

HEALTH IN A CHANGING CLIMATE

Climate Change and Health: Impacts and Opportunities

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Climate change is the greatest environmental issue of our time; it is also the greatest health issue of our era¹. In a 2016 speech to the Human Rights Council of the United Nations, Margaret Chan, former Director General of the World Health Organization stated that it is the health impacts of climate change that are most important, affecting “the air people breathe, the water they drink, the food they eat, and the chances that they will get infected by a disease”².

Climate change poses unique challenges for local public health care providers and the communities we serve. Identifying and implementing appropriate responses is daunting. Communicating the risks and need to act on a range of complex issues to the public is difficult.

That is why, in 2014 we decided to include climate change as a priority within our strategic plan, to better explore and determine the roles and contributions that we can make to support the broader societal response.

We started by conducting a Climate Change Vulnerability Assessment, projecting the climate change impacts on health anticipated to occur within Simcoe Muskoka up to the year 2080.³ Our assessment also included a detailed array of recommendations to both mitigate and adapt to these

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projected climate change effects. **The health concerns in our study as well as the actions that we recommend are relevant throughout southern Ontario.**

From a health perspective the evidence is very clear; climate change must be both mitigated and adapted to. Mitigation means making changes in society that curb and ultimately end greenhouse gas emissions. But even if we stop burning fossil fuels today, we will still experience increasing climate change impacts for generations, so we must also plan for and adapt to the new climate reality.¹

What does this mean for your health? It is very significant because your health and risk of illness are intrinsically linked to our climate. Hotter temperatures may lead to more extreme heat events and associated illness, such as heat stress and

exhaustion.⁴ Changing weather patterns will mean more extreme weather events, including drought, flooding, winter storms, and forest fires.⁵ Not only will these events mean a higher rate of injury (during protection/evacuation of homes)^{6,7}, but will also impact mental health, including increased risk of depression.^{6,8,9}

Rates of food- and waterborne illness are linked to changing environments, through increased bacterial growth rates in warmer temperatures^{10,11}, and contamination from overland flooding in extreme storms.^{12,13} Currently, in Simcoe Muskoka we see more people affected by food- and waterborne illnesses during summer months³; this trend is expected to continue as temperatures rise.

Water quality will also be impacted due to potential increased bacteriological contamination and blue-green algae blooms.^{13,14,15,16} This will affect not only people reliant on private water systems for drinking water, but also the many who use our lakes for recreation.¹⁷

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Table1: Projected climatic changes and health impacts due to climate change in Simcoe Muskoka

CLIMATE-RELATED HEALTH IMPACTS	CLIMATIC CHANGES	PROJECTED HEALTH IMPACTS
 Extreme Temperatures	↑ Annual temperatures ↑ In the number of extreme heat events ↑ In tropical nights (above 20°C) from approx. 2 to over 40 by 2080s • Warmer winters will still have extreme cold events	• Heat-related illness, such as heat stress and exhaustion • Tropical nights increase risk of illness and death, especially for vulnerable populations • Lack of acclimatization during extreme cold events causing cold-related illness • Most vulnerable: seniors, children, individuals with cardiovascular illness and the homeless/under-housed
 Extreme Weather	• Changes to precipitation (↑ snow/rain in winter/spring, ↓ summer rain) ↑ Potential for flooding, drought, winter storms and forest fires • Poor air quality during forest fires ↑ Risk of poor indoor air quality from moulds after flooding	• Injuries related to extreme storms (lacerations, puncture wounds, etc.) • Respiratory illnesses due to poor outdoor (forest fires) and indoor (moulds) air quality • Most vulnerable: individuals with mobility issues and chronic illness, mental illness, socially isolated
 Food- and Waterborne Illness	↑ Contamination of food and water by bacteria ↑ Risk of blue-green algae blooms in lakes	↑ Potential for food- and waterborne illness (diarrhea and intestinal illness) • Exposure to toxins during algae blooms • Most vulnerable: seniors, children, those with compromised immune systems, individuals reliant on private water systems
 Food Security	• Changes in food availability due to impacts from extreme storms ↑ Food prices as availability changes	↑ Rates of food insecurity, especially for those already experiencing food insecurity ↓ In negative physical and mental health outcomes for those without sufficient food • Most vulnerable: individuals living on social assistance, single parent families, individuals living on low income

CLIMATE-RELATED HEALTH IMPACTS

CLIMATIC CHANGES

PROJECTED HEALTH IMPACTS

Vector-Borne Disease



- ↑ Ability of mosquito vectors to propagate
- ↑ West Nile virus proliferation in warmer temperatures
- ↑ Range within Ontario and Simcoe Muskoka of blacklegged ticks, the vector responsible for transmitting the bacteria which causes Lyme disease

- ↑ Risk of exposure to vectors which have the potential to carry **West Nile** virus and the bacteria responsible for **Lyme disease**
 - Most vulnerable: seniors, children, pregnant women, individuals with pre-existing conditions, individuals who spend time outdoors

Air Quality



- Warmer temperatures leading to pollutants such as ground-level ozone
- Changes to volume, timing, and distribution of pollens and moulds
- ↑ In aeroallergens due to increased productivity of plants and prolonged growing periods
- Poor air quality especially near road-ways due to traffic-related air pollutants

- ↑ Risk of respiratory illness, such as **asthma** and asthma-like symptoms
- ↑ Risk of impact for more people as plant production of allergens changes
 - Most vulnerable: children, seniors, individuals with respiratory illness, individuals who smoke tobacco, and the socially and economically disadvantaged

Exposure to Ultra-Violet Radiation



- ↑ Exposure to ultraviolet radiation due to temperature increases, as well as behavioural variables

- ↑ Rates of non-melanoma **skin cancers**
 - Most vulnerable: children, fair-skinned individuals, those with family history of skin cancer, those with history of sunburns

When it comes to climate change and health, everyone can be affected. For example, people who work or are active outside are at a greater risk of exposure and illnesses from extreme heat. Farmers and their workers, contractors and gardeners, and other workers who are outside in the heat for long periods will be at risk. Even healthy sports enthusiasts need to think twice before exercising during heat warnings. Ticks and mosquitoes will also be of increasing concern to everyone, as warmer temperatures extend the habitat and range of some insects, such as the blacklegged tick which carries the bacteria responsible for Lyme disease.

Anyone has the potential to unknowingly eat food or drink water contaminated with bacteria. However certain factors, such as age, gender, health status, and access to resources, put some people at greater risk for negative health outcomes, for example seniors and children.

As these health risks increase and our population ages, what can we do, as a public health unit, and as individuals, to ensure that our communities are resilient and able to adapt to our new reality? One of the principal ways we can reduce our carbon footprint and support resiliency for health is through promoting community level actions, such as building compact, complete

communities that allow individuals the choice to live, work and play in one community. Not only does this decrease carbon footprints, by reducing dependency on vehicles and promoting healthy choices such as active and public transportation; it also enhances social capital, allowing individuals the opportunity to become involved in their community and enhancing social change.¹⁸

Much of what is needed to adapt to climate change will also help to mitigate it, while additionally being directly beneficial to our health. Tree coverage and green space within and between our communities is an excellent example of this. Green spaces absorb carbon dioxide (a major greenhouse gas) thus supporting mitigation. They also contribute to adaptation by providing protection against heat, skin cancer, reducing storm water runoff and associated flooding, and improving air quality. Research is also increasingly demonstrating that local exposure to green, natural spaces directly improves physical and mental health, reduces stress and anxiety, and encourages physical activity.^{19,20,21} Investing in the protection and enhancement of green spaces, such as Ontario's Greenbelt, conservation areas, municipal forest tracts, agricultural lands, and urban forests can support mitigation and adaptation, while at the same time promoting healthier communities and residents.^{22,23}

While there are many actions that communities can take, we can all play a part. Small changes to routines, such as walking or riding a bike instead driving for short distances, or reducing the amount of meat consumed in your diet, can equate to large carbon reductions while also being healthy life choices. Actions can also be taken to ensure that you are prepared for the changing weather, such as enhancing flood resiliency on your property through the installation of rain gardens and rain barrels. While there are many physical and mental benefits to spending time outdoors, you can make sure you reduce the risk to your health by taking protective measures, such as utilizing sunscreen and insect repellent.

While climate change is the defining public health issue of our time, it has also been called our greatest public health opportunity.²⁴ This is because the kinds of changes needed to address climate change are also needed to improve health today – changes that clean the air, bring walking and cycling into our

daily lives, improve pedestrian safety and thus increase freedom of movement for children, allow for seniors to more readily 'age in place' and remain housed in communities of their choice, and bring us together to socialize with family, friends and neighbours in beautiful outdoor green spaces. Enhancing tree coverage and greenspace within and between our communities (including Ontario's Greenbelt) is essential to this. These would (and with our collective wisdom and action, will) be a great blessing to our health and the quality of our lives, while also being essential to our response to climate change.¹⁸

In the end it is up to us all to insist on these changes being made, to understand and visualize how our communities and our way of life must change for the better, and to hold our community decision makers accountable to make it so.

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