to analyse data; it aims to examine narrative materials from the life stories of research participants (Vaismoradi et al., 2013). Each transcript was read and analysed for key words, phrases, and sentiments, and then coded (Vaismoradi et al., 2013). Three researchers individually coded three transcripts and NVivo was utilized. They then reconvened to discuss and agree upon codes and developed a coding framework. Codes were collected and merged under potential subthemes, and subthemes were then merged to create themes (Vaismoradi et al., 2013). Researchers met at each step to discuss codes, process, and theme development. Data were collected and analysed concurrently and iteratively, so that each process could influence the other until data saturation was reached.

Rigour

Lincoln and Guba (1985) established four criteria as the benchmarks for rigour among qualitative works: credibility, transferability, dependability, and confirmability. For this study, credibility was maintained through ongoing rigorous discussions among the researchers throughout all phases of the study. Processes, codes, and themes were all discussed and agreed upon by the team. Credibility was further enhanced through the thick descriptions provided in the data. The team addressed transferability by creating a detailed and transparent analytical decision trail; personal notes, the coding framework, and the theme building process were all recorded, and a reflexive journal was maintained. Dependability and confirmability were established through frequent meetings and check-ins with the team. Finally, the COnsolidated

criteria for REporting Qualitative research (COREQ) checklist was applied to this study (Supplementary File 1).

Findings

Of the 22 participants, 14 worked in the emergency room (four unit managers, one quality improvement manager, one nurse educator, and eight frontline RNs), and eight participants worked on the medicine units (two unit managers, two quality improvement team members, three frontline RNs, and one frontline LPN). Participants were aged 26-65 and had between one to 38 years of nursing experience. Three participants were male and 19 were female. See Appendix. The main themes developed are as follows: muddled terminology, climate change and health, and nursing's relationship to climate change. Participants were assigned pseudonyms. Observational notes are cited throughout.

Muddled Terminology

Overall, participants tended to discuss the following four concepts somewhat interchangeably throughout the interviews: climate change, environmental impact, ERP, and waste. Though these concepts hold important differences (for example, while not all waste contributes to climate change it often impacts the environment), it was evident that the concepts were closely related enough for participants to consider them together.

Climate Change

When asked to explain climate change in their own words, participants had varying levels of knowledge of the phenomenon. Pollution, waste, the ozone layer, single-use plastics, Earth's resources, and the environment were all considered together and related to climate change; sometimes the links were related to climate change while other times they referred more generally to an environmental impact of some kind. For example, Kate described climate change

as the following: *"When I think of climate change, I think of the things we're doing to our environment like pollution, smokestacks, things like that that are creating the ozone layer cap. [They are] creating heating and global warming, therefore climate change.*" This demonstrates how climate change and other environmental concerns were often described together.

Deeyah articulated climate change as follows: "*To me, climate change is associated with the global warming due to the effects of man's influence on the environment. What they've done with respect to pollution and use of the earth's resources, and how that's impacted our environment.*" When compared, these two excerpts show varying levels of knowledge of climate change science among participants. However, there was a base understanding among most that climate change was likely due to some level of human intervention (often associated with waste, industry, and pollution) and that it had important implications for both humans and other lifeforms (usually in the ways of extreme weather events and loss of biodiversity).

One participant did not agree that climate change was a concern (negative case). This participant believed that any observable changes in the climate were due to natural fluctuations rather than human intervention, however, they still believed that humans impacted the environment in unacceptable ways. Despite refuting climate change, the participant believed that humans had a responsibility reduce their environmental impact:

> *Our responsibility is… to exist with the rest of the climate, being the plants, the animals, etc., in a way that we can all continue to survive. If we threw all of our garbage in lakes and rivers and we killed off the animals, that has effects on the ecosystem… we will be in a situation where we can barely survive ourselves. Not because of the climate change but because we changed the ecosystem and killed off the animals and plants that are required for our existence.* (Jesse)

Environmental Impact and Environmentally Responsible Practice

While some participants discussed climate change and environmental impact interchangeably, others described the two as related yet still differing from one another. For example, Morgan said: "*I think climate change has an environmental impact. It's the cause and the effect… The climate change is the cause, the effect is environmental impact. Environmental impact is what impacts me. It's the chain.*" Given this, Morgan felt that ERP meant that one should do their best to align one's nursing practice with institutional policies that helped reduce the environmental impact of the work. "*I would think that it would [mean to] just try your best with whatever policies [and] procedures, [because] institutionalized policies [and] procedures can stop or minimize the effect of how much stuff needs to be incinerated per se.*" Dimi similarly stated: *"I'd say climate change is the temperatures changing. It's a more generic term, [whereas] environmental impact… [is] the result of climate change.… I think they can be used interchangeably but the term impact kind of gives it a different meaning.*" When specifically asked to describe ERP, however, Dimi defined it in relation to both the personal and professional domains: **"***It means obviously you would do things, you know, the amount of electricity you use, not littering,… helping out the environment in small ways, picking up a piece of trash off the ground.*"

Overall, ERP was not well understood by participants. It was rarely encouraged in their practice and thus was challenging to envision what environmentally responsible nursing could look like. Any environmentally responsible actions noted in the workplace were often associated with reducing waste and costs, so differentiating the organizational motivations was challenging:

… is it for [the] environment, or is it just for the sake of pure waste?… We're encouraged

to not waste as we bring things into our isolation rooms or to patients' rooms… but is it

because it's fiscally responsible? (Kate)

Waste

Many participants had difficulties linking their own nursing practice to the larger issue of

climate change and did not always understand how it was possible to incorporate ERP into their

daily work. However, all the participants had a strong understanding of how resource-intensive

their nursing work was, and they indicated how they experienced waste and participated in

wasteful behaviours every day. Unlike their uncertainties around how their work impacted the

climate, the proximity they had to waste allowed them to clearly articulate how their practice

likely had a significant environmental impact. Participants noted that, in general, patient care

within the hospital was extremely resource-intensive and waste-producing; all meals were sent

up with individual items wrapped in plastic, single use cutlery was the standard, and each patient

would receive water in a plastic cup for every meal (Observational note [ON], June 11, 2019, p.

8). Guilt associated with the amount of waste was noticeable through the interviews as well as

during the observational portion of this study (ON, June 20, p. 12). Niko stated: "*Everything is*

one-time use, single-use and in a high amount of packaging of plastic… The amount of stuff it

takes to start an IV or to hang a bag of fluids is a lot…" Mel agreed and stated: "*Terrible… We*

use too much packaging. It's difficult because everything needs to be sterile. There must be other

things they can use… that aren't going to affect the environment... We're putting it in the

garbage."

Some participants felt the amount of waste produced by their practice was linked to

workplace culture. On one hand, some suggested that, because they worked in a Canadian

hospital setting, there was always a surplus of supplies available to them. This was noticeable in observations when examining well-stocked supply closets and supply carts around the units (ON, June 6, 2019). Some participants felt it was this sense of abundance that encouraged people to be thoughtless about the amount of supplies they used to complete their work, and ultimately produced more waste than necessary. On the other hand, some participants spoke of what could be described as a "resource war" occurring within the hospital setting. Hospital units were in a constant state of lending and borrowing supplies from one another and this led to a culture of resource-guarding; units labelled all large supplies with the unit numbers they belonged to such as chairs, stretchers, and even 'wet floor' signs (ON, June 6, 2019, p. 1; ON, June 11, 2019, p. 8). Some units had sign-out sheets for staff coming from other units to use for when they borrowed supplies in order to track costs, and as one nurse explained, to know how much to back-charge the borrowing units (ON, June 12, 2019, p. 9). Kate suggested her unit switched to disposable supplies because the re-usable versions

> *… would disappear… A lot of the stuff we have is disposable so that we can keep the stock… There is a bit of a scarcity mentality because… you only get enough that people hoard things… you'll find the things shelved in cupboards because people are always worried about the last one being there. On the daily, we have enough supplies, but it's just whenever we run out, you're waiting the next day or two to get your stock again. There's always been a scarcity mentality.*

The interviews demonstrated a paradoxical thinking related to hospital supplies; either there was a surplus of supplies which led to wasteful behaviour, or there was a sense of scarcity which led to stockpiling. Regardless, participants stated that workplace resources and supplies were

needlessly wasted, and staff were not encouraged to consider how their practices impacted the environment or the climate.

In summary, while climate change, environmental impact, ERP, and waste all differ in definition and practicality, participants often spoke about them interchangeably. Moreover, participants had varying levels of knowledge of these concepts, or how their practice related to them, yet they all understood how their work produced significant amounts of waste.

For me, I can't really separate it all out in my head, like, the use of fossil fuels contributes to climate change and then it's connected to each other. Also, the disposal of waste, pollution, because there's a lot of waste [that] is produced and it goes into the oceans. To me, it's all related to each other. (Deeyah)

Climate Change and Health

Participants understood, to varying degrees, the relationship between climate change and health. Although some participants struggled to see a connection:

I don't really know how climate change can affect health… The ozone layer is thinning and we're getting higher rates of skin cancer... I can see if there's garbage and contamination and stuff around, maybe it's possible that there'll be different diseases popping up but not that I've seen or not that I've heard about. (Niko)

Most participants understood that the environment influenced health and how, for example, extreme weather events exacerbated by climate change could negatively impact people. Some participants made specific links between climate change and mental health, which is an important health consequence that has recently gained more attention (Trombley et al., 2017; Veneema et al., 2017).

> *… If you're used to a certain type of weather and you move somewhere for this type of reason and let's say it's raining every day, I think it affects people's mood… People's mental health can [be impacted]. It might affect their careers.* (Dimi)

While some links made by participants were more general and related to how the environment impacted health rather than climate change ("*I think a lot of our cancers are from pollution. Some of it is location. Canada has a high rate for MS… Lack of sun [and] vitamin D… A lot of diseases have environmental factors.*" Kate), the clearest connection related to climate change and respiratory illness. Participants often discussed increased rates of asthma, chronic obstructive pulmonary disease, general lung disease, links to air pollution, and influenza. Jessica said: "*I think that with breathing issues like COPD or asthma, it can definitely be affected by warmer or drier climate areas… Breathing and other issues can be affected.*" Su Ying also discussed the impact of air quality on health, and stated: "*All the forest fires, all the air quality was terrible for a long time. Definitely [those] with respiratory issues [had] a hard time. That decreases our health.*"

One participant who also worked as a travel nurse discussed the changes in disease vectors related to climate change: "*Down the south, you'll see that a lot more different types of diseases. Flu is kicking [around] a lot longer [and] with different strains. You'll see a lot more influenza B. We usually did not see that as often*" (James). Another participant who had a personal interest in travel brought a broader and more global perspective to the discussion: "*… obviously climate change is going to affect the way food is produced. I don't know the specifics on it… but I would assume that any temperature changes would change the produce and ultimately affect somebody's health that way*" (Dimi). Both participants attributed their broader understanding of climate change's impacts on health to their travels and experiences in countries

outside of Canada. Participants with experiences in other countries, both professional and personal, had a slightly broader and more global perspective on the links between climate change and health. However, some local participants who were born and raised in Canada also brought this perspective to the interviews: *"...with the deserts growing...people... can't grow as much food anymore. Even if there [are] flash floods and severe weather..., the crops are being destroyed and so people don't have as much access to food, there's more malnutrition"* (Su Ying).

Nursing's Relationship to Climate Change

A range of answers were received when participants were asked whether they saw a relationship between nursing and climate change. Several participants did not see any connection while others saw very clear links. Some even began to make connections during the interview process. For example, at first Niko said: "*I honestly don't see a link... I don't know how my nursing profession can affect [climate change] when I'm in a building that's climate-controlled and I'm asked to use the supplies that I have."* Later in the same interview, Niko stated:

> *I think it's definitely like [this study] decided to raise some discussion on the frontline levels if the nursing profession is actually affected by climate change and how we can focus on it... [We can think about] things to do on our own,... [like] getting rid of plastics, getting rid of straws, things like that.*

Alternatively, Yoko readily described a connection between nursing and climate change and outlined some responsibilities she felt the nursing profession held: *"The more things continue to change, they're probably not going to change for the better... the more nursing's probably going to be needed. Also, I think as nurses, we have a responsibility to help change the conversation."*

Amir also saw the link: "*Yes, definitely. Nurses have to advocate for patient health, so advocating for the health of the environment helps patient health.*" Muneera did as well, and being the youngest and newest nurse among the participants, she brought the perspective of the younger generation of nurses to the study:

> *Ultimately, it's going to be me and my generation that's nursing these people who are exposed to the effects of climate change. So much right now is only diabetes and personal modifiable lifestyle factors. Climate change, it's going to affect everyone. I would say in the long term, yes, I definitely do see the connection.*

While not everyone saw the link directly, for example Nurit said that she only saw the relationship between the two "*in a small way, but I don't think in a huge way. I think [nurses can make] small changes, but I don't think they're speaking out as much as other groups might be*", participants tended to suggest that everyone had a responsibility towards climate action and this was not unique to nursing. Mel said "*I think everybody should. Every one of us should because if we don't look after [the environment], it's not going to be here.*"

Participants discussed barriers they felt were impeding nurses in taking action against climate change. Sandra felt that nurses did not lack knowledge on climate change as a phenomenon, rather they lacked an understanding of their role in the matter:

> *I have not encountered one single nurse who doesn't understand that it exists, and it is affecting people's health and that we are seeing things that we didn't see… I think that there may not always be understanding of our role in that within the hospital environment.*

James felt that he did understand the role of nurses in climate action, but that nurses working in the hospital setting had challenges seeing the bigger picture due to their highly specific context:

There is a connection where we try to combat the changes of climate change on our patients by the type of care that we provide for them, and the type of patients that come in here that we treat at that point. That's our role, but since we're so microscopic in depth in that fold, we can't really see the bigger picture basically. We're treating each patient on a patient by patient basis.

Finally, participants' challenges in articulating the relationship between nursing and climate change, or the role nurses played in climate action, were summarized by Tal:

When I think about my day, I can't identify readily anything that I could currently do differently [or] easily that would have a positive impact on climate change. Maybe there are things and I just haven't thought of them, but I think that if change would need to happen, it would need to happen at a higher level, like an administrative level within [the organization] as a whole. I don't think that there are easy things that nurses could do to help turn that trend around.

Personal Versus Professional

While climate change was viewed, to varying degrees, as a concerning phenomenon by most participants, many did not readily frame it as a professional issue. Those who were cognizant of the issue seemed to have gained this knowledge from personal interest in the matter but not necessarily because they were nurses. When participants discussed their attempts at reducing their carbon footprint and environmental impact at work, these actions stemmed from their personal knowledge, understanding, and concern. Both Nurit and Jessica discussed how climate change was a concern for them, yet it was predominantly a personal priority. Nurit said *"I would say it's more [in] my home life that I think about it than at work… It's two different worlds. Yes, they are intertwined, but my priorities at home are very different from my priorities*

here at work." Jessica drew attention once more to the gap between the focus on the immediate environment rather than the broader and more macro-environment:

> *Maybe we as nurses need to be a little bit more aware of our effect on the environment, because we're focused on how we're affecting patients and not necessarily looking at the broad picture. We come in, we work our 8 or 12-hour a day with the patients and we go home. Maybe we are looking at our carbon footprint in our home life but not necessarily our work life, and maybe that needs to be congruent.*

Deeyah also discussed this division between the personal and the professional, and the difference between a micro and macro perspective on the issue:

> *There's a tendency to separate it. You have your work mind and you have your outside brain and you have a set way of doing things at work and you're just there to follow the procedures... We're just dealing with the person in front of us and maybe not thinking so broadly about them or what we're doing. Certainly now, being asked these questions, I can see how it definitely does affect our job and the type of people we see. Perhaps the things that we're doing in our jobs can maybe be modified or should be modified at an organizational level to help contribute to helping the issue.*

When asked, participants described the individual actions they took either at home or in the workplace to reduce waste, mitigate climate change, or reduce their environmental impact. Home activities included: gardening, composting, recycling, being mindful of energy-usage, taking transit, using reusable containers for food and drink, eating a plant-based diet, and one participant even sewed her own sanitary napkins that she could wash and re-use. Work activities included: being mindful of supply usage and only using as needed, not taking an excess of supplies into patient rooms, and turning off lights in empty rooms. Those that were concerned

about climate change had a good idea about how they could act in an environmentally responsible way and reduce their carbon footprint in their personal lives, however, they were still not always sure of how to bring these values into the workplace. According to Niko, "*there's this awareness, like, you know what you can do as an individual person. If we can't change our big, huge [organization], maybe we can change it on the personal level.*"

When asked to elaborate on why they could not bring their "green" values into their workplaces, these participants stated that it was due to the nature of their work, time restrictions, concerns about health and safety, feeling unsupported by fellow staff and the organization as a whole. Nurit described one initiative that a colleague attempted to set up:

> *NURSE X tried to set up recycling in our department, recycling of paper products, even IV bags and things like that, but there was nowhere for it to go so it was like, we were trying to do this but nobody would take it and bring it to recycling.*

Muneera, a participant who did try to reduce her climate and environmental impact in her personal life, said the inability to do the same in their work life contributed to work dissatisfaction:

> *It contributes to maybe job dissatisfaction. I think I would feel better practicing in an area that promoted being environmentally sustainable. It's unfortunate that I have to go home and feel like, "This is how much waste I produce. This is my carbon footprint. This is what I'm leaving behind." I feel like it's not really addressed… it's discouraging that we work so hard to promote health and well-being but we leave such so much waste behind us.*

Overall, opinions on nursing and its role in climate action were diverse. Some participants were uncertain of nursing's role and others saw clear links between the two. Participants described

contextual, organizational, and professional barriers that impeded climate action in the workplace (i.e., environmentally responsible practice). Finally, participants often felt that climate change was a concern that was separate from their professional lives.

Discussion

This study offers several important findings towards the realm of climate change and nursing. First, nurses' perspectives on climate change, and knowledge about this phenomenon, are diverse. Almost all participants understood that humans have a part to play in exacerbating the problem, but levels of knowledge on the causative factors or outcomes of climate change ranged from limited to well-informed. Despite this, almost all participants understood climate change to be a major concern. Several participants made strong links between climate change and its negative impacts on health, however, many did not understand what individual nurses could do about this. They could not easily articulate what nursing's professional role was in addressing climate change and were not sure if nursing even had a specific role.

This seems to go against what previous research has found with nurses in Sweden (Anåker et al., 2015) as well as nurses in Ontario (Laan, 2014) where nurse-participants saw a clear role and responsibilities for the nursing profession in confronting the issue of climate change. Like the Anåker et al. (2015) and Polivka et al. (2012) studies, several participants believed there was little they could do to make a difference through their work. This sentiment was also identifiable among well-informed participants who were deeply concerned about climate change. Similar to the participants in the Anåker et al. (2015) study, the well-informed group of participants often tried to make a difference in their personal lives, because unlike their professional lives, they had a very clear understanding of how this could be done. Another similarity with Anåker et al. (2015) was that participants understood waste and environmental

impacts much better than how their work contributed to global health and climate change. This study is unique from other research in that it has demonstrated how nurses can also change perspectives and begin to develop an understanding of nursing's role in addressing climate change by simply engaging with the topic and having time to reflect. Participant Niko began their interview by not understanding the relevance climate change to nursing practice, yet after having time to reflect on the topic, they began to see important connections.

Overall, participants in this study were generally uncertain about nursing's role in addressing climate change and unfamiliar with the existing research. Some scholars view nursing's role in addressing climate change related to policy improvements (Leffers & Butterfield, 2018). Nurses can get involved in the development of both upstream and downstream policies, where upstream policies focus on "pollution prevention and taking actions to assure the best possible climate outcomes for future generations" (Leffers & Butterfield, 2018, p. 211) and downstream policies help countries address the health consequences of climate change by focusing on climate adaptation and response (Leffers & Butterfield, 2018). Other scholars have identified nursing leaders who have established "green teams" (Kurth, 2017; Sayre et al., 2010). Often led by nurses, Green teams can improve the efficiency of: 1) food services (offering more plant-based options and exploring locally sourced options), 2) waste management (assessing what waste can be reduced, what can be re-used, what can be recycled, and what alternatives exist to incineration), and 3) transportation (reducing unnecessary trips, accessing local suppliers, encouraging staff to find low-emission options for their daily commute) (Kurth, 2017; Sayre et al., 2010).

Another important role that nurses have in addressing climate change is through education; both for themselves and those they work with. Given the negative impacts climate

change has on human health and the social inequalities associated with these, climate change education for both practice and academic nurses is critical (Leffers et al., 2017). Some scholars argue that nurses have an ethical duty to understand the effects of their professional behaviour on the environment and the ecosystems (Kangasniemi et al., 2013). The scientific evidence supporting the negative consequences of climate change compels the "nursing profession to educate nurses across all levels of academic and professional education to ensure competency in addressing mitigation, adaptation, and resilience strategies for nursing practice" (Leffers et al., 2017, p. 685). Once nurses themselves are experts on the issue, they can also be trusted sources of knowledge for patients, families, and communities (Allen, 2015). Nurses that are educated on the issues will be integral in disaster planning and response; nurses will be "better able to keep themselves and their patients, families, and communities safe or at least to minimize the harm that may occur, and will ultimately lead to communities that are more resilient to disasters" (Veenma et al., 2017). Research demonstrates that nurses have a role to play in addressing climate change in policy making, nursing practice, and in nursing education.

Participants' inconsistencies in knowledge on climate change and limited understanding of nursing's role in addressing climate change is potentially linked to the lack of professionalization around these topics in addition to an educational gap. Nurses may have not yet fully accepted climate change as a professional issue, and there is potential for nurses to benefit from increasing educational content on climate change and nursing's role in addressing it. This is not because the profession has not started this work (Goodman, 2011; Kalogirou et al., 2020; Kurth, 2017; Leffers & Butterfield, 2018; Sayre et al., 2010), or that professional bodies do not support the adoption of this issue (American Nurses Association, 2008; Canadian

Association of Nurses, 2008; International Council of Nurses, 2018). Findings demonstrate that a gap remains between climate change and the consciousness of every-day nurses.

Limitations

Findings from this study were not always consistent with those from prior studies. This could be related to the lack of professionalization around the issue of climate change in nursing, or it could be reflective of regional differences. Inconsistencies may also be due to differences in the studied healthcare delivery settings. Countries and regions around the world have different experiences of climate change, and regional contexts shape attitudes, beliefs regarding these issues. It would be important to more fully explore how these factors influence the results. Moreover, due to these possible differences, these findings may not be easily transferrable to other settings beyond the western Canadian context.

Conclusion

The purpose of this paper was to explore nurses' perceptions on climate change, health, nursing practice, and the relationship between the three. Overall, participants had diverse levels of knowledge on climate change, its causes, and its implications. Previous research shows that nursing has a significant role in addressing climate change. However, study findings indicate this role is not yet ubiquitously understood or incorporated into every-day nursing consciousness. The incongruency in these findings and those found in previous research conducted in different regions could indicate that the nursing profession has not yet fully established climate change as a practice concern. Integration of the phenomena into nursing curricula for nursing education and professional practice standards is still lacking.

Relevance to Clinical Practice

This study demonstrated that nursing's role in addressing climate change was not well understood among participants. To encourage this connection, nurses must start considering how their practice impacts global health. Creating opportunities for clinical nurses to engage with the topics of climate change, health, and nursing practice could be beneficial; informal lunchtime sessions, interprofessional educational seminars, or even incorporating content into clinical competencies may be good opportunities for engagement. Moreover, there are many ways for clinical nurses to develop climate advocacy within their workplace, such as developing green teams, influencing workplace practices and policies, and educating patients and families on climate change and health; nursing leadership is essential in these endeavours. Moreover, nurses require support from their workplace to aid in developing strong environmentally responsible nursing practices and strengthening the relationship between nurses and climate change.

References

Adlong, W., & Dietsch, E. (2015). Environmental education and the health professions: Framing

climate change as a health issue. *Environmental Education Research, 21*(5), 687–709.

http://doi.org/10.1080/13504622.2014.930727

Allen, J. P. (2015). Climate change: It's our problem. *Pediatric Nursing, 41*(1), 42–46

American Nurses Association. (2008). *American Nurses Association 2008 House of Delegates*

Resolution: Global Climate Change.

https://www.nursingworld.org/~4afb0e/globalassets/practiceandpolicy/work-

environment/health--safety/global-climate-change-final.pdf

Anåker, A., Nilsson, M., Holmner, Å., & Elf, M. (2015). Nurses' perceptions of climate and

environmental issues: a qualitative study. *Journal of Advanced Nursing, 71*(8), 1883-

1891. doi: 10.1111/jan.12655

Canadian Association of Nurses. (2008). *The role of nurses in addressing climate change.*

https://www.cna-aiic.ca/~/media/cna/page-content/pdf-

en/climate_change_2008_e.pdf?la=en

Cruz, E. V., & Higginbottom, G. (2013). The use of focused ethnography in nursing research.

Nurse Research, 20(4), 36-43.

Department of Economic and Social Affairs. (2016). *World economic and social survey 2016.*

Climate change resilience: An opportunity for reducing inequalities.

https://www.un.org/development/desa/dpad/publication/world-economic-and-social-

survey-2016-climate-change-resilience-an-opportunity-for-reducing-inequalities/

Fawcett, J. (1984). The metaparadigm of nursing: Present status and future refinements. Image: *The Journal of Nursing Scholarship, 16*(3), 84–89. https://doi.org/10.1111/j.1547-5069.1984.tb013 93.x

Goodman, B. (2011). The need for a 'sustainability curriculum' in nurse education. *Nurse Education Today, 31*(8), 733–737. doi:10.1016/j.nedt.2010.12.010

Health Care Without Harm & Arup. (2019). *Health care's climate footprint: How the health sector contributes*. https://noharm-uscanada.org/ClimateFootprintReport

Intergovernmental Panel on Climate Change. (2014). *Climate change 2014: Synthesis report.* https://archive.ipcc.ch/report/ar5/syr/

International Council of Nurses. (2018). *International Council of Nurses position statement: Nurses, climate change and health.* https://www.icn.ch/sites/default/files/inline-files/PS_E_Nurses_climate%20change_health_0.pdf

Kalogirou, M. R., Olson, J., & Davidson, S. (2020). Nursing's metaparadigm, climate change and planetary health. *Nursing Inquiry, 27*(3), 1–9. https://doi.org/10.1111/nin.12356

Kangasniemi, M., Kallio, H., & Pietilä, A. M. (2014). Towards environmentally responsible nursing: A critical interpretive synthesis. *Journal of Advanced Nursing, 70*(7), 1465–1478. https://doi.org/10.1111/jan.12347

Knoblauch, H. (2005). Focused ethnography. *Forum: Qualitative Social Research, 6*(3). Retrieved from http://www.qualitative-research.net/index.php/fqs/article/view/20/43#footnoteanchor_11

Kurth, A. E. (2017). Planetary health and the role of nursing: A call to action. *Journal of Nursing Scholarship, 49*(6), 598–605. https://doi.org/10.1111/jnu.12343

Laan, M. S. (2014). *Analysing Ontario public health nurses' knowledge, attitudes, and beliefs about roles and responsibilities in addressing climate change (master's thesis)*. Retrieved from

https://qspace.library.queensu.ca/bitstream/handle/1974/12480/Laan_Megan_S_201409_MSc.pdf?sequence=1&isAllowed=y

Leffers, J., & Butterfield, P. (2018). Nurses play essential roles in reducing health problems due to climate change. *Nursing Outlook, 66*(2), 210–213. https://doi.org/10.1016/j.outlook.2018.02.008

Leffers, J. M., McDermott-Levy, R., Nicholas, P. K., & Sweeney, C. F. (2017). Mandate for the nursing profession to address climate change through nursing education. *Journal of Nursing Scholarship, 49*(6), 679–687. https://doi.org/10.1111/jnu.12331

Lilienfeld, E., Nicholas, P. K., Breakey, S., & Corless, I. B. (2018). Addressing climate change through a nursing lens within the framework of the United Nations Sustainable Development Goals. *Nursing Outlook, 66*(5), 482–494. https://doi.org/10.1016/j.outlook.2018.06.010

Lincoln, Y. S. & Guba, E. G. (1985). *Naturalistic Inquiry*. Sage Publications.

National Aeronautics and Space Administration [NASA]. (n.d.). *The effects of climate change.* NASA Global climate change: Vital signs of the planet. https://climate.nasa.gov/effects/

Polivka, B. J., Chaudry, R. V., & Crawford, J. M. (2012). Public Health Nurses' Knowledge and Attitudes Regarding Climate Change. *Environmental Health Perspectives, 120*(3), 321–325. http://dx.doi.org/10.1289/ehp.1104025

Roper, J. M., & Shapira, J. (2000). *Ethnography in nursing research.* Sage Publications.

Sayre, L., Rhazi, N., Carpenter, H., & Hughes, N. L. (2010). Climate change and human health: The role of nurses in confronting the issue. *Nursing Administration Quarterly, 34*(4), 334–342. https://doi.org/10.1097/ NAQ.0b013 e3181 f60df9

Smith, K. R., Woodward, A., Campbell-Lendrum, D., Chadee, D. D., Honda, Y., Liu, Q., Olwoch, J. M., Revich, B., & Sauerborn, R. (2014). Human health: impacts, adaptation, and co-benefits. In C. B. Field, V. R. Barros, D. J. Dokken, K. J. Mach, M. D. Mastrandrea, T. E. Bilir, M. Chatterjee, K. L. Ebi, Y. O. Estrada, R. C. Genova, B. Girma, E. S. Kissel, A. N. Levy, S. MacCracken, P. R. Mastrandrea, and L. L. White (Eds.), *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects* (pp. 709-754). Intergovernmental Panel on Climate Change.

Trombley, J., Chalupka, S., & Anderko, L. (2017). Climate change and mental health. *American Journal of Nursing, 117*(4), 44–52. https://doi.org/10.1097/01.NAJ.0000515232.51795.fa

United Nations [UN]. (n.d.). *13 climate action: Why it matters.* United Nations: Sustainable development goals. https://www.un.org/sustainabledevelopment/wp-content/uploads/2017/07/13.pdf

United Nations [UN]. (2011). *Fact sheet: Climate change science - the status of climate change science today.* https://unfccc.int/files/press/backgrounders/application/pdf/press_factsh_science.pdf

U.S. Global Change Research Program. (November 2018). *Climate change impacts in the United States: The fourth National Climate Assessment Volume 1.* https://science2017.globalchange.gov/downloads/

Vaismoradi, M., Turunen, H., & Bondas, T. (2013). Content analysis and thematic analysis:

Implications for conducting a qualitative descriptive study. *Nursing and Health Sciences,*

15(3), 398–405. doi:10.1111/nhs.12048

Veenema, T. G., Thornton, C. P., Lavin, R. P., Bender, A. K., Seal, S., & Corley, A. (2017).

Climate change–related water disasters' impact on population health. *Journal of Nursing*

Scholarship, 49(6), 625–634. https://doi.org/10.1111/jnu.12328

Whitmee, S., Haines, A., Beyrer, C., Boltz, F., Capon, A. G., Ferreira de Souza Dias, B., Ezeh,

A., Frumkin, H., Gong, P., Head, P., Horton, R., Mace, G. M., Marten, R., Myers, S. S.,

Nishtar, S., Osofsky, S. A., Pattanayak, S. K., Pongsiri, M. J., Romanelli, C., … & Yach,

D. (2015). The Rockefeller Foundation–Lancet Commission on planetary health:

Safeguarding human health in the Anthropocene epoch: report of The Rockefeller

Foundation–Lancet Commission on planetary health. *The Lancet, 386,* 1973-2028.

http://dx.doi.org/10.1016/S0140-6736(15)60901-1

World Health Organization. (2011). *The social dimensions of climate change.*

https://www.who.int/publications/i/item/the-social-dimensions-of-climate-change

World Health Organization. (2014). *Gender, climate change and health.*

https://www.who.int/globalchange/publications/reports/gender_climate_change/en/

World Health Organization. (2016). *Global strategy on human resources for health: Workforce*

2030. http://apps.who.int/iris/bitstream/10665/250368/1/9789241511131-eng.pdf

World Health Organization & Health Care Without Harm. (2009). *Healthy hospitals, healthy*

planet, healthy people: Addressing climate change in healthcare settings.

https://www.who.int/globalchange/publications/healthcare_settings/en

Appendix

Demographic Information

	Unit Managers	Quality Improvement Team	Nurse Educators	RNs	LPNs	**Total**	Male	Female	Average Age	Average Years of Experience
Emergency Room	4	1	1	8	0	14	3	11	40	15
Internal Medicine	2	2	0	3	1	8	0	8	40	12
Total:	6	3	1	11	1	22	3	19	40	14

Chapter Four:

The Impact of Context on Practice: How the Hospital Setting Influences Nurses' Abilities

to Practice in Environmentally Responsible Ways

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Abstract

Aim: To understand how working in the hospital setting influenced nurses' abilities to practice in environmentally responsible ways. **Background:** Climate change is a global crisis that negatively impacts human health. Nurses have a role to play in addressing climate change, yet previous research suggests nurses are unable to do so because they feel unsupported by their healthcare organizations. Little is known on how Canadian nurses understand these issues. **Methods:** A focused ethnography was conducted within a large Canadian hospital. Nurses (n=22) working in the emergency room and three medicine units were invited. Semi-structured interviews were conducted, and observations were collected. **Results:** Three themes were identified: patient care not environmental care, organizational role, and standardization. **Conclusion:** Participants were unable to practice in an environmentally responsible manner because they felt unsupported by their hospital. The hospital can help promote environmentally responsible practice by changing policies and developing supportive workplace cultures. **Implications:** Nurses need the support of their hospital organization if they are to successfully address climate change. Environmental accreditation standards might help hospitals deliver environmentally responsible healthcare.

Key words: climate change, environmentally responsible practice, nursing practice, nurses, environmental health

The Impact of Context on Practice: How the Hospital Setting Influences Nurses' Abilities

to Practice in Environmentally Responsible Ways

Climate change is a global health crisis, and the healthcare sector is significantly contributing to the problem. According to the United Nations (2011), anthropogenic climate change is defined as either an indirect or direct change in the climate that is attributed to human activity. While there are several factors that contribute to the changing climate, human activity is considered the primary accelerating force (Intergovernmental Panel on Climate Change [IPCC], 2014; National Aeronautic Space Administration [NASA], n.d.). It is primarily through the burning fossil fuels that harmful greenhouse gases are emitted into the atmosphere, and these gases critically impact our climate (IPCC, 2014; NASA, n.d.; U.S. Global Change Research Program, 2018).

> Anthropogenic greenhouse gas emissions have increased since the pre-industrial era, …
> and are now higher than ever. This has led to atmospheric concentrations of carbon
> dioxide, methane and nitrous oxide that are unprecedented in at least the last 800,000
> years. Their effects, together with those of other anthropogenic drivers, … are extremely
> likely to have been the dominant cause of the observed warming since the mid-20th
> century. (IPCC, 2014)

When compared to pre-industrial levels, the past five years have been the warmest on record and so has the past decade (World Meteorological Organization [WMO], 2020). "Since the 1980s, each successive decade has been warmer than any preceding one since 1850" (WMO, 2020). The health sector finds itself in 'catch-22', where on one hand, it is a major emitter of greenhouse gases (and thus a significant contributor to climate change) (Health Care Without Harm [HCWH] & Arup, 2019), yet on the other, climate change has major negative

consequences towards human health (Smith et al., 2014). As such, the health sector is in direct contradiction to its mandate to promote and protect human health.

"[Healthcare's] climate footprint is equivalent to 4.4% of global net emissions (2 gigatons of carbon dioxide equivalent) … If the health sector were a country, it would be the fifth-largest emitter on the planet" (Health Care Without Harm [HCWH] & Arup, 2019). This is significant because climate change, while having significant implications for all life on Earth, has especially harmful consequences for human health (Smith et al., 2014). The Intergovernmental Panel on Climate Change are predicting (and have already noted) increasing levels of malnutrition, death, disease, injury due to heatwaves, a growing frequency of cardio-respiratory illness, and increasing costs of healthcare services due to climate change (Smith et al., 2014). Given the unique position that the health sector finds itself, it is important for healthcare organizations and practitioners to critically examine their processes and practices and offer healthcare services in an environmentally responsible manner. Nurses specifically are crucial leaders in this field.

Background

Nurses are the largest group of healthcare practitioners around the world, making up almost half of the global healthcare team (World Health Organization [WHO], 2016). As such, they have an important role to play in promoting environmentally responsible practice (ERP) within the workplace (Kalogirou et al., in press). Previous research found that nurses considered the concepts of climate change, environmental impact, and waste altogether (Kalogirou et al., in press). While the authors recognize the differences between these concepts, in the following work we refer to all three with the encompassing term 'environmental impact'.

The foci of ERP within nursing include: 1) reducing energy consumption, primarily electricity; and 2) responsible consumption of products and materials, specifically ensuring responsible purchasing as well as appropriate waste management (Kangasniemi et al., 2013). While nurses in both academia (Lilienfeld et al., 2018; Griggs et al., 2017; Schenk, 2019; Trombley et al., 2017) and education (Jackman Murphy, 2015; McDermott-Levy et al., 2019; Neal-Boylan et al., 2019) also play a significant role, we will predominantly focus on nurses in the clinical setting.

Clinical nurses are important actors in addressing climate impact prevention and response (Leffers & Butterfield, 2018). First, nurses serve as essential personnel during climate disasters, help manage and prepare health facilities for such events, and can lead efforts to anticipate surges in demand in emergency departments and outpatient facilities (Cook et al., 2019; Kurth, 2017; Leffers & Butterfield, 2018; Sayre et al., 2010). Second, nurses are critical to health promotion and are trusted communicators of important climate health information to patients and their families (Allen, 2015; Kurth, 2017; Sayre et al., 2010). Third, nurses are in a key position to influence decision-making (Cook et al., 2019) and are leaders in implementing strategies that reduce healthcare's waste and carbon emissions (Leffers & Butterfield, 2018). Finally, nurses establish and lead "green teams," which can improve hospital efficiency in several ways. Green teams: 1) work with food services to offer more plant-based options and explore locally sourced options; 2) assess and reform waste management practices, such as assessing what sources of hospital waste can be reduced, what resources can be re-used, and what alternative waste strategies exist as opposed to incineration; and 3) address transportation emissions by educating staff on the value of reducing unnecessary trips in vehicles and encouraging the use of low-emission transportation (Kurth, 2017; Sayre et al., 2010).

Although the academic literature has begun to define nursing's role in addressing climate change, previous studies found that practicing nurses are less certain (Kalogirou et al., in press). Other studies found that nurses were aware of their professional role in addressing climate change, however, they were often uncertain of how to engage with this role and felt unsupported by their healthcare organization (Anåker et al., 2015; Polivka et al., 2012). Little is known about how Canadian nurses understand these issues. The aim of this study is to understand how working in a Canadian hospital setting influences nurses' abilities to practice in an environmentally responsible way.

Methods

Design

This study utilized focused ethnography (FE) to study how the hospital setting influenced nurses' abilities to practice in environmentally responsible ways. FE is utilized when the study is limited in scope, the research question or phenomenon has been understudied, or when questions important to the profession are being answered (Cruz & Higginbottom, 2013; Roper & Shapira, 2000). FE was appropriate for this study as it is used to understand a culture's beliefs and practices by observing behaviours, actions, interactions, and social situations (Cruz & Higginbottom, 2013; Knoblauch, 2005; Roper & Shapira, 2000). In this case, the culture being studied was that of nurses working in a hospital.

Setting and Sample

This study took place at a large, western Canadian hospital. Nurses working in three internal medicine units and the emergency room were invited to participate. Purposive and snowball sampling strategies were employed. The first author hung posters advertising the study around the units and was present during shift-change to share study details with unit staff. Unit

managers were asked to forward email invitations to nursing staff. Nurse managers, nurse educators, Licensed Practical Nurses (LPNs), and Registered Nurses (RNs) were all invited to participate. Overall, 22 nurses participated (n=22).

Data Collection

Interviews were conducted by the first author, a doctoral candidate at the time, between May and August 2019. These took place either in-person (in the hospital or the nearby university campus) or via telephone. Participants and the first author had no previous connection or relationship. The information letter and consent forms were provided to participants prior to their interview and the pertinent concepts of consent, confidentiality, and data usage were also reviewed. Participants were then given opportunities to ask questions. Once consent was provided, interviews were audio recorded and transcribed verbatim. Interviews were semi-structured, used a general interview guide, and lasted 40-90 minutes. Prompts were offered by the interviewer and field notes were recorded during and after the interviews. All participants were assigned pseudonyms.

Unit managers assisted in setting up research days whereby the first author could collect observations on each of the participating units. The first author observed how staff engaged with ERP, (how nursing staff used hospital resources, amounts of resources required to complete daily tasks, amounts of waste generated, and use of electricity, water, and indoor climate control), the workplace's daily routines, and how the physical layout of each unit impacted nurses' abilities to practice in an environmentally responsible way (where was the recycling, how many recycling bins versus garbage bins, what was recycled and what was wasted, challenges to climate controlling patient and staff spaces). Staff were notified at the start of each shift of the researcher's presence and no personal information was collected during these times.

Ethical Considerations

Ethics approval were obtained from the Research and Ethics Board of a large western Canadian university.

Data Analysis

The aim of thematic analysis is to examine narrative materials from the life stories of research participants (Vaismoradi et al., 2013), and thus it was an appropriate tool to analyse study data. Three researchers individually coded three transcripts and then compared results. NVivo Software aided in this task. Codes were agreed upon and a coding framework was developed. Transcripts were analysed for key words, phrases, and sentiments, and later coded (Vaismoradi et al., 2013). Subthemes were developed based on collected and merged codes, and subthemes were then merged to create themes (Vaismoradi et al., 2013). The team met up to discuss and confirm codes, process, and theme development. Data were collected and analysed in an iterative fashion.

Rigour

The following four criteria may be used to establish rigour among qualitative works: credibility, transferability, dependability, and confirmability (Lincoln & Guba, 1985). The team developed credibility through their ongoing, rigorous discussions that occurred throughout all phases of the study. The thick descriptions of situations and themes provided by participants aided in developing high levels of credibility. Transferability was addressed when the team created a detailed and transparent analytical decision trail via the recording of personal notes, the coding framework, and the theme building process. Moreover, a reflexive journal was maintained. Dependability and confirmability were both achieved through recurrent team meetings and check-ins, and frequent comparisons of findings among the team members.

Findings

A total of 22 participants agreed to participate in this study. Eight participants worked on the medicine units (two unit managers, two quality improvement team members, three frontline RNs, and one frontline LPN), while the other 14 worked in the emergency room (four unit managers, one quality improvement manager, one nurse educator, and eight frontline RNs). Three participants were male and 19 were female. At the time of data collection, participants were between the ages of 26 to 65, with a mean age of 40, and had between one to 38 years of nursing experience, with a mean of 14 years of experience. The main themes developed are as follows: patient care not environmental care, organizational role, and standardization. Participants were assigned pseudonyms. Observational notes are cited throughout.

Patient Care Not Environmental Care

The following theme represents participants' competing priorities relative to the environmental impact of their work. Participants prioritized their patients and described how their workload was often a barrier to considering the environment or integrating ERP into their work. The theme is comprised of two categories: 1) ERP at odds with patient care, and 2) too busy and overwhelmed to care (about the environment).

ERP at Odds with Patient Care

Participants universally identified the patients and patient care/safety as their main priority. *[My] priorities [are] patient safety, patient care and getting the work done for the day… charting, medications, vital signs, safety, get them settled… [and] comfortable* (Amir). Other nursing priorities included: safety of self and other staff, evidence-based practice, and working efficiently to complete tasks. ERP was not identified as a priority. "… *You would find most people do not consider [ERP] in their daily practice… Whether they have the option to use a*

product or not, it would not come down to an environmental priority that helps to make that decision" (Charlie). Several participants stated that they did not think about ERP or climate change often and had difficulties linking these concepts to their work. Niko stated: "*I have to use the supplies that I have, and I have to work in the building that I'm in. We have to follow process and policy that's in place so no, I don't really think about climate change.*" Tal agreed and suggested that ERP did not directly relate to patient care: "*It's not [that] I don't care but… if I'm going to spend my time doing research…, it typically is related to my actual practice or something that I came across that I needed to know more about…*"

At times, ERP was even seen as incompatible or at odds with nursing priorities. As Jessica described: "*I don't think about the environment… when I'm doing patient care. I focus on patients' needs in that moment… Maybe at some point, we are reflecting, 'wow, that does add on,' but it's not in the moment.*" Specifically, participants often felt that ERP was misaligned with certain occupational health and safety policies. Charlie stated: "*A lot of what we use is single-use, but its single-use for very necessary reasons. We wouldn't be able to maintain our standards of patient safety competence, for instance, if a number of our supplies were multi-used.*" While participants supported these safe practices, some expressed concern about how their organization and work culture possibly took these measures too far. Nurit outlined this dilemma: "*Everything is single-use… to ensure we have safe patient care. In that way, yes, it's supportive, but in the other way, it can be very wasteful.*" Samir also shared his concern: "*Right back from Florence Nightingale, her motto was 'cleanliness helps heal'. It does, but what point is too much?… What are we preventing?*"

Too Busy and Overwhelmed to Care (About the Environment)

Even when participants were concerned about promoting ERP or reducing their environmental impact, they often felt they did not have the time to do so. "*I do [think about climate change], but not at the time when I'm actually in the trenches working. It's something you think about after or think about before. In the time that you work, you're on autopilot*" (Morgan). This sentiment was observable: staff meetings took place between shifts and presented a multitude of new initiatives, policy and practice changes, and unit updates to incoming and exiting staff (Observational Note [ON], June 26, 2019, p. 18). Nurses had hectic shifts where they were often observed moving constantly from patient rooms, working hard to complete tasks (ON, June 6, 2019, p. 5), and working with patients and families (ON, June 26, 2019, p. 19). When nurses were not directly working with patients or their families, they were instead documenting their work (ON, June 12, p. 11). Furthermore, units often appeared outwardly chaotic, with medical devices, paperwork, and extra supplies cluttering the workplace (ON, June 12, 2019, p. 9; ON, June 20, p. 18).

Participants described an intense pressure to get through their workdays. Going "above and beyond" and caring about ERP or their environmental impact was asking too much from an already overwhelmed group. Sandra stated:

> *Get through the day. That's survival mode… [You] need to give that guy blood and make sure these [nurses] bag this guy. Am I going to give a crap about where I dumped that garbage? I am not… I think that that immediacy takes over.*

Dimi described how being too busy actually negatively impacted the environment: "*The quicker we work, the more inefficient we [are]… I'm starting an IV. If I'm doing it quickly, I might not do it as efficiently, therefore wasting more materials… When there's more time to do things, there's*

less waste." Even when participants had the desire to do so, they stated they were unable to engage with ERP because of their workload. One participant noted that being too busy at work was also a barrier to considering her environmental impact in her personal life. Despite being interested, she was a working mother that, alongside her nursing career, had to care for her family. "*I've got two children and I work almost full time. I don't have a whole lot of time and energy to devote to that research"* (Yoko). Thus, she did not feel like she had the time to engage with these issues, even during her time off.

Organizational Role

The following themes reflect the participant's perspectives on their organization; what they thought the organization prioritized, whether they felt ERP was supported by their organization, and expectations they had of their organization regarding ERP.

Budget is the Top Priority

Participants stated that, from their perspective, the largest organizational priority appeared to be the budget. "*I think the hospital's top priorities are to save money and to see as many people as possible in a short amount of time and to please absolutely everybody*" (Niko). Although participants also stated other organizational priorities (patient safety, patient through-put, ensuring protocols are followed, and accreditation), they often felt that keeping a balanced budget superseded everything else. Su Ying stated: "*I think they do care about the patients and patient safety. They do care about the staff safety, but I think they're really concerned with money as well."* Alternatively, José suggested that the organization prioritized "*safe quality, equitable distribution of healthcare resources to patients in need and families… It's about quality and safety and cost."*

Participants were asked whether they felt their professional priorities aligned with the organization's priorities, and many described a misalignment. The misalignment was typically attributed to organizational concerns around budget, even if unrelated to ERP or other environmental concerns. Kate understood the importance of the budget, but said: "*I guess they have to be financially responsible, but sometimes we think it's just at the point where we can't get what we need always to care for the patients properly. It's hard to say*". Niko supported this stance:

> *We feel like we're not really supported as frontline workers either. If we say like, 'We're tired, we're burnt out, we need different supplies or different things to make our job more effective,' we're just told to just deal with it and move on so we're frustrated.*

Finally, Dimi also described how she felt the organization prioritized the budget and explained how it affected patients: "*I know cost is an issue… but I think that I disagree with them... We're already so short-staffed, and patients don't get the care they need as soon as they need because we are so short-staffed.*"

One participant disagreed with the others and suggested that ERP and the hospital's environmental impact were prioritized. "*I would say, yes, because one of the things, this is we're always looking at best practice*" (Judy). However, most participants suggested that ERP and the hospital's environmental impact were not organizational priorities. This perspective was also observable. For example, garbage bins were noted in every patient room, main hallways, and at each nursing desk. However, there was only one designated area where a staff-member could recycle, typically located in the middle of the unit in an area meant only for unit staff (ON, June 6, 2019, p. 4; ON, June 26, 2019, p. 18). These recycling bins were often not accessible to families, visitors, or patients (ON, June 6, 2019; p. 4).

Some participants stated the organization prioritized ERP or considered its environmental impact when doing so would also reduce the cost of services; the primary focus was the latter. Charlie stated:

> *... [They] want us to be as efficient as possible with supplies without creating any extra waste because it's costly. Using more supplies than we need is costly and we pay dearly for medical waste disposal... Certainly, I think there's an indirect relationship between their attempt at cost savings and attempt at reduced single-use dumped waste.*

Hints of this were also observable. Signage placed near the garbage bins reminded staff to remove re-usable supplies (scissors, clamps, etc.) from their garbage piles, not because they were re-usable, but because they were expensive to replace (ON, June 6, 2019, p. 3). Another example was when a staff member told the first author that the unit had moved from using disposable wipes to using towels, soap, and water for bathing patients. The staff member informed the first author that this switch was primarily due to budget concerns, however, the change did reduce unnecessary waste (ON, June 20, 2019, p. 13).

Despite feeling as though their hospital did not prioritize ERP or attempt to reduce its environmental impact, participants believed it had a responsibility to do so. Participants also gave examples of practices they would like to see changed. Samir suggested: "*If you give people small things, [like] better pads that are more environmentally conscious,... all those things could be looked at as [impacts on] our environment... [that] we could change.*" Jamie proposed that the organization create "*a division [in charge of decreasing] waste because in the end, you can save healthcare dollars.*" Muneera discussed the importance of looking more broadly at the hospital as a whole: "*... I don't really think that the building or the hospital itself focuses on being environmentally sustainable. Which I think they could. Even in the cafeteria, there's some*

restaurants that work towards that." Finally, Sandra wanted to see the organization do the following:

> *I would like to see them source supplies that are recyclable,… do their sterilization in an environmentally responsible way,… recognize that staffing has an effect on environmentally responsible care,… educate healthcare workers on how we can make positive changes [and] what effects we have.*

Overall, participants suggested several ideas for how the organization could incorporate ERP and reduce its environmental impact. Although participants did not feel like these were tasks they could easily take on as individuals, they readily supported the idea of the organization encouraging these behaviours.

Enacting Change

Many participants did not feel like they were able to easily enact change within their organization; this was true whether they were discussing ERP initiatives and otherwise. For example, Samir said "*I wish there were more ways that we could impact what we do at this job because it's such a huge ship. How do we, as nurses, voice or try to [enact] change?*" Sometimes participants did not know how to access the appropriate channels that would bring about their desired changes, and other times they did know but did not have the time or energy to do so. Mel discussed her challenges: "*… You have to go through so many hoops until you get to [the right] person [and] sometimes they say "no", even though you know it's going to positively change the work area.*" Some participants stated they had tried to change something in their workplaces but were denied. Jamie described his attempts at enacting change as an ongoing situation: "*It's a continual fight at my end of things.*" Similarly, Niko stated:

I've been turned down for financial reasons or just no interest or they felt that it wasn't

important. ... It's hard to go back again and say, when you've been turned down so many

times, ... 'Hey, this is important still and I think it's worthwhile.'

Alternatively, two other participants tried to enact change, specifically changes that prioritized

ERP, and had success. Tal described her experience as follows: "*I tried a couple of times to*

change some of the products we use... We had our paper cups taken away and replaced with

plastic cups. I talked to our supply manager and got some paper cups back." Although both the

plastic and paper cups were single-use items, Tal hoped that switching to the paper version

would be less harmful to the environment. Yoko, who worked on a different unit, shared a

similar story: "*I went to our supply manager… and I said, 'Hey… why did [we get plastic cups*

instead of paper cups]? Can we get [them] changed back?' She did manage to get them switched

back for us. …[It] wasn't hard…"

Another story of enacting change included one local champion. While the champion was

unable to participate in this study, participants stated the champion advocated for ERP and the

environment. Participants described the champion as someone who acted out of personal concern

about the environment and had little organizational support for their initiatives. Nurit said:

[Champion] tried to set up recycling in our department. Recycling of paper products,

even IV bags and things like that, but there was nowhere for it to go. So it was like, we

were trying to do this, but nobody would take it and bring it to recycling… [there] was no

follow through with the [organization]… unless we, the staff, took it home.

While it was unclear whether the champion's recycling initiative was successful, it was evident

that there were more recycling bins on this unit than any of the others who participated in this

study (ON, June 12, 2019, p. 9). Hand-written notes written by the champion and taped to the

bins were also observable, reprimanding staff on utilizing the bins appropriately and not as a regular garbage can (ON, June 12, 2019, p. 9). These notes suggested that other staff members may not have valued the recycling bin as much as the champion did, did not have time to separate their garbage into recycling and refuse, or perhaps that there were ongoing issues where staff were uncertain of how to sort medical waste (ON, June 12, 2019, p. 10).

Different participants had different perspectives on how easy it was to enact change in their workplace. Participants also had varying experiences of trying to enact change and have it successfully adopted. The wide range of experiences may be due to the complexity surrounding critical change-channels within the organization, leaving a disparity in understanding among participants regarding how to navigate them.

Change from the Top. Participants wanted the organization to prioritize ERP and the environment more. Nurit wanted to prioritize ERP and the environment in her own nursing work, yet to be successful, she discussed how support needed to come from the top-down, "*I think that we could do better... [I want this to come] either from top-down or to be listened to and have somebody say, "You know what? That's a great idea."* Morgan also stated: "*If it comes from the CEO section and then from senior management or whoever the ivory tower people, if it trickles down that way, it will be easier swallowed... It has to be from the top down..."* Finally, Kate remarked on how the lack of organizational support in prioritizing ERP and the environment hindered her own ability to do so: "*I feel helpless. I can only do so much because this is what my environment is letting me do... I think it does have to sometimes come from the top up."* Without the support of the organization, participants could not easily engage with ERP or consider the environmental impacts associated with their work. It is unclear whether nurses felt similar

helplessness with all types of changes they wanted to see, or if ERP is unique in the challenges it presents.

Standardization

The concept of standardization was only discussed by two participants, yet it was readily observable to the researchers. Judy compared how ordering workplace resources had changed throughout her career: "*Before, every area would have been able to decide what they wanted and… could go and purchase it… Now they've gone to standardizing as much as they can across the departments, the hospitals, the zone, and across the province.*" The researchers also noted how the units were similar in their organization, layout, scheduling of routines and events, supplies, and documentation (ON, June 11, 2019, p. 6; ON, June 20, 2019, p. 12). Standardization is important as it can improve patient safety; *[It] doesn't matter where you work, you should be working with products that are similar, it's less confusing to the staff and something that everybody's aware of how to use it properly* (Judy). Charlie noted, however, that while the role of standardization was partially to increase patient safety, it was also used as a cost-saving measure. He explained:

> *A lot of [our processes] get centralized. Again, to hop on linens and food services, those things are now all constantly in transit via truck all over the province. They are not washed locally. They are trucked, washed, and distributed. Although that must be saving somebody dollars, … the cost of fuel rises and [our impact on] climate change increases.*

As such, standardization might also increase the organization's environmental impact.

While not all participants discussed the impact of standardization, many indirectly explored some of the results of having standardized equipment. Participants explained the challenges they experienced at work regarding the resources they work with, and many

suggested that, when the organization prioritized budget, staff were left using resources that were cheaply made and often ineffective. Nurit stated:

A lot of the supplies that we get do not do the job properly, but because they're lower-cost alternatives, that is what we get. What happens is people get frustrated, they throw it out, and they go find something else. They're using two items that could have been done with one that may have been a little bit higher cost.

José agreed and discussed how staff often ended up using resources in unintended ways due to the lack of appropriate resources available: "*People will go find items that aren't intended to be used for that purpose, just to have a container for something, so, like, using a plastic suction container to put hot water in to warm up a baby bottle.*" Thus, standardization might have the unintended consequences of increasing costs and affecting ERP.

Standardization of waste management procedures were also observable. Each day, employees from the environmental services department would come to every unit and remove garbage and waste (ON, June 6, 2019, p. 3). Reflective of broader society, waste and garbage were removed and participants did not know what happened to it. Mel said: "*We waste so much waste… Where does it go? How does it get incinerated? What happens to it after that?... How does that contribute to our overall environmental wellness?*" The extent of a standardized recycling program remained unclear. While there was evidence of waste sorting of paper, cytotoxic materials, biohazardous materials, batteries, Styrofoam, medications, sharps, and glass (ON, June 6, 2019, p. 3), some participants felt that other staff members did not do this; "*obviously, we have the opportunity to sort waste… [but] quite honestly, almost a large percentage of our product can be recycled that isn't.*" (José). Others still were uncertain whether there was a standardized recycling program. Samir stated: "*It floors me that*

[ORGANIZATION]… [hasn't] developed some recycling program of their own." If such a recycling program existed, most of the participants were not well-informed about it.

Discussion

The findings from this study indicate that, while nurses play a significant role in addressing climate change, it is difficult for them to do so if their organization does not offer appropriate organizational supports. Nurses in this study wanted to engage with ERP and reduce their environmental impact, yet they often felt this was near-impossible given both the nature of their work and their workplace setting. As such, healthcare organizations (e.g., hospitals) must recognize their important role in addressing climate change and will need to support nurses by developing a workplace context that promotes ERP and focuses on reducing its environmental impacts.

According to the World Health Organization (WHO) (n.d), hospitals are critical structures within the health sector because:

> [hospitals] are instrumental for care coordination and integration and have a key role to play in supporting other health-care providers,… and in community outreach and home-based services. They also often provide a setting for education of doctors, nurses and other health-care professionals and are a critical base for clinical research. They must be resilient and able to maintain and scale up services in emergency situations (para. 2).

Hospitals are well-positioned to promote ERP within their settings and among their practitioners, and they can do so in two ways. First, hospitals can develop workplace policies that encourage ERP, reduce their environmental impact by reducing greenhouse gas emissions and other harmful pollutants (Health Care Without Harm & Arup, 2019). Moreover, hospitals can support

the adoption of national policies, such as the framework outlined by the WHO called *The National Environmental Sustainability Policy for Health Systems* (2017, p. 9).

While the WHO recognizes that there is no "one-size-fits-all" approach to policy making, this framework "expresses the principles, commitments and priorities of the organization with respect to the environment" (p. 9). The elements in this framework are: a) minimizing and adequately managing waste and hazardous chemicals; b) promoting an efficient management of resources; c) sustainable procurement; d) reducing health systems' emissions of air pollutants and greenhouse gases; e) prioritizing disease prevention, health promotion, and public health services; f) engaging the health workforce as agents of sustainability; g) increasing community resilience and promoting local assets; h) creating incentives for change; i) promoting innovative models of care (WHO, 2017, p. 9). Policies that promote ERP and reduce the hospital's environmental impact are critical as "bold new approaches to policy making, research, and business are needed in order to change course" (Watts et al., 2019, p. 1836).

By encouraging ERP and reducing their environmental impact, hospitals are also 1) supporting the tackling of upstream determinants of health; 2) providing benefits for patients, providers, the health workforce, and the health systems' core functions while also decreasing environmental health risks; and 3) reducing costs while also increasing the resilience of health systems (WHO, 2017). One health system that is already taking significant action is the United Kingdom's National Health Service (NHS). Between the years of 2007 to 2017, the NHS had reduced its carbon emissions by 18.5% (27.1 million tonnes), water consumption by 21% (2.23 billion cubic meters), and has managed to keep 85% (590,000 tonnes) of its waste out of the landfill (National Health Services England & Public Health England, 2018). Efforts are also being made to reduce air pollution and greenhouse gas emissions related to patient travel and

staff commuting (National Health Services England & Public Health England, 2018). If entire health systems took this approach, they "… would improve, maintain or restore health, while minimizing negative impacts on the environment and leveraging opportunities to restore and improve it, to the benefit of the health and well-being of current and future generations" (WHO, 2017).

Second, healthcare institutions such as hospitals can also develop a culture where ERP is promoted, and where patients and staff are encouraged to reduce their environmental impact. For example, several groups put out different environmental challenges where hospitals can join in and compete against one another in making changes to their settings and practices. Health Care Without Harm is one such group, and one challenge they put forth is called the Health Care Climate Challenge (HCWH n.d.). The challenge is based on the pillars of mitigation (the reduction of climate change), resilience, and leadership, and "addresses key areas including local climate change risk assessments, health adaptation plans, fossil fuel and renewable energy project investments, and works with government agencies to support greenhouse-gas emission reductions and health-care sector adaptation" (Watts et al., 2019, p. 1862). Partaking in this challenge is also beneficial to the hospital because they can receive global recognition and awards as they progress and achieve the challenge targets.

Like the Health Care Climate challenge, there are ancillary benefits to promoting ERP and reducing hospitals' environmental impact; these are known as co-benefits (Watts et al., 2019; Smith et al., 2014). In other words, addressing climate change and other environmental concerns can also promote health, which is ultimately the goal of any organization within the health sector. Some examples of actions that are both good for the environment and good for human health (co-benefits) include reducing greenhouse gas emissions, reducing meat

consumption, increasing access to reproductive health services, increasing active modes of transportation, and increasing the amount of green space (Smith et al., 2014, p. 737). While the impacts of other co-benefits are currently being tracked (Watts et al., 2019), it is useful for hospitals to consider how promoting ERP and reducing their environmental impacts have positive implications for populations they serve, and how these actions can also be beneficial for health systems.

Implications

Two main implications may be derived from this study. First, nurses cannot act alone. Nurses have an important role in promoting ERP, reducing the hospital's environmental impact, and addressing climate change. However, this study identified that nurses found this challenging because their hospital did not support them in doing so. Hospitals can promote ERP and reduce their environmental impact by developing environmentally healthy workplace policies and creating a workplace culture that supports such activities. If nurses are to take a leadership role in this field, they will require the help and support of their healthcare organization; together, healthcare organizations and practitioners have an important role to play in promoting ERP and reducing the health sector's environmental impact.

Second, while there are several co-benefits that encourage hospitals to promote ERP and reduce their environmental impact, it might be useful to consider the adoption of environmental health accreditation standards. For example, the accreditation standards that the hospital from this study conforms to do not currently include any reference to minimum or acceptable level of environmental health standards (Health Standards Organization, n.d.). Integrating environmental health into accreditation could create incentives for healthcare organizations to create systems, policies, and processes that would support ERP among healthcare professionals.

Limitations

Findings from this study are based on nursing staff from a single Canadian hospital. Further work is needed to fully discover how nurses in other parts of Canada understand these issues. Moreover, given that climate change impacts various parts of the world differently, as well as healthcare and hospital practices, these findings may not be easily transferrable to other settings beyond the western Canadian context.

Conclusion

While the literature outlines a clear role for nurses in addressing climate change, promoting ERP, and reducing healthcare's environmental impact, participants in this study felt overwhelmed and unable to do so. Participants suggested that their hospital organization did not prioritize ERP or the environment, and as such, it was difficult for them to do so as well. Participants wanted support from their hospital organization and stated that it was important for change to come from the top-down. We identified several ways for hospitals to promote ERP, reduce their environmental impact, and address climate change. By engaging with these suggestions, hospitals and nurses can address climate change together.

References

Allen, P. J. (2015). Climate change: It's our problem. *Pediatric Nursing, 41*(1), 42–46

Cook, C., Demorest, S. L., & Schenk, E. (2019). Nurses and climate action. *American Journal of Nursing, 119*(4), 54–60. https://doi.org/10.1097/01.NAJ.0000554551.46769.49

Cruz, E. V., & Higginbottom, G. (2013). The use of focused ethnography in nursing research. *Nurse Research, 20*(4), 36-43.

Griggs, C., Fernandez, A., & Callanan, M. (2017). Nursing and the barriers to sustainable health care: A literature review. *British Journal of Nursing, 26*(22), 1230–1237. https://doi.org/10.12968 / bjon.2017.26.22.1230

Health Care Without Harm [HCWH]. (n.d.). *The Health Care Climate Challenge.* https://noharm-uscanada.org/healthcareclimatechallenge

Health Care Without Harm [HCWH] & Arup. (2019). *Health care's climate footprint: How the health sector contributes*. https://noharm-uscanada.org/ClimateFootprintReport

Health Standards Organization. (n.d.). *Standards*. https://healthstandards.org/standard/

Intergovernmental Panel on Climate Change. (2014). *Climate change 2014: Synthesis report.* https://archive.ipcc.ch/report/ar5/syr/

Jackman-Murphy, K. P. (2015). Environmental health 101: Incorporating environmental health into the nursing curriculum. *Teaching and Learning in Nursing, 10*(4), 192–195. https://doi.org/10.1016/j.teln.2015.05.005

Kalogirou, M. R., Dahlke, S., Davidson, S., & Yamamoto, S. (In press). Nurses' perspectives on climate change, health and nursing practice. *Journal of Clinical Nursing.* http://dx.doi.org/10.1111/jocn.15519

Knoblauch, H. (2005). Focused ethnography. *Forum: Qualitative Social Research, 6*(3). http://www.qualitative-research.net/index.php/fqs/article/view/20/43#footnoteanchor_11

Kurth, A. E. (2017). Planetary health and the role of nursing: A call to action. *Journal of Nursing Scholarship, 49*(6), 598–605. https://doi.org/10.1111/jnu.12343

Leffers, J., & Butterfield, P. (2018). Nurses play essential roles in reducing health problems due to climate change. *Nursing Outlook, 66*(2), 210–213. https://doi.org/10.1016/j.outlook.2018.02.008

Lilienfeld, E., Nicholas, P. K., Breakey, S., & Corless, I. B. (2018). Addressing climate change through a nursing lens within the framework of the United Nations Sustainable Development Goals. *Nursing Outlook, 66*(5), 482–494. https://doi.org/10.1016/j.outlook.2018.06.010

Lincoln, Y. S. & Guba, E. G. (1985). *Naturalistic Inquiry*. Sage Publications.

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. doi:10.1097/NNE.0000000000000525

National Aeronautics and Space Administration [NASA]. (n.d.). *The effects of climate change.* NASA Global climate change: Vital signs of the planet. https://climate.nasa.gov/effects/

National Health Services England & Public Health England. (2018). *Natural resources footprint 2018.* NHS sustainable development unit. https://www.sduhealth.org.uk/policy-strategy/reporting/natural-resource-footprint-2018.aspx

Neal-Boylan, L., Breakey, S., & Nicholas, P. K. (2018). Integrating climate change topics into nursing curricula, *Journal of Nursing Education,* 58(6), 364–368. https://doi.org/10.3928/01484834-20190521-09

Polivka, B. J., Chaudry, R. V., & Crawford, J. M. (2012). Public Health Nurses' Knowledge and Attitudes Regarding Climate Change. *Environmental Health Perspectives, 120*(3), 321–325. http://dx.doi.org/10.1289/ehp.1104025

Roper, J. M., & Shapira, J. (2000). *Ethnography in nursing research.* Sage Publications.

Sayre, L., Rhazi, N., Carpenter, H., & Hughes, N. L. (2010). Climate change and human health: The role of nurses in confronting the issue. *Nursing Administration Quarterly, 34*(4), 334–342. https://doi.org/10.1097/ NAQ.0b013 e3181 f60df9

Schenk, E. C. (2019). Environmental stewardship in nursing: Introducing the "WE ACT– PLEASE" framework. *Creative Nursing, 25*(3), 222–231. https://doi.org/10.1891/1078-4535.25.3.222

Smith, K. R., Woodward, A., Campbell-Lendrum, D., Chadee, D. D., Honda, Y., Liu, Q., Olwoch, J. M., Revich, B., & Sauerborn, R. (2014). Human health: impacts, adaptation, and co-benefits. In C. B. Field, V. R. Barros, D. J. Dokken, K. J. Mach, M. D. Mastrandrea, T. E. Bilir, M. Chatterjee, K. L. Ebi, Y. O. Estrada, R. C. Genova, B. Girma, E. S. Kissel, A. N. Levy, S. MacCracken, P. R. Mastrandrea, and L. L. White (Eds.), *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects* (pp. 709-754). Intergovernmental Panel on Climate Change.

Trombley, J., Chalupka, S., & Anderko, L. (2017). Climate change and mental health. *American Journal of Nursing, 117*(4), 44–52. https://doi.org/10.1097/01.NAJ.0000515232.51795.fa

United Nations [UN]. (2011). *Fact sheet: Climate change science - the status of climate change science today.*

https://unfccc.int/files/press/backgrounders/application/pdf/press_factsh_science.pdf

U.S. Global Change Research Program. (November 2018). *Climate change impacts in the United States: The fourth National Climate Assessment Volume 1.* https://science2017.globalchange.gov/downloads/

Vaismoradi, M., Turunen, H., & Bondas, T. (2013). Content analysis and thematic analysis: Implications for conducting a qualitative descriptive study. *Nursing and Health Sciences, 15*(3), 398–405. doi:10.1111/nhs.12048

Watts, N., Amann, M., Arnell, N., Ayeb-Karlsson, S., Belesova, K., Boykoff, M., Byass, P., Cai, W., Campbell-Lendrum, D., Capstick, S., Chambers, J., Dalin, C., Daly, M., Dasandi, N., Davies, M., Drummond, P., Dubrow, R., Ebi, K. L., Eckelman, M., Ekins, P., … Montgomery, H. (2019). The 2019 report of The Lancet Countdown on health and climate change: Ensuring that the health of a child born today is not defined by a changing climate. *The Lancet, 394,* 1836-78. https://doi.org/10.1016/

World Health Organization [WHO]. (n.d.). *Hospitals in the health system.* https://www.who.int/hospitals/hospitals-in-the-health-system/en/

World Health Organization [WHO]. (2016). *Global strategy on human resources for health: Workforce 2030.* http://apps.who.int/iris/bitstream/10665/250368/1/9789241511131-eng.pdf

World Health Organization [WHO]. (2017). Environmentally sustainable health systems: A strategic document. https://www.euro.who.int/en/health-topics/Health-systems/public-health-services/publications/2017/environmentally-sustainable-health-systems-a-strategic-document-2017

World Meteorological Organization. (2020). *WMO statement on the state of the global climate in 2019.* https://library.wmo.int/doc_num.php?explnum_id=10211

Chapter Five: Pulling it all Together

Discussion

Several important findings arose from this work. First, the hospital organization did not appear to consider climate change a priority. While the hospital did prioritize the safety of those who immediately accessed its services, or worked within the building, the idea of safety was limited to a local scope rather than a global notion of safety. Second, Albertan nurses had varying levels of knowledge on climate change, its impacts on health, and its relationship with nursing practice. These findings suggest that climate change is not yet a widely recognized professional concern and that more work is needed to help promote this. It is possible for these findings to also be correlated to the study setting; nurses in Alberta may have a different understanding of climate change when compared to other Canadian provinces due to Alberta's unique relationship with the energy sector. Finally, it was identified that nurses did not feel empowered to promote ERP or consider climate change or the environment due the nature of their work. Moreover, they did not feel supported by their workplace to do these things. In this case, the hospital setting hindered nurses in addressing climate change and thus, the most significant finding was that a partnership between the hospital and nurses is necessary.

The three papers that comprise this dissertation demonstrate that, for individual practitioners to address climate change and practice in environmentally responsible ways, it is essential for hospitals to first prioritize climate change. They can do so by first considering global safety and adopting a planetary health perspective (Whitmee et al., 2015). Hospitals can also prioritize climate change by reforming their workplace policies, and the World Health Organization's (2017) document, *The National Environmental Sustainability Policy for Health Systems* (p. 9) may aid in this. Finally, hospitals will need to develop a culture where climate

change is at the forefront and ERP is the standard. This can be done in several ways, however, in Canada there is a group called the Canadian Coalition for Green Health Care that can help. Their mission is to integrate environmentally responsible practices into the delivery of healthcare, and they offer support to all components of Canada's healthcare system who wish to deliver environmentally responsible healthcare services (Canadian Coalition for Green Health Care, n.d.).

Although hospitals have a responsibility to prioritize climate change, the organization in this study did not appear to do so. This leaves an important gap that nurses can potentially fill. While nursing's role in addressing climate change has already been discussed (Allen, 2015; Nicholas & Breakey, 2019; Kalogirou et al., in press; Leffers & Butterfield, 2018), findings from this study indicate that perhaps the first step for nurses would be to advocate for ERP and climate action at the organizational level. In other words, while there are many ways for nurses to advocate for the climate within their practice, perhaps their efforts are best served (and most needed) at the level that impacts the organization's policies and processes. While nurses require support from their organizations to address climate change and promote ERP, the organization also requires nursing leadership to do the same.

Nurses can address climate change from the organizational level by advocating for policies that support the health of the patients as well as the climate (Leffers & Butterfield, 2018; Watts et al., 2018a). For example, nurses can encourage the adoption of upstream policies that focus on pollution prevention (Leffers & Butterfield, 2018). These policies promote environmentally responsible practices and increase the public's awareness of the health effects of climate change (Leffers & Butterfield, 2018). Nurses can also support upstream policies by advocating for, and participating in, hospital level climate health monitoring and tracking,

educational programs aimed at helping the public learn about the connection between climate change and health, and training programs aimed at educating nurses and other healthcare practitioners on climate change (Leffers & Butterfield, 2018; Whitmee et al., 2015). Nurses can also advocate for downstream policies that focus on the organization's climate response and adaptation (Leffers & Butterfield, 2018). For example, nurses are critical to disaster preparedness, so advocating for strong organizational communication and education on disaster planning would be beneficial (Labrague et al., 2017).

Nurses can also address climate change from the organizational level by changing hospital processes and practices. Nurses are encouraged to critically examine their own practices to discover activities that could be done differently. For example, nurses identified the disposal of controlled substances into the sewer system to be a harmful practice to the environment, and thus nurses have a responsibility to work with their organization to find alternative practices for the entire organization (King & McCue, 2017). Nurses can also develop and lead "green teams," which are responsible for examining hospital-wide practices, identifying those that are harmful to the environment, and offering alternatives (Huffling & Schenk, 2014; Lilienfeld et al., 2018; Sayre et al., 2010). Finally, nurses can also personally get involved with professional environmental groups, such as the Canadian Association of Nurses for the Environment or the Alliance of Nurses for Healthy Environments, to lobby for change.

Implications

Nurses in this study were open to the idea of ERP but felt unsupported by their organization, and thus they felt unable to integrate it into their daily work. They largely believed that for them to prioritize ERP or the climate, change had to come from the top-down. This study identified that, while important for nurses to be well-supported, the hospital organization also

required nursing leadership to help it prioritize ERP and climate advocacy. This means that both a top-down and bottom-up approach are necessary. To develop the nursing leadership required for such a task, several requirements must still be met.

First, it is important for nurses to receive education on climate change and the environmental impacts of healthcare. Nurses must understand how climate change impacts local and global populations and have the necessary skills to educate patients and other members of the public on the topic. Currently, the Canadian Association of Schools of Nursing offers guidelines for undergraduate nursing education on climate-driven vector-borne diseases (Canadian Association of Schools of Nursing, 2020), which is an important step in this direction. However, guidelines for nursing education are still required regarding climate change as a phenomenon which negatively impacts human health, disaster nursing, and nursing's role (nurse researchers, educators, and practitioners) in addressing climate change. Specific educational considerations may be necessary for nurses employed in Alberta. Nurses working in this province may have nuanced educational needs, and given the province's relationship with the energy sector, different communication strategies may be warranted.

Second, nursing researchers must continue to develop nursing's professional role in addressing climate change and identifying ways for the nurses to help. Specifically, more research is still needed on nurses' perceptions on climate change. Furthermore, more research is needed pertaining to developing, implementing, and measuring interventions that help nurses, and the settings they work in, to address climate change. Perhaps more importantly, nurse researchers much ensure strong knowledge translation of their findings. It is not enough to simply develop knowledge in this field, and nurse researchers must ensure this information gets to those who need it most – practicing nurses.

Finally, nurses in this study had difficulties looking beyond their day-to-day work and examining how their practice impacted global health, however, this is essential to address climate change. Practicing nurses must critically examine their own professional practice and have the moral courage required to enact change and challenge the "business as usual" mentality. This is not an easy feat, but it is essential if nursing is to develop the necessary leadership skills required to promote human health in a warming world.

Next Steps

There are two significant next steps for this study. The first step is to develop effective knowledge translation strategies. I plan to re-connect with the managers from each of the participating units and organize a time where I can present the findings of this study to the nursing staff. Prior to the event, I plan to share the three papers with the unit managers and will ask them to disseminate these to their nursing staff so they may read them ahead of time. I will also summarize the findings in a short, easy to read infographic for nurses who may not have the time to engage with academic literature, and I will request that managers disseminate this as well. This event will ideally take place in person, but it can also be organized as a virtual session such as a webinar. In these sessions I will briefly summarize each of the three papers, identify the major findings, and describe the ways in which nurses can address climate change in their practice and within their hospital. I will also encourage group discussions, answer participant questions, and ask for feedback on both the session itself as well as the study findings. The second step will be to secure a post-doctorate position that will allow me to continue to research climate change and health. I have already found a post-doctorate supervisor, outlined a research proposal, and initiated the funding application process for this. Securing a post-doctoral position will allow me to continue to develop knowledge on how climate change impacts human health,

effective adaptation and mitigation strategies, and perhaps most importantly, will help initiate my academic career.

Limitations

Due to the nature of qualitative work, findings may not be transferrable. This study included nurses working in a single Albertan hospital. Alberta is a large province, and it would be valuable to conduct a similar study in similar Albertan settings to understand whether the findings are consistent across the province. As such, it is important to conduct this work not only in other cities and countries, but also in other settings where nurses work (e.g., community, public health, etc.).

Conclusion

This study contributes to the field of knowledge in several significant ways. First, findings identified that the participating hospital organization did not appear to encourage ERP or prioritize climate change through their workplace policies. Strategies were offered for how hospitals could prioritize ERP and climate change within their setting. Second, this study found that nurses had varying levels of knowledge on climate change as a phenomenon as well as its relationship to health and nursing practice. Suggestions were made to help nurses learn about and understand their role in addressing climate change. Finally, findings demonstrated how nurses were unable to promote ERP or prioritize climate change because they felt unsupported by their hospital to do so. Participants wanted change to come from the top-down, however, it was suggested that effective change requires support and advocacy to also arise from the bottom-up. Overall, it was concluded that setting had an important influence on nursing practice, however, it was also identified that nurses have an essential influence over how their setting operates. There

is an important relationship between nurses and their workplace settings, and for one to prioritize

climate change and ERP, the other must as well.

References

Adlong, W., & Dietsch, E. (2015). Environmental education and the health professions: Framing climate change as a health issue. *Environmental Education Research, 21*(5), 687–709. http://doi.org/10.1080/13504622.2014.930727

Aiken L. H., & Sermeus, W. (2012). Patient safety, satisfaction, and quality of hospital care: Cross sectional surveys of nurses and patients in 12 countries in Europe and the United States. *British Medical Journal, 344,* 20. https://www.jstor.org/stable/41551711

Aiken, L. H., Sloane, D. M., Bruyneel, L., Van den Heede, K., & Sermeus, W. (2013). Nurses' reports of working conditions and hospital quality of care in 12 countries in Europe. *International Journal of Nursing Studies, 50,* 143-53. http://dx.doi.org/10.1016/j.ijnurstu.2012.11.009

Allen, P. (2015). Climate change: It's our problem. *Pediatric Nursing, 41*(1), 42–46

American Nurses Association. (2008). *American Nurses Association 2008 House of Delegates Resolution: Global Climate Change.* https://www.nursingworld.org/~4afb0e/globalassets/practiceandpolicy/work-environment/health--safety/global-climate-change-final.pdf

Anåker, A., Nilsson, M., Holmner, Å., & Elf, M. (2015). Nurses' perceptions of climate and environmental issues: a qualitative study. *Journal of Advanced Nursing, 71*(8), 1883-1891. doi: 10.1111/jan.12655

Atkinson, P. A. & Coffey, A. (2004). Analysing documentary realities. In D. Silverman (Ed.), *Qualitative research: Theory, method and practice* (pp. 56-75) (2nd ed.). Sage Publications.

Berry, P., Clarke, K., Fleury, M. D., & Parker, S. (2014). Chapter 7: Human health. In F. J.

    Warren & D. S. Lemmen (Eds.), *Canada in a changing climate: Sector perspectives on*

    impacts and adaptation (pp. 191-232). Government of Canada.

Bowen, G. A. (2009). Document analysis as a qualitative research method. *Qualitative Research*

    Journal, 9(2), 27–40. doi:10.3316/QRJ0902027

Canadian Association of Nurses. (2008). *The role of nurses in addressing climate change.*

    https://www.cna-aiic.ca/~/media/cna/page-content/pdf-

    en/climate_change_2008_e.pdf?la=en

Canadian Association of Schools of Nursing. (2020). *Guidelines for undergraduate nursing*

    education on climate-driven vector-borne diseases. https://www.casn.ca/wp-

    content/uploads/2020/04/VB-Disease-Doc-web.pdf

Canadian Coalition for Green Health Care. (n.d). *Vission, mission, and goal.*

    https://greenhealthcare.ca/about/mission/

Canadian Institute for Health Information. (2017). *Regulated nurses, 2016.*

    https://secure.cihi.ca/free_products/regulated-nurses-2016-report-en-web.pdf

Centers for Disease Control and Prevention. (2020, September 9). *Climate effects on health.*

    https://www.cdc.gov/climateandhealth/effects/default.htm

Chappelow, J. (2020, April 28). *Free market.* Investopedia.

    https://www.investopedia.com/terms/f/freemarket.asp

Chung, J. W., & Meltzer, D. O. (2009). Estimate of the carbon footprint of the US health care

    sector. *Journal of the American Medical Association, 302*, 1970–1972.

    doi:10.1001/jama.2009.1610

Cohen, A. B. (2012). The debate over health care rationing: Déjà vu all over again? *Inquiry, 49*(2), 90-100. doi:10.5034/inquiryjrnl_49.02.06

Cook, C., Demorest, S. L., & Schenk, E. (2019). Nurses and Climate Action. *American Journal of Nursing, 119*(4), 54–60. https://doi.org/10.1097/01.NAJ.0000554551.46769.49

Costello, A., Abbas, M., Allen, A., Ball, S., Bell, S., Bellamy, R., Friel, S., Groce, N., Johnson, A., Kett, M., Lee, M., Levy, C., Maslin, M., McCoy, D., McGuire, B., Montgomery, H., Napier, D., Pagel, C., Patel, J., … Patterson, C. (2009). Managing the health effects of climate change. *The Lancet, 373*, 1693–1733. https://doi.org/10.1016/S0140-6736(09)60935-1

Cruz, E. V., & Higginbottom, G. (2013). The use of focused ethnography in nursing research. *Nurse Research, 20*(4), 36-43.

Department of Economic and Social Affairs. (2016). *World economic and social survey 2016. Climate change resilience: An opportunity for reducing inequalities.* https://www.un.org/development/desa/dpad/publication/world-economic-and-social-survey-2016-climate-change-resilience-an-opportunity-for-reducing-inequalities/

Eckelman, M. J., Sherman, J. D., & MacNeill, A. J. (2018). Life cycle environmental emissions and health damages from the Canadian healthcare system: An economic-environmental-epidemiological analysis. *PLoS Medicine, 15*(7), 1–17. https://doi.org/10.1371/journal.pmed.1002623

Environment and Climate Change Canada. (2018). *Canadian environmental sustainability indicators: Greenhouse gas emissions.* https://www.canada.ca/content/dam/eccc/documents/pdf/cesindicators/greenhouse-gas-emissions/greenhouse-gas-emissions-en.pdf

Fawcett, J. (1984). The metaparadigm of nursing: Present status and future refinements. Image:
The Journal of Nursing Scholarship, 16(3), 84–89. https://doi.org/10.1111/j.1547-5069.1984.tb013 93.x

Goodman, B. (2011). The need for a 'sustainability curriculum' in nurse education. *Nurse Education Today, 31*(8), 733–737. doi:10.1016/j.nedt.2010.12.010

Government of Alberta [GOA]. (n.d.). *About oil sands: Facts and statistics.* https://www.energy.alberta.ca/OS/AOS/Pages/FAS.aspx

Government of Canada. (2019). *Canada's changing climate report.* https://www.nrcan.gc.ca/climate-change/impacts-adaptations/what-adaptation/canadas-changing-climate-report/21177

Greenhouse Gas Protocol. (2013). *Technical guidance for calculating Scope 3 emissions (version 1.0): Supplement to the corporate value chain (Scope 3) accounting and reporting standard.* https://ghgprotocol.org/sites/default/files/standards/Scope3_Calculation_Guidance_0.pdf

Griggs, C., Fernandez, A., & Callanan, M. (2017). Nursing and the barriers to sustainable health care: A literature review. *British Journal of Nursing, 26*(22), 1230–1237. https://doi.org/10.12968 / bjon.2017.26.22.1230

Hammersley, M., & Atkinson, P. (2007). *Ethnography* (3rd ed.). New York, NY: Routledge.

Health Care Without Harm [HCWH]. (n.d.). *The Health Care Climate Challenge.* https://noharm-uscanada.org/healthcareclimatechallenge

Health Care Without Harm [HCWH] & Arup. (2019). *Health care's climate footprint: How the health sector contributes*. https://noharm-uscanada.org/ClimateFootprintReport

Health Standards Organization. (n.d.). *Standards.* https://healthstandards.org/standard/

Henderson, J., Willis, E., Toffoli, L., Hamilton, P., & Blackman, I. (2016). The impact of
rationing of health resources on capacity of Australian public sector nurses to deliver
nursing care after-hours: a qualitative study. *Nursing Inquiry, 23,* 368-76.
doi:10.1111/nin.12151

Howard, C., Buse, C., Rose, C., MacNeil, A., & Parkes M. (2019, November). *The Lancet
Countdown on health and climate change: Policy brief for Canada.* Lancet Countdown:
Tracking progress on health and climate change. https://www.lancetcountdown.org/2019-
report/

Huffling, K., & Schenk, E. (2014). Environmental sustainability in the intensive care unit:
Challenges and solutions. *Critical Care Nursing Quarterly, 37*(3), 235–50.
doi:10.1097/CNQ.0000000000000028

Intergovernmental Panel on Climate Change [IPCC]. (2014). *Climate change 2014: Synthesis
report.* https://archive.ipcc.ch/report/ar5/syr/

International Council of Nurses. (2012). *The ICN code of ethic for nurses.*
http://ethics.iit.edu/ecodes/sites/default/files/International%20Council%20of%20Nurses
%20Code%20of%20Ethics%20for%20Nurses.pdf

Jackman-Murphy, K. P. (2015). Environmental health 101: Incorporating environmental health
into the nursing curriculum. *Teaching and Learning in Nursing, 10*(4), 192–195.
https://doi.org/10.1016/j.teln.2015.05.005

Kalogirou, M. R., Dahlke, S., Davidson, S., & Yamamoto, S. (In press). Nurses' perspectives on
climate change, health and nursing practice. *Journal of Clinical Nursing.*
doi:10.1111/jocn.15519

Kalogirou, M. R., Olson, J., & Davidson, S. (2020). Nursing's metaparadigm, climate change and planetary health. *Nursing Inquiry, 27*(3), 1–9. https://doi.org/10.1111/nin.12356

Kangasniemi, M., Kallio, H., & Pietilä, A. M. (2014). Towards environmentally responsible nursing: A critical interpretive synthesis. *Journal of Advanced Nursing, 70*(7), 1465–1478. https://doi.org/10.1111/jan.12347

King, C., & McCue, A. (2017). Drugs down the drain: When nurses object. *Nursing Ethics, 24*(4), 452–61. doi:10.1177/0969733015614882

Klein, N. (2014). *This changes everything: Capitalism vs. the climate.* Simon and Schuster Paperbacks.

Knoblauch, H. (2005). Focused ethnography. *Forum: Qualitative Social Research, 6*(3). Retrieved from http://www.qualitative-research.net/index.php/fqs/article/view/20/43#footnoteanchor_11

Kurth, A. E. (2017). Planetary health and the role of nursing: A call to action. *Journal of Nursing Scholarship, 49*(6), 598–605. https://doi.org/10.1111/jnu.12343

Laan, M. S. (2014). *Analysing Ontario public health nurses' knowledge, attitudes, and beliefs about roles and responsibilities in addressing climate change (master's thesis).* https://qspace.library.queensu.ca/bitstream/handle/1974/12480/Laan_Megan_S_201409_MSc.pdf?sequence=1&isAllowed=y

Labrague, L. J., Hammad, K., Gloe, D. S., McEnroe-Petitte, D. M., Fronda, D. C., Obeidat, A. A. Leocadio, M. C., Cayaban, A. R., & Mirafuentes, E. C. (2017). Disaster preparedness among nurses: A systematic review of literature. *International Nursing Review, 65*(1), 41-53. https://doi.org/10.1111/inr.12369

Landrigan, P. J., Fuller, R., Acosta, N. J., Adeyi, O., Arnold, R., Basu, N., Baldé, A. B., Bertollini, R., Bose-O'Reilly, S., Boufford, J. I., Breysse, P. N., Chiles, T., Mahidol, C., Coll-Seck, A. M., Cropper, M. L., Fobil, J., Fuster, V., Greenstone, M., Haines, A., … Zhong, M. (2017). The Lancet Commission on pollution and health. *The Lancet, 391*, 462-512. https://doi.org/10.1016/S0140-6736(17)32345-0

Leffers, J., & Butterfield, P. (2018). Nurses play essential roles in reducing health problems due to climate change. *Nursing Outlook, 66*(2), 210–213. https://doi.org/10.1016/j.outlook.2018.02.008

Leffers, J. M., McDermott-Levy, R., Nicholas, P. K., & Sweeney, C. F. (2017). Mandate for the nursing profession to address climate change through nursing education. *Journal of Nursing Scholarship, 49*(6), 679–687. https://doi.org/10.1111/jnu.12331

Lilienfeld, E., Nicholas, P. K., Breakey, S., & Corless, I. B. (2018). Addressing climate change through a nursing lens within the framework of the United Nations Sustainable Development Goals. *Nursing Outlook, 66*(5), 482–494. https://doi.org/10.1016/j.outlook.2018.06.010

Lincoln, Y. S. & Guba, E. G. (1985). *Naturalistic Inquiry*. Sage Publications.

Matthews, J. B. (2018). Annex I: Glossary. In V. Masson-Delmotte, P. Zhai, H. O. Pörtner, D. Roberts, J. Skea, P. R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J. B. Matthews, Y. Chen, X. Zhou, M. I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (Eds.), *Global warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*.

(pp. 541-62). Intergovernmental Panel on Climate Change.

https://www.ipcc.ch/sr15/chapter/glossary/

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.

doi:10.1097/NNE.0000000000000525

McGain, F., & Naylor, C. (2014). Environmental sustainability in hospitals - A systematic

review and research agenda. *Journal of Health Services Research & Policy*, *19*(4), 245–

252. doi:10.1177/1355819614534836

Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., & The PRISMA Group (2009). Preferred

Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement.

PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

National Aeronautics and Space Administration [NASA]. (n.d.). *The effects of climate change.*

NASA Global climate change: Vital signs of the planet. https://climate.nasa.gov/effects/

National Health Services England & Public Health England. (2018). *Natural resources footprint*

2018. NHS sustainable development unit. https://www.sduhealth.org.uk/policy-

strategy/reporting/natural-resource-footprint-2018.aspx

Neal-Boylan, L., Breakey, S., & Nicholas, P. K. (2018). Integrating climate change topics into

nursing curricula, *Journal of Nursing Education,* 58(6), 364–368.

https://doi.org/10.3928/01484834-20190521-09

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), 23-35.

Polivka, B. J., Chaudry, R. V., & Crawford, J. M. (2012). Public Health Nurses' Knowledge and Attitudes Regarding Climate Change. *Environmental Health Perspectives, 120*(3), 321–325. http://dx.doi.org/10.1289/ehp.1104025

Roper, J. M., & Shapira, J. (2000). *Ethnography in nursing research.* Sage Publications.

Sayre, L., Rhazi, N., Carpenter, H., & Hughes, N. L. (2010). Climate change and human health: The role of nurses in confronting the issue. *Nursing Administration Quarterly, 34*(4), 334–342. https://doi.org/10.1097/ NAQ.0b013 e3181 f60df9

Schenk, E. C. (2019). Environmental stewardship in nursing: Introducing the "WE ACT–PLEASE" framework. *Creative Nursing, 25*(3), 222–231. https://doi.org/10.1891/1078-4535.25.3.222

Scranton, R. (2015). *Learning to die in the Anthropocene: Reflections on the end of a civilization.* City Lights Bookstore.

Smith, K. R., Woodward, A., Campbell-Lendrum, D., Chadee, D. D., Honda, Y., Liu, Q., Olwoch, J. M., Revich, B., & Sauerborn, R. (2014). Human health: impacts, adaptation, and co-benefits. In C. B. Field, V. R. Barros, D. J. Dokken, K. J. Mach, M. D. Mastrandrea, T. E. Bilir, M. Chatterjee, K. L. Ebi, Y. O. Estrada, R. C. Genova, B. Girma, E. S. Kissel, A. N. Levy, S. MacCracken, P. R. Mastrandrea, and L. L. White (Eds.), *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects* (pp. 709-754). Intergovernmental Panel on Climate Change.

Steffen, W., Crutzen, P. J., & McNeill, J. R. (2007). The Anthropocene: Are humans now overwhelming the great forces of nature? *AMBIO: A Journal of the Human Environment, 36*(8), 614–621. https://doi.org/10.1579/0044-7447

Steffen, W., Persson, Å., Deutsch, L., Zalasiewicz, J., Williams, M., Richardson, K., Crumley, C., Crutzen, P., Folke, C., Gordon, L., Molina, M., Ramanathan, V., Rockström, J., Scheffer, M., Schellnhuber, H. J., & Svedin, U. (2011). The Anthropocene: From global change to planetary stewardship. *AMBIO: A Journal of the Human Environment, 40*(7), 739–761. https://doi.org/10.1007/s13280-011-0185-x

Trombley, J., Chalupka, S., & Anderko, L. (2017). Climate change and mental health. *American Journal of Nursing, 117*(4), 44–52. https://doi.org/10.1097/01.NAJ.0000515232.51795.fa

United Nations [UN]. (n.d.). *13 climate action: Why it matters.* United Nations: Sustainable development goals. https://www.un.org/sustainabledevelopment/wp-content/uploads/2017/07/13.pdf

United Nations [UN]. (2011). *Fact sheet: Climate change science - the status of climate change science today.*

https://unfccc.int/files/press/backgrounders/application/pdf/press_factsh_science.pdf

U.S. Global Change Research Program. (November 2018). *Climate change impacts in the United States: The fourth National Climate Assessment Volume 1.*

https://science2017.globalchange.gov/downloads/

Vaismoradi, M., Turunen, H., & Bondas, T. (2013). Content analysis and thematic analysis: Implications for conducting a qualitative descriptive study. *Nursing and Health Sciences, 15*(3), 398–405. doi:10.1111/nhs.12048

Veenema, T. G., Thornton, C. P., Lavin, R. P., Bender, A. K., Seal, S., & Corley, A. (2017). Climate change–related water disasters' impact on population health. *Journal of Nursing Scholarship, 49*(6), 625–634. https://doi.org/10.1111/jnu.12328

Watts, N., Amann, M., Ayeb-Karlsson, S., Belesova, K., Bouley, T., Boykoff, M., Byass, P., Cai, W., Campbell-Lendrum, D., Chambers, J., Cox, P. M., Daly, M., Dasandi, N., Davies, M., Depledge, M., Depoux, A., Dominguez-Salas, P., Drummond, P., Ekins, P., … Costello, A. (2018a). The Lancet Countdown on health and climate change: From 25 years of inaction to a global transformation for public health. *The Lancet,* 391, 581–630. https://doi.org/10.1016/s0140-6736(17)32464-9

Watts, N., Amann, M., Arnell, N., Ayeb-Karlsson, S., Belesova, K., Berry, H., Bouley, T., Boykoff, M., Byass, P., Cai, W., Campbell-Lendrum, D., Chambers, J., Daly, M., Dasandi, N., Davies, M., Depoux, A., Dominguez-Salas, P., Drummond, P., Ebi, K. L., … Costello, A. (2018b). The 2018 report of the Lancet Countdown on health and climate change: Shaping the health of nations for centuries to come. *The Lancet, 392*, 2479–514. https://doi.org/10.1016/S0140-6736(18)32594-7

Watts, N., Amann, M., Arnell, N., Ayeb-Karlsson, S., Belesova, K., Boykoff, M., Byass, P., Cai, W., Campbell-Lendrum, D., Capstick, S., Chambers, J., Dalin, C., Daly, M., Dasandi, N., Davies, M., Drummond, P., Dubrow, R., Ebi, K. L., Eckelman, M., Ekins, P., … Montgomery, H. (2019). The 2019 report of The Lancet Countdown on health and climate change: Ensuring that the health of a child born today is not defined by a changing climate. *The Lancet, 394,* 1836-78. https://doi.org/10.1016/

Weaver, H. J., Blashki, G. A., Capon, A. G., McMichael, A. J. (2010). Climate change and Australia's healthcare system – Risks, research and responses. *Australian Health Review, 34*(4), 441–444. doi:10.1071/AH09829

Whitmee, S., Haines, A., Beyrer, C., Boltz, F., Capon, A. G., Ferreira de Souza Dias, B., Ezeh, A., Frumkin, H., Gong, P., Head, P., Horton, R., Mace, G. M., Marten, R., Myers, S. S.,

Nishtar, S., Osofsky, S. A., Pattanayak, S. K., Pongsiri, M. J., Romanelli, C., … & Yach, D. (2015). The Rockefeller Foundation–Lancet Commission on planetary health: Safeguarding human health in the Anthropocene epoch: report of The Rockefeller Foundation–Lancet Commission on planetary health. *The Lancet, 386,* 1973-2028. http://dx.doi.org/10.1016/S0140-6736(15)60901-1

World Health Organization [WHO]. (n.d.). *Hospitals in the health system.* https://www.who.int/hospitals/hospitals-in-the-health-system/en/

World Health Organization [WHO]. (2011). *The social dimensions of climate change.* https://www.who.int/publications/i/item/the-social-dimensions-of-climate-change

World Health Organization [WHO]. (2014). *Gender, climate change and health.* https://www.who.int/globalchange/publications/reports/gender_climate_change/en/

World Health Organization [WHO]. (2016). *Global strategy on human resources for health: Workforce 2030.* http://apps.who.int/iris/bitstream/10665/250368/1/9789241511131-eng.pdf

World Health Organization [WHO]. (2017). Environmentally sustainable health systems: A strategic document. https://www.euro.who.int/en/health-topics/Health-systems/public-health-services/publications/2017/environmentally-sustainable-health-systems-a-strategic-document-2017

World Health Organization [WHO] & Health Care Without Harm [HCWH]. (2009). *Healthy hospitals, healthy planet, healthy people: Addressing climate change in healthcare settings.* https://www.who.int/globalchange/publications/healthcare_settings/en/

World Meteorological Organization. (2020). *WMO statement on the state of the global climate in 2019.* https://library.wmo.int/doc_num.php?explnum_id=10211

Zalasiewicz, J., Williams, M., Smith, A., Barry, T. L., Coe, A. L., Bown, P. R., Brenchley, P.,

    Cantrill, D., Gale, A., Gibbard, P., Gregory, F. J., Hounslow, M. W., Kerr, A. C.,

    Pearson, P., Knox, R., Powell, J., Waters, C., Marshall, J., Oates, M., … Stone, P. (2008).

    Are we now living in the Anthropocene? *Geological Society of America Today, 18*(2), 4-

    8. doi:10.1130/GSAT01802A.1

Appendix A

Interview Guide

Main Research Question: What are Albertan nurses' beliefs related to climate change, health, and nursing practice, and how is their ability to practice in an environmentally responsible manner influenced by their workplace setting?

Sub-Questions:

1. How do Registered Nurses (RNs) practicing in an Albertan hospital understand climate change and its relationship with health and nursing practice?

2. How does a healthcare organization incorporate environmentally responsible practice and into its policies? What do the policies related to the procurement, utilization, conservation, and disposal of workplace resources reveal about the organization's perspectives on climate change?

3. How do the physical and social contexts within the organization promote or inhibit environmentally responsible practices among nurses?

Climate Change:

1. Can you offer a definition for the term "climate change?"

2. Do you think the climate is changing?

    a. If yes: In what ways?

    b. If yes: do you think you have experienced the effects of it either in your professional or personal life?

    c. If no, can you tell me more about your beliefs that the climate is not changing?

3. What do you believe to be true regarding climate change? What have you heard that you think is not true?

     a.   What factors or sources of information have led you to your conclusion?

     b.   In your opinion, what are the main things causing climate change?

4. Is there a difference to you between the terms climate change and environmental impact? What does environmentally responsible practice mean to you?

5. How do you generally learn about climate change or related issue?

6. In what ways, if any, is climate change influencing peoples' health? Be specific.

     a.   Locally?

     b.   Nationally?

     c.   Internationally?

     d.   Do you think some places/people will be impacted more than others?

7. What do you think other nurses think or believe to be true around climate change, health, and their relationship to each other?

8. How would you explain nursing's relationship (as a profession) to climate change, if any? Explain.

9. What things do you wish you knew more about regarding climate change? What are your strengths and knowledge gaps currently?

Climate Change and Context:

1. What are some of your main priorities that you keep in mind while you do your job?

2. What are the hospital's top priorities? Are they aligned with your own?

3. In what ways does the hospital support or oppose your own priorities (nursing and personal)? Are they always aligned or sometimes not? If they are not always aligned, how do you decide what to do or which priorities are most important? How do you make those decisions/what do you take into consideration?

4. How do you think climate change fits into your organization's priorities?

    a. How about your own? Do you ever think about environmental impact and/or climate change while you do your work?

    b. If you care about these things at home, what happens when you come into the hospital that makes you not able to enact them in this context?

    c. What sorts of things do you do at home that are "green"?

5. How does your organization support nurses' efforts to be good resource managers? How do you feel about the amount of resources used within the hospital setting, and what is your own relationship like to the resources you use to conduct your work?

6. What do you think the culture on your unit is like regarding use of resources? Are these things explicitly discussed among staff?

7. Do you feel like your organization supports/hinders environmentally responsible practices?

8. Do you think your organization has a role or responsibility towards doing something which promotes environmentally responsible practice?

    a. What sorts of things would you want to see? (Do these things extend to outside the work setting (like community around the facility?)

9. Anything else you want to add?

Appendix B

Participant Information Letter

Study: Nursing Practice and Context: The Relationship Between the Hospital Setting and Environmentally Responsible Practice

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Background:
Climate change is a widely discussed issue in today's day and age. Changes in climate, weather patterns, and increased pollution emissions are being associated with a global increased risk of malnutrition, allergens, heat stress, water and air pollution, mental stress, and changes to disease vectors. Most nurses in Canada work in the hospital setting, and they have a professional mandate to promote health. If climate change is threatening human health, then there is a need to examine 1) how nurses understand this phenomenon; 2) how the hospital setting affects these. Currently, not enough is known about Canadian nurses' actions and beliefs as they relate to climate change. The purpose of this study is to understand how Albertan nurses' actions and beliefs related to climate change are affected by the hospital setting. You are being asked to participate in this study because you are a licensed nurse working at the University of Alberta hospital.

Study Procedure:
With your permission, we would like to interview you. The interview can either take place in person or over the telephone; it is up to you to decide which method is more convenient and preferable. During your interview, you will be questioned about topics such as climate change, health, and your nursing practice. We will invite you to discuss your thoughts and opinions related to climate change, and to reflect on how the hospital setting may or may not influence your practice in relation to these. The interview will take around 60-90 minutes. There is a chance you may be asked to be interviewed once more. You do not have to consent to this follow-up interview, even if you agreed to the initial interview.

You do not have to answer all the questions – you are encouraged to only answer the questions you are comfortable with. The conversation will be audio-recorded to make sure we accurately represent your opinions. Only audio will be recorded – no images or pictures of you will be taken. You may request to not be audio-recorded if you are not comfortable with this.

You will also be asked permission for the researcher to shadow you for one shift. During this time, observations will be collected on how you utilize resources around the unit. You do not

have to participate in both the interview and the shadowing portion of this study; if you only wish to be interviewed and not observed (or vice-versa), this is perfectly acceptable.

It is fine for you to participate in the interview or shadowing and later change your mind about your participation. If you decide you no longer wish to participate in this study, you will have two weeks from the date of interview to request your data be pulled from the study. After this time, the data analysis process will have begun, and it becomes difficult to remove your data. Before you make your decision, one of the researchers will go over this form with you. You are encouraged to ask questions if you feel anything needs to be made clearer. You will be given a copy of this form for your records.

Possible Benefits:
There are no direct benefits from participating in this study. However, supporting this study may help improve the health of our environment, and possibly lead to changes in hospital policies and practices.

Possible Risks:
There are no obvious risks associated in participating in this study. Discussing certain topics like climate change may be uncomfortable for some people, and if this is the case for you then you may choose to not answer questions related to it. It is not possible to know all the risks that may happen in any study, but the researchers have taken all reasonable safeguards to minimize any known risks to a study participant. If you find yourself feeling distressed, we can direct you to your Employee and Family Assistance Program (T: 1-877-273-3134)

Confidentiality:
Your identity will be kept secret and confidential. Any recordings or notes will be given a code number or pseudonym. The electronic files will be stored on a password protected computer within a secure folder. Only we have access to this computer and folder. Hard-copy data will be stored in a locked and secure office. Your name will only be found on the consent form and on a list which links your name to your code number/pseudonym. This is only for organizational purposes and we are the only ones who will have access to this information.
When we report the findings of this study, we will not share anything about you that would allow others to figure out who you are. The information you provide will not identify you in any way. Some of your ideas may appear as direct quotes or may be grouped with others' answers and be used in presentations, publications, public documents, and/or teaching situations. At no time will your identity be revealed.

Future use of Data:
Your de-identified data may be used for future studies. Future studies would be subject to research ethical approval prior to your data being used.

Contact for Information About the Study:
You may ask any questions at any time regarding any part of this study. You can reach us by phone or by email. See the top of this document for contact information.

Consent:
Participating in this study is completely voluntary. If you change your mind, you can withdraw your consent at any time (including during and after the interview) and it will in no way affect your employment. If you withdraw from the study, all your data will be removed and destroyed. If you wish to withdraw from the study *after* your interview has already been conducted, then you will have two weeks to do so.

Contact About the Rights of Research Participants:
The plan for this project has been checked to make sure it is safe and follows the rules of the Research Ethics Board at the University of Alberta and Alberta Health Services. For questions about your rights and ethical conduct of research, contact the Research
Ethics Office at (780) 492-2615. This office has no affiliation with the study investigators.

Appendix C

Consent Form

Title of Study: Understanding Nurses' Perceptions of Climate Change, Health, and Nursing Practice.

Student Investigator: Maya R. Kalogirou   **Phone Number(s):** 780-722-7546
Supervisors: Dr. Sherry Dahlke   780-492-8232

	Yes	No
Do you understand that you have been asked to be in a research study?	☐	☐
Have you read and received a copy of the attached Information Sheet?	☐	☐
Do you understand the benefits and risks involved in taking part in this research study?	☐	☐
Have you had an opportunity to ask questions and discuss this study?	☐	☐
Do you understand that you are free to leave the study at any time, and without having to give a reason or penalty, and without affecting your employment?	☐	☐
Do you understand that you have two weeks from your interview date to request that your data be completely removed from this study?	☐	☐
Has the issue of confidentiality been explained to you?	☐	☐
Do you understand that the conversation will be recorded?	☐	☐
Do you understand who will have access to your interview data?	☐	☐
Do you understand that portions of the final research may be published in professional journals or presented at conferences?	☐	☐
Do you understand the researcher is obligated to report any breach of professional conduct that is unethical and not legal, and that is not currently in a process of resolution?	☐	☐
If the researchers require more information, may we contact you for a follow-up interview?	☐	☐

Who explained this study to you? _____

I agree to take part in this study: **YES** ☐   **NO** ☐

Signature of Research Participant: _____

Printed Name: _____

Date: _____

I believe that the person signing this form understands what is involved in the study and voluntarily agrees to participate.

Signature of Investigator or Designee: _____ Date: _____

THE INFORMATION SHEET MUST BE ATTACHED TO THIS CONSENT FORM AND A COPY GIVEN TO THE RESEARCH PARTICIPANT

Appendix D

Demographic Data

Birth year:

Birth Country:

Where did you live prior to living in Edmonton (if applicable):

Years living in Edmonton:

What is your political affiliation (center, left, right, center-left, center-right, etc.)?

Nurse designation (RN, LPN, NP):

Area of nursing you are currently employed in:

How many years working as a nurse:

How did you hear about this study?

Email address: