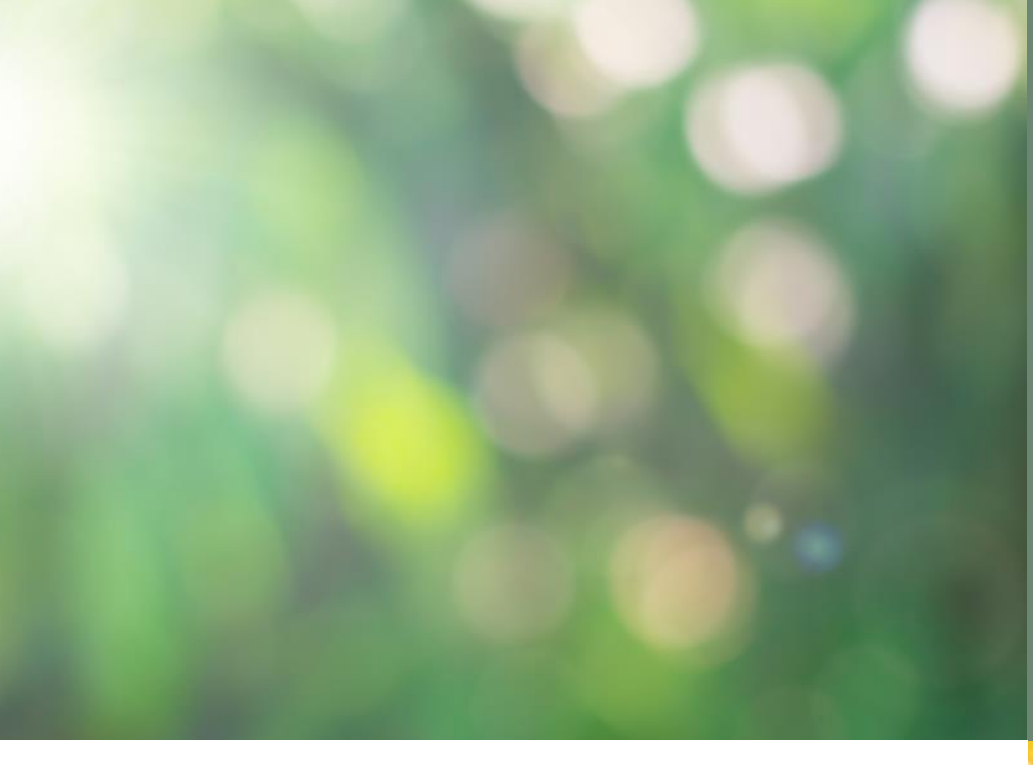

Guidelines for Undergraduate Nursing Education on Climate-Driven Vector-Borne Diseases

CASN ACESI

ISBN e-book: 978-1-989648-02-5

ISBN print: 978-1-989648-01-8

Acknowledgements

The Canadian Association of Schools of Nursing (CASN) gratefully acknowledges the expertise, time, and contributions of all those who engaged in the development of the *Guidelines for Undergraduate Nursing Education on Climate-Driven Vector-Borne Diseases*. We would especially like to thank the Climate-Driven Infectious Disease (CDID) Committee, a group of dedicated experts in climate-driven infectious disease and nursing who developed the domains and learning outcomes delineated in this document. We extend special thanks to the multiple stakeholders across Canada who provided their feedback and expertise either at the in-person stakeholder forum or through the online validation survey. We are particularly grateful to the patient advocates and committee members representing persons with lived experience of vector-borne infectious diseases (VBDs) who offered their time and expertise to inform the project, as well as those who shared their expertise during the gender and Indigenous consultations.

CASN also gratefully acknowledges the guidance and oversight of the Canadian Indigenous Nurses Association in planning and implementing the Indigenous consultations for this project.

Production of this document has been made possible through a financial contribution from the Public Health Agency of Canada. The views expressed herein do not necessarily represent the views of the Public Health Agency of Canada.

Guiding Principles

CASN recognizes that all Canadians are at risk of being affected by the health impacts of climate change. However, special consideration has been given to individuals, families, communities, and populations who are at a greater risk. Women, the elderly, Indigenous Peoples, communities in northern and remote areas, as well as individuals and communities who are economically disadvantaged, are more likely to suffer from poorer environmental conditions (Berry et al., 2014; Bush & Lemmen, 2019; Government of Canada, 2019b). In addition, inequities related to access to health care and resources intensify the impact of climate change (Islam & Winkel, 2017). As a result, CASN conducted consultations with persons with lived experience of VBDs, members of Indigenous communities, and gender experts to ensure that their knowledge and experience are recognized and integrated into the nursing education guidelines related to climate-driven VBDs.

CASN is also committed to developing inclusive policies and statements that challenge discrimination and cisnormative behaviour. A second guiding objective, therefore, in developing these guidelines was to ensure that they promote sensitivity, inclusion, and respect for all people, including but not limited to transgender, non-binary, and intersex, as well as for all marginalised communities.

Climate-Driven Infectious Disease (CDID) Committee

Name	Representation
Ruth Schofield (Co-Chair)	McMaster University
Cheyenne Joseph (Co-Chair)	University of New Brunswick
Aden Hamza	Canadian Nurses Association
Adrienne Hansen-Taugher	Kingston, Frontenac and Lennox & Addington Public Health
Andrea Chircop (Acting co-chair)	Dalhousie University
Dan Gregson	Association of Medical Microbiology and Infectious Disease Canada
Judith Lapierre	Université de Laval
Julie Thériault	Public Health Agency of Canada
Lorraine Holtstander	University of Saskatchewan, CASN Board Liaison Member
Madi Sutton	Person with lived experience / Patient advocate
Marie Dietrich Leurer	University of Saskatchewan
Marilee Nowgesic	Canadian Indigenous Nurses Association
Muriel Kranabetter	University of British Columbia – Okanagen
Richard Rusk	Medical Officer, Government of Manitoba
Sue Faber	Registered Nurses Association of Ontario
Suzanne Rowland	Infection and Prevention Control Canada / Ottawa Public Health
Sylvane Filice	Lakehead University
Willena Nemeth	Cape Breton University, CASN Board Liaison Member
Cynthia Baker	Canadian Association of Schools of Nursing (ex-officio)

Indigenous Health Consultation

Name	Representation
Daniel Jubas-Malz	Alliance for Healthier Communities
Deborah McGregor	York University
June Kaminski	Kwantlen Polytechnic University
Isabelle Wallace	Registered Nurse and Independent Consultant

Gender Expert

Name	Representation
Yasmin White	National Institutes of Health, United Kingdom

Introduction

There is clear evidence that climate change is increasing the risk of infectious diseases and affecting the health of populations globally (Government of Canada, 2018). In 2014, the Government of Canada released a national scale assessment of the impact of climate on health (Warren & Lemmen, 2014). It concludes that higher temperatures have been lengthening the transmission season of vector-borne diseases (VBDs) and expanding their geographical range northward. Current evidence indicates that the trends in climate change in Canada observed to date will continue, and the risk of climate-driven infectious diseases will increase (McPherson et al., 2017). The International Council of Nurses has called upon nurses to be part of "measures to mitigate the impact of climate change with a special focus on populations particularly vulnerable to disease and injury" (2018, p. 4). As the largest health professional group in Canada, nurses and future nurses have an important role to play in addressing health challenges related to climate change.

In response to the increasing health effects of climate change, the Canadian Association of Schools of Nursing (CASN) is conducting a project funded by the Public Health Agency of Canada targeting climate-driven VBDs. The anticipated outcome of this project is that nurses will enter the workforce well-equipped with relevant, evidence-informed knowledge to address climate-driven VBDs and to provide support to individuals, families, communities and populations affected by, or at risk of being affected by, these diseases. The project builds on previous work related to nursing education carried out by CASN, including the development of *Entry-to-Practice Public Health Nursing Competencies* (2014) and an online repository of nursing education strategies for public health. The ultimate goal is to reduce the impact of these diseases in Canada and improve the health of Canadians.

Purpose

The domains and the accompanying entry-to-practice learning outcomes in this guideline delineate the key knowledge, skills, and attitudes that all new registered nursing graduates in Canada should possess to support and care for individuals, families, communities, and populations affected by, or at risk of being affected by, climate-driven VBDs.

Their purpose is to provide direction for nursing faculty regarding curriculum development. The learning outcomes are not intended to replace jurisdictional entry-to-practice competencies, but rather to offer national, consensus-based direction to educators regarding the depth and breadth of curriculum coverage for this topic area.

The education guidelines are one of two key deliverables for this project. They are supplemented by an e-resource to foster the integration of the entry-level learning outcomes into the curricula of nursing schools across the country. The e-resource is an open-access, online teaching and learning tool presented in a dynamic and easy-to-use format. It contains a series of modules, each designed to address specific learning outcomes within the education guidelines. It also includes a series of online tools and learning activities related to the modules, such as case studies, self-assessment quizzes, and virtual patient scenarios.

Background

The effects of climate change are global in scope and unprecedented in scale. The United Nations (2019) has identified shifting weather patterns as the defining issue of our time and emphasizes that the world has reached a turning point moment in history. Without immediate drastic action today, shifting weather patterns will have catastrophic consequences in the future (United Nations, n.d.). Our response to climate change is considered "the greatest health opportunity of this century" (Watts et al., 2015).

The effects of climate change include "overall changes in temperature, increases in extreme weather events, changes in conventional patterns of disease vectors, polar ice decline, sea level rise, and changes in plant food production patterns, all of which have subsequent effects on human health" (CPHA, 2019, p. 3). Although climate change occurs naturally, human activity has had the greatest influence on this global phenomenon. The major causes are the burning of fossil fuels and deforestation, both of which release carbon dioxide into the environment causing a greenhouse effect that increases temperature (CPHA, 2019).

The average annual temperature over land in Canada increased 1.7 °C from 1948 to 2016, about twice the average global rate of increase. Moreover, in Northern Canada, the Canadian region most affected, annual temperatures have risen by 2.3 °C in the same period (Bush & Lemmen, 2019). This increased annual temperature in the North is threatening food safety, drinking water supplies, water and ice safety, the availability of traditional medicine, and the stability of the infrastructure (Inuit Tapirit Kanatami, 2019). As a result, Indigenous Peoples and communities in the North report that environmental changes are affecting their livelihoods, their relationship with the land, their culture, and their mental health and well-being (Berry et al., 2014; Centre for Indigenous Environmental Resources, 2006; Council of Canadian Academies, 2019; Ford, 2012; Quebec Native Women, Inc., 2019; United Nations General Assembly, 2007).

The Canadian Public Health Association (2019) has identified climate change as a public health emergency and has called on the federal government to work with provinces, territories, municipalities, communities, Indigenous groups, and industries to take action in the areas of legislation, regulation, greenhouse gas emissions, and the health of Canadians.

As the results of climate change become increasingly visible (Rose, 2017), public health and governmental sectors around the world are taking action and adopting measures to reduce its effects on the environment and on populations. To combat this global threat, Canada ratified the 2015 Paris Agreement, with a commitment to reduce the emission of gases that contribute to global warming. As part of that commitment, the Government of Canada developed the Pan-Canadian Framework on Clean Growth and Climate Change (PCF). Its purpose is to "reduce Canadian greenhouse gas emissions; drive clean growth; develop regulatory instruments; support businesses and Canadians to adapt and become more resilient to climate change; and contribute to international climate change actions to increase global benefits" (Environment and Climate Change Canada, 2019, p. 7).

Climate-driven vector-borne diseases

Vector-borne diseases are transmitted by ticks and mosquitos, spreading disease from human to human (such as malaria or dengue) or from animals to humans (such as West Nile virus and Lyme disease). In Canada, warmer temperatures have resulted in a higher prevalence of these diseases (Lindsay, 2016). Climate change has played a significant role in influencing the distribution of species and their life cycle, with longer transmission seasons and an environment that has allowed foreign vector-borne disease pathogens to become established (Ogden & Gachon, 2019). New species have expanded into Canada from the United States, and species within Canada are expanding their geographic distribution northward and across provincial boarders at alarming rates (Bellard et al., 2018; Kulkarni, 2015).

Lyme disease is the most common tick-borne disease in Canada (Bouchard, 2019). It is a bacterial infection transmitted to humans through an infected black-legged tick (I. scapularis). There are various hosts for black-legged ticks, such as white-tailed deer, white-footed mice, and migratory birds, to name a few. The white-footed mouse has been moving northward at a rate of 10 km per year (Roy-Dufresne, 2013). Furthermore, climate change has accelerated the northward expansion of migratory birds that host and spread black-legged ticks and has increased temperatures, allowing the tick to complete its life cycle and establish populations in places previously too cold to sustain them (Ogden et al., 2008).

The most health-endangering endemic mosquito-borne disease in Canada is West Nile virus (WNv) (Ludwig et al., 2019). WNv is transmitted from bird to human through a mosquito bite. WNv can also be transmitted from human to human through a blood transfusion or organ donation. Although WNv is largely asymptomatic, severe cases can be life-threatening. Climate change models show a growing geographic range in the spread of WNv in Canada, resulting from the positive correlation between WNv prevalence and warmer temperatures (Zheng et al., 2014). With WNv now well established in North America, the impact of climate change on its transmission in Canada has been investigated in two studies that reached similar conclusions: the prediction of continued northward range expansion of this disease vector (Chen et al., 2013; Hongoh et al., 2014).

The majority of VBDs (including malaria, dengue, chikungunya, and Zika) that are transmitted to humans by mosquitoes are not currently established in Canada because of our cooler climate and harsh winters (Kamal et al., 2018). In 2017, the principal mosquito vector for dengue, chikungunya, Zika and yellow fever was found to have emerged in a very limited part of Southwestern Ontario. There is no evidence that these carry any VBDs, however, this situation could evolve with climate change. (Ng et al., 2019). Under this scenario, exotic diseases such as malaria and chikungunya could become endemic over time (Giordano et al., 2017), given that the mosquitoes that carry these diseases are already present in Canada, although in limited geographical areas (Berrang-Ford et al., 2009).

The environmental trends related to warmer temperatures in Canada are predicted to increase the risk of acquiring Lyme disease and WNv, as well as other tick-borne and mosquito-borne diseases, and thus are a public health concern in Canada (McPherson et al., 2017). Canadian surveillance programs have

already shown that outbreaks of WNv and Lyme disease are steadily increasing from year to year (Bouchard et al., 2019; Ludwig et al., 2019; Ogden & Gachon, 2019). The reported number of Lyme disease cases in Canada increased from 144 in 2009 to 2025 in 2017, and more than doubled between 2016 and 2017 alone (Ogden et al., 2019).

As the risk of VBDs continues to grow (Howard & Huston, 2019), it is anticipated that some groups will be disproportionately affected by the increasing prevalence of these diseases. In the case of WNv, for example, those with an underlying condition or who are over 70 years of age are more likely to be adversely affected (Zheng et al., 2014). Childbearing persons with Lyme disease are at increased risk for adverse outcomes such as miscarriages, newborn deaths, and birth defects. Moreover, fewer adverse birth outcomes have been reported for those who are treated for Lyme disease compared with those who are not (Waddell et al., 2018). Other VBDs that are known to have significant impacts on the childbearing person and their fetus include malaria, Zika, and dengue. Although not yet established in Canada, these diseases are worth noting given that this situation may change as a result of climate change (Sorensen et al., 2018).

Climate change also poses a threat to the emotional and social well-being and mental health of individuals, families, and communities (Albrecht, 2011). Scientists have recently researched and documented the psychological effects that climate change has on individuals' mental health, causing syndromes such as "ecoanxiety," "ecoparalysis," and "solastalgia" (Albrecht et al., 2007; Hayes et al., 2018).

While prevention of mosquito and tick bites is primordial in responding to the health impacts of climate change, early diagnosis and treatment, particularly of Lyme disease, are critical to prognosis and treatment success (Hatchette et al., 2014; Centers for Disease Control, 2018). Later stage diagnoses are considerably more challenging, costly for health services, and detrimental to individuals, families, and communities (Gasmi et al., 2017; Mac et al., 2019). Patient advocacy groups have called attention to this issue. They are advocating for new technologies and approaches to accelerate diagnosis and treatment and are playing a major role in educating the public, persons with lived experience of VBDs, and health care providers (Tick-Borne Disease Working Group, 2018).

Supporting individuals, families, communities, and populations affected by VBDs is a very important role that nurses could assume (Canadian Nurses Association, 2008; Martin & Vold, 2019). So it comes as no surprise that the challenges related to the increasing prevalence of VBDs in Canada have prompted a call to action from patient advocates for nurses and other health care professionals to collaborate with persons with lived experience of VBDs and their communities to mitigate the effects of climate-driven infectious diseases.

Health care professionals clearly need to be aware of the effects of the changing Canadian climate and its impact on VBD. At present, practicing nurses, nurse educators, and nursing students lack the formal education and resources to prepare them for this role (Leffers et al., 2014; Leffers et al., 2017), and require a greater depth of evidence-based knowledge of these issues (Barna et al., 2012).

Guideline development methods

This comprehensive set of national, consensus-based guidelines was developed using an evidence-informed, modified-Delphi approach. This entails an iterative process of stakeholder input, guideline revision, and further stakeholder input from expert panels to build consensus. A series of online learning modules, encompassing teaching and learning tools in a dynamic and easy-to-use format, accompanies the guidelines.

In October 2018, CASN established an advisory committee of experts from across Canada to lead the process of guideline development. An environmental scan was conducted pertaining to the knowledge, skills, and attitudes entry-level registered nurses should possess related to climate change and VBDs. It comprised a Joanna Briggs Institute scoping review (peer-reviewed literature) and a grey literature review for existing nursing-specific and interprofessional resources, regulatory and/or educational competencies, and other relevant Canadian and international documents. The findings of the literature review were analyzed and synthesized to develop a draft document of learning outcomes for nurses. The draft guidelines underwent several rounds of revisions by the advisory committee.

In May 2019, preliminary learning outcomes were shared at a National Stakeholder Forum with representatives from multiple sectors, including nursing education, nursing regulation, nursing employers, practicing nurses, public health organizations, government, nursing students, and persons with lived experience of VBDs in Canada. Over 50 stakeholder participants reviewed and revised each learning outcome using a world café format, allowing for cross-pollination of ideas, rich discussion, and in-depth input. The feedback provided was collated and reviewed by the advisory committee, who revised the educational guidelines based on this input from stakeholders.

Following the Stakeholder Forum, a national validation survey and formal consultations with gender and Indigenous health experts were also conducted to gather further feedback. The online bilingual validation survey employed a snowball sampling method to obtain broad, multi-stakeholder, pan-Canadian feedback. The advisory committee was invited to distribute the online validation survey to their members and networks. The survey was also sent to all nursing programs in Canada, to CASN's networks, to project stakeholders, and to the Forum attendees.

A total of 53 respondents answered the survey, which asked them to rate the importance of each domain and learning outcome statement as one of the following: "essential," "important," "somewhat important," "not important," or to indicate that they did not know. Respondents were also given the opportunity to provide comments throughout the survey. All learning outcome statements except for two were strongly supported as "essential" or "important". Two outcomes fell slightly below the 70% cut-off, as they were considered graduate-level outcomes.

Following the validation survey, the education guidelines underwent in-depth gender-informed and Indigenous reviews. The objective of the gender-based analysis, conducted by a gender expert, was to ensure that the perspectives of women, men, gender-diverse people, and marginalized communities were included in the development of the guidelines. This was carried out through the identification of gender-based differences, assumptions, and gender equality issues relevant to the topic areas in the guidelines.

The Indigenous review was achieved through completion of a questionnaire and/or by telephone interview with experts on Indigenous health and on populations vulnerable to climate change, as identified through the advisory committee and project stakeholders. The objective was to obtain feedback and suggestions from these experts in order to integrate Indigenous perspectives and experiences into the guidelines and the accompanying e-resource. The feedback on the guidelines, domains, and learning outcomes was recorded. Several themes were identified through the thematic analysis of the questionnaire responses and the interviews. These more in-depth consultations built on the feedback received from Indigenous and gender experts who attended the Stakeholder Forum in Ottawa in May 2019.

The CDID committee reviewed all comments and made revisions to the education guidelines based on the results of the validation survey and the expert reviews. Once the committee had reached final consensus and approved the education guidelines, the guidelines were translated into English and French.

Framework

The document is organized into the five domains:

Domain 1: Public Health — Vector-Borne Infectious Diseases

Domain 2: Populations Exposed to Potential Risks

Domain 3: Prevention (Primary and Secondary)

Domain 4: Treatment (Tertiary Prevention)

Domain 5: Advocacy

Detailed learning outcomes accompany each domain. A learning outcome “expresses the lasting changes that must arise in the learner during or following an educational experience” [translation] (Legendre, 2005 as cited in Richard, 2016). There are many benefits of well-defined learning outcomes. They clarify what must be learned in a course or program, offer direction for the selection of learning activities, and provide benchmarks for the assessment of learning (Richard, 2016). The learning outcomes identified in this document provide targets for graduates of baccalaureate nursing programs to achieve in the area of climate-driven vector-borne infectious diseases.

Guidelines for Undergraduate Nursing Education on Climate-Driven Vector-Borne Diseases

Domain 1

Public Health — Vector-Borne Infectious Diseases

Nursing graduates are able to:

1.1 Describe the epidemiology and changing landscape of vector-borne diseases (VBDs) in Canada as a result of climate change, within the global context.

1.2 Outline the causes of climate change, emerging driving factors, and sustainable efforts to reduce the impact of climate change.

1.3 Explain ecological, social, cultural, and environmental risks as well as protective factors and determinants of health for individuals, families, communities, and populations in relation to VBDs.

1.4 Recognize Indigenous knowledge and expertise on climate change, as well as its effects on health and the environment.

1.5 Apply an intersectional lens and a health equity-focused framework to the effects of climate change in order to positively influence health outcomes.

1.6 Demonstrate understanding of VBDs and the ability to access appropriate evidence on the profile of each of the climate driven VBDs relevant to Canada (including clinical features, causative agents, diagnoses, occurrence, reservoirs, incubation period, transmission, risk groups, and prevention).

1.7 Describe health, social, and cultural outcomes following VBD infections.

1.8 Discuss the current best evidence related to the prevention, diagnosis, and treatment of VBDs in Canada

1.9 Demonstrate awareness of key public health initiatives related to VBDs at national, regional and local levels.

1.10 Describe intersectoral measures at all levels of government to mitigate both the impact of climate change on the risks of acquiring VBDs and the adverse effects of VBDs.

1.11 Demonstrate awareness of VBD surveillance practices and programs and understand their implications for population health.

1.12 Identify the role of interprofessional and inter-sectoral collaboration in addressing VBDs.

1.13 Demonstrate cultural safety and trauma-informed perspectives in relation to individual and community beliefs about climate-related health effects.

Domain 2

Populations Exposed to Potential Risks

Nursing graduates are able to:

2.1 Identify circumstances that put individuals, families, communities, and populations more at-risk of acquiring VBDs and/or experiencing the adverse effects of VBDs, including biological, social, economic, and environmental determinants of health and their intersection.

2.2 Describe how social determinants of health impact the prevention, diagnosis, and treatment of VBDs, using an environmental and ecological justice lens.

2.3 Acknowledge and respect the perspective of those with lived experiences of VBDs, their strengths, knowledge, and capacities, as well as the unique challenges they face.

2.4 Recognize and respect diverse ways of learning and knowing in relation to VBDs among populations exposed to potential risks and vulnerable circumstances.

2.5 Describe how historical injustices, public policies, and institutional factors place certain individuals, families, communities, and populations at greater risk of VBDs.

Domain 3

Prevention (Primary and Secondary)

Nursing graduates are able to:

3.1 Explain primary prevention and protection strategies related to VBDs to individuals, families, communities and populations, integrating diverse ways of learning and knowing, to reduce risks of exposure.

3.2 Explain secondary prevention of VBDs to individuals, families, communities, and populations integrating diverse ways of learning and knowing, to facilitate early detection and treatment.

3.3 Identify key public health measures and resources to control VBDs by reducing risk exposure and facilitating early detection and treatment.

3.4 Identify relevant international primary and secondary prevention resources and collaborative strategies related to VBDs.

3.5 Recognize that Indigenous Peoples have a holistic relationship to the land that is critically important to primary and secondary prevention strategies related to VBDs.

Domain 4

Treatment (Tertiary Prevention)

Nursing graduates are able to:

4.1 Describe nursing care related to current treatment approaches to VBDs in Canada.

4.2 Explain how to assist individuals, families, communities, and populations to navigate the health care system in collaboration with inter-/intra-professional and intersectoral partners.

4.3 Describe community-tailored and person-centred strategies and approaches to improve prognosis and quality of life of persons with VBDs.

4.4 Demonstrate an awareness of the inequities and the impact of colonization on health care for Indigenous persons in accessing health care resources and treatment for VBDs .

Domain 5

Advocacy

Nursing graduates are able to:

5.1 Describe strategies to address health inequities faced by individuals, families, communities, and populations living with and/or affected by VBDs.

5.2 Describe culturally appropriate advocacy strategies to promote equitable access to care and address care delivery gaps.

5.3 Engage in culturally safe partnerships with affected individuals, families, communities, and populations to address VBDs.

5.4 Reflect critically on current regulations and public policies related to VBDs.

5.5 Describe advocacy strategies to develop and shape policy related to climate change and VBDs, in partnership with persons with lived experience, advocacy groups, interprofessional and intersectoral partners, as well as with all levels of government.

5.6 Demonstrate awareness of nursing position statements, policies, guidelines, practice standards, and processes in order to advocate for quality of VBD care.

5.7 Describe strategies to influence decision-makers at all levels of government, and within the global context, to address climate change and mitigate its adverse impacts on health and well-being.

Glossary

Advocacy: The active support of a cause, supporting others to act for themselves or speaking on behalf of those who cannot speak for themselves.

Cisnormative [behaviour]: Cisnormativity refers to the oppression experienced by transsexual and transgender people in a society that identifies and represents cissexual/cisgender people as dominant, normal and superior. The term cisnormative refers to the assumption that it is more "natural" or "normal" to keep the body intact than to transition or transform your sex or gender. In Latin etymology, the prefix "cis" means intact and static, while the prefix "trans" refers to a transition from one state to another (Baril and Trevenen, 2014).

Climate change: "A change of climate attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods" (United Nations, 1992, p. 3).

Climate change drivers: "Earth's long-term climate and average temperature are regulated by a balance between energy arriving from the sun . . . and energy leaving the Earth.... When this balance is disrupted in a persistent way, global temperature rises or falls. Factors that disrupt this balance are called 'climate drivers' or 'climate forcing agents,' evoking their influence in forcing climate toward warmer or cooler conditions" (Bush & Lemmen, 2019, p. 38).

Community: A collection of people who interact with one another and whose common interests or characteristics gives them a sense of unity and belonging.

Cultural safety: "Cultural safety is an outcome based on respectful engagement that recognizes and strives to address power imbalances inherent in the health care system. It results in an environment free of racism and discrimination, where people feel safe when receiving health care." (First Nations Health Authority, n.d.).

Ecoanxiety: Anxiety caused by an awareness of the complex and threatening problems associated with climate change (Albrecht et al., 2007).

Ecoparalysis: The feeling of hopelessness from the belief that an individual is incapable of effective action to mitigate climate change (Albrecht, 2011).

Epidemiology: The study (scientific, systematic, and data-driven) of the distribution (frequency, pattern) and determinants (causes, risk factors) of health-related states and events (not just diseases) in specified populations. It is also the application of this study to the control of health problems. (U.S. Department of Health and Human Services and Centers for Disease Control and Prevention, 2012).

Evidence-based: The "integration of the best research evidence, clinical expertise and the patient's unique values and circumstances" (Bhargava & Bhargava, 2007, para. 3). In the Indigenous context, this includes Two-Eyed Seeing which considers the strengths of Western knowledge from one eye and Indigenous knowledge from the other, then brings both eyes mindfully together for the benefit of all (Bartlett et al., 2015).

Gender: "Gender refers to the roles, behaviours, activities, attributes and opportunities that any society considers appropriate for girls and boys, and women and men. Gender interacts with, but is different from, the binary categories of biological sex." (WHO, 2020)

Gender-based analysis: “[T]he process by which a policy, program, initiative or service can be examined for its impacts on various groups of women and men. GBA+ provides a snapshot that captures the realities of women and men affected by a particular issue at a specific time. This means that analysts, researchers, evaluators and decision makers are able to continually improve their work and attain better results for Canadian men and women by being more responsive to their specific needs and circumstances” (Status of Women Canada, n.d., Background section).

Health equity: “Equity is the absence of avoidable, unfair, or remediable differences among groups of people, whether those groups are defined socially, economically, demographically or geographically or by other means of stratification. "Health equity” or “equity in health” implies that ideally everyone should have a fair opportunity to attain their full health potential and that no one should be disadvantaged from achieving this potential.” (WHO, 2020). For example, the health and well-being of Indigenous Peoples continues to lag behind that of the Canadian population on virtually every measure. This is not about *lifestyle* factors or the *culture* of a people, rather it reflects historical and ongoing impacts of colonialism on the health and well-being of Indigenous Peoples (Browne et al., 2016).

Health professionals: Health professionals maintain health in humans through the application of the principles and procedures of evidence-based medicine and caring. Health professionals study, diagnose, treat and prevent human illness, injury, and other physical and mental impairments in accordance with the needs of the populations they serve. They advise on or apply preventive and curative measures and promote health with the ultimate goal of meeting the health needs and expectations of individuals and populations and improving population health outcomes (World Health Organization, 2013).

Historical injustices: Past moral wrongs committed by previously living people that have a lasting impact on the well-being of currently living people (Holmes & Hunt, 2017).

Indigenous Peoples: The descendants of the original inhabitants of North America. The term Indigenous Peoples can be used to describe collectively the three groups recognized in the *Constitution Act, 1982*—First Nations, Inuit, and Métis. These are separate Peoples with unique histories, languages, cultural practices, spiritual beliefs, and political goals. (Canadian Race Relations Foundation, 2019)

Infectious diseases: Illnesses caused by organisms, such as bacteria, viruses, fungi, and parasites. Many of these organisms live in and on our bodies and are normally harmless and can even be helpful. Some infectious diseases can be passed from person to person; others are transmitted by insects or other animals. Some come from consuming contaminated food or water or being exposed to organisms in the environment (Mayo Clinic, n.d.).

Interprofessional: Different healthcare professionals — with diverse knowledge, skills and talents — collaborating to achieve a common goal.

Intersectionality: “[A]cknowledges the ways in which people’s lives are shaped by their multiple and overlapping identities and social locations, which, together, can produce a unique and distinct experience for that individual or group, for example, creating additional barriers or opportunities. In the context of race, this means recognizing the ways in which peoples experiences of racism or privilege, including within any one racialized group, may differ and vary depending on the individual’s or group’s additional overlapping (or ’intersecting’) social identities, such as ethnicity, Indigenous identification, experiences with colonialism, religion, gender, citizenship, socio-

economic status or sexual orientation" (Government of Ontario, 2017).

Inter-sectoral collaboration: Joint action taken to improve the health of populations by health professionals, governments, and the private sector, as well as representatives of voluntary and non-profit groups.

Lived experience: An understanding of an individual's experiences, choices, and options and how they influence the person's perception of events.

Mosquitoes: Main vector that transmits the viruses that cause numerous VBDs, including dengue, malaria, West Nile, and Zika. (Ludwig et al., 2019; Bush & Lemmen, 2019).

Non-binary: "Some people have a gender which is neither male nor female and may identify as both male and female at one time, as different genders at different times, as no gender at all, or dispute the very idea of only two genders. The umbrella terms for such genders are ' genderqueer' or 'non-binary' genders" (Richards et al., 2016, p. 95).

Primary prevention: Education and health promotion strategies designed to help people avoid acquiring unhealthy conditions, diseases, and injuries, thus reducing their population-wide incidence (Encyclopedia of Public Health, 2008).

Health protection: A term used to describe important public health functions in the areas of food hygiene, clean water, clean air, drug safety, and other activities that reduce, as much as possible, the risks to health linked to preventable environmental causes (Public Health Agency of Canada, 2010).

Protective factors: Conditions and attributes (skills, strengths, resources, supports, and coping strategies) in individuals, families, communities, and society at large that help people deal more effectively with stressful events and mitigate or eliminate risks to health and well-being in families and communities.

Registered nurse (RN): Registered nurses "are self-regulated health-care professionals who work autonomously and in collaboration with others to enable individuals, families, groups, communities and populations to achieve their optimal levels of health. At all stages of life, in situations of health, illness, injury and disability, RNs deliver direct health-care services, coordinate care and support clients in managing their own health. RNs contribute to the health-care system through their leadership across a wide range of settings in practice, education, administration, research and policy" (Canadian Nurses Association, 2015).

Secondary prevention: The second level of health care, based on the earliest possible identification of disease so that it can be more readily treated or managed and adverse sequelae can be prevented (Encyclopedia of Public Health, 2008).

Tertiary prevention: The prevention of disease progression and attendant suffering after it has become clinically obvious and a diagnosis has been established. This activity includes the rehabilitation of disabling conditions (Encyclopedia of Public Health, 2008).

Social determinants of health: The social determinants of health influence the health of populations. They include income and social status; social support networks; education; employment/working conditions; social environments; physical environments; personal health practices and coping skills; healthy child development; gender; and culture (Public Health Agency of Canada, 2016).

Solastalgia: Feelings of distress and isolation because of the gradual loss of one's home environment, which can include climate change-related displacement (Albrecht, 2011).

Transmission: The passing of a pathogen causing communicable disease from an infected host individual or group to another individual or group, regardless of whether the host was previously infected.

Trauma: "[B]oth the experience of, and a response to, an overwhelmingly negative event or series of events, such as interpersonal violence, personal loss, war or natural disaster. In the context of violence, trauma can be acute (resulting from a single event) or complex (resulting from repeated experiences of interpersonal and/or systemic violence)" (Public Health Agency of Canada, 2018).

Trauma informed care: "[S]eeks to create safety for clients/patients by understanding the effects of trauma, and its close links to health and behaviour. Unlike trauma-specific care, it is not about eliciting or treating people's trauma histories but about creating safe spaces that limit the potential for further harm for all people" (Varcoe, et al., 2016).

Vector: An organism, typically a biting insect or tick, that transmits a disease or parasite from an animal, plant, or human to another animal, plant, or human.

Vector-borne diseases (VBDs): VBDs are transmitted among their human or animal hosts by arthropods, usually insects. A broader definition of VBDs recognizes that other animals can serve as the infectious disease vector by harboring pathogens that cause disease only in susceptible populations (Hierlihy, 2017).

Vector-borne disease surveillance: Monitoring VBDs by collecting information and samples to determine the distribution, density, and species of vector. Surveillance data is used in decision-making about public education and VBD reduction activities. Surveillance plays a critical role in the detection, prevention, and clinical management of mosquito-borne diseases (North Bay Parry Sound District Health Unit, 2017).

Ways of knowing: Barbara Carper (1978) identified four fundamental patterns of knowing that form the conceptual and syntactical structure of nursing knowledge. These four patterns include: personal, empirical, ethical, and aesthetic knowing.

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