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A Changing Climate: Assessing health impacts & vulnerabilities due to climate change within Simcoe Muskoka

Summary Report for Municipalities & Stakeholders

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Overview

Climate change is impacting the health of Canadians, and is expected to have a significant effect on public health throughout the twenty-first century. Potential health impacts are varied and widespread, and have been identified as direct (increased range and transmission of infectious diseases; health impacts of air pollution and temperature stress; reduced access to safe water; injuries related to extreme weather events; food insecurity) and indirect (psychosocial impacts; population displacement). While there are global, national, provincial, and local implications, public health units are uniquely positioned within their communities to build understanding and reduce climate-related health impacts.

In 2014, the Simcoe Muskoka District Health Unit (SMDHU) identified climate change as an issue of public health importance for the organization; an action plan was created in 2015 that supports the reduction of climate-related health impacts. A key deliverable of the action plan was the completion of a climate change and health vulnerability assessment. The purpose of the climate change and health vulnerability assessment was three fold, and included: identifying health outcomes expected due to climate change; determining populations vulnerable to these outcomes; and identifying actions to mitigate harms due to climate change in the future.

This report highlights the findings from the SMDHU climate change and health vulnerability assessment. Climate projections (including temperature and precipitation) for the near-term (2020s), short-term (2050s), and long-term future (2080s) are provided. It examines the expected health impacts due to climate change for six climate-sensitive categories, including:

- temperature extremes;
- extreme weather events and natural hazards;
- air quality;
- contamination of food and water;
- infectious disease transmission by insects and ticks; and
- exposure to ultraviolet radiation

Additionally, the report provides information on projected climate change impacts for the region based on exposure (the probability of an individual or community being exposed to a climate-related health issue), sensitivity (the degree to which individuals or communities are affected by the health impacts of climate change), and adaptive capacity (the ability of an individual or community to adapt to the changing environment). Results from stakeholder engagement surrounding climate change mitigation and adaptation strategies are also presented. When possible, data is presented within a Northern and Southern Region context, to identify any differences due to geographical regions within Simcoe County and the District of Muskoka.

Projected Climate

Climate projections identify that climate change will alter future temperature and precipitation patterns within Simcoe Muskoka. Specifically:

Temperatures

- annual mean temperatures are expected to rise by approximately 1°C (2020s), 3.5°C (2050s) and 5.7°C (2080s) above baseline temperatures (1990s);
- the largest mean temperature increases above baseline (1990s) are expected to occur in winter with expected increase of:
 - 2°C (2020s)
 - 5°C (2050s) and
 - 7.5°C (2080s)
- Mean temperature increases are also expected in summer:
 - 1°C (2020s)
 - 3°C (2050s) and
 - 5°C (2080s)

Precipitation

- annual precipitation levels are expected to increase, with the largest increases occurring during the winter and spring months;
- summer precipitation levels are expected to decrease, leading to potential drought during these warmer, dryer months; and
- precipitation events are projected to occur less frequently, but as more extreme downpours when precipitation events occur.

Potential Health Outcomes of Climate Change in Simcoe Muskoka

As temperature rise and precipitation patterns change, the potential for detrimental health outcomes to occur will increase throughout Simcoe Muskoka. Highlighted below are factors which have the potential to increase climate-related health outcomes:

Extreme Temperatures

- An increase in the number of extreme heat events is expected within Simcoe Muskoka, thus increasing potential for heat-related illness.
- Urban heat island (UHI) effect will increase exposure in urban centres. Urban heat islands will become more prominent as areas within Simcoe Muskoka are developed and urbanized.
- While average winter temperatures are projected to become milder, there is the potential for extreme cold events to impact populations due to a decreased acclimatization to winter weather.

- Access to home cooling/air conditioning, a strategy to adapt to extreme temperatures, is highest among Simcoe Muskoka residents who own their own home. Tenants or individuals in the lowest income category having the least access to home air conditioning.

Extreme Weather

- An increase in the number and intensity of extreme precipitation events, and associated flooding, is expected by 2080.
- Increases in thunderstorms has the potential to increase the number of forest fires caused by lightning. Smoke from forest fires can cause severe impacts on respiratory illnesses, especially for those who already suffer from chronic conditions. Other issues such as injuries (burns) and mental health impacts for those involved, can be expected.
- Winter storms will become more prevalent, with increases in precipitation in the form of snow or rain. Increases in ice and snow can impact mobility, making it more difficult to walk or drive throughout a community. It can also lead to extreme storms causing electrical failures, injuries and fatalities.
- Drought periods are expected due to decreases in summer precipitation levels. Drought conditions have the potential to increase respiratory issues (due to dry, dusty conditions). Degrading environmental conditions due to drought can also have economic impacts which in turn impact mental health.

Air Quality

- While air quality has been improving across the province, climate change has the potential to increase levels of air pollutants, such as ozone, within Simcoe Muskoka, which will increase risk of respiratory illnesses
- Climate change is expected to impact on the volume, timing, and distribution of pollens and moulds within the environment; increases in aeroallergens are expected due to increased productivity of plants and prolonged growing periods. Individuals who suffer from allergies will be increasingly impacted by these changes in pollen patterns.

Contamination and Availability of Food and Water

- Increased temperatures may lead to increased foodborne illnesses, due to an enhanced ability for pathogens to survive, and a rise in human activities during warmer months that increase risk of food contamination (i.e. barbeques).
- Impacts to food access can be expected, as climate change weather events (temperature, flooding, drought, and extreme storms) interrupt local and global food production systems.
- Water quality throughout the region will be impacted through both increased potential for contamination by bacteriological agents, as well as increases in blue-green algae blooms.

Vector-Borne Disease

- Increased risk of West Nile virus is anticipated, due to an enhanced ability of the specific mosquito vectors to propagate, as well as increasing viral proliferation in warmer temperatures.

- Lyme disease is caused by blacklegged ticks that are infected with *Borrelia burgdoferi* bacteria. Climate change is already expanding the range of blacklegged ticks and increasing the potential for infections of Lyme disease.

Exposure to UV Radiation

- Temperature increases, as well as behavioural variables, are expected to impact levels of ultraviolet radiation exposure, increasing rates of non-melanoma skin cancers.
- Basal cell carcinomas are projected to increase by 7.8% (2050s) and 13.1% (2080s)
- Squamous cell carcinomas are projected to increase by 14.8% (2050s) and 24.8% (2080s).

Vulnerable populations

While climate change has the potential to impact all residents of Simcoe Muskoka, certain individuals may be more sensitive and more likely to have negative health consequences from climate change. Sensitivity can be impacted by both physiological and social attributes, such as age, gender, chronic conditions, income level, and other socioeconomic variables.

Certain individuals, such as children, seniors, individuals living in low income, the homeless and precariously housed, and individuals with pre-existing chronic conditions tend to be the most sensitive to climate-related health outcomes. Within Simcoe Muskoka, the populations which may be most greatly impacted by climate change include:

- **Aging population:** In 2015, children (ages 0-9 years) made up 10% (54,593) of the Simcoe Muskoka population in 2015. While the population is expected to increase by 2041, the proportion of children is expected to decrease to 9%. Alternatively, in 2015 just over 99,100 seniors (ages 65 years and older) resided within Simcoe Muskoka (18% of the population). By 2041 the proportion of seniors is expected to increase dramatically, to 30% of the population, surpassing 218,800 individuals.
- **Individuals living on Low Income:** Approximately 12%, or 59,000 people within Simcoe Muskoka, live on low income. Access to appropriate income is a main contributor in an individual's ability to adapt to climate change. For example, as food becomes more expensive due to rising temperatures and extreme storms, having enough income to meet daily needs and pay for increasing food prices is a key way people can adapt. Currently in Simcoe Muskoka, 12% of households have indicated they have experienced food insecurity at least once in the past 12 months; food insecurity is highest among single-parent families, with 24% reporting some level of food insecurity.
- **Individuals with Chronic Conditions:** Individuals living with chronic conditions are also more susceptible to the health impacts of climate change. This may be because they have conditions that can be exacerbated due to our changing climate (for example, respiratory illnesses exacerbated by heat or pollen), or because their medications can be impacted with changing climate, as can occur during extreme heat. Others, including those who are socially isolated, have mental illness, or have mobility issues, may not be able to appropriately react during emergency weather events. As our population ages and the number of individuals with chronic conditions increases, climate change will have increasing impacts for our residents.

Mitigation and Adaptation

Strategies have been implemented across each department of the SMDHU to help mitigate or adapt to the impacts listed above. Some of these strategies include: the implementation of an Extreme Temperature Warning and Information System which provides notification of heat and extreme cold warnings; surveillance of vectors that can spread illnesses such as West Nile virus, Eastern Equine Encephalitis, and Lyme disease; monitoring of air quality levels and the notification of the public when air quality deteriorates; working to enhance the sustainability of food systems throughout the region; monitoring recreation and drinking water quality; and many others.

Municipalities and community partners are also implementing climate change mitigation and adaptation strategies throughout the region, which support programming offered by public health. At the end of each health-related chapter is a chart that summarizes both existing and potential actions and partnerships. Actions which help to decrease energy use, enhance green spaces, reduce waste, management of water resources, and planning for our changing climates, all help to ensure the safety and health of our populations in the future. Further prioritization of climate change programming that supports vulnerable populations will enhance adaptive capacity among those most greatly affected by climate change.

Moving Forward

Moving forward, SMDHU will utilize the information gathered within this assessment to support planning for Phase II of the agency's Climate Change Action Plan. This will include the development and implementation of a stakeholder engagement plan, internal staff education plan, and knowledge translation plan to support communities and health units related to climate change assessments within their own regions. Some of the actions to be implemented within the phase include the creation of resources for the public that help to illustrate the importance of climate change action from a health perspective, engagement plans to increase knowledge of the public and community partners of the linkages between climate change and health, and the prioritization of further internal mitigation and adaptation actions to decrease future health-impacts of climate change.

For municipalities and community partners, the findings of this report can support internal climate change planning and provide additional health-related rationale for actions related to climate change mitigation and adaptation. The health unit will also be launching an interactive GIS tool, which will help to identify the climate change threats within specific geographic areas. Moving forward, we hope to engage with municipalities and organizations to support climate change mitigation and adaptation planning, which will enhance our communities' resiliency to climate change in the years ahead.