Canadian Association of Nurses for the Environment

Association canadienne des infirmières et infirmiers pour l'environnement

PeriPHAT Toolkit

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Introduction

What is Planetary Health?

- **Planetary health** is a term used to describe an evolving science and social movement that recognises the intricate and interdependent connections between humans and the natural world and focuses upon the protection and preservation of human life and the Earth's natural systems upon which we depend for health and well-being (Planetary Health Alliance, 2025).
- It is a relatively new term describing the growing understanding that caring for and preserving Earth's natural systems is essential in protecting and caring for human life and wellbeing
- Traditional or Indigenous Ecological Knowledge (TEK) is fundamental in grasping the concept of planetary health (Robinson et al., 2021). It is based on respect, personhood, kinship with nature, and knowledge that has been developed over thousands of years by interacting with, experiencing and observing nature spiritually and culturally. This knowledge has been shared intergenerationally through ancient cultural practices such as storytelling, songs, and ceremonies.

Figure 1: All our Relations (Galway, Esquega, Jones-Casey, 2022)

Used with permission

- In achieving planetary health, it is essential to listen to, promote and engage in with Indigenous voices, with Traditional Ecological Knowledge as the embodiment of Indigenous People's profound relationship with nature.
- Human health and survival depend upon the health of the place where we live. A flourishing biodiversity provides clean air, water, soil fertility, diverse food options, medications, genetic resources, spiritual and aesthetic enjoyment, contributing to human health and well-being. All these bolster resilience to impacts of climate change, and foster connections between people and nature.
- These are the underpinnings of the Perinatal Planetary Health Assessment Tool (PeriPHAT).

What is Climate Change?

- Climate change describes average long-term changes in weather patterns over the entire Earth. Human activities, primarily the burning of fossil fuels such as coal, oil and gas, for energy, transport, agriculture and production of goods and materials such as plastics, have induced accelerating changes in climate, with a sharp rise starting from mid-20th century. This has resulted in multiple disruptions to the Earth's natural systems including rising global sea and surface temperatures, precipitation changes, coastal erosion, sea level rise, shrinking sea ice and melting permafrost. The consequences to populations are unevenly felt across the globe, with some already experiencing acute effects, with devastating consequences for their health (Romanello et al., 2023; Roque et al., 2021).
- As a northern country warming twice as fast as the global rate, Canada is increasingly feeling the effects of this in all regions. Northern regions such as Canada's Arctic are warming even faster, putting communities at risk from melting permafrost and sea-ice, loss of traditional knowledge of landscapes and weather patterns, while other areas of the country face flash flooding, wildfires, extreme heat or severe weather events such as windstorms. The reference points long used by indigenous peoples to find their bearings in northern regions are disappearing from the landscape as a result of climate change and melting permafrost.

Climate change and Health

In what ways are health care providers key players in climate action; ideally positioned to conduct assessments and provide education in relation to health impacts of climate change?

- Healthcare providers are highly trusted by patients and the general public, with the ability to recognise and assess health threats to patients and communities, even with personal or sensitive topics. Healthcare providers are also educated in advising patients effectively on any necessary changes to improve or maintain health.
- Incorporating planetary health into healthcare education and the healthcare system will benefit patients, communities, and the environment (Oudbier et al., 2023).
- Modern healthcare education and delivery have existed in the context of fossil-fueled economic growth and a relatively stable climate. But as climate change advances, healthcare systems are put at risk from extreme weather events affecting continuity of services and supply chain. Sustainable healthcare is a practice that must be developed and taught to ensure long-term health for everyone. Healthcare is a top contributor to carbon emissions and consumes vast amounts of single-use materials creating an ongoing mass of medical waste and resultant pollution.
- Most healthcare professionals, policymaker, patients, and the general public are unaware of the prevalence and extent of the effects of environmental impacts on public health and of the long-term consequences on future generations (Giudice, 2021).
- Patients seeking information and assistance about fertility, reproductive health, maintaining healthy pregnancies, and raising healthy babies deserve reliable information on choices and beneficial changes they can make, including evidence-based screening for risks (Giudice, 2021).

What do HCPs need to know specifically about climate change and health?

- Climate change is widely recognized as a health crisis and major driver of humanitarian emergencies in Canada and around the world. There is a profound interconnection between human health and inequity and the rising impacts of global environmental disruption and climate change (Valentine et al., 2022), with widespread concern of reversal of 50 years of public health gains (Tennison et al., 2021).
- Climate change amplifies global inequities in the current world (Williams et al., 2021), simultaneously spiralling upwards in gravity as climate change accelerates (Valentine et al., 2022).
- While the health risks are worldwide, the highest risk for exposure and impacts is amongst equity-denied individuals, families and communities, who must therefore be considered in all climate prevention and health promotional strategies (Giudice, 2021).

- Over a decade ago, the WHO estimated that climate change would result an excess of 250,000 additional deaths per year between 2030 and 2050, numbers confirmed by more recent analyses (Oudbier et al., 2023; IPCC, 2023; Government of Canada, 2025).
- Interventions to reduce environmental threats are also effective in promoting equity in human health and development (Valentine et al., 2022, IPCC 2023).
- Paradoxically, healthcare is a top contributor to carbon emissions (Rodríguez-Jiménez, et al., 2023; Tennison et al. 2021). But education and awareness about the contribution of healthcare to climate and environmental disruption, and the impacts of climate change on human health will better equip providers to undertake effective actions for mitigation and adaptation (Barna et al., 2020).

Why perinatal health? – why the focus on this population?

- All stages of perinatal development from pre-conception onwards can be severely affected by a multiplicity of environmental factors that influence fertility, reproductive health, pregnancy and child development (Giudice, 2021). These factors include toxins found in both occupational or inadvertent household exposures, indoor and outdoor air pollution, and climate change, all of which can have significant impact son human health, in particular on reproductive health and child development, potentially extending through to future generations.
- Climate change has significant direct, indirect and long-term repercussions on children's health, with impacts influenced by socio-economic status, geographic location, living conditions, age, developmental stage, and other factors. Consequences of climate change for infants and children include birth disorders such as low birth weight or prematurity related to extreme heat and/or air pollution, physical injury, occurrences of recurrent or acute infection, increased respiratory illness, intergenerational poverty, malnutrition from food and resource scarcity, and long-term emotional and psychological disorders due to these adverse childhood experiences (Williams et al., 2021).
- During this time of their lives, people are highly motivated do all they can to protect the health and future of their children, and to change their behaviour if necessary to achieve this. It is therefore extremely important to target the perinatal population and provide them with clear and comprehensive information as a key aspect of early intervention.

Intersectionality & Equity-Denied Populations

- Although climate change affects everyone, some individuals or populations are at greater risk than others due to a combination of factors including gender, ethnic background, socio-economic status, language fluency, racism, discrimination, minoritisation, lack of access to resources, power structures, or support services (Perkins, 2018; Versey, 2021).

- Socioeconomically disadvantaged, women, racial and ethnic minorities, those living with disability, the uninsured, lower-income children and families, the elderly, the unhoused, immigrants, refugees, urban and rural poor, and those living with chronic conditions are all at particular risk from impacts of climate change. Inadequate or overcrowded housing or living in certain rural areas subject to extreme weather or far from health or social services can increase climate change vulnerabilities (Versey, 2021). Women and girls are of particular risk from impacts of climate change, with major consequences for maternal and reproductive health from extreme heat, air pollution, inadequate food or water, and insufficient health services (Perkins, 2018; WHO, 2023).

Who is most impacted

- Black, indigenous, and other people of colour experience significant barriers in accessing safety nets, mental health support, and adequate housing, further increasing their level of risk in relation to climate change (Versey, 2021). Important risk factors include reduced access to housing, resources, and mobility which increases potential impacts from climate change, and putting individuals at a higher risk of poorer social outcomes, physical health, and psychological health as a result (Versey, 2021).

Impacts of power and social identity

- Those who contribute the least to climate change are often most affected by its impacts, and least well equipped to adapt effectively. Power, social identity, experiences, and representation influence people's access to resources and decision-making, affecting their capacity to adapt to and reduce the impacts of climate change now and in the future (Walker et al., 2019). Indigenous Peoples, often ignored in climate policy discussions are at high risk for damages from climate change and fossil-fuel extraction (Perkins, 2018). It is only recently that the IPPC recognised colonialism as a driver for climate change for people and ecosystems (IPCC, 2022). The Sixth assessment report described the historical

and ongoing patterns of colonial attitudes and ideas threaded though economic and social systems globally, driving climate change, and amplifying vulnerabilities of people, destroying Indigenous communities and their traditional stewardship of the environment, in a world dominated by white supremacy and structural racism (Nair, 2022; IPCC 2022).

Mitigation strategies

- To mitigate climate change impacts it is important to recognise the role of colonialism, racism and white supremacy in causing, exacerbating, and fueling the forces behind human driven environmental damage (O'Brien, 2020). Intersectional efforts must involve the perspectives and input of populations affected by marginalization (O'Brien, 2020). It is important to heed calls for decolonisation to be well integrated into approaches, systems, and people that comprise the climate fight (Nair, 2022). With this, vulnerable populations must be included in decision making, especially women and indigenous people who suffer the most from climate change related health impacts (Perkins, 2018).
- To effectively address climate change vulnerabilities, policy development should incorporate intersectionality, focusing on poverty, place and race (Walker et al., 2019; Versey, 2021). An approach incorporating understanding of adaptability and vulnerability, will help to mitigate climate risks for all (Versey, 2021). Mitigation strategies should target risk factors such as poverty and inadequate housing to promote climate equity. Education and prevention efforts should be tailored to those most at risk, taking into account the various factors that influence their resilience (Perkins, 2018; Versey, 2021).
- It is imperative to involve vulnerable populations in decision-making, particularly women and indigenous populations who suffer most from the health impacts of climate change (Perkins, 2018).

What is the PeriPHAT

- The PeriPHAT is a tool for healthcare providers to assess climate and environmental risks to pregnancy and child development that uses brief intervention and motivational interviewing.

Seven sections of the PeriPHAT

- The PeriPHAT includes seven types of potential exposures and health impacts from planetary health disruption, with guidance on solutions-finding:

  - ❖ Mental health
    - Connection between green spaces and time spent outside and positive mental health
    - Vitamin D
  - ❖ Eco-anxiety Vector-borne illnesses and communicable diseases
    - Increase stress on body systems
    - Susceptibility
  - ❖ Air quality
    - Increased rates of asthma and lung damage Toxins and pollution
    - Microplastics, Teflon (PFOA), polymer fumes, lead etc. in bloodstream
  - ❖ Heat extremes and heat waves
    - Certain mental health medications are sensitive to heat extremes
    - Lithium toxicity in heat
    - Increased pressure on body systems, heat stroke and heat stress
  - ❖ Food and water security
    - Malnutrition
    - Contaminated water supply
    - Increased infection from contamination of food and water
  - ❖ Climate Change and Disaster Preparedness

Things to consider prior to using the PeriPHAT with Families during the transition to parenthood

Motivational Interviewing

- To use the PeriPHAT tool effectively with families, it is important to have a good understanding of Motivational Interviewing and Brief Interventions since these methods underlie the desired approach in using the PeriPHAT tool with clients/patients.
- Motivational interviewing (MI) is a method enabling healthcare providers (HCPs) to bring about behaviour change using an objective, non-judgemental approach. It is based on the idea of enabling people to change by discovering their desire and capacity to change.
- In using MI, the practitioner first seeks to understand a person's motivation by providing a space for listening, meeting them where they are, and supporting client empowerment in the process of change.
- HCPs encounter patients/clients with varying levels of readiness to change (Rollnick, Miller and Butler, 2023). Some of them may never have thought or known about the issue under discussion, nor of making changes to their lives about this, while others may have thought about it but have not undertaken any desired changes. Still, others may have already begun to make changes but are unsure of how to proceed with the next best steps.
- Before conducting a motivational interview, it is essential to be mindful that each person is an individual with a distinct background, story and understandings. Everyone we encounter comes with their unique knowledge, wisdom and experience that can inform the practitioner/client relationship. Engendering effective purposeful interactions with clients requires a strong foundation built on trust, kindness and a sense of hope (Rollnick, Miller and Butler, 2023).
- The mnemonic RULE (Rosengren, 2009) for motivational interviewing is a useful guide and consists of the following:
    - **R** - resisting the righting reflex
    - **U** - understand your client's motivation
    - **L** - listen to your client
    - **E**- empower your client

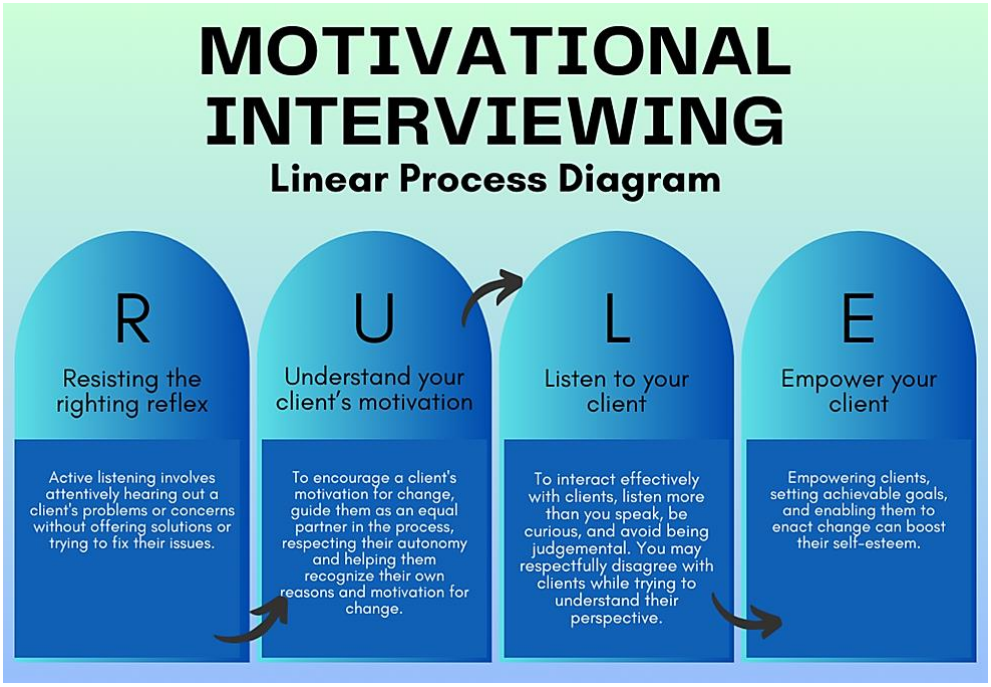

Image: Knowles, K. 2025 Motivational interviewing

- Due in part to the nature of their work, one of the more difficult skills for practitioners is the art of active listening, i.e. to listen carefully and attentively without suggesting solutions or attempting to 'fix' a client's problems or concerns. When practitioners give in to the temptation to intervene instead of fully engaging in listening, the opposite effect to that intended can occur leading to a reduced likelihood of change on the part of the client.
- When conducting a MI, a practitioner must reflect on their own practice and identify behaviours that can increase resistance to change, including for example, attempting to convince a client that they have a problem, arguing about the advantages of change, telling a client how they should change, and even warning them about possible consequences for failing to change (Rosengren, 2009). A vital part of MI is identifying the client's motivation for change since motivation comes from within, rather than something that can be instilled by another.
- The role of the practitioner, therefore, is to guide the client as an equal partner in the process, that respects the autonomy of the client while helping the client recognize their reason and motivation for change (Rosengren, 2009).
- Fundamental tenets of practice are: to listen more than you speak and to be curious and non-judgemental. It may be appropriate to disagree with your client provided it is

done respectfully in attempting to understand the client's perspective. It is important to remember that empowering your clients enhances their ability to enact desired change, and setting realistic attainable goals will also increase their self-esteem (Rosengren, 2009).

- In summary, the goal of motivational interviewing is to assist individuals with making effective changes to address the challenges that they are facing. It allows them to decide for themselves without pressure while being supported with information and advice from a trusted practitioner (Rollnick, Miller and Butler, 2023). To build a strong therapeutic relationship, the practitioner should remain non-judgemental and listen throughout the process while also maintaining boundaries and offering constructive guidance. Allowing the client to make a plan for change with the support of a practitioner with whom they are confident increases the likelihood of positive change (Rollnick, Miller and Butler, 2023).

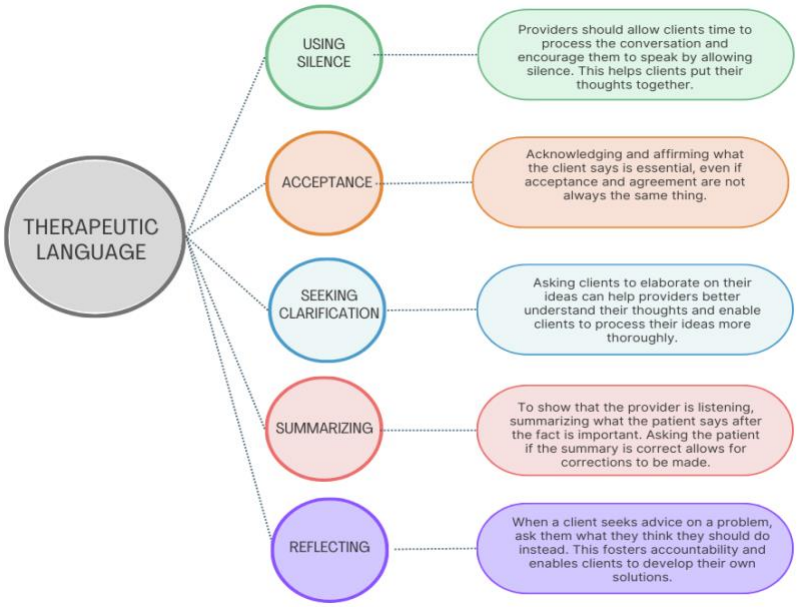

Image : Knowles, 2024. Therapeutic language in Motivational Interviewing

Brief Intervention

- Brief intervention (BI) concerning healthcare practice is a short, and focused conversation, structured to address a specific patient's health concern. These sessions can last anywhere from 5-15 minutes, with the intent to provide immediate support, health education, and guidance to the patient (Barbor, et. al, 2017). The general aim of brief intervention in healthcare is to prevent, promote or manage

existing health concerns. This approach can also be referred to as Screening, Brief Intervention & Referral to Treatment (SBIRT) (Barbor, et. al, 2017)

- Brief intervention is comprised of the following key elements:
  - Assessment
  - Education
  - Motivational Interviewing
  - Goal Setting
  - Counselling and support
  - Follow-Up

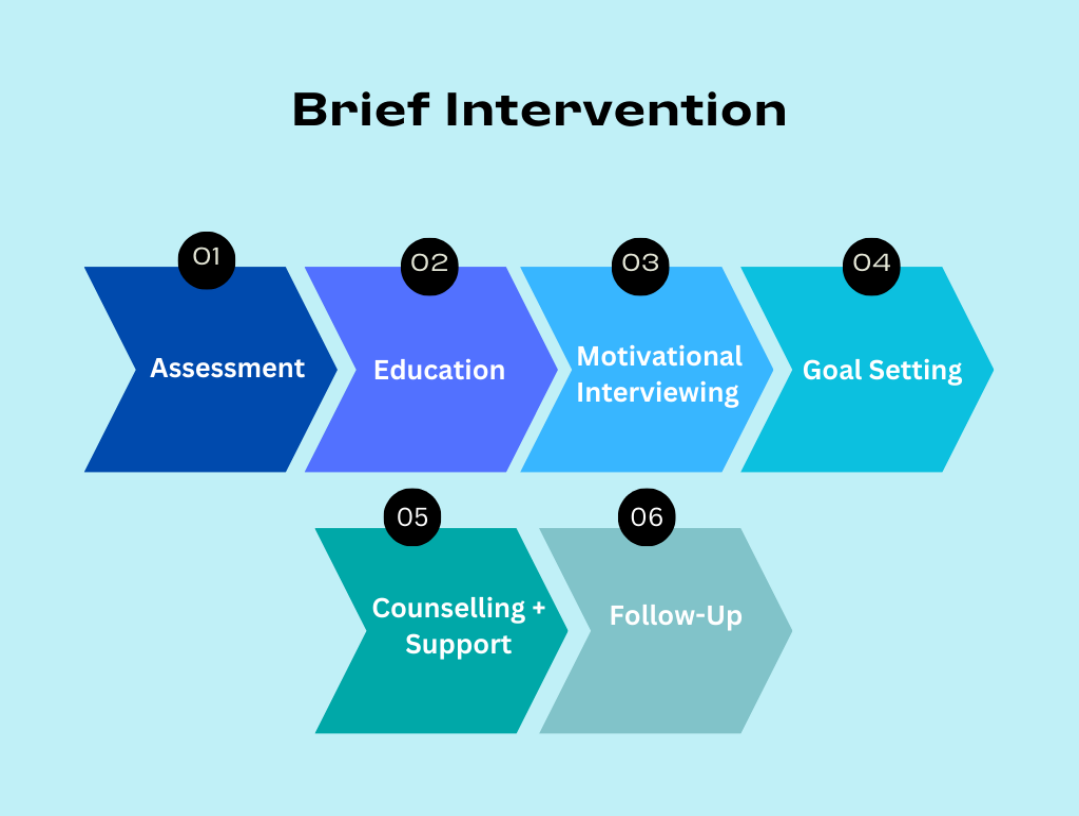

Image : Brief Intervention Knowles, 2024

- There are many benefits to utilizing brief intervention in practice. When used successfully, it empowers the individual by involving them in their own care and making their own health decisions (Barbor et. al., 2017). Brief intervention is time efficient and achievable in busy healthcare settings, leading to improved health outcomes and potentially lesser complications, making it a cost-effective practice for healthcare. Lastly, brief intervention underlines the positive outcomes of preventative care, specifically beneficial for health promotion and chronic disease management (Barbor, et. al, 2017).

Mental Health Assessments

- Before undertaking any planetary health education or assessments, it is important to evaluate an individual's overall mental health and feelings of climate anxiety since these activities in themselves can be anxiety provoking. If they or their family demonstrate high levels of eco-anxiety or lack the emotional capacity to manage this information wait until they verbally indicate they are ready to receive it and make any necessary changes.
- After discussing planetary health and family well-being, it is crucial to follow-up by a mental health check in and offer appropriate mental health resources. While generally climate emotions are normal and adaptive responses to the threat of climate change. if these emotions are described as severe and debilitating worry, consulting a therapist is recommended (to find a therapist or counsellor, see the Climate Aware Therapist Directory by the Climate Psychology Alliance of North America).

Climate Emotions

- Climate change profoundly affects the health and wellbeing of humans, animals and ecosystems. The environmental changes we experience and anticipate can evoke a wide range of distressing emotions such as sadness, uncertainty, anxiety, hopelessness, grief and anger (Albrecht, 2006; Comtesse et al., 2021). Individuals or families may also feel fearful or powerless in the face of potential health impacts compounded by difficulties in discussing these issues with health care providers. It is very important to take the time and offer guidance for healthy coping, and to empower for patients/clients.
    - Mental health professionals propose three practical coping strategies to adapt to stressful climate change emotions (Climate Atlas of Canada, n.d.)
    - Strategies to work through our emotions.
    - Strategies to move to climate action; and
    - Strategies to help reframe the problem and find hope.
- In working through the varied emotions that arise from absorbing the reality of climate change it is important to acknowledge that these emotions are normal adaptive responses to a serious threat (i.e., climate change) (Climate Atlas of Canada, n.d.), It is important to take time to explore your emotions as you experience them, either by writing in a personal journal or discussing them with people close to you. Connecting with others with similar feelings can break one's sense of isolation.

- The second strategy encourages us to take action in order to alleviate distressing emotions (Climate Atlas of Canada, n.d.). Directing our climate emotions (e.g., grief, anxiety, distress) into action can be very beneficial for our mental health. It is important to acknowledge that climate change isn't solely the responsibility of one individual, but that each person has a role to play in driving systemic changes required to have sustainable impact. Actions can range from individual efforts such as biking, eating plant-based meals, and composting, to collective actions such as joining local or national environmental groups, attending climate protests and engaging in democratic processes (voting, contacting your municipal, regional or national political representative). By contributing both individually and collectively, we can inspire others, with a a ripple effect reaching for our communities and social networks.

- The third strategy focuses on sustainable hope and resilience in the face of a growing threat (Climate Atlas of Canada, n.d.). We can take the opportunity to reimagine our desired future, motivating us to participate in activities to achieve these goals. Instead of fixating on negative "doom and gloom" narratives in news and social media, which can be overwhelming and paralysing, seek out solution-focused or positive news about addressing the climate crisis such as Anxiety-Free News or Good News Network. In addition, thinking about both the health and economic co-benefits of climate action, and protecting the planet for the next generation can be strong motivating factors for engagement (Mullins-Jaime, C & Wachter, 2022; Brown et al., 2023; Marshall et al., 2023).

- Although experiencing distressing emotions in response to climate change can be uncomfortable, we can learn to recognize that these feelings are normal and adaptive responses and can serve as powerful motivators for action. It is important to not face these challenges alone, and to leverage emotional support and hope to stay motivated a proactive. Engaging in strategies that work through these emotions, finding support in friends, family and community can be powerful motivators for action and reveal sources of hope.

Instilling Hope

- Hope plays a crucial role in lessening the emotional impact of climate change. Engaging in climate action can improve mental health by promoting social inclusion, and active coping strategies. As a healthcare worker, consider sharing strategies that instill hope and offer ideas to your patients on how they can take part in climate action. To summarize, activities that can help foster hope and resilience in the face of climate change include (Climate Atlas of Canada, n.d.; Government of Canada, 2024):

    * Writing about your emotions/feelings in a journal
    * Biking, walking or taking public transport instead of driving

- Spending time outdoors exploring green spaces around you
- Creating a garden or balcony planters for pollinators, or rewilding an area
- Consuming plant-based meals
- Composting with your municipality if available, or home-composting if not
- Adopting low or zero-waste practices in shopping for groceries
- Buy second-hand clothes and house-hold items, participate in community exchanges
- Connecting with others who feel similarly (e.g., friends, family, other climate activists)
- Look for local events such as talks or learning sessions to learn more
- Join or start a community environmental group
- Attending climate/Earth Day marches and/or events
- Participating in the democratic system, i.e. contacting your local representative; learning about political party positions with Vote Compass.
- Write a letter to the editor
- Support groups that are action on climate or protecting nature and wildlife such as the Canadian Wildlife Federation, Environmental Defence or others.
- Seeking out solution-focused or positive news about the climate crisis

Checking in on Yourself and the People you Work WITH

- Learning about or experiencing the effects of climate change can affect mental health and wellbeing. Healthcare providers (HCPs) should identify warning signs of mental health concerns, and offer support and resources to those who need them. Equity-denied individuals and new immigrant or asylum seekers are highly vulnerable to experiencing mental health effects from climate events due to stressors related to complex living circumstances, and barriers to accessing care including mental health services or advice in their mother tongue. If you suspect that an individual requires mental health support, use motivational interviewing to assess their readiness for change and be familiar with the range of brief interventions you can provide. Keep current with free resources available within Canada and keep them handy in your healthcare setting. Encourage clients/patients to identify support networks they can contact in times of need.

- If you are working with, or are yourself an asylum seeker, refugee, or newcomer you can access the resources below. Culturally appropriate, individual-centred mental health counselling that recognises the sociopolitical and historical forces leading to exile are pivotal in building resilience and overcoming struggles associated with forced or voluntary displacement.

    - Mental Health Counselling
    - The Immigrant and Refugee Mental Health Project (CAMH)

Resources

Mental health and eco-anxiety

- Mental health support: get help – Governement of Canada
- Therapists and counsellors: Climate Aware Therapist Directory by the Climate Psychology Alliance of North America
- Ecopsychepedia is a go-to source for information on how human activity has caused the climate crisis, on how the crisis is now, in turn, affecting us – and, critically, on what we can do about it.

Podcasts (that address climate emotions):

* Climate Change and Happiness Podcast
* Facing It Podcast: A podcast about love, loss and the natural world. From J. W. Atkinson, PhD.

Websites (that address climate emotions):

* The Mental Health and Climate Change Alliance Website
* Climate and Mind Website

* Dial 9-8-8: Suicide Crisis Helpline offers support that is:
    - Bilingual
    - Trauma-informed
    - culturally appropriate
    - available to anyone in Canada
* Climate-change-empowerment-handbook.From Australian Psychological Society

To read:

Essential Reading List Reading list from Climate Psychology Alliance)

Other resources:

* Self administered screening for generalised anxiety disorder (GAD) - if needed
* Institut national de santé publique du Québec. (2019, February). https://www.inspq.qc.ca/en/post-disaster-mental-health-impacts-surveillance-toolkit Post-disaster mental health impacts surveillance toolkit. Québec: Bibliothèque et Archives nationales du Québec.

Air Quality

What is Air Quality?

- Air quality is usually referred to as good or poor, according to the levels and types of contaminants and pollutants in the indoor and outdoor air environments, and can be chemical, physical, or biological (WHO, 2024). Common air contaminants include household combustion devices such as gas stoves and furnaces, vehicles that run on fossil fuels, industrial processes and plants, pollens, forest fires, or mould spores from flooding or damp areas (WHO, 2024). Many of the contaminants are also top contributors to greenhouse gas emissions and climate change (i.e. fossil fuel combustion and forest fires).

What are the health effects of poor air quality?

- Air pollution is a leading environmental health risk factor worldwide (Lelieveld et al., 2023). Exposure to poor air quality can affect all body systems, increasing the risk of developing a range of serious health conditions, including respiratory diseases such as asthma, rhinitis, bronchitis, and lung cancer, as well as ischemic heart disease, stroke, chronic obstructive pulmonary disease, and lung cancer (WHO, 2024b, Lelieveld et al., 2023). Additionally, poor air quality can cause or worsen acute respiratory infections such as pneumonia or COPD. Children living in areas with poor air quality are at high risk of developing or worsening asthma and other acute respiratory infections. Over 8 million premature deaths are attributed to air pollution globally (WHO, 2024b; Levlieveld et al., 2023), a heavier burden than previously estimated, and it is estimated that a significant proportion of air pollution related deaths could be avoided by phasing out fossil fuels (Levieveld et al., 2023).

Who is at risk?

- Low to middle-income countries and communities often have the greatest exposure to air pollutants, with limited access to air purification systems (WHO-1, 2024). People residing close to industrial areas or in crowded cities where industrial or vehicle air pollution is common and green spaces or tree canopy is limited, are at increased risk for poor health outcomes. Inside the home, the use of gas appliances increases exposure to air pollutants such as nitrogen dioxide (NO2), benzene and carbon monoxide (CO) which can increase the risk of asthma and other respiratory symptoms, particularly in children, low-income and elderly (Zhu et al., 2020)

- Children exposed to poor air quality are at risk of developing asthma and potentially long-term respiratory problems. Individuals with pre-existing asthma can experience exacerbation with increased breathing difficulties, and possible lung damage. Pregnant individuals risk gestational diabetes which can result in complications at birth such as high blood pressure or macrosomia. Other groups at risk include outdoor workers living or working in areas with high levels of industrial air pollution, and residents of areas prone to regular seasonal wildfires or floods. Smokers face heightened risk of heart disease, stroke, COPD, and a wide range of cancers, with long-term exposures worsening risks and exacerbating disease symptoms.

Mitigation Strategies

- As mentioned above, the majority of health impacts from air pollution are avoidable. Phasing out fossil fuels would go a long way to eliminating the burden of air pollution related disease.

Reducing emissions and reducing exposure to poor air quality:

- On an individual or community level there are also many strategies to improve air quality and achieve numerous health benefits. Increasing accessible, affordable and efficient active transport infrastructure options can not only reduce vehicle-related air pollution, but also increase physical activity and physical and mental wellbeing.

- The Canadian Government Air Quality Health Index is freely available on-line, and helps the public understand current air quality conditions and make informed decisions about outdoor activities to protect health (Environment and Climate Change Canada, 2021.

- Keep doors and windows closed during periods of poor outdoor air quality, e.g. from high traffic, wildfire smoke or industrial emissions.

- Individuals can help prevent their exposure to air pollution by watching for signs of damp such as moisture on the walls, floors or windows, leaking windows or and broken seams.

- Allowing bathrooms to dry thoroughly by leaving the door open or using a fan can help avoid the buildup of mold spores.

- Other strategies to maintain indoor air quality include using switching from gas to electric ranges if possible, and using range hoods when cooking, and using air purification systems to increase ventilation when indoor air quality is poor

- It is also recommended to install carbon monoxide monitors for each floor. Using public transportation, walking or cycling or reducing car use through car shares can

help reduce emissions and improve outdoor air quality as well as overall health and wellbeing

- If a car is essential, switching to an electric or hybrid vehicle, or participating in a car-sharing scheme such as Comunauto offers convenience and economic advantages, and reduces excess car use, thus reducing emissions
- Take the train or bus instead of flying for shorter distances if possible
- Refraining from idling gasoline or diesel engines, using certified filters on woodburning stoves eliminating backyard fires, as well as following fire prevention are all helpful strategies.
- The WHO has developed a free online course for healthcare providers on air quality and health impacts to further understanding of risks and strategies for prevention.

Climate Change and Disaster Preparedness

What is climate-related natural disasters?

- Climate-related natural disasters are described as unusually severe weather systems that impact communities, for example, flooding, extreme heat waves, deep freezes or tornadoes. Depending on the region where you live, you may be at higher risk for certain extreme weather events or climate-related natural disasters. It is important to know which weather events your region is more likely to experience.

What are the risks of natural disasters?

- Extreme weather events and natural disasters can affect each person differently depending on the severity of the event and the circumstances of the individual or family. They may need urgent or ongoing health services or community support to cope with or work through the consequences following the event. Natural disasters and extreme weather events can have a wide range of disastrous effects, destroying homes, livelihoods and ecosystems, displacing people and affecting health and well-being, from physical injury and illness to mental health effects and death.

Identifying At-Risk Populations:

* Seniors aged 65 years or older
* People with pre-existing health conditions such as diabetes, heart disease or respiratory disease
* People with mental illness such as schizophrenia, depression, or anxiety
* People with substance use disorders
* People who are marginally housed or homeless
* Pregnant people
* Infants and young children
* People living with disability
* People of low socioeconomic status
* People living in locations at high risk of climate events

Mitigation Strategies and Patient Education

Some recommendations for preparing for an extreme weather event.

- Keep tuned to weather or emergency alerts and follow the advice of emergency officials
- Follow Health Canada Weather Alerts
    - How to check the weather in your city
        - Canadian Weather - Environment Canada
        - Weather Information - Environment Canada
        - Air Quality - Environment Canada
        - Seasonal forecasts - Environment Canada
- Inform yourself about risks in your area
    - Get Prepared
- Have an emergency preparedness kit ready
    - Your Emergency Preparedness Guide
- Make an emergency plan with your family/support system
    - Complete the Your Emergency Preparedness Guide
    - https://www.getprepared.gc.ca/index-en.aspx
- Ensure sufficient supplies and plans for food and nutrition for young childre, or others with special nutritional needs.
- Ensure an adequate supply and storage of essential medications &/or medical supplies
- Ensure vaccinations are up to date
- Take a certified first-aid and CPR course

- As a provider, there are ways you can integrate climate change and disaster preparedness into daily practice. Consider implementing the following strategies to help prepare your patients and their families for resiliency amidst extreme weather or natural disasters.

Engage with your patients about climate change by starting a conversation during a regular interaction. You can start for example by exploring symptoms with patients and thinking about aspects of climate change that might be adding to or aggravating their health condition. An examaple of a patient/HCP provider from the University of Minnesota can be found here .

- You can also start by simply asking if your patient/client have any concerns in relation to a climate change.
    - Use their experience as a way to start the conversation and provide education related to their topic of concern (ex. Respiratory health and education surrounding the air quality health index and warning signs of wildfires or smoke)
    - Take opportunities to provide health promotion and education in relation to symptoms or particular conditions or medications

* As part of your standard practice, include environmental factors in your health or mental health assessments
* Consider that your patients may face more than one barrier to the social determinants of health and be prepared to share resources for where they can receive financial aid or other supports in keeping themselves and their families safe.
* Know which extreme weather events or climate-related disasters are most common in your region and use them as a starting point for patient education.

Extreme Heat and Heat Waves

Understanding Extreme Heat & Heat Waves

- Extreme heat and heat waves are periods of unusually high temperatures that persist for an extended period, typically several days or more, and have a significant impact on population health, infrastructure, and the environment.

What are The Effects of Extreme Heat?

- Extreme heat can lead to heat-related illnesses such as heat exhaustion and heatstroke, particularly amongst populations at higher risk including the elderly, young children, pregnant people and people with mobility issues. During heat waves there is an elevated risk of mortality, especially for those who are are living in inadequate housing conditions, in areas of reduced tree cover or shade, or who are unable to access cooling facilities Heat waves can also worsen air quality with the formation of ground-level ozone, a well-known respiratory irritant, and increase the concentration of air pollutants such as fine air particles, which in turn, can contribute to or exacerbate pre-existing health problems. These heat-related events also have adverse effects on ecosystems, including heat stress on wildlife,and plants, leading to changes in vegetation patterns and increased risk of wildfires, which can further impact air quality and human health.

Which of the people I work with are more susceptible to the effects of heat?

- Extreme heat poses a serious threat to human health. Heatwaves are associated with increased admissions to hospitals for cardiovascular, kidney, respiratory and reproductive disorders as well as adding to mental distress. Families with young children need to be aware of the risks and the signs and symptoms related to extreme heat and know when to seek care. Those at greatest risk of extreme heat events are:
    - Older adults (Especially older men)
    - Pregnant people
    - Infants and young children
    - Those diagnosed with a mental illness
    - Individuals taking certain medications
    - Those unhoused, or with unstable housing situations

    - Low-income earners
    - Those with chronic illnesses (such as breathing or heart problems)
    - Socially isolated individuals, families or communities

- Heat illnesses can occur if an individual is exposed to high temperatures, and the body is unable to cool down. The normal body temperature for a healthy adult is typically around 37°C (98.6°F) when measured orally. However, individual body temperatures can vary slightly, and factors such as age, time of day, and activity level can influence body temperature. Normal body temperature varies depending on how the temperature is measured (oral, rectal, underarm, etc.).
- With heat-related illnesses, the body temperature can rise significantly above normal levels, often exceeding 40°C (104°F). This increase in body temperature is the result of the body's inability to regulate its temperature effectively in response to prolonged exposure to high temperatures or strenuous physical activity and is an important indicator of heat illness. It is important to be aware that Heatstroke is a medical emergency.
- With the changing climate, heat events are becoming more frequent, and more severe, and occurring in regions where they previously have not occurred. It is essential to be aware of signs and symptoms of health illness, and how they may appear in children. Here are the most important signs to be familiar with in order to care for or educate your clients/patients:

What Signs do I Need to Watch for and Teach the People I Work with About?

Dehydration

- Dehydration occurs when the body loses more fluids than it takes in, resulting in an imbalance of water and important electrolytes in the body.
- It can happen due to various factors, including increased sweating in high temperatures physical activity, vomiting, diarrhea, fever or reduced fluid intake
- Signs and symptoms include: increased thirst, dry mouth, decreased urine output, dark-yellow or strong-smelling urine, dry skin, fatigue, dry lips and mouth, dizziness, fainting, flushed skin, low blood pressure, or increased heart rate
- If someone is experiencing dehydration, provide plenty of water and fluids, rest in a cool, shaded area if possible, avoid physical activity, and pay attention to any new

or worsening symptoms. Seek medical care if symptoms persist or the individual is unable to keep fluids down due to vomiting.

Dehydration in Babies:

* Mild: they may pee less than usual, and require fewer diaper changes than normal
* Moderate: fewer tears, their eyes and mouth may be dry, they may have a soft sunken spot on the top of their head, no wet diaper in 6 hours
* Severe: No wet diaper in 12 hours, they may be hard to wake up, their mouth and eyes will be very dry and have no tears when crying
* They could also have sunken eyes, grayish skin, and a faster heartbeat

Dehydration in Young Children:

* Mild: they may pee less than usual and will be more thirsty
* Moderate: they may be a lot more thirsty than usual, their mouth and eyes may be drier than usual, they will pass only a small amount of urine in 8 hours, and they may feel dizzy when they stand up i
* Severe**:** their mouth and eyes will be very dry, they may pass only a small amount of urine in 12 hours, they may be too weak or dizzy to stand, they may pass out

Sunburn

* Sunburns occur when the skin is exposed to excessive ultraviolet (UV) radiation from the sun or artificial sources, like tanning beds. The severity of the sunburn can vary depending on the intensity and duration of UV exposure, skin type and protective measures taken before, during and after exposure.
* Signs and symptoms may include swelling of the skin that may be pink or red, or warm and hot to the touch, itching, blisters, or peeling of the skin. Sunburns can also cause headaches, fever, nausea, or fatigue.
* To relieve sunburn pain and inflammation, it is important to apply cool compresses or take a cool bath to cool the skin. Over-the-counter relievers like ibuprofen or acetaminophen can also help with pain relief and inflammation, along with drinking plenty of fluids.
* Medical attention may be required in severe cases, especially if blisters are present covering larger areas of the body, or the person is experiencing

confusion, a fever over 40°C (104°F), vomiting, cold skin, dizziness, or fainting.

- Preventing sunburn involves taking measures such as wearing sunscreen with an SPF of at least 30, even on cloudy days. Wear protective clothing like hats, long-sleeve shirts and sunglasses, and avoid sun exposure during the peak UV hours between 10 a.m - 4 p.m.
- Some common prescription and non-prescription medications can increase an individual's risk of heat-related illnesses, including sunburn. For example, antibiotic medications, and cholesterol-lowering drugs, as well as non-steroidal anti-inflammatory drugs such as ibuprofen (Advil, Motrin), Patients should be informed about the side effects of common medications and how they may increase their risk of developing heat-related illnesses.

Heat Exhaustion

- Heat exhaustion is a milder form of heat-related illness compared to heat stroke
- It occurs when a person is exposed to high temperatures and becomes dehydrated due to the loss of salt and water, but is not life-threatening if treated promptly.
- Signs and symptoms include skin rash, muscle cramps, nausea or vomiting, heavy sweating, headache, rapid breathing, increased heartbeat, extreme thirst, dark urine, reduced urinary output and dizziness or fainting
- If someone is experiencing heat exhaustion, it is important to move the person to a cooler place, have them rest, and provide fluids for hydration.

Heat Stroke

- Heat stroke is a severe medical emergency that can be life-threatening
- It occurs when an individual's regulatory system fails and their core body temperature rises to a dangerously high level, usually above 40°C (104°F).
- Signs and symptoms include high body temperature, hot skin but no sweating, confusion or lack of coordination, loss of consciousness, seizure or coma.
- If someone is experiencing heat stroke, they require immediate medical attention. While waiting for medical help, it is important to try to lower the person's body temperature by moving the person to a cooler space, removing excess clothing, and applying cool water or ice packs.

Resources:

- Follow these sun safety tips: Sun Safety Tips for Parents
    - Check your local UV index: UV Index
    - Check your local air quality index: Local Air Quality Health Index
    - Learn about extreme heat: Communicating the Health Risks of Extreme Heat Events
- Follow these hydration tips: Facts on fluids: How to stay hydrated - Canada.ca
    - Learn about medications and heat waves: Medications and Heat Waves
- Heat Alert and Response Systems to Protect Health: Best Practices Guidebook - Canada.ca
- Health Facilities Preparation for Extreme Heat: Recommendations for Retirement and Care Facility Managers - Canada.ca
- Communicating the Health Risks of Extreme Heat Events - Canada.ca
- Community Care During Extreme Heat: Heat Illness: Prevention and Preliminary Care - Canada.ca
- Extreme Heat Events Guidelines: Technical Guide for Health Care Workers - Canada.ca
- Acute Care During Extreme Heat: Recommendations and Information for Health Care Workers - Canada.ca
- Extreme heat and human health: For pharmacists and pharmacist technicians - Canada.ca

Vector-Borne Illness

What are Vector-borne Diseases?

- Vector Borne Diseases (VBDs) are a type of infectious disease transmitted from animal to animal or to humans via a vector. They account for more than 17% of all infectious diseases globally (WHO, 2024) Vectors are living organisms that carry and spread diseases between humans or from animals to humans. Most vectors are blood-sucking insects (e.g. mosquitos, lice, fleas or ticks) that become infected when they bite a person or animal already carrying the disease. The pathogen then multiplies inside the vector and is passed to a new host at the next bite

Image source : Google images, open access

- VBDs are also known to disproportionately affect marginalized populations that already face multiple barriers in relation to the social determinants of health not only concerning an individual or family's ability to prepare or cope with climate-related events and hazards but also concerning the locations in which they live, the prevalence of existing medical conditions, financial resources and access to care. , It is essential that healthcare providers understand the health impacts of

VBD in order to adequately assess risks and educate as climate change increases the risk of further VBD (Otten et. al, 2020; Ogden et al., 2022).

- The most common VBDs to become established in Canada within the last 25 years are West Nile Virus (WNV) spread by mosquitoes, and Lyme disease, spread ticks carrying the bacterium Borrelia burgdorferi (Otten et al, 2020; Ogden et al., 2022; Vandenberg et al., 2023). As Canada continues to warm, concerns about the emergence and re-emergence of a growing list of 'climate sensitive' infectious diseases, including invasion of exotic mosquito-borne diseases such as dengue and malaria (See chart below) (Ogden et al., 2022). VBD can pose important health risks with a range of detrimental effects on individuals and communities.
- West Nile Virus: West Nile Virus (WNV) transmitted by mosquitoes, is endemic in several regions of Canada, and of ongoing concern by public health authorities (PHAC, 2025). Mosquito exposure is a common risk factor, especially in forested, wetland, swampy areas, or locations near stagnant water bodies, but can also occur in urban backyards when conditions are suitable for mosquito breeding. For example, the presence of tall grass or stagnant water in residential areas can be conducive to mosquito proliferation. The Public Health Agency of Canada monitors mosquito-borne diseases throughout the year, and provides a regularly updated map of mosquito-borne diseases in Canada. Although there has been a public perception that mosquito-borne diseases are primarily tropical concerns (Climate Atlas of Canada, 2019), climate change has created conditions that favour their prevalence in Canada, particularly in urban areas with higher population densities, and increasing concern on the part of Canadians for their risk for these illnesses
- Lyme Disease: Lyme disease in Canada is primarily transmitted by Ixodes scapularis (the blacklegged tick), with lesser risk from Ixodes pacificus in Southern British Columbia (Ogden et al., 2022). Climate change has facilitated the northward expansion of tick habitats, increasing the risk of Lyme disease transmission (CPHA, 2017; Ogden et al., 2022).
- VBD reviewed in the PeriPHAT include West Nile Virus, Lyme Disease and the following VBD listed in the table below. Please look to your provincial and or regional information for specific VBD treatment regime.

Vector-borne diseases of significance in Canada

VBD	Vector	Cause	Symptoms	Testing	Treatment
West Nile Virus	Mosquito	West Nile Virus	Fever, rash, neurological conditions	Diagnosed by considering symptoms, location and time of year likely bitten, lab tests (blood test) https://www.canada.ca/en/public-health/services/diseases/west-nile-virus/treatment-west-nile-virus.html Serology (preferred) - blood or cerebrospinal fluid https://www.publichealthontario.ca/en/Laboratory-Services/Test-Information-Index/West-Nile-Virus-Serology PCR (not routinely recommended) - blood/plasma	Symptom and supportive treatments (https://www.canada.ca/en/public-health/services/diseases/west-nile-virus/treatment-west-nile-virus.html)

				https://www.publichealthontario.ca/en/Laboratory-Services/Test-Information-Index/West-Nile-Virus-Serology	
Lyme Disease	Black-legged tick	Bacterial infection	Rash, fever, headache, fatigue Severe cardiac, nervous and joint symptoms	Diagnosed considering signs and symptoms, exposure to blacklegged ticks and travel to a place where the ticks are found, blood tests • If there was exposure to the blacklegged ticks and there is the characteristic expanding rash, you may not need a blood test https://www.canada.ca/en/public-health/services/diseases/lyme-disease.html	Antibiotics https://www.canada.ca/en/public-health/services/diseases/lyme-disease.html
Babesiosis	Black-legged tick	Parasitic Infection	Fever and at least one of the following: chills, fatigue, sweats,	Blood sample and unstained blood smear slides - manually identify the bacteria and do	Symptomatic: oral atovaquone and azithromycin Asymptomatic: N/A unless risk

			anorexia, hemolytic anemia, thrombocytopenia	PCR https://www.ottawapublichealth.ca/en/professionals-and-partners/babesiosis.aspx#Diagnosis--Laboratory-testing	factors for severe infection are present https://www.ottawapublichealth.ca/en/professionals-and-partners/babesiosis.aspx#Management
Powassan Virus	Black-legged tick, Groundhog tick, Squirrel tick	Flavivirus	Chills, fever, fatigue, headache, vomiting, weakness Encephalitis, meningitis	Diagnosis based on signs and symptoms, exposure to blacklegged, groundhog, or squirrel ticks and travel to an area where the ticks may be found, blood tests or lumbar puncture https://www.canada.ca/en/public-health/services/diseases/powassan-virus.html	Supportive care https://www.canada.ca/en/public-health/services/diseases/powassan-virus.html
Rocky Mountain Spotted Fever	Wood tick, Dog tick	Bacterial Infection	Fever and at least one of the following: headache, malaise/asthenia, arthralgia/myalgia, mild anemia, thrombocytopenia,	Diagnosis based on history, physical exam, and lab results Tests should not delay treatment* https://emergencycarebc.ca/clinical_resource/clinical-summary/rocky-mountain-	Treat with doxycycline (antibiotics) https://emergencycarebc.ca/clinical_resource/clinical-summary/rocky-mountain-spotted-fever-diagnosis-and-treatment/

			leukopenia	spotted-fever-diagnosis-and-treatment/ Nucleic acid amplification test or serology http://www.bccdc.ca/health-info/diseases-conditions/tick-borne-diseases/rocky-mountain-spotted-fever Serology of IFA test, PCR with blood sample or on skin biopsy/post mortem tissue, culture and IHC on skin biopsies/post mortem tissue https://www.cdc.gov/rocky-mountain-spotted-fever/hcp/diagnosis-testing/index.html	
Borrelia Miyamotoi	Black-legged tick,	Bacterial Infection	Fever, chills, headache, body and joint pain, fatigue	Diagnosis based on symptoms, exposure to black legged ticks, and lab testing https://www2.gnb.ca/content/dam/gnb/Departments/h-	Antibiotics https://www2.gnb.ca/content/dam/gnb/Departments/h-s/pdf/en/CDC/FactSheets/borrelia-miyamotoi-disease-fact-

				s/pdf/en/CDC/FactSheets/borrelia-miyamotoi-disease-fact-sheet.pdf Microscopy (blood/csf) (not as common), PCR (blood/csf), serodiagnosis (detecting immunoglobulins) https://pmc.ncbi.nlm.nih.gov/articles/PMC9967256/	sheet.pdf
Tularemia	Tick, insect, infected animals (common wild animals/rodents), mosquitoes (in Europe) Ticks and deer flies	Bacterial infection https://www.gov.mb.ca/health/publichealth/cdc/protocol/tularemia.pdf	6 patterns of illness: ulceroglandular, glandular, oculoglandular, oropharyngeal, pneumonic, and typhoidal. Sudden high fever, chills, fatigue, general body aches, headache, and nausea are present with all forms. Can get secondary skin	Serology or nucleic acid testing. Can use blood, sputum, ulcer swabs, or lymph aspirate. Culture is not as common as the bacteria is highly infectious. https://www.gov.mb.ca/health/publichealth/cdc/protocol/tularemia.pdf	Antibiotics https://www.gov.mb.ca/health/publichealth/cdc/protocol/tularemia.pdf

	Also contaminated food and water; breathing in organisms https://www.gov.mb.ca/health/publichealth/cdc/protocol/tularemia.pdf		rashes. https://www.gov.mb.ca/health/publichealth/cdc/protocol/tularemia.pdf		
Ehrlichiosis	Ticks https://myhealth.alberta.ca/Health/aftercareinformation/pages/conditions.aspx?hwid=ad1759	Bacterial infection https://ncceh.ca/resources/evidence-reviews/review-ticks-canada-and-health-risks-exposure	Fever, chills, headache, nausea, vomiting, purple/red rash https://myhealth.alberta.ca/Health/aftercareinformation/pages/conditions.aspx?hwid=ad1759	Serology testing using blood https://www.publichealthontario.ca/en/Laboratory-Services/Test-Information-Index/Ehrlichia-chaffeensis-Serology Serology, PCR, IHC, culture, and blood smear, but PCR and serology are perhaps more used and reliable	Antibiotics https://myhealth.alberta.ca/Health/aftercareinformation/pages/conditions.aspx?hwid=ad1759

	Lone start stick and ixodes scapularis (deer tick) https://ncceh.ca/resources/evidence-reviews/review-ticks-canada-and-health-risks-exposure			https://www.cdc.gov/ehrlichiosis/hcp/diagnosis-testing/index.html	
Bourbon Virus Disease	Lone star tick https://www.canada.ca/en/public-health/services/diseases/ticks-tick-borne-diseases/ti	Bourbon virus https://www.cdc.gov/bourbon-virus/hcp/clinical-diagnosis-treatment/index.html	Fever, fatigue, nausea, vomiting, loss of appetite, development of maculopapular rash leukopenia, thrombocytopenia https://www.cdc.gov/bourbon-virus/hcp/clinical-diagnosis-	Serological testing: Reverse transcription-polymerase chain reaction (RT-PCR) or Plaque reduction neutralization test (PRNT) https://www.cdc.gov/bourbon-virus/hcp/clinical-diagnosis-treatment/testing-guidance.html	No specific treatment https://www.cdc.gov/bourbon-virus/hcp/clinical-diagnosis-treatment/index.html

	cks.html		treatment/index.html		
Heartland Virus Disease	Lone star tick https://www.canada.ca/en/public-health/services/diseases/ticks-tick-borne-diseases/ticks.html	Heartland Virus https://pmc.ncbi.nlm.nih.gov/articles/PMC6139916/	Fatigue, fever, muscle and joint pain, diarrhea, headache, nausea, leukopenia, thrombocytopenia https://www.cdc.gov/heartland-virus/hcp/clinical-diagnosis/index.html	Serological testing: RT-PCR, IgM microsphere-based immunoassay (MIA) or PRNT https://www.cdc.gov/bourbon-virus/hcp/clinical-diagnosis-treatment/testing-guidance.html	No specific treatment; supportive care https://www.cdc.gov/heartland-virus/hcp/treatment-prevention/index.html
Cache Valley Virus Disease	Mosquito	Cache Valley Virus	Fever, rash, headache, nausea, fatigue Encephalitis, meningitis	Serological (ie. blood antibody) testing (though may not distinguish from closely related viruses) (https://onlinelibrary.wiley.com/doi/10.1111/zph.12621 cited by: https://science.gc.ca/site/science/en/blogs/previous-blogs/national-microbiology-laboratory-science-stories/examining-cache-	None identified (no existing data) (https://onlinelibrary.wiley.com/doi/10.1111/zph.12621 cited by: https://science.gc.ca/site/science/en/blogs/previous-blogs/national-microbiology-laboratory-science-stories/examining-cache-valley-virus-research)

				valley-virus-research)	
Eastern Equine Encephalitis	Mosquito	Eastern Equine Encephalitis virus *(Alphavirus eastern)* https://www.canada.ca/en/public-health/services/laboratory-biosafety-biosecurity/pathogen-safety-data-sheets-risk-assessment/eastern-equine-encephalitis.html	Headache, vomiting, encephalitis, meningitis	Serological (ie. blood antibody) testing or direct virological testing eg. cell culture, nucleic acid amplification https://www.canada.ca/en/public-health/services/laboratory-biosafety-biosecurity/pathogen-safety-data-sheets-risk-assessment/eastern-equine-encephalitis.html (Section V - Surveillance)	No specific treatment https://www.canada.ca/en/public-health/services/laboratory-biosafety-biosecurity/pathogen-safety-data-sheets-risk-assessment/eastern-equine-encephalitis.html (Section V - First aid/treatment)
La Crosse Virus	Mosquito	La Crosse Virus	Fever, headache, nausea, vomiting, fatigue	Antigen-antibody assay of blood (most common), CSF, or tissue.	No specific treatment

			Encephalitis	Results from article cited in: https://science.gc.ca/site/science/en/blogs/older-blogs/national-microbiology-laboratory-science-stories/examining-la-crosse-virus-research	https://www.cdc.gov/la-crosse-encephalitis/symptoms-diagnosis-treatment/index.html ; https://www.cambridge.org/core/journals/epidemiology-and-infection/article/la-crosse-virus-a-scoping-review-of-the-global-evidence/771A5A1E565AB3CECDA32C4C1596F574

Understanding Vector-Borne Diseases

- Vector-borne diseases are caused by microorganisms like bacteria, viruses, parasites, or fungi that spread from one individual to another, either through direct or indirect means. Others are transmitted via insect bites or the consumption of contaminated food or water (World Health Organization, 2023a). Some individuals may be asymptomatic carriers of a disease and may not show symptoms but can still spread the disease to others.

- Climate change is an important consideration that directly impacts the prevalence, spread, and transmission of communicable diseases. Ongoing emissions of greenhouse gases disrupt the balance of solar and infrared radiation, resulting in global temperature rise and exacerbating various climate-related hazards such as droughts, heatwaves, wildfires, floods, storms, and sea-level rise. These hazards are further intensified by increased evaporation rates, altered precipitation patterns, and more frequent extreme weather events (Mora et al., 2022). As a consequence, the life cycles and habitats of disease-carrying vectors such as mosquitoes and ticks are directly affected, leading to expansion into previously unaffected areas and heightening the risk of diseases being transmitted to humans and animals in new regions. For example, the Government of Canada (2021) reported a total of 3,147 cases of Lyme disease. Among these, 2,595 (82.5%) were confirmed, while 552 (17.5%) were classified as probable cases. However, this represented the highest number of cases ever reported in the country. Human driven changes to the landscape such as deforestation or breaks in forest continuity for construction of homes or agricultural use can also contribute to vector-borne disease by bringing humans into closer contact with insects such as ticks (Elmieh, 2022). The movement of people related to political, social or climate pressures can also influence communicable disease transmission, as with the increased cases of malaria found in Columbia attributed to Venezuelan refugees (Carreño-Almánzar, et al.,2021).

Canada Infectious Disease Directory

Impacts of Communicable/Infectious Diseases

- Communicable diseases can cause a range of health effects, from mild to severe, or life-threatening. Beyond direct health impacts, communicable diseases also have economic, social, and global effects. Outbreaks can strain healthcare systems, increase medical costs, and lead to social stigma and discrimination. Communities and individuals may face isolation during outbreaks. The economic repercussions can extend globally, affecting trade and travel due to imposed restrictions as a result of communicable disease outbreaks (Samsudin et al., 2024).

Who is More at Risk for VBDS and other Communicable Diseases?

- While all individuals face the risk of contracting communicable diseases, certain groups may be more susceptible than others. Older adults, infants, pregnant individuals, and individuals with weakened immune systems are at a heightened risk. Factors such as poverty, inadequate housing, and limited access to healthcare exacerbate susceptibility to VBD, with children, women, and the elderly being particularly at risk, especially when facing food insecurity and malnutrition (Thompson & Stanberry, 2022). Additionally, pregnant individuals facing financial insecurity or marginalization are especially vulnerable to adverse health outcomes associated with VBD (Thomson & Stanberry, 2022).

- Certain populations can be more vulnerable to VBD, including people who live in rural areas with more wildlife and arthropods or engage in outdoor activities. Dog owners face increased exposure as pets can bring ticks into homes or yards. Outdoor workers, such as farmers, construction workers, and park rangers, spend long hours in environments where mosquitoes and ticks thrive. Similarly, outdoor enthusiasts, including hikers, campers, and gardeners, frequently visit areas with high vector populations, increasing their chances of being bitten. Indigenous people in Canada that are connected to the land are also more likely to live in rural remote areas and interact with the land more often which can increase their chances of coming in contact with vectors.

- Individuals facing homelessness are another at-risk population, with over 235,000 people in Canada facing homelessness annually (Nisenbaum et al., 2023). Individuals facing challenges with housing may live in unsanitary conditions and encounter barriers to accessing health care due to transportation issues, lack of insurance, stigma, or lack of the necessary documentation. Furthermore, insecurely house populations may face barriers in preventing VBDs (being outside at dusk and dawn etc., inability to purchase mosquito repellent or have adequate screens on windows).

- Additionally, individuals exposed to persons infected with communicable diseases, such as family members, healthcare workers, and those in crowded environments are at an elevated risk of transmission.
- Living in crowded spaces or shelters with limited access to healthcare, which translates into missed opportunities for screening tests or immunizations. In addition, challenges in maintaining proper nutrition and hygiene practices may further weaken the immune system and increase the risk of communicable diseases.
- Indigenous populations in Canada may experience elevated rates of communicable diseases due to factors including limited healthcare access, crowded living conditions, and inadequate water and sanitation. For example, during the COVID-19 pandemic, First Nations community members were three times more likely to be hospitalized due to infection and six times more likely to require intensive care compared to non-First Nations individuals (Pickering et al., 2023).

Strategies for Prevention and Control

- By implementing mitigation strategies, individuals and communities can work to prevent, control, and manage the impact of communicable diseases. Mitigation strategies for VBD include surveillance, vector control measures, and public health interventions. Long-term mitigation efforts rely on addressing climate change to limit vector expansion. Strategies have and may involve land-use management changes, early-warning systems, access to prevention methods like insecticides and vaccines, and public health education on avoiding vector habitats and using personal protective measures (Thomson & Stanberry, 2022; CPHA, 2017). Additionally, household interventions, such as insecticide use and window screens, and public policies like improved housing regulations and land-use management, play crucial roles in VBD prevention. Personal protective measures, such as insect repellents, clothing barriers and bed nets, are also essential in reducing exposure to vectors and minimizing disease transmission. Healthcare workers should aim to understand the different identities or factors that contribute to an individual's risk and vulnerability to VBD to provide specific interventions. Public health measures are especially crucial during outbreaks to protect individuals and the broader population.
- Hand hygiene is a very important in reducing the spread of most infectious diseases

Possible Exposure to Communicable Disease?

- For information or guidance about communicable disease exposure, testing, or access to self-assessment resources specific to your province or territory, utilize

the contact information provided to notify your respective provincial or territorial public health authority for assistance.

Provincial and Territorial Contacts:

British Columbia – Phone Number: 811

Alberta – Phone Number: 811

Saskatchewan – Phone Number: 811

Manitoba – Phone Number: 1-866-626-4862

Ontario – Phone Number: 1-866-797-0000

Quebec – Phone Number: 1-877-644-4545

Newfoundland and Labrador – Phone Number: 811 or 1-888-709-2929

New Brunswick – Phone Number: 811

Prince Edward Island – Phone Number: 811

Nova Scotia – Phone Number: 811

Yukon – Phone Number: 811

Northwest Territories – Phone Number: 811

Nunavut – Phone Number: 1-888-975-8601

Toxins & Pollution

Understanding Toxins and Pollutants

Toxins and pollutants originate from various sources and can enter the environment through different pathways. In the air, pollutants like nitrogen dioxide, sulfur dioxide, carbon monoxide, ozone, volatile organic compounds (VOCs), and heavy metals including lead and mercury are prevalent, often emitted from vehicle exhaust, industrial processes, and combustion from fossil fuels. In the water, pollutants include heavy metals, pesticides, fertilizers, industrial chemicals, pharmaceuticals, and microbial contaminants like bacteria and viruses, which can contaminate water sources through runoff, industrial discharge, and improper waste disposal. Soil pollutants consist of pesticides, herbicides, heavy metals, industrial waste, and chemicals leaching from landfills, impacting soil quality and ecosystem health. In our food, contaminants such as pesticide residues, heavy metals, microbial pathogens, and food additives accumulate in the food chain, posing risks to human health. Additionally, household toxins like lead, asbestos, phthalates, and bisphenols found in plastics, food packaging, and various personal care products can affect indoor air quality. Finally, radiation from different sources such as nuclear facilities, medical procedures, and natural sources can also pose health risks to living organisms and the environment. Accordingly, understanding and mitigating the impacts of these common toxins and pollutants is essential for protecting human health and the environment (Crighton et al., 2016; Government of Canada, 2020; 2024; 2025)

General Exposure Pathways of Common Toxins & Pollutants (Crighton et al., 2016)

- Understanding the general exposure pathways of common toxins and pollutants is crucial in safeguarding the health of the population and the environment. Common pathways include:

- Inhalation (indoor air or dust): Inhalation occurs when we breathe in aerosolized particles from toxins or pollutants, such as cleaning sprays or powders. For both adults and children, this can lead to respiratory issues, especially for individuals with asthma or allergies, who may be more susceptible to indoor air pollutants and toxins

    For example: Second-hand smoke – tobacco products contain numerous harmful chemicals including nicotine, carbon monoxide, formaldehyde, and benzene.

Exposure can increase risk of respiratory infections, asthma, and lung cancers, especially for children and non-smoking adults.

- Ingestion (Direct, Dust, Surfaces, Drinking Water, or Other): Ingestion occurs when cleaning product residues are accidently swallowed, either from direct or indirect contact, contaminated surfaces, or even drinking water sources. Children, who tend to explore their environment by putting things in their mouths, are particularly at risk.

  For example: Phthalates and bisphenols are chemicals commonly found in plastics, food packaging, and personal care products. These chemicals can leach into food and beverages, leading to ingestion through consumption. Research suggests that exposure to phthalates and bisphenols may have adverse effects on hormone balance, reproductive health, and development.

- Dermal (dust, surfaces, or other): Dermal exposure occurs when residues from toxins or pollutants come into contact with the skin. Children, especially those with sensitive skin and tendency to touch surfaces, are susceptible to absorbing these harmful agents.

  For example: Household Chemicals: Cleaning products, pesticides, and personal care products often contain chemicals that can be absorbed through the skin upon contact. These chemicals may include irritants, allergens, and potentially toxic substances, leading to skin irritation, allergic reactions, or systemic toxicity.

- Take-home (occupational, dry-cleaning or other): Anyone entering the home, including family members, children, siblings, or guests, may inadvertently bring home toxins or pollutants from their workplace or other settings, such as dry-cleaned clothing, exposing themselves and others to potential harm.

  For Example: Asbestos: Workers in industries where asbestos is handled or used, such as construction, shipbuilding, and automotive repair, may carry asbestos fibers home on their clothing, tools, or personal belongings. Family members exposed to asbestos fibers brought into the home may be at risk of developing asbestos-related diseases, including mesothelioma or lung cancer.

Who do we need to think about during our practice? (Berry & Schnitter, 2022; NCCIH, 2022)

- While all individuals face potential health risks from exposures to toxins and pollutants, certain populations may be at a greater risk of harm and experience disproportionate effects from such exposures due to various factors including socio-economic status, occupation, age, and any underlying health conditions. These vulnerable populations include:

- Infants and young children: due to their developing bodies and higher metabolic rate
- Elderly: especially those with weakened immune systems or underlying health issues
- Pregnant women: exposure to toxins or pollutants during pregnancy can have harmful consequences for both the mother and developing fetus, potentially leading to birth defects, preterm labour, developmental issues, or other health problems.
- Low-income communities: these individuals often face higher exposure to toxins and air pollutants due to factors such as living in close proximity to industrial sites, limited access to clean drinking water, or access to healthcare resources to address health issues.
- Racial and Ethnic Minorities: marginalized populations may experience higher exposure to environmental hazards due to systemic inequalities in housing, employment, and access to resources, leading to further disparities in health outcomes.
- Individuals with Pre-existing Health Conditions: individuals with pre-existing health conditions, such as asthma, cardiovascular disease, or compromised immune systems may experience exacerbated symptoms or heightened susceptibility to the effects of environmental toxins or pollutants, which can be both acute and/or chronic.
- Occupational Groups: individuals working in certain occupations such as agriculture, manufacturing, mining, waste management, or healthcare entail higher risks of exposure to toxins and pollutants in the workplace.

Considerations for Healthcare Workers

- In the healthcare setting, healthcare workers are exposed to a wide range of chemicals and pollutants as part of their daily routines and responsibilities. Various toxins and pollutants may be present due to medical procedures, equipment sterilization, cleaning practices, and waste management protocols (Bansod et al., 2023). For example, quaternary ammonium compounds (QACs) are commonly found in cleaning wipes, including well-known brands like Lysol and Cavi-wipes. These compounds are widely used as disinfectants due to their effectiveness against a broad spectrum of microorganisms, including bacteria, viruses, and fungi. However, prolonged or repeated exposure to QACs can pose health risks to healthcare workers, such as skin irritation, dermatitis, and respiratory problems, particularly in individuals with pre-

existing sensitivities or allergies. Additionally, there are concerns about the potential development of antimicrobial resistance with frequent use of QAC-based disinfectants (Camagay et al., 2023).

- Anesthetic gases like nitrous oxide, isoflurane, and sevoflurane often used in surgical or medical procedures pose health risks to health workers and further contribute to environmental problems by increasing air pollution and climate change. Nitrous oxide, in particular, is a potent greenhouse gas exacerbating global warming (Cunha and Pellino, 2023). Furthermore, handling chemotherapy drugs and radioactive materials, such as methotrexate and cyclophosphamide can present risks such as skin irritation and radiation exposure, which can lead to cancer and genetic mutations with repeated exposure or unsafe handling (Ndaw and Remy, 2023).
- Similarly, exposure to radioactive materials utilized in diagnostic imaging procedures can pose risks of radiation exposure, leading to potential health problems such as cancer and genetic mutations (Centers for Disease Control and Prevention, 2021). Furthermore, healthcare workers may encounter formaldehyde and volatile organic compounds (VOCs) in cleaning products, which can irritate the skin, eyes, and respiratory tract and contribute to indoor air pollution (Government of Canada, 2021). Accordingly, facilities must ensure proper ventilation, provide suitable personal protective equipment, offer training on safe handling practices, and adhere to strict protocols for disposal to minimize risks from exposure to toxins and pollutants.

Understanding the Effects of Toxins and Pollutants on Human Health

Respiratory Problems – Inhalation of fine particulate matter (PM2.5) from air pollution can lead to respiratory issues, including coughing, wheezing, and shortness of breath. Additionally, exposure to indoor pollutants like tobacco smoke and volatile organic compounds (VOCs) from household products can exacerbate respiratory conditions such as asthma, chronic bronchitis or chronic obstructive pulmonary disease (COPD).

Cardiovascular Diseases– exposure to heavy metals like lead and mercury, often found in contaminated water sources and certain foods, has been linked to an increased risk of cardiovascular diseases such as heart attacks and strokes. These toxins can contribute to arterial plaque buildup, hypertension, and inflammation in the cardiovascular system.

Neurological Disorders – Certain toxins, including heavy metals like lead and mercury, as well as neurotoxic chemicals found in air and water pollutants, can adversely affect neurological function. Prolonged exposure to these substances may lead to cognitive

impairment, developmental delays, neurobehavioral disorders, and an increased risk of neurodegenerative diseases such as Parkinson's disease or Alzheimer's disease.

Reproductive Disorders– Exposure to endocrine-disrupting chemicals (EDCs) found in pollutants like phthalates, bisphenols, and pesticides can disrupt hormonal balance and reproductive function. This can result in infertility, miscarriages, birth defects, and reproductive organ abnormalities, affecting both male and female reproductive health.

Increased Risk of Cancer – Various toxins and pollutants are known carcinogens, increasing the risk of developing cancer. For example, exposure to air pollutants like nitrogen dioxide and VOCs has been linked to lung cancer, while occupational exposures to carcinogens like arsenic or vinyl chloride commonly found in plastic manufacturing increases the risk of bladder cancer and liver cancer.

Mitigation Strategies

S.A.F.E - Sustainable Actions for Environmental Protection

Source Control– Implement measures to reduce or eliminate the release of toxins or pollutants at their source. For example, through technological improvements, pollution prevention programs, and stricter regulations on industrial emissions.

Air Quality Management– Focus on improving air quality through measures such as reducing vehicle emissions, promoting cleaner energy sources, and implementing air quality monitoring and enforcement programs.

Filtering and Filtration – Utilize filtration systems to remove pollutants from air, water, or soil. This can include installing air filters in buildings, implementing water treatment plants, and using soil remediation techniques to filter out contaminants.

Education and Awareness– Raise public awareness about the risks of exposure to toxins and pollutants, steps to reduce personal exposure and to contribute to environmental protection efforts, such as educational campaigns or community workshops.

Screening Tools and Resources:

Learn about Pollutants and Toxins: Pollutants - Canada.ca

Complete an Exposure History: Possible Sources of Indoor Air Pollution

Assess Your Water Sources: Canadian Drinking Water Quality Guidelines

Review these Chemical Guidelines and Safety Tools: WHMIS.org

Check your Products: EWG VERIFIED® : For Your Health

Possible Exposure to Toxins or Pollutants? Follow these Steps:

1) Remove yourself from the area: if you are indoors, go outside and get some fresh air. If you are outside and suspect contamination, move to a safe location away from the source.
2) Alert others: if you suspect that others may also be affected, such as family, coworkers, or neighbours, inform them of the situation so they can take appropriate precautions.
3) Try to identify the source of the potential toxins or pollutants. It could be anything from chemical spills, gas leaks, mold, or other environmental hazards.
4) Call the Canadian Poison Centre or your healthcare provider right away.
5) Tell the person who answers the phone what the product label says. There should be first aid instructions surrounded by a border on the back or side of the product label.
6) If able, bring the product container with you when you go for help.
7) Follow any instructions or recommendations provided by authorities or medical professionals. This may include evacuation procedures, seeking medical treatment, or taking precautions to avoid further exposure.
8) Report the incident: Health Canada - Incident Reporting

Food and Water Security

Understanding Food and Water Insecurity

- Food and water security refers to the assurance of access to sufficient, safe, and nutritious food and clean water to meet the dietary, hydration and sanitation needs of individuals, including availability, accessibility, and stability of food and water over time. In 2022, Statistics Canada reports revealed that 18 percent of families experienced food insecurity, with Newfoundland and Labrador, New Brunswick, and Alberta reporting the highest rates of food insecurity. Further, the data revealed significant disparities among different demographic groups. For example, families
- with a racialized major income earner were twice as likely to report food insecurity compared to those with non-racialized earners. In Canada, Indigenous populations and Black Canadians are disproportionately affected, underscoring systemic inequalities that contribute to unequal access to food and water resources. Currently, there are 26 Indigenous communities not supplied with safe drinking water due to long-term drinking advisories (Government of Canada, 2024).

Understanding the Effects of Food and Water Insecurity

Environmental Impacts

- Food and water insecurity in Canada have significant environmental implications. Unsustainable agricultural practices, driven by the need to increase food production, contribute to habitat destruction, biodiversity loss, and ecosystem degradation (Zerriffi et al., 2023). Intensive farming practices like monoculture and excessive use of fertilizers and pesticides degrade soil quality, leading to erosion, compaction, and loss of organic matter, which impairs soil fertility and ecosystem services (Wang et al., 2024). Agricultural runoff, industrial discharge, and inadequate wastewater treatment contaminate surface water and groundwater sources, endangering human health, aquatic ecosystems, and planetary health (Sharma et al., 2024).
- Pollutants such as pesticides, nutrients, heavy metals, and pathogens degrade water quality. Overexploitation of water resources exacerbates water scarcity, particularly in drought prone regions, such as Alberta, Saskatchewan, and Manitoba. In 2023, Statistics Canada reported an average per capita water use of 401 liters per person per day, equivalent to approximately 802 500ml water bottles daily. Although usage has declined since 2019, reduced water availability impacts aquatic habitats, disrupts

ecosystems, and threatens biodiversity, exacerbating challenges already faced by vulnerable ecosystems. Furthermore, food and water insecurity are significantly worsened by climate change, disrupting temperature and precipitation patterns, resulting in increasingly frequent and severe extreme weather events. For instance, prolonged droughts and intense storms directly impact agricultural productivity, diminishing crop yields and exacerbating water scarcity (Sharma et al., 2024). Finally, shifts in climate alter ecosystem dynamics, further challenging the availability and quality of food and water resources essential for human survival.

Human Health Impacts

- Food and water insecurity have significant human impacts in Canada, contributing to malnutrition as individuals may lack access to sufficient nutrient-rich foods to meet their dietary needs. Malnutrition affects physical and cognitive development, compromises immune function, and increases the risk of chronic diseases such as obesity, diabetes, and cardiovascular disorders. Inadequate access to safe drinking water and sanitation facilities increases the risk of waterborne diseases, such as diarrhea, cholera, and typhoid fever. Contaminated water sources contribute to the spread of infectious diseases, posing significant health risks to affected populations (World Health Organization, 2024). Additionally, food and water insecurity leads to inequitable access to resources and opportunities, perpetuates social disparities and undermines community resilience, imposes economic burdens on individuals, families, and societies, including healthcare costs, lost productivity, and decreased economic output. Furthermore, living with food and water insecurity can cause psychological distress, anxiety, and depression, disproportionality affecting Indigenous children and youth in Canada (Banerji et al., 2023).

Identifying At-Risk Populations

- In Canada, various groups are at risk of experiencing food and water insecurity. Among these groups, certain populations are particularly vulnerable, facing greater challenges accessing adequate nutrition and safe drinking water, including:
    - Low-Income Households- individuals and families with limited financial resources may struggle to afford or access nutritious food and safe drinking water, leading
    - Indigenous Communities- many Indigenous communities in Canada face significant challenges in accessing clean and safe drinking water due to factors such as inadequate infrastructure, contamination of water sources, and funding gaps.

* Rural and Remote Communities- some rural and remote communities may lack access to reliable water infrastructure and face challenges in accessing affordable and nutritious food due to limited availability of grocery stores and higher transportation costs
* Northern Communities- communities located in the northern regions, particularly those living in remote or Arctic regions, may experience challenges related to food and water insecurity due to factors such as permafrost thaw, changing climate conditions, limited accessibility to resources, and higher costs of living
* Houseless Populations- individuals experiencing housing insecurity may have limited access to food and water due to economic barriers and lack of stable housing, leading to heightened vulnerability to food and water security
* Newcomers and Refugees- newcomers to Canada may face challenges in accessing affordable and culturally appropriate food, especially while navigating settlement and integration processes in their communities, where water resource may be insufficient
* Marginalized and Vulnerable Populations- marginalized and vulnerable populations including racialized communities, persons with disabilities, and individuals with chronic diseases may face greater systemic inequities or barriers to access.
* Children and Seniors- children and seniors may be particularly vulnerable due to factors such as limited income, increased nutritional needs, or reduced mobility.

Mitigation Strategies

Water Purification Instructions

* Water purification through boiling is a versatile method that effectively treats various types of water, including tap water, well water, spring water, surface water (such as rivers, lakes, and streams), and rainwater. Boiling water effectively kills most bacteria, viruses, and parasites, making it a simple and effective method for purification, providing an extra layer of safety for drinking water, especially when other purification systems may not be available. However, it does not remove potential contaminants such as chemicals, heavy metals, or sediment. If there are concerns about possible contaminants, consider using additional water treatment methods.

Follow these steps to boil water for safe drinking:

1) Gather supplies – find a heat source (e.g., stove or campfire), a pot or kettle, and water
2) Heat the water – place the pot on the heat source and bring the water to a rolling boil. This means the water should have large, vigorous bubbles breaking the surface.
3) Boil the water – once the water reaches a rolling boil, let it continue boiling for at least one minute. If you're at high altitudes (over 6,500 feet or 2,000 meters), boil the water for three minutes due to the lower boiling point at higher elevations.
4) Cool the water – remove the water from the heat source and allow it to cool before use
5) Store the water – once cooled, store the boiled water in clean, covered containers. Utilize for drinking, cooking, or other purposes as needed.

Reporting Unsafe Drinking Water: Steps and Resources

In Canada, individuals can report unsafe drinking water to local authorities or regulatory agencies responsible for water quality and safety. While the steps may vary depending on the province or territory, these are the general guidelines on how to report unsafe drinking water:

1) Contact Local Health Authority: Provincial and Territorial Health Authority Contacts
2) Provide Details: Explain the issue, including the location and symptoms
3) Visit the Government of Canada's website on water quality and safety to report unsafe drinking water or seek guidance: Water Quality Program - Contact Health Canada
4) Email: water-eau@hc-sc.gc.ca Phone: 1-833-223-1014 Teletypewriter: 1-800-465-7735 (Service Canada)
5) Follow-up: Stay informed about actions taken to address the issue
6) **Seek Medical Attention if Necessary**

Consequences of exposure contaminated water

- Exposure to contaminated water can cause a range of symptoms, including gastrointestinal issues such as diarrhea, nausea, and vomiting, as well as fever,

dehydration, fatigue, skin irritation, respiratory symptoms, muscle aches, headaches, and dizziness. The severity and duration of symptoms may vary, depending on the type and concentration of contaminants. In more severe cases, contaminated water can lead to serious complications, especially in vulnerable populations. If you experience any of these symptoms after consuming water from a potentially unsafe source, seek medical attention promptly (Center for Disease Control and Prevention [CDC], 2022).

Support Resources for Canadians

Food Banks Canada – access Food Banks Canada's website or directly reach out to local food banks for details regarding food assistance programs nationwide.

- Website: Food Banks Canada Phone: 1-877-535-0958

211 Canada – Regardless of location, individuals can access this free, confidential, and comprehensive helpline service to connect with community, social, and governmental services in their area, including food assistance programs.

- Website: 211.ca Phone: 211 or 1-877-330-3213

Additional Resources:

* Explore the map of lifted and active long-term drinking water advisories on public systems on reserves across Canada: Drinking Water Advisories
* Follow these guidelines and steps to test your water: Making Water Safe
* Read about water contaminants: Germs That Can Contaminate Tap Water | CDC
* Learn about food security policies and programs: Food Secure Canada
* Explore healthy eating guidelines: Canada's Food Guide

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