Module 7

Climate Change Toolkit for Health Professionals

Preparing for Climate Change in our Communities

April 2019

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Preface

This toolkit consists of eight modules which have been prepared as stand-alone documents that can be read by themselves, but they have also been prepared to complement one another. It has been designed as a tool for health professionals and students in the health care and public health sectors who want to engage more directly on the issue of climate change as educators with their patients, peers and communities, and/or as advocates for the policies, programs and practices needed to mitigate climate change and/or prepare for climate change in their workplaces and communities.

Module 1 – Climate Change – Science, Drivers & Global Response provides an introduction to climate science and discusses the human activities that are contributing to climate change, the international commitments that have been made to address it, and where we are in terms of complying with those commitments.

Module 2 – Global Health Impacts of Climate Change summarizes the direct and indirect health impacts that are occurring, and are predicted to result from, climate change, on a global scale.

Module 3 – Climate Change Health Impacts across Canada summarizes the direct and indirect health impacts that are occurring, and that are predicted to occur, in the different regions of Canada.

Module 4 – Greenhouse Gas Emissions in Canada by Sector and Region discusses the volume of greenhouse gases emitted, and the trends in those emissions, from different sectors in Canada at a national, provincial and territorial scale.

Module 5 – Climate Change Solutions with Immediate Health Benefits discusses climate solutions that can produce fairly immediate health co-benefits for the jurisdictions that implement them.

Module 6 – Taking Action on Climate Change at Health Care Facilities discusses the climate mitigation and adaptation policies, programs and practices that can be adopted and implemented by health care institutions to reduce their greenhouse gas emissions and prepare for climate change.

Module 7 – Preparing for Climate Change in our Communities discusses the climate adaptation policies and programs that can be developed by public health units or municipalities to minimize the health impacts associated with climate change.

Module 8 – Engaging in Climate Change as Health Professionals discusses the different ways in which health professionals can educate and engage their patients, the public, their peers, and their communities on the health impacts of climate change, and the policies and programs needed to mitigate climate change and prepare for it.

Module 7 – Preparing for Climate Change in our Communities

Introduction

All levels of government are increasingly concerned about the growing risks to the health of Canadians from climate change (Berry, 2014). Cities expect climate change to seriously compromise public health infrastructure when extreme weather disrupts crucial services (Watts, 2018). Municipal and regional public health officials are concerned about how a changing climate could exacerbate existing health issues or create new health burdens (Paterson, 2012).

Regional and local governments are taking action to adapt to the risks associated with climate change. Successful adaptation requires collaboration between sectors such as health, environment, planning, transport and infrastructure as well as non-government organizations (Paterson, 2012, Berry, 2014).

A homeless man outside in extreme cold weather. Photo by Tedward Quinn on Unsplash.

This module provides an overview of adaptation policies and programs undertaken by a range of sectors within local governments and community organizations. These actions include measures associated with temperature extremes (heat and cold), floods, wildfires, vector-borne diseases, food systems and water quality. Building community resiliency will also be discussed. Each section in this module contains a summary of the associated impacts, examples of local actions and topic specific actions for consideration by health professionals.

Extreme Cold Weather

Climate change is likely to bring volatile swings in weather that may result in more frequent unusual cold spells (Ebi, 2013). Exposure to extreme cold weather can increase the immediate risk of cold-related injuries including hypothermia and frostbite. Cold weather, even with moderate temperature changes, can also increase the risk of cardiovascular-related mortality for up to several days after

exposure (TPH, 2019, Canada, 2019).

Extreme Cold Weather Alerts and Response Programs

Extreme cold warnings are issued when very cold temperatures or wind chill create an elevated risk to health. While Environment Canada issues extreme cold warnings across Canada, some municipalities also issue alerts based on local criteria (Canada, 2018). For instance, Toronto's Extreme Cold Weather Alert is based on factors such as temperature, wind chill, precipitation, or several days and nights of cold weather in a row that increase the impact of cold weather on health (TPH, 2019). The Greater Vancouver Area's Extreme Weather Response Alerts are issued when temperatures are near zero with precipitation and/or sustained high winds (HSA of BC, 2019). Alerts are shared with service providers, transit authorities and other partners who can warn people about the risks of extreme cold. Alerts are often communicated to the public by media who deliver weather information via television, radio and digital platforms.

The issuing of extreme cold alerts triggers local community responses. In Montreal, the Société de transport de Montréal allows homeless people to warm up in transit stations during extreme cold temperatures and provides free shuttles to get them to shelters once the stations close for the night (STM, 2017). Additional homelessness services are initiated in the City of Toronto during cold alerts, including outreach teams who contact individuals on the street and check on their condition and offer transportation to a shelter, winter respite drop-in or their home. Shelters add temporary beds and extend their hours of operation to allow clients to stay indoors until other services in the area are open. Transit tokens are distributed to individuals at drop-in centers to allow them to reach shelters and other community service locations (TPH, 2019).

Cold Weather Services in the Winter Season

Cold-related injuries can occur at times when Extreme Cold Weather Alerts are not in place. Toronto Public Health interviews with people experiencing homelessness found that throughout the winter their health was affected by precipitation,

Université-de-Montréal Metro Station. Photo by Chicoutimi, 2010.

changes in temperature, high occupancy in shelters, anxiety, stress and worsening of pre-existing conditions. To address these issues, the City of Toronto's cold weather response includes 24-hour continuous respite drop-in services across the city during the winter months. Services include providing resting spaces, meals and service referrals (City of Toronto, 2019).

Protecting Renters from Extreme Cold

In addition to protecting the homeless population from extreme cold, some communities have temperature bylaws for rental accommodation. For example, Ontario's Residential Tenancies Act, 2006 requires landlords to maintain a minimum temperature as set by the local municipality/city. Toronto has a bylaw that requires landlords to provide heating up to at least 21°C between September 15 and June 1 of each year (Toronto, 2019).

Case Study: Keeping Warm in Vancouver

Vancouver opens warming centres in extreme cold weather as a life-saving measure. Last year, up to 100 people accessed their warming centres on any open night.

Warming centres include community centres and other public buildings. While they are not set up with beds or mats, they provide a safe, warm space for people who might be living outside.

Warming centre alerts are circulated to partner agencies, community centre staff, outreach program staff and a variety of agencies serving individuals experiencing homelessness.

(Adapted from the 2019 City of Vancouver Winter Response Strategy)

Health Professional Tips for Taking Action

- Be aware of local extreme cold weather alerts that are issued and discuss the risks of extreme cold weather with your vulnerable clients/patients (e.g. seniors, people who have cardiovascular disease and the under-housed).
- Provide clients/patients with information on how to stay safe in the cold and provide links to resources such as Health Canada's Extreme Cold web page
- Be aware of and connect clients/patients who may be experiencing homelessness, or are under-housed to cold weather services in your community. These services may include warming centres and shelters that add temporary beds.

Extreme Heat

It is predicted that, in Canada, heat waves will be more severe, occur more frequently and last longer (Berry, 2014). The risk of heat-related illness and death is greatest when temperatures increase beyond values traditionally experienced, and when these high temperatures are sustained through several consecutive extremely warm days and nights (Guiobault, 2016).

Heat Alert and Response Systems

Many Canadian communities have Heat Alert and Response Systems. In Ontario, health units and municipalities use a Harmonized Heat Warning and Information System in which the issuing of heat alerts activates response plans based on the association between temperature, humidex and mortality (TPH, 2019). Gatineau's heat response plan has region-specific thresholds that reflect when higher mortality and morbidity rates were observed (Guiobault, 2016).

> *"Climate change is intensifying pressures on human health & wellbeing, in large part, because of the loss of natural features that support climate resilience – trees to provide shade and protect from extreme heat, and wetlands to mitigate the impacts of flooding."*
>
> *(Personal communication, Environmental Health Working Group Chair, Ontario Public Health Association, 2019)*

Decreasing the Impact of Urban Heat Islands

Higher temperatures occur in urban areas because of a preponderance of dark, heat-absorbing surfaces such as roads, roofs, parking lots and sidewalks, as well as the displacement of trees and green spaces that provide natural cooling. The dark surfaces release stored heat overnight, preventing cities from cooling off. These areas are known as Urban Heat Islands. Temperatures in urban centres can be reduced by increasing urban vegetation, the use of reflective surface materials that reflect or reduce heat conduction, and natural or constructed shade structures (TPH, 2015).

Communities are promoting cool and green roofs to reduce summer temperatures in urban settings (Guiobault, 2016). In addition to reducing the intensity of the Urban Heat Island effect, green roofs enhance air quality and public health by capturing airborne pollutants, providing green space and improving biodiversity. They also reduce stormwater runoff by retaining water and delaying the timing of any runoff that does occur (ICLEI Canada, 2012). Rosemont-La Petite-Patri, Quebec has white and green roof regulations in which property owners wishing to replace or build a new roof must install a green roof, a white roof, a highly reflective cool roof or a combination there-

Case Study- An Innovative Approach to Reducing Urban Heat: Schoolyard Oasis Project

Paris suffers from a significant lack of green space for residents – just 9.5% of Paris consists of parks and gardens. The 2017 heat waves in Paris highlighted that the city's impermeable asphalt-covered schoolyards were an impediment to ongoing efforts to battle heat in the city. With temperatures on the rise and asphalt trapping heat, schools have been forced to close due to dangerously high heat waves.

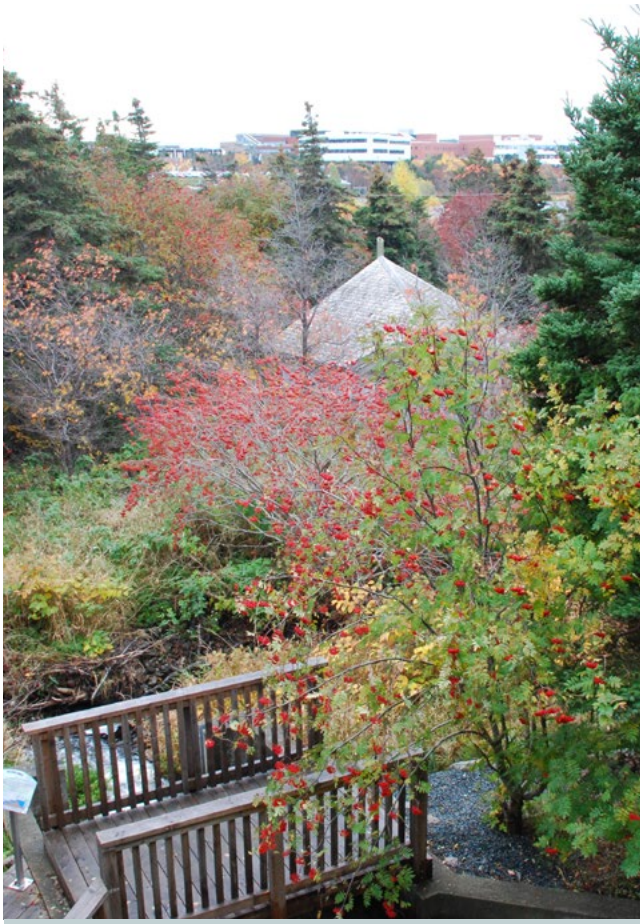
The "Schoolyard Oasis" project transformed school yards from asphalt into lower-temperature green spaces that all Parisians can use during heat waves. The schoolyards will also serve as community centers and cultural hubs that can be used during after school hours, improving community cohesion and reducing isolation amongst residents. School greening will be mainstreamed in all renovations moving forward, making it the new standard. With the average Parisian living within 200 meters of a schoolyard, the project has the potential to impact every resident in the city when fully implemented. Adapted from 100 Resilient Cities: Schoolyard Oasis Project, 2019

of (Guilbault , 2016). The City of Toronto requires the construction of green roofs on new developments. The Green Roof Bylaw affects all new residential, institutional, commercial and industrial building developments with over 2,000 m^2 of gross floor area (ICLEI Canada, 2012).

Greening Communities

Green spaces help to reduce the intensity of the urban heat island effect as well as provide additional health benefits. Links between health and green space include lower all-cause mortality and improved wellbeing associated with green space. Both small and large green spaces are of value, and the association between green space and health is likely stronger for disadvantaged populations (TPH, 2015). In addition, outdoor physical activity in a natural environment or relaxing in a park improves mental health and reduces mental fatigue (Vancouver, 2018).

Kingston and Peel Region are working to reduce the risk of extreme heat in urban centres by encouraging the planting of more shade trees. Surrey has developed a robust street tree management plan (Guiobault, 2016). The EcoHealth Ontario (EHO) collaborative fosters improved health and wellbeing outcomes through the provision of better ecosystem quality, increased green space and enhanced access to nature. EHO's Greenspace and EcoHealth Toolkit provides resources, guidance and assistance to those interested in making improvements in community health through green space provision,



Park, St. John's, Newfoundland and Labrador. Photo by Kim Perrotta.

access and design. The Toolkit includes a series of profiled case studies drawn from municipalities, public health and conservation agencies that have begun to make connections between green space and community health (Eco Health, 2017).

Official Plans Set the Tone

Zoning regulations such as the green roof bylaws and provision of green spaces are often supported by Official Plans. Official plans can be designed to incorporate climate change adaption as they provide the policy framework for all other planning decisions. For instance, the City of Winnipeg supports green design principles and construction methods for new buildings and neighbourhoods in their community sustainability plan (Winnipeg, 2019).

Maximum Indoor Temperature Bylaws

People spend most of their time indoors. This can be particularly true for the elderly and those who are chronically ill or socially isolated, for whom indoor temperature can have a substantial impact on health and well-being (TPH, 2015). Bylaws currently exist in some communities such as the City of Toronto and Town of Ajax that set maximum indoor temperatures of 26^{0}C during the summer for rental apartments with air conditioning. Toronto Public Health suggests that from a health equity perspective, it is important that the same standards are applied to residents who do not have air conditioning in their apartment. Toronto and Durham Region are exploring the feasibility of implementing a maximum indoor temperature standard/bylaw for rental multi-unit residential buildings without air-conditioning. Considerations include the implications of adding air conditioning units to the electrical grid and requiring a cool common room where tenants can take reprieve from the heat (TPH, 2015, Durham Region, 2018).

Health Professional Tips for Taking Action

- Be aware of extreme heat alerts and sign up for email or text notifications, if available in your community. Here is the link to Environment Canada public alert page
- Discuss the risks of hot weather with your clients/patients and promote the use of local cooling spaces (e.g. air conditioned spaces and shaded areas). Provide them with information on how to stay safe in the heat and links to resources such as Health Canada's "It's Way too Hot" web page
- Discuss UV index implications with your clients/patients and encourage them to seek shade.
- Encourage your clients to spend time in green spaces, prescribe nature and take the time yourself to enjoy activities in natural environments. Learn more about the benefits of being outside
- Support projects in your community to decrease urban temperatures and prevent climate change impacts on health such as green roofs and increasing the amount of green spaces.
- Support initiatives in your community to protect vulnerable populations from weather extremes by supporting policies such maximum temperature bylaws.

Building Flood-Resilient Communities

In Canada, heavy precipitation events and rising sea levels will increase the risk of flooding in many communities (Berry, 2014). Along with immediate injury and death from flood water, longer-term impacts on health include respiratory illness related to an increased risk of mould developing in homes damaged by flood waters, contamination of drinking water from wells and mental illness associated with destruction of infrastructure, homes and livelihood (Watts, 2018). Psychosocial impacts associated with being displaced due to flooding include increases in alcohol and drug use and family violence, and other general symptoms of high levels of stress such as depression, anxiety, sleep disruption, post-traumatic stress disorder (PTSD) and an increase in physical ailments.

Measures can be taken to build flood-resilient communities, including the development of guidelines and policies for flood-prone areas. For instance, the Weathering the Storm: Developing a Canadian Standard for Flood-Resilient Existing Communities report provides guidance to local governments through a framework for prioritizing flood resilience efforts and suggested approaches to reduce flood risk. Actions include proactive maintenance of flood control structures, re-grading of lots and road-

ways, and constructing new or upgrading stormwater storage facilities. The report recommends that flood forecasting and warning protocols be put in place and include standard messaging and communication protocols (Moudrak, 2019).

After the June 2013 flood damaged homes for thousands of residents in Southern Alberta, the Government of Alberta developed flood policies that prohibit future development in floodways. The policy requires homeowners to take on future risk if they opt to stay in their homes and they will no longer be eligible for future Disaster Recovery Fund assistance. The City of Calgary is revising its zoning bylaws to limit development in flood hazard areas (ICLEI Canada, 2014).

Outreach and education to the public can increase awareness of local flooding risks and associated physical and mental health impacts (CCNB, 2018). The coastal community of Annapolis Royal, Nova Scotia, developed flooding maps in response to rising sea levels and increased flood risks. The flooding maps were presented to citizens in a series of public forums. These were followed by a mock disaster scenario that engaged local fire, medical and emergency response teams. The public was also involved, allowing citizens to observe the potential effects that a flood might have on their lives and enabling them to explore how to minimize property damage and harm during a real disaster (Canada, 2015a).

Caption: 2013 Calgary Flooding on Elbow Drive. Photo by Andy Van Der Raadt.

Health Professional Tips for Taking Action

- Be aware of local flooding risks and warnings in your community.
- Provide clients/patients with information on the health risks associated with flooding and link to resources.
- Connect clients who have experienced flooding with local health and emergency management authorities to learn about when it is safe to return to their homes and with mental health services for those who may be experiencing psychosocial impacts associated with being displaced.
- Support policies in your community that decrease flood risks.

Preparing for the Impacts of Wildfires

Increased drought and heat, among other factors, contribute to the occurrence of wildfires and many regions of Canada are expected to see an increase in the extent and severity of wildfires as the climate continues to change (Berry, 2014). In Canada, forest fires or wildfires are common occurrences from May to September and can cause extensive damage and put lives in danger (Canada, 2018).

Health impacts associated with wildfires include direct injury from contact with fire, stress of evacuations and increases in air pollution (Berry, 2014). Adaptation measures related to wildfires include avoiding building in vulnerable locations, preparing for the health impacts of smoke and supporting the community after a wildfire.

The Community Wildfire Protection Plan in Kamloops BC specifies that before a building or subdivision is approved for development, the landowner must agree to wildfire mitigation measures, including fire-resistant roofing materials, fuel buffer dimensions and spark arresters for wood stoves. In addition, the plan specifies that a proposed development situated in the assessed moderate, high or extreme wildfire hazard classes, cannot be built upon unless the landowner submits a site-specific wildfire hazard assessment to the City (Canada, 2015b).

Health Professional Tips for Taking Action

- Consider how local wildfires, or smoke from more distant fires may be affecting your clients/patients. Natural Resources Canada provides detailed information about wildfire conditions across Canada
- Encourage your clients/patients to learn about how to protect themselves and their families during wildfires. Protective actions include keeping the indoor air as clean as possible by keeping the windows and doors closed and checking local air quality reports such as the Air Quality Health Index (AQHI) tool. The AQHI provides guidance about protecting health by limiting short-term exposure to air pollution and adjusting activity levels during increased levels of air pollution such as a wildfire or smog events. Visit the Government of Canada's AQHI site for more information
- Connect clients/patients who have been evacuated from their homes due to a wildfire with local health and/or emergency management authorities to get advice about safely returning to their homes.
- Connect clients/patients with mental health services for those who may be experiencing psychosocial impacts associated with the event.

Supporting Community Recovery from Wildfires

Alberta Health Services provides information to their communities impacted by forest fires. This information includes advice about returning to their homes after an evacuation; testing water quality; and the impacts of wildfire smoke on health and air quality advisories including use of the AQHI tool. In addition, a recovery plan for Addiction and Mental Health was developed in the aftermath of the 2016 wildfires in the Regional Municipality of Wood Buffalo including Fort McMurray. This plan is focused on those who were evacuated from their homes to promote a return to health and wellness (AHS, 2017).

Food Systems and Security

The food system encompasses activities related to the production, processing, distribution and consumption of food. Food systems can be impacted by climate change and related weather events such as flooding, drought and heat as they affect agriculture and may reduce the availability of some foods. This can result in increased costs for food and reduce accessibility for people, especially those with low incomes (Berry, 2014, TPH, 2015).

Extreme weather events may result in food transportation and supply-chain disruptions, thereby decreasing access to

Case Study: Preparing for Wildland Fire Smoke and Air Quality Events in Manitoba

Wildland fires occur regularly throughout much of Manitoba and communities, health disaster managers, and public health officials are often faced with the complex decision of if, or when, to evacuate residents of a smoke-impacted community. This occurs most frequently in the North, where travel into and out of a community may depend on a single road, rail line or air service. Before evacuating, health risks need to be assessed. Evacuations can also be disruptive, stressful and costly to residents as well as communities, and therefore should only occur when health benefits outweigh all other risks.

The Office of Disaster Management (ODM), a branch within the provincial department of Manitoba Health, Seniors and Active Living has developed specific smoke event health messaging, and has also tailored that messaging to be used in Environment and Climate Change Canada's Special Air Quality Statements when a smoke event forecast creates elevated AQHI forecasts. The Air Quality Health Index is a tool that can help the public understand what air quality means to their health and how to limit exposure when the air quality is poor. Manitoba ODM has also developed operational guidance for provincial entities, using smoke forecasts and associated health impacts.

Adapted from Berry, 2016: "Enhancing Preparedness around the Health Impacts of Wildland Fire".

Case Study: "Shipping Crates Bring New life to Dundas St." Toronto, Ontario

"The street outside Scadding Court in Toronto was a desolate space – an unused strip with no activity. So, we plopped down a bunch of shipping containers for small-scale businesses to set up shop at a very low cost and low risk. This simple concept has resulted in a lot of success stories for people who just needed an accessible opportunity to get started. It has rekindled street life here on Dundas St., and it even brings in revenue for the Community Centre. Today we have several community gardens, outdoor markets, food vendors, greenhouses, retailers, apprenticeship and other programs, and even a commercial-grade kitchen for affordable hourly rates. In our model, everyone gets a piece of the pie; everyone wins".

Adapted from City of Toronto RAC Zoning Success Stories, 2019.

food for many people. For example, local officials in Whitehorse, Yukon identified highway obstructions and washouts during extreme weather events as a key concern as they can prevent the delivery of food (Casello, 2017). Northern communities and the significant Indigenous populations within the region can also experience food insecurity that can result from conditions such as reduced duration and thickness of sea and lake ice and the thawing of permafrost, which make it dangerous or impossible to access local food sources (Berry, 2016).

Supporting Local Agriculture

Communities are considering the impact of climate change on food systems by reviewing and developing policies that support local agriculture through production and distribution. For instance, Metro Vancouver's Regional Food System Action Plan includes actions to better understand and mitigate the risks to the region's food producing lands and the agricultural sector, including the expansion of the local-food sector. Urban agriculture activities include improving the availability of community gardens for residents (Metro Vancouver, 2016).

Additional activities in Metro Vancouver include reviewing zoning bylaws to expand support for local food and allow market food gardening in residential areas, and encouraging agricultural production by allowing urban farming. Toronto's Residential Apartment Commercial (RAC) zoning bylaw allows for food markets and small businesses/grocers to provide year-round fresh fruit and vegetables for nearly 500 apartment tower sites which were formerly food deserts (Toronto, 2019).

Building Capacity in the Agricultural Sector

A community-based project in Arviat, Nunavut is building capacity for local food

Community Garden, Dundas, Ontario.
Photo by Kim Perrotta.

production by involving researchers and community youth to monitor and collect data on optimal growing conditions in the community greenhouse and to build capacity for its ongoing operation. The Township of Douro-Dummer in Ontario with a largely agricultural community was significantly affected by a drought in 2016 due to extreme heat that led to water shortages and crop damage. In response to these concerns, the Township hosted a workshop for the agricultural community on how to adapt to, and prepare for, drought conditions (ICELI Canada, 2018).

Integrating Food Systems into Emergency Plans

Local governments can undertake emergency management planning that addresses the risks associated with natural disasters or the impacts of climate change. In many cases, emergency plans lack process and protocols to address food-related issues such as the availability of food in an emergency and food safety risks (Metro Vancouver, 2016). A study by Toronto Public Health identified significant rain and flooding, an extended heat wave, and a major winter ice storm as being the most significant extreme weather event risks to food processing, distribution and access in Toronto. The report recommends integrating food access into the City's emergency response planning, engaging with multiple partners across the city to understand and strengthen food distribution and to develop community food resilience action plans for vulnerable neighbourhoods (TPH, 2017).

Addressing Food Safety

Food safety is a concern if power outages occur and food cannot be properly stored. Local governments provide guidance to their communities through their public health departments or emergency management resources (TPH, 2017, Metro Vancouver, 2016).

Health Professional Tips for Taking Action

- Advocate for and support local policies that encourage local food production, including community gardens or Community Food Centres that encourage local food security, especially in lower income areas.
- Advocate for integration of food-related issues such as the availability of food in an emergency and food safety risks into your community's emergency plans.
- Advocate for measures that increase the resiliency of the Canadian food system.
- Educate your clients/patients about food safety concerns if power outages occur and link them to resources such as the Canadian Food Inspection Agency's
- "Food Safety in an Emergency"

Vector-borne diseases

Vector-borne diseases such as West Nile virus (WNV) and Lyme disease are of concern in Canada with changes in precipitation patterns and rising temperatures. In recent years, these diseases have seen their geographic range expand northward (Lindsay, 2016, Hierlihy, 2017). West Nile virus demonstrates patterns of "boom and bust" with outbreaks often followed by many years of few human infections. Lyme disease cases in Canada are increasing each year driven in part by the range expansion of the tick vectors that carry the disease (Lindsay LR 2016).

Surveillance Programs

By maintaining effective surveillance programs on insect- and mite-borne diseases, we increase both our understanding of the dynamics of human risk, and the effectiveness of disease-prevention strategies that are used to minimize the impact of these pathogens on the health of Canadians (Lindsay, 2016). Vector surveillance can act as an early warning system for health officials (Hierlihy, 2017).

In Ontario, the provincial and federal governments worked with public health units to develop a Lyme disease case management tool to improve human disease surveillance in the province. The tool helps to standardize the collection of exposure data for human cases by local public health units. The data will be used to identify Lyme disease risk areas and effective public health interventions (PHO, 2016).

Prevention Programs

Surveillance programs contribute to the development of vector-borne disease prevention plans. Peel Region developed a plan that emphasizes WNV disease prevention in humans and protection of the environment through public education, source reduction and larviciding. The plan includes Lyme dis-

ease tick surveillance through examination of ticks submitted by residents to identify sites where black-legged ticks are present (Region of Peel, 2016).

Health authorities across Canada provide education on preventing and seeking timely treatment for Lyme Disease, WNV or other emerging vector-borne diseases. Winnipeg's strategy with communicable disease is mainly public education at the regional level. This targets both the public and health care providers (WRHA, 2019).

Policy Considerations: Urban Design and Vector-Borne Diseases

Planners are beginning to consider vector-borne diseases as they design urban communities. For instance, suburban landscape design such as the greening of urban spaces to reduce heat islands may increase contact with mosquitoes and ticks. Exposure may also be exacerbated by pools of stagnant water associated with particular types of landscape and drainage design in both urban and suburban areas. Planners are promoting urban design principles that enhance healthy living while minimizing opportunities for vector breeding (Ogden, 2016).

Health Professional Tips for Taking Action

- Be aware of local vector-borne risk areas in your community by contacting the local health authority.
- Provide guidance to your clients/patients about the risks and prevention activities associated with vector-borne diseases. Link them to Health Canada factsheets on WNV and Lyme Disease

Water Quality

Climate change is increasing health risks associated with the availability and quality of water in Canada. Health can be affected when water-borne illnesses results from contamination of food and drinking and recreational waters due to exposure to chemicals and microbes. This can result from many pathways including severe storms, floods, droughts, permafrost melt, sea level rise and landslides. Climate change may also increase health risks from cyanobacteria (i.e., blue-green algae) that can taint drinking and recreational waters (Canada, 2018).

Stormwater management plans are important in urban environments. Cities with large paved areas like surface parking lots and roads displace natural ground surfaces that can absorb heavy rainfall, thereby increasing stormwater runoff. The Township of Nipigon, Ontario's stormwater master plan includes the use of low-impact development strategies that rely on natural infrastructure, such as rain gardens, to reduce peak runoff during rain and melting events and to improve stormwater discharge quality (ICLEI Can-

Case Study: Disconnect to Protect Rebate Program

Stormwater is a large concern for the City of Barrie, especially as extreme rainfall events continue to become more frequent and intense, and mid-winter snowmelts become more commonplace. The impacts of this increased rainfall are compounded by the fact that many residents have downspouts or sump pump/foundation drains that are illegally connected to the sanitary system. These systems discharge directly into the Wastewater Treatment Facility and can cause sewage backup during extreme rainfalls.

The City's Climate Change Adaptation Strategy in March 2017 includes the recommendation to increase the uptake of the City's Disconnect to Protect Rebate Program. The City hosted a workshop with real-estate agents, home inspectors and plumbers in order to build partnerships for the communication and implementation of the program. As these participants return to their positions and companies, they'll have the information to share with their members and clients concerning Barrie's Disconnect to Protect program, bylaw compliance and possible rebates available. This was an advantageous way of capitalizing on existing networks to disseminate the information.

Adapted from ICLEI Canada, Case Study Series, 2018

ada, 2018). Guidelines were developed in Quebec to manage stormwater and reduce the urban heat-island effect by improving the design of surface parking lots. The guidelines include design criteria to expand the proportion of permeable to impermeable surface (Eyzaguirre, 2015).

Toronto's Wet Weather Flow Master Plan includes a focus on improving water quality at the City's swimming beaches. In addition, Toronto provides information to the public about beaches that are safe for swimming through the Blue Flag certification program (Toronto, 2017).

Communities are also planning for water supplies during times of drought. For instance, the City of Calgary conducts ongoing watershed monitoring and analysis to inform its water treatment operations and

Health Professional Tips for Taking Action

- Be aware of drinking water advisories issued by your local health authorities and provide guidance to clients about safe drinking water practices. This may be particularly important during or after extreme weather events such as heavy rain, droughts, and floods.
- Encourage your clients to be aware of beach swimming advisories. This information may be available through the local health authority or the Blue Flag certification program.
- Support local governments in the development of stormwater and drought management plans as well as related public education activities.

meet Calgary's water demand. Calgary also has a Water Efficiency Plan to protect its water supply and a water utility bylaw to implement water restrictions if needed during water shortage (Calgary, 2018).

Increasing Resiliency in Communities

Many communities are approaching climate change and adaptation actions through a resiliency lens. A resilient city is one in which institutions, communities, businesses and individuals have the ability to survive, adapt and grow in response to shocks or stresses that they may experience. The Whole Community Approach to Emergency Management engages emergency managers, government officials, community leaders, local organizations and residents to evaluate the needs of their community and determine ways to strengthen their assets and capacities. Strengthening public awareness of climate-related risks and disaster preparedness practices requires strong partnerships with community organizations working with vulnerable populations to increase health and safety throughout the city (Prairie Climate Centre, 2017).

The Rockefeller Foundation, through the 100 Resilient City project, is supporting the cities of Vancouver, Montreal, Calgary and Toronto in their efforts to build their resilience. Calgary has identified their shocks and stresses as aging infrastructure, blizzards, droughts, rainfall flooding, hazardous materials accidents, hurricanes/typhoons/cyclones, lack of affordable housing, shifting macroeconomic trends and

Case Study: Resiliency and Faith-Based Organizations

The presence of faith-based communities in the City of Brampton brought to light a new method of sharing information and spreading resilience across vulnerable communities. The Lighthouse Project is a city-wide initiative that aims to involve local Faith-Based Organizations in climate change adaptation. Its purpose is to assist vulnerable populations during emergencies and improve the City's ability to respond to extreme weather events.

The project included several steps: a study that identifies and maps vulnerable populations and faith-based centers around the City; forming relationships with leaders from Faith-based Organizations around the City; and hosting training workshops for Faith-Based Organization volunteers from different religious communities. The leaders who attended the training would then disseminate the information through their own religious communities using their preferred messaging, language and materials. The project helps to build capacity in communities, so that residents can help each other in emergencies.

Source: ICLEI Canada, Case Study Series, 2018

water insecurity. Montreal's resiliency strategy identifies citizens as being the heart of their approach and the need to mobilize neighbours to build united and safe communities (100 Resilient Cities, 2019).

Managing climate risks requires coordination between actions that result from an understanding of Canada's overall progress on adaptation and climate resilience, including to what extent collective action and investments are building adaptive capacity. There is a need to better understand the health impacts associated with climate change through monitoring and evaluating progress toward increasing the resilience of people, communities and health practitioners (Canada, 2018). The health sector can help build this knowledge base by collecting and analyzing data on physical and mental health impacts after extreme weather events.

Ice Fishing on Churchill River. Photo by Dan Tobias.

Health Professional Tips for Taking Action

- Health care professionals are important partners and leaders in responding to the health threat of climate change and building resiliency in their communities. Examples of actions that you can take to promote adaption efforts have been described throughout this module. You can partner with local governments, health authorities and community organizations to highlight the health threat of climate change and to advocate for action to be taken to reduce climate related risks. You can also volunteer with organizations involved in climate change programs, emergency preparedness and other related activities to be a resource to your neighbourhood. Finally, as the climate changes so do the health risks, you are encouraged to stay current by undertaking education/ training courses, as available.

References

- Alberta Health Services (AHS) (2017) "Wildfire Recovery Resources". https://www.albertahealthservices.ca/eph/Page14085.aspx
- Berry, P., Clarke, K., Fleury, M.D. and Parker, S. (2014): Human Health in Canada in a Changing Climate: Sector Perspectives on Impacts and Adaptation, (ed.) F.J. Warren and D.S. Lemmen; Government of Canada, Ottawa, ON, p. 191-232.
- Berry,P., Reeder,P., Brettle,M., Yusa,A., Health Canada (2016). "Draft Report - Climate Change and Health Resiliency Collaboration Workshop: A Primer on Climate Change and Health Resiliency".
- Calgary (2018). "Water Conservation". http://www.calgary.ca/UEP/Water/Pages/Water-conservation/Water-Conservation.aspx
- Canada (2019). Extreme Cold
- https://www.canada.ca/en/health-canada/services/healthy-living/your-health/environment/extreme-cold.html
- Canada (2018). Public Weather Alerts for Canada
- https://weather.gc.ca/warnings/index_e.html
- Canada - Natural Resources Canada (NRC) (2015a): Community Adaptation Case Studies, Preparing for Storm Surges, Annapolis Royal, NS". https://www.nrcan.gc.ca/environment/resources/publications/impacts-adaptation/tools-guides/16303
- Canada (2018), "Wildfires resources". https://www.getprepared.gc.ca/cnt/hzd/wldfrs-en.aspx
- Canada - Natural Resources Canada (NRC) (2015b): Community Adaptation Case Studies, "Wildfire Protection Plan, Kamloops BC". https://www.nrcan.gc.ca/environment/resources/publications/impacts-adaptation/tools-guides/16283
- Canada (2018). "Climate Change and Health Factsheets". https://www.canada.ca/en/public-health/services/health-promotion/environmental-public-health-climate-change/climate-change-public-health-factsheets-floods.html
- Conservation Council of New Brunswick (CCNB) (2018). "Stress and high water: How flooding impacts our mental health". https://www.conservationcouncil.ca/en/stress-and-high-water-how-flooding-impacts-our-mental-health/
- Casello, J., and Towns, W. (2017). Urban. In K. Palko and D.S. Lemmen (Eds.), Climate risks and adaptation practices for the Canadian transportation sector 2016 (pp. 264-309). Ottawa, ON: Government of Canada.
- Durham Region (2016). "Towards Resilience: Durham Community Adaptation Plan 2016"
- www.durham.ca/climatechange
- Ebi, K., & Mills, D. (2013). Winter mortality in a warming climate: A reassessment. Wiley Interdisciplinary Reviews: Climate Change. 4. 10.1002/wcc.211
- EcoHealth Ontario (EHO) (2017). "Greenspace and Ecohealth Toolkit: Improving Health and Wellbeing Through Greenspace Provision, Design and Access".
- http://www.ecohealth-ontario.ca/files/Greenspace_and_Ecohealth_Toolkit_2.pdf
- Eyzaguirre,J. (2015). The Impact of Canada's Regional Adaptation Collaboratives on Climate Adaptation. Prepared by ESSA Technologies Ltd. April, 2015.
- Guilbault,S., Kovacs, P., Berry ,P. and Richardson.G., eds.(2016). "Cities Adapt to Extreme Heat: Celebrating Local Leadership"
- https://www.iclr.org/wp-content/uploads/PDFS/cities-adapt-to-extreme-heat.pdf
- Homelessness Services Association of BC (HSC of BC) (2019). Extreme Weather Response Program
- https://vancouver.ca/people-programs/winter-response-shelter-strategy.aspx
- Hierlihy, C (2017) "Climate change and vector-borne illness". Canadian Public Health Association https://cpha.ca/climate-change-and-vector-borne-illness
- ICLEi Canada (2012) "Finding the Nexus: Exploring Climate Change Adaptation and Mitigation"
- http://www.icleicanada.org/images/icleicanada/pdfs/Nexus_Series_Adaptation_Mitigation_Final.pdf
- ICLEI Canada (2014). "Finding the Nexus: Exploring Climate Change Adaptation and Planning". http://icleicanada.org/images/icleicanada/Adaptation_Planning_Nexus_Final.pdf
- ICLEI Canada (2018). "Case Studies Series: Collaborative Implementation Groups".
- http://www.icleicanada.org/resources/item/261-collaborative-implementation-groups-case-study-series
- Lindsay LR (2016). "Present state of common vector-borne diseases in Canada. Can Comm Dis Rep 2016;42:200-1. The Public Health Agency of Canada https://doi.org/10.14745/ccdr.v42i10a03
- Metro Vancouver (2016). "Regional Food System Action Plan 2016" http://www.metrovancouver.org/services/regionalplanning/PlanningPublications/Re-

gionalFoodSystemActionPlan.pdf
- Moudrak N, Feltmate B. (2019). "Weathering the Storm: Developing a Canadian Standard for Flood-Resilient Existing Communities". Prepared for Standards Council of Canada and National Research Council of Canada. Intact Centre on Climate Adaptation, University of Waterloo.
- Ogden NH. Vector-borne disease, climate change and urban design. Can Comm Dis Rep 2016;42:202.
- Paterson.J., et al " Adaptation to climate change in the Ontario public health sector." BMC Public Health 12 (2012): 452.
- Prairie Climate Centre (2017)." Building a Climate-Resilient City". https://climateatlas.ca/building-climate-resilient-city
- Public Health Ontario (PHO) (Ontario Agency for Health Protection and Promotion). 2016. " Technical report: Update on Lyme disease prevention and control". Second edition. Toronto, ON: Queen's Printer for Ontario.
- Region of Peel (2016). "Vector-Borne Disease Prevention Plan". http://www.peelregion.ca/health/vbd/resources/pdf/2016-vbd-plan.pdf
- Société de transport de Montréal (STM) (2017). "Onset of cold weather: Taking Action to Support the Homeless in the Montreal Metro"
- http://stm.info/en/press/press-releases/2017/onset-of-cold-weather---taking-action-to-support-the-homeless-in-the-montreal-metro
- The Rockefellar Foundation – 100 Resilient Cities (2019). "Case Studies: Schoolyard Oasis Project, Paris France". http://www.100resilientcities.org/paris-schoolyards/
- Toronto 2018/2019 Cold Weather Response Plan (2019)
- https://www.toronto.ca/wp-content/uploads/2018/11/900a-Cold-Weather-Response-Plan-2018-19-AODA.pdf
- Toronto (2019). Low or No Heat/Other Vital Services in Rental Units
- https://www.toronto.ca/city-government/public-notices-bylaws/bylaw-enforcement/not-enough-heatother-vital-services/
- Toronto Public Health (TPH) (2018). "Heat Relief Services".
- https://www.toronto.ca/legdocs/mmis/2018/hl/bgrd/backgroundfile-121744.pdf
- Toronto Public Health (TPH) (2015). "A Climate of Concern: Climate Change and Health Strategy for Toronto" https://www.toronto.ca/legdocs/mmis/2015/hl/bgrd/backgroundfile-81509.pdf
- Toronto Public Health (TPH). (2015). "Green City: Why nature matters to health – An Evidence Review. Toronto, Ontario". https://www.toronto.ca/legdocs/mmis/2015/hl/bgrd/backgroundfile-83421.pdf
- Toronto Public Health (TPH) (2015). "Reducing Health Risk from Extreme Heat in Apartment Buildings" ,
- Board of Health, June 11, 2015. https://www.toronto.ca/legdocs/mmis/2015/hl/bgrd/backgroundfile-81510.pdf
- Toronto Public Health (TPH) (2015). "Update on Extreme Heat and Maximum Indoor Temperature Standard for Multi-unit Residential Buildings" Board of Health, November 16, 2015 https://www.toronto.ca/legdocs/mmis/2015/hl/bgrd/backgroundfile-85835.pdf
- Toronto: RAC Zone (2019). "RAC Success Stories". http://www.raczone.ca/success-stories-1/#successstory2-1-1
- Toronto (2017). "Environmental Progress Report: 2017" https://www.toronto.ca/ext/digital_comm/pdfs/environment-energy/2017-toronto-environmental-progress-report-environment-energy-division-city-of-toronto.pdf
- Vancouver (2019). Winter Response Strategy .
- https://vancouver.ca/people-programs/winter-response-shelter-strategy.aspx
- Vancouver (2018). "Healthy City Strategy – Four Year Action Plan: 2015-2018".https://vancouver.ca/files/cov/Healthy-City-Strategy-Phase-2-Action-Plan-2015-2018.pdf
- Watts,N., Amann,M., Arnell,N., et al. "The 2018 report of the Lancet Countdown on health and climat
- change: shaping the health of nations for centuries to come" The Lancet 392 (2018): 2479-2514.
- Winnipeg Regional Health Authority (WRHA). 2019. Personal Communication
- Zeuli, K.; Nijhuis, A.; Macfarlane, R.; Ridsdale, T. "The Impact of Climate Change on the Food System in Toronto". Int. J. Environ. Res. Public Health 2018, 15, 2344.

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