2024

Executive Summary: Climate Change and Health in Halton Region

Indigenous Land Acknowledgment

Boozhoo, She:kon , Tanshi, Greetings!

Halton Region acknowledges the Treaty Lands of the Mississaugas of the Credit First Nation as well as the Traditional Territory of the Haudenosaunee, Huron-Wendat and Anishinabek on which we gather.

In stewardship with Mother Earth and the enduring Indigenous presence connected to these lands we acknowledge the Indigenous Nations of the past, present and future.

In the spirit of ally-ship and mutual respect, we will take the path of Truth and Reconciliation to create change, awareness and equity as we strive to elevate the collective consciousness of society.

Miigwetch, Nia:wen, Marsi, Thank you

Positionality Statement

In this report we refer to First Nations, Inuit, and Métis peoples, racialized, gender diverse and 2SLGBTQI+ populations, persons with disabilities, and people who experience various health conditions or low-income as priority populations. We acknowledge that all individuals have unique, intersectional experiences and perspectives. As Halton Region employees, who may also share some of these identities, we are aware of the power dynamics that exist among those we serve. We recognize that as employees in Regional Government, our privilege and power impact our work. We understand that our social locations can provide us with advantages in specific contexts and that we are part of a larger system. To address this, we will continually reflect on our own positionality and biases and use our privilege to advocate for equity and the needs and rights of everyone we work with and serve.

Executive Summary

In the fall of 2023, Halton Regional Council endorsed the 2023-2026 Corporate Climate Action Plan and Corporate Net Zero target of 2045. The Corporate Climate Action Plan is the foundation that guides Halton Region's work to accelerate its climate response. The plan includes four themes to support the Region's climate change actions – Climate Ready, Climate Lens, Climate Finance, and Engagement and Advocacy. As a recommended action under the Climate Ready theme, Halton Region Public Health completed the Climate Change and Health in Halton Region report. The primary focus of the report is to identify priority populations, understand patterns of climate-related vulnerability, provide baseline health information, and outline existing adaptive capacity.

All Canadians can be affected by climate change, and the distribution of these impacts and related health risks is not uniform.[1] First Nations, Inuit, and Métis peoples, racialized populations, gender diverse, 2SLGBTQI+, low-income individuals, older adults, children, and individuals with chronic health conditions often experience greater health impacts of climate change.[2]

Climate change is already affecting the health of Canadians both directly and indirectly. Direct impacts include injuries and loss of life from extreme temperatures and severe weather events.[3] Indirect impacts include water contamination after intense rainfalls, exacerbated cardio-respiratory issues related to poor air quality, and increased risks from food-borne and vector-borne diseases. Climate change is predicted to increase the severity and frequency of events and create health threats in areas where they have not typically occurred. Events can occur simultaneously resulting in compounding or cascading health impacts.[4]

The Climate Change and Health in Halton Region report covers seven key climate-related health impact categories of concern: extreme temperature; UV radiation; extreme weather; food- and water-borne illnesses; food systems and food security; air quality; and vector-borne disease.

The six Climate Change and Health in Halton Region highlight reports below provide a high-level overview of these impact categories. The full Climate Change and Health in Halton Region report is available upon request by contacting 311 or 905-825-6000 or by emailing accesshalton@halton.ca.

For more information on Halton Region's climate change initiatives visit **halton.ca**.

Endnotes

[1] Berry, P., & Schnitter, R. (Eds.). (2022). *Health of Canadians in a Changing Climate: Advancing our Knowledge for Action*. Ottawa, ON: Government of Canada.
[2] Berry, P., & Schnitter, R. (Eds.). (2022). *Health of Canadians in a Changing Climate: Advancing our Knowledge for Action*. Ottawa, ON: Government of Canada.
[3] Public Health Agency of Canada. (2018). *Climate change and public health fact sheets*. Canada.ca. https://www.canada.ca/en/public-health/services/health-promotion/environmental-public-health-climate-change/climate-change-public-health-factsheets.html
[4] U.S. Global Change Research Program. (2016). *The Impacts of climate change on Human health in the United States: a scientific assessment*. https://health2016.globalchange.gov/

Extreme Temperatures in Halton

Climate change & health

Climate change

is already altering temperatures across Canada, with further warming expected.[1] Extreme hot temperatures will become more frequent and more intense, increasing the severity of heatwaves and contributing to increased drought and wildfire risks.[1]

Extreme Temperature Projections

Extreme heat

In Canada, extreme heat events have the most well documented health consequences of all other natural hazards[1]

By the 2080s, it is projected that Halton will have a hottest day temperature of approximately 40ºC (Figure 1)[2]

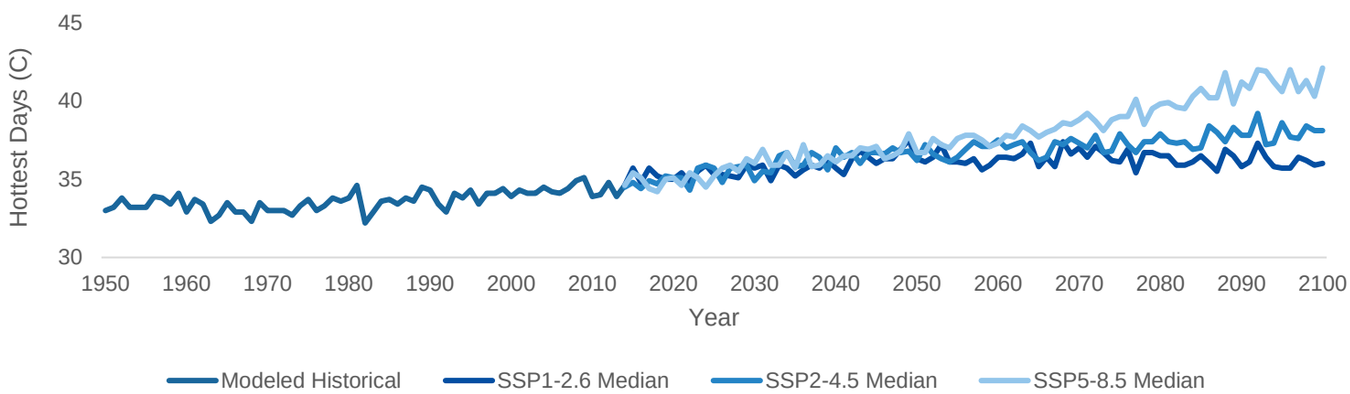

Figure 1. Hottest day annually, Halton Region, 1950-2014 Historical data, 2015-2100 SSPs projections

In 2014, there were 7 days where temperatures were above 32 degrees Celsius in Halton. By the 2080s, it is projected that there will an over 8-fold increase in average number of days per year above 32ºC in Halton (Figure 2)[2]

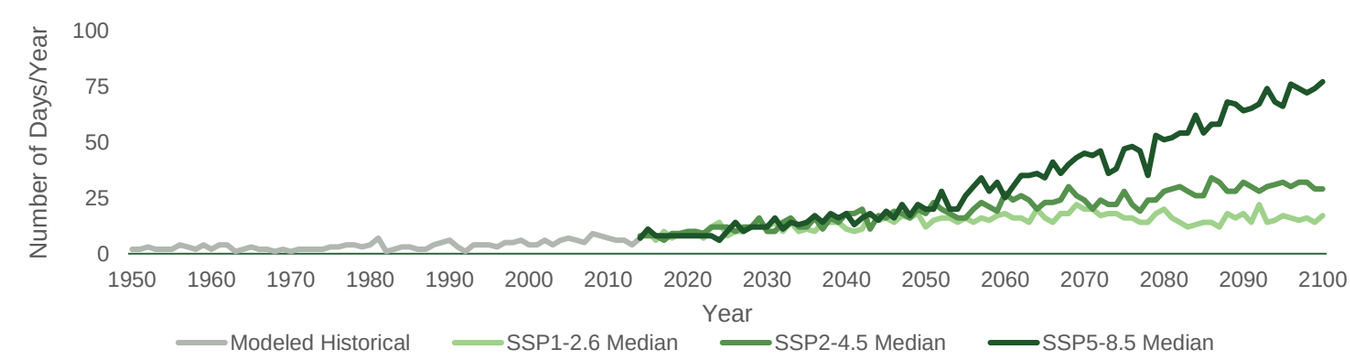

Figure 2. Number of days in a year over 32ºC, Halton Region, 1950-2014 Historical data, 2015-2100 SSPs projections

Extreme cold

Despite the overall warming trend that will result in fewer cold events, it is important to adequately prepare for and manage the health impacts of extreme cold. Climate projections indicate the number of cold days (where temperatures are below -15°C) is expected to decrease from approximately 15 to 18 days per year (baseline period 1981-2010) to between 0 (SSP5-8.5) and 9 (SSP1-2.6) days per year by the 2080s.[2]

Figure 3 shows a decreasing trend of annual cold days in Halton. It is projected that the annual coldest day temperature will decrease from approximately -20 degrees Celsius to -11 degrees Celsius by the 2080s.[2]

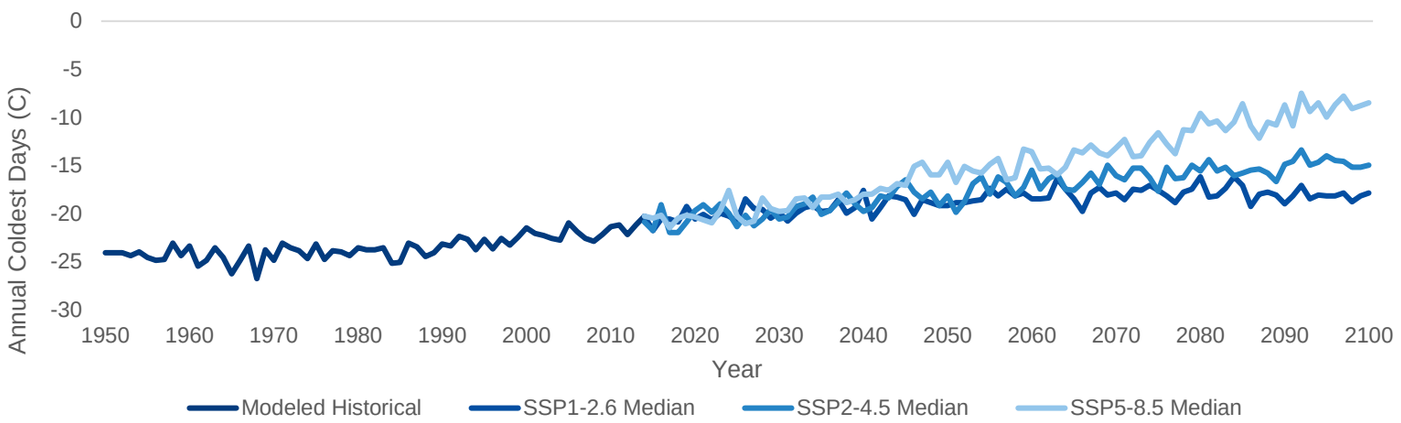

Figure 3. Coldest Day Annually, Halton Region, 1950-2014 Historical data, 2015-2100 SSPs Projections .

Health Outcomes

The effects of extreme temperatures in Halton

Rising temperatures are predicted to result in increases in direct heat-related illnesses and deaths (especially for outdoor workers), cardiovascular disorders (especially for older adults and people with chronic diseases), emergency department visits for mental health problems, and perinatal care complications (such as miscarriage, premature birth, or congenital complications).[1]

Exposure to extreme heat has also been found to exacerbate pre-existing health conditions affecting the cardiac, respiratory, and cerebrovascular systems, resulting in increased emergency room visits and hospital admittance.[3]

Crude rates of ED visits for myocardial infarction in Halton hospitals have remained relatively stable over the last 10 years, at an average rate of 50 cases per 100,000 population (Figure 5). However, high temperatures can increase the workload of the heart, particularly in those with pre-existing conditions, which means we may see an increase in myocardial infarction rates as annual temperatures increase over time.[3]

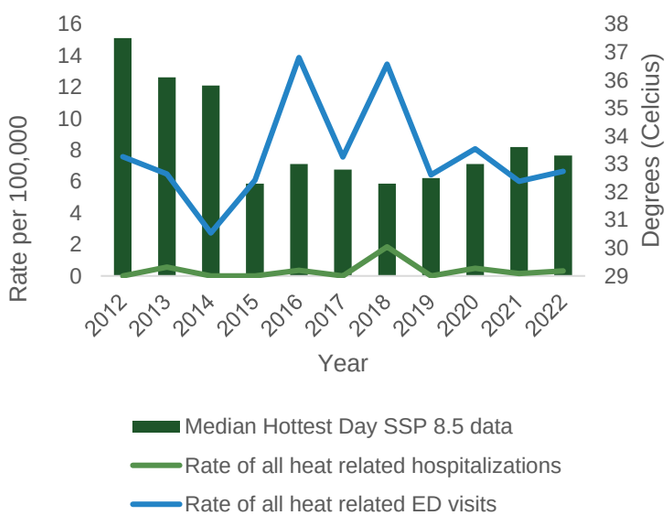

Figure 4. Crude rates (per 100,000 people) of emergency department visits and hospitalizations for heat-related illnesses and extreme heat occurrences in Halton hospitals, 2012-2022

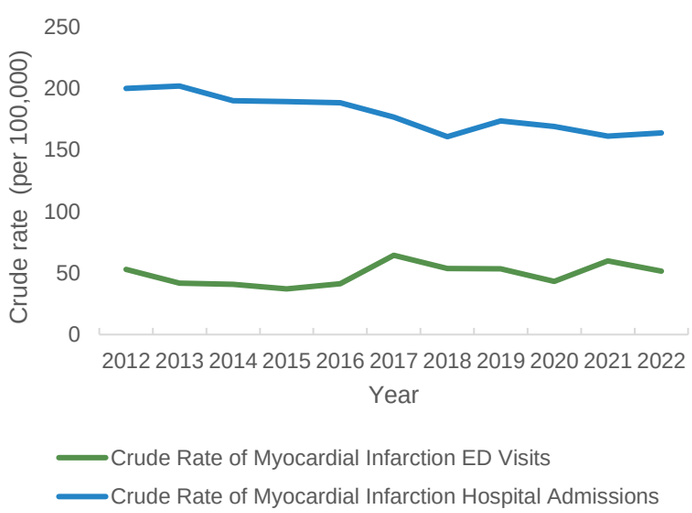

Figure 5. Crude rates (per 100,000 people) of emergency department visits and hospitalizations for myocardial infarction in Halton hospitals, 2012-2022

Priority Populations

Adults over the age of 65 are at a greater risk of developing heat-related illness compared to younger adults, for a variety of reasons. Older adults are less able to regulate body temperature through sweating and may have reduced thirst sensation, sweating, and fitness levels, making them more sensitive to higher temperatures and dehydration.

Children, particularly those under the age of 1, are at an increased risk of heat-related illness due to their limited ability to regulate body temperature and to respond appropriately to stress.

People who are physically active outdoors (e.g., marathon runners, recreational athletes, people who walk or bike) have a greater environmental exposure to extreme heat.

People with pre-existing medical comorbidities (e.g., cardiac disease, on certain medications, pregnancy, etc.) may be more prone to heat-related illness.

Actions

Ways to prevent heat-related illness include:

- Paying close attention to how you feel while outside in the heat
- Checking-in regularly, by phone or video, with susceptible family, friends and neighbours
- Planning outdoor activities during cooler parts of the day
- Seeking shade from trees or shade structures when spending time outdoors
- Closing awnings and curtains to block out the sun
- Avoiding sun exposure by wearing a wide brimmed hat or using an umbrella
- Wearing loose-fitting, light-coloured clothing made of breathable fabric
- Drinking plenty of cool liquids, especially water, before you feel thirsty
- Preparing meals that do not require cooking in the oven
- Taking cool showers or baths
- Never leaving people or pets in parked vehicles

Did you know?

Warming and Cooling Centres provide space for residents to cool down during Heat Warnings and warm-up during Cold Warnings. Cooling Centres and Warming Centres in Halton Region are free public spaces operated by the local municipalities that include libraries, community centres, and other municipal buildings. In addition to these spaces, splash pads and pools offer opportunities for residents to take a break from the heat. See your local municipality's website for more information.

Data Notes

- Shared Socio-economic Pathways (SSPs) describe possible socio-economic conditions, land-use changes, and other human-caused climate drivers that influence greenhouse gas emissions, thus affecting Radiative Forcing, which describes the amount of excess energy trapped within the Earth's climate system due to the variation of climate change factors. The SSPs also describe socio-economic characteristics that influence greenhouse gas emissions (and subsequently, Radiative Forcing) in a standardized way, given an indication of the societal pathways associated with different levels of warming.[4]

- The period from 2041-2070 is referred to as the 2050s, while the period from 2071-2100 is referred to as the 2080s.

Under each family of scenarios there can be multiple emissions scenarios that lead to different levels of Radiative Force. The three future scenarios explored in this report are the three hosted on ClimateData.ca:

- SSP5-8.5 – high emissions
- SSP2-4.5 – medium emissions
- SSP1-2.6 – low emissions

References

1. Gosselin, P., Campagna, C., Demers-Bouffard, D., Qutob, S., & Flannigan, M. (2022). Natural Hazards. In P. Berry & R. Schnitter (Eds.), Health of Canadians in a Changing Climate: Advancing our Knowledge for Action. Retrieved from https://changingclimate.ca/health-in-a-changing-climate/chapter/30/#:~:text=Heatwaves%2C%20major%20floods%2C%20wildfires%2C,economic%20disruption%2C%20or%20environmental%20degradation

2. Climate Data.(n.d.) Halton, ON. Retrieved from https://climatedata.ca/explore/location/?loc=FBLID&location-select-temperature=tn_min&location-select-precipitation=r1mm&location-select-other=tr_20

3. Ebi, K. L., Capon, A., Berry, P., et al. (2021). Hot weather and heat extremes: health risks. Lancet, 398(10301), 698–708. https://doi.org/10.1016/s0140-6736(21)01208-3

4. Climate Data. (n.d.) Understanding Shared Socio-economic Pathways (SSPs). Retrieved from https://climatedata.ca/resource/understanding-shared-socio-economic-pathways-ssps/

This highlight report provides a high-level overview of this impact category. The full Climate Change and Health in Halton Region report is available upon request by contacting 311 or 905-825-6000 or by emailing accesshalton@halton.ca.

For more information on Halton Region's climate change initiatives visit halton.ca.

Last updated: December 2024

Ultraviolet Radiation Exposure in Halton

Climate change & health

Climate change

including through variations in ozone and cloud cover, is expected to impact ultraviolet radiation (UVR) levels at the Earth's surface.

Overexposure to UVR is associated with health effects, the most severe of which are skin cancers, such as malignant melanoma.

Future of UVR

Climate change could potentially increase human exposure to UVR as a result of behavioral changes due to a warmer climate in which individuals spend more time outdoors.

Sun Exposure

In Halton, the trend in melanoma incidence has fluctuated from 2012 to 2018. Melanoma rates increased in 2018 with 33.6 cases per 100,000 people. Rates remain higher among males compared to females in Halton. The development of melanoma is also more common as people grow older.

Studies have found an increased risk for melanoma among people of higher socioeconomic status. However, there is an increased risk for advanced stages of melanoma among people of lower socioeconomic status. This may represent inequities in access to dermatology consultations.[1]

Racialized groups tend to be at lower risk for skin damage as a result of exposure to solar UVR due to their skin tone, but unfortunately when skin cancer does develop, it is often in a later stage and worse prognoses when diagnosed.[2]

Table 1: Rate of Melanoma per 100,000, for all ages, by sex, Halton Region, 2012-2018, Ontario Cancer Profiles

Year	All Sexes	Males	Females
2012	31.7	39.0	25.3
2013	27.3	31.5	24.6
2014	32.1	38.1	27.3
2015	33.3	40.4	28.1
2016	29.8	39.0	22.4
2017	27.6	30.7	25.0
2018	33.6	38.8	29.1

Outdoor workers can have greater exposure to UVR than individuals who work indoors.[3] Over 1.5 million Canadian workers are exposed to solar UVR at work, and almost 60% of these workers spend 75% or more of their workday outdoors ("high exposed").[4] The largest occupational groups in this high exposed category include farmers, construction labourers, and landscapers.[5]

Did you know?
Younger children have more skin relative to body mass than adults, so their sunburns can be very serious.[6] Children also rely on their caregivers to protect them from exposure to solar UVR, including applying sunscreen, wearing protective clothing, and utilizing shade.[6] Burns can lead to skin cancer when children get older.[7]

Action

Individual actions to reduce exposure to UVR include the following SunSense behaviours:

- Check the UV Index everyday and take extra precautions to protect skin on days when the UV Index reaches 3 or more, including reducing time in the sun between 11 a.m. and 3 p.m. (when the sun's rays are at their strongest), or any other time of the day when the UV Index is 3 or more.
- **Slip** on clothing made from tightly woven fabric or look for clothing that is labelled with UV protection factor to cover up as much skin as possible.
- **Slop** on a broad-spectrum sunscreen with an SPF of 30 or higher.
- **Slap** on a wide-brimmed hat that covers the head, face, ears and neck.
- **Seek** shade. If your shadow is shorter than you, find some shade, because this means the sun's rays are at their strongest.
- **Slide** on sunglasses with UVA and UVB protection in a wraparound style.

References

1. Li, H. O., et al (2020). Socioeconomic Status and Melanoma in Canada: A Systematic review. Journal of Cutaneous Medicine and Surgery, 25(1), 87–94. https://doi.org/10.1177/1203475420960426

2. American Academy of Dermatology. (n.d.). Skin cancer in people of color. Retrieved from https://www.aad.org/public/diseases/skin-cancer/types/common/melanoma/skin-color

3. Glanz K. et al 2007, Surdu S. et al 2013, and O'Riordan DL et al 2008 as cited in Buse, C. et al. (2022). Climate Change and Health Vulnerability Assessment for Waterloo Region, Wellington County, Dufferin County, and the City of Guelph. Waterloo and Guelph, ON: Region of Waterloo Public Health and Wellington-Dufferin-Guelph Public Health Unit. Retrieved from https://www.regionofwaterloo.ca/en/health-and-wellness/resources/Documents/Climate-Change-and-Health-Vulnerability-Assessment.pdf

4. Peters, C. E., Nicol, A. M., & Demers, P. A. (2012). Prevalence of exposure to solar ultraviolet radiation (UVR) on the job in Canada. Canadian journal of public health - Revue canadienne de sante publique, 103(3), 223–226. https://doi.org/10.1007/BF03403817

5. CAREX Canda. (n.d.). Solar UV Radiation Occupational Exposures. Retrieved from https://www.carexcanada.ca/profile/uv_radiation_solar-occupational-exposures/

6. Health Canada. (2022). Sun safety tips for parents. Retrieved from https://www.canada.ca/en/health-canada/services/sun-safety/sun-safety-tips-parents.html

7. Skin Cancer Foundation. (2023). Sunburn & Your Skin. Retrieved from https://www.skincancer.org/risk-factors/sunburn/#:~:text=Even%20one%20blistering%20sunburn%20in,there%20is%20no%20obvious%20burn

This highlight report provides a high-level overview of this impact category. The full Climate Change and Health in Halton Region report is available upon request by contacting 311 or 905-825-6000 or by emailing accesshalton@halton.ca.

For more information on Halton Region's climate change initiatives visit halton.ca.

Last updated: December 2024

Extreme Weather in Halton

Climate change & health

Climate change

Climate change

is any significant long-term change in current normal climate conditions, such as temperature, precipitation, extreme weather events, snow cover, and sea level.

Extreme weather events

include unexpected, unusual, unpredictable, severe, or unseasonal weather events such as floods, ice storms, snowstorms, hot spells, and cold spells.

Extreme precipitation events overall are projected to increase in intensity by 6 per cent to 7 per cent for each degree Celsius increase in temperature.[1]

Climate change also increases the likelihood of consecutive extreme weather events.

What are the impacts of extreme weather events that can occur in Halton?

Flooding can result in injuries, drowning, hypothermia, and electrocution. Floodwaters can become contaminated from various sources (including sewage overflow), leading to gastrointestinal and skin disease as well as wound infections.

While winter storms are expected to diminish in their frequency due to an overall warming trend across Halton Region, the intensity and duration of extreme snowfall events can still create significant impacts on health and social service delivery.

The area burned by wildfires in Canada is increasing, doubling from the 1970s to the 2000s mainly due to climate change.[2] Wildfire smoke contains many different air pollutants, most notably fine particulate matter that can penetrate deep into lungs. [3]

Who is most at risk in Halton?

Older adults may be more physiologically sensitive to extreme weather. They can experience falls from slipping on ice.[4] Falls are the most common cause of injury and a leading cause of hospitalization among older Canadians.[4] Older adults account for high levels of morbidity and mortality from extreme weather related to climate change.[5]

Populations that live in floodplains can be differentially exposed to risks associated with extreme rainfall events where flood risks are higher. Low-income households living in areas prone to flooding may not have the ability to relocate, which increases their risk of exposure to flood hazards. See your local municipality's website for more information.

Health effects from extreme weather events

- Injuries, illness, and death from violent storms, floods
- Mental health and stress-related illness
- Displacement and over-crowding in emergency shelters
- Food and waterborne illness from contaminated food and water sources
- Hunger and dehydration due to food and water shortages/contamination

Historical Population Exposure to Extreme Weather Events

Rainstorms and freezing rain result in pedestrian and motor vehicle-related injuries and other health risks due to infrastructure failure (such as power outages).

The effects of climate change can already be felt in Halton. The frequency and severity of windstorms, flooding, ice storms, and snowstorms have been increasing in Halton and globally.

Ice storm

December 21st 2013 - January 1st 2014

Southern Ontario experienced a severe freezing rain event that resulted in up to 3cm of ice accumulation.[6]

- The Region of Halton incurred over $3.5 million in costs related to the ice storm.[7]
- Over 41,100 residents were without power for two or more days, and some residents for up to eight days.[7]

Flood

August 4th 2014

The city of Burlington experienced severe rainfall resulting in two months worth of rain (~20 cm) in less than 8 hours.

- Over $90 million of insured damage costs[8] were incurred, and much more in partial or uninsured costs.
- The Region received approximately 6,000 calls including roughly 3,500 related to basement flooding.[9]
- The average cost of a flooded basement in Canada is $40,000.[10]

Flood

July 15-16th 2024

Halton experienced severe rainfall.

- In Halton Hills, 118 mm of rain was recorded, which is more than the area normally receives in an entire month.[11]
- The City of Burlington received 65mm in rain over three hours on July 15th, and more rain the following day.
- Across the Region, intersections, homes, and buildings were flooded. A total of 1,897 basement flooding incidents were reported, including 1,620 in the City of Burlington, 124 in the Town of Halton Hills (Georgetown), 49 in the Town of Milton and 104 in the Town of Oakville.[11]

Even after flood waters have subsided, the effects of the weather event can still be felt. Damp or flooded buildings can develop mold. Mold can impact indoor air quality. Poor indoor air quality has been shown to aggravate asthma and result in other respiratory symptoms, including coughing and wheezing.

There is also evidence that flooding and severe storms can have an impact on people's mental health, including symptoms of psychological distress, anxiety, and depression. Studies have shown that the prevalence of mental health symptoms is two to five times higher among individuals who reported flooding in their homes compared to non-flooded individuals.[12]

Looking to the Future

Projections show that by the 2080s, Halton Region can expect an average increase in Total Precipitation of 62mm at SSP1-2.6, 85mm at SSP2-4.5, or 145mm at SSP5-8.5, compared to the historical baseline years of 1971-2000.[13]

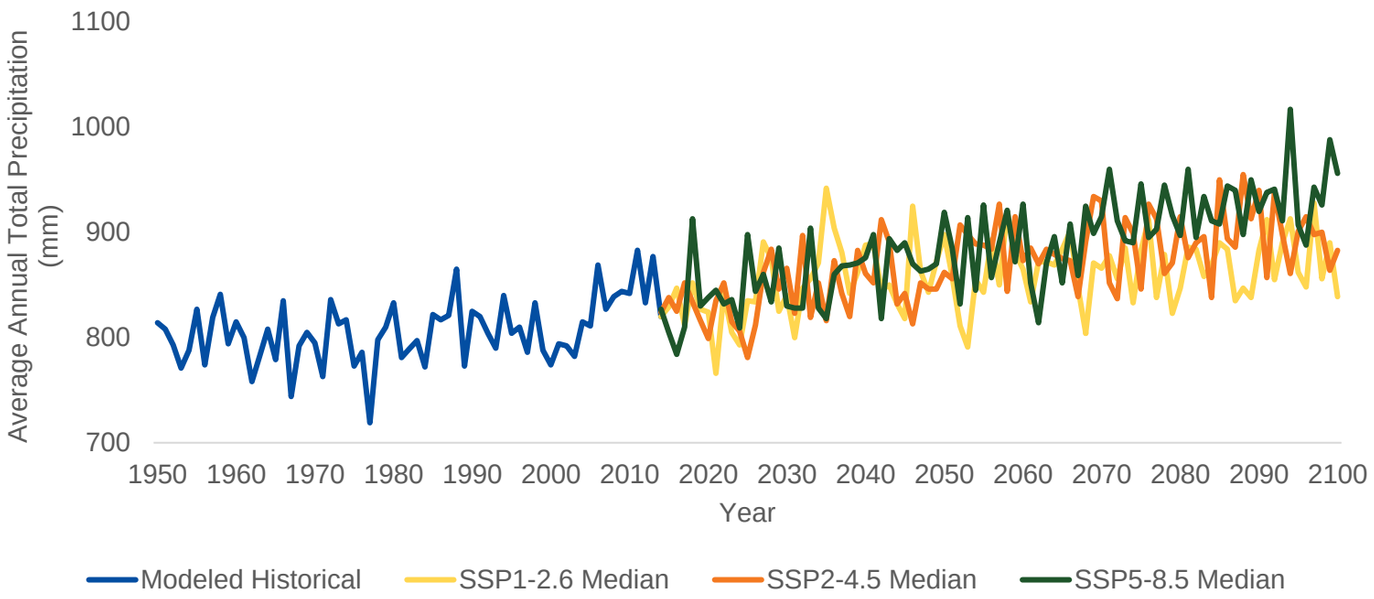

Figure 1. Average Annual Rainfall (mm), Halton Region, 1950-2014 Historical Data and 2015-2100 SSPs Forecasting

Be Prepared!

Individual actions to reduce health risks of extreme weather primarily involve listening to alerts and following safety orders issued by regional agencies; checking in on more susceptible neighbours; having an adequate supply (typically three days) of essential supplies in the event of power outages and service disruptions; and removing oneself from a disaster affected area (e.g., flooded housing or buildings located near floodplains). More information on preparing for emergencies can be found at halton.ca/For-Residents/Emergency-Preparedness

Data Notes

- Shared Socio-economic Pathways (SSPs) describe possible socio-economic conditions, land-use changes, and other human-caused climate drivers that influence greenhouse gas emissions, thus affecting Radiative Forcing, which describes the amount of excess energy trapped within the Earth's climate system due to the variation of climate change factors. The SSPs also describe socio-economic characteristics that influence greenhouse gas emissions (and subsequently, Radiative Forcing) in a standardized way, given an indication of the societal pathways associated with different levels of warming.[14]

- The period from 2041-2070 is referred to as the 2050s, while the period from 2071-2100 is referred to as the 2080s.

Under each family of scenarios there can be multiple emissions scenarios that lead to different levels of Radiative Force. The three future scenarios explored in this report are the three hosted on ClimateData.ca:

- SSP5-8.5 – high emissions
- SSP2-4.5 – medium emissions
- SSP1-2.6 – low emissions

References

1. U.S. Global Change Research Program [Wuebbles, D.J., D.W. Fahey, K.A. Hibbard, D.J. Dokken, B.C. Stewart, and T.K. Maycock (eds.)]. (2017). Climate Science Special Report: Fourth National Climate Assessment, Volume I. U.S. Global Change Research Program, Washington, DC, USA, 470 pp., doi: 10.7930/J0J964J6

2. Gillett et al., 2004 as cited in as cited in Gosselin, P., et al. (2022). Natural Hazards. In P. Berry & R. Schnitter (Eds.), Health of Canadians in a Changing Climate: Advancing our Knowledge for Action. https://changingclimate.ca/site/assets/uploads/sites/5/2021/11/3-NATURAL-HAZARDS-CHAPTER-EN.pdf

3. Egyed, M., et al. (2022). Air Quality. In P. Berry & R. Schnitter (Eds.), Health of Canadians in a Changing Climate: Advancing our Knowledge for Action. Ottawa, ON: Government of Canada. Retrieved from https://changingclimate.ca/health-in-a-changing-climate/chapter/5-0/#:~:text=The%20health%20impacts%20of%20air,to%20result%20by%20mid%2Dcentury

4. Public Health Agency of Canada. (2015). Seniors' Falls in Canada. Retrieved from https://www.canada.ca/content/dam/phac-aspc/migration/phac-aspc/seniors-aines/publications/public/injury-blessure/seniors_falls-chutes_aines/assets/pdf/infographic-infographie2_2015-eng.pdf

5. Leyva et al, 2017 as cited in Buse, C. et al. (2022). Climate Change and Health Vulnerability Assessment for Waterloo Region, Wellington County, Dufferin County, and the City of Guelph. https://www.regionofwaterloo.ca/en/health-and-wellness/resources/Documents/Climate-Change-and-Health-Vulnerability-Assessment.pdf

6. Public Safety Canada. (n.d.). Canadian Disaster Database. Retrieved from https://cdd.publicsafety.gc.ca/dtprnt-eng.aspx?cultureCode=en-Ca&provinces=9&normalizedCostYear=1&dynamic=false&eventId=1075&prnt=both

7. The Regional Municipality of Halton. (2014). LPS14-14 - December 2013 Ice Storm Response. Retrieved from https://edmweb.halton.ca/OnBaseAgendaOnline/Documents/ViewDocument/LPS14-14_-_December_2013_Ice_Storm_Response_-_LPS1414_Ice_Storm_Response.doc?meetingId=2687&documentType=Minutes&itemId=63717&publishId=35042&isSection=false

8. Insurance Bureau of Canada. (2014). Burlington flooding insured damages estimated at $90 million. Retrieved from https://www.newswire.ca/news-releases/burlington-flooding-insured-damages-estimated-at-90-million-515416341.html

9. The Regional Municipality of Halton. (2014). PW-46-14 – Region Wide Basement Flooding Mitigation Study. Retrieved from https://edmweb.halton.ca/OnBaseAgendaOnline/Documents/ViewDocument/PW-46-14_-_Region_Wide_Basement_Flooding_Mitigatio_-_PW-46-14.doc?meetingId=3782&documentType=Minutes&itemId=98851&publishId=49028&isSection=false

10. Decent, D. & Feltmate, B. (2018). After the Flood: The Impact of Climate Change on Mental Health and Lost Time from Work. Intact Centre on Climate Adaptation. Retrieved from Retrieved from https://www.intactcentreclimateadaptation.ca/wp-content/uploads/2018/06/After-The-Flood.pdf

11. The Regional Municipality of Halton. (2024). July 15 and 16, 2024 Flood Response Update. Retrieved from https://edmweb.halton.ca/OnBaseAgendaOnline/Documents/ViewDocument/PW-25-24.docx.pdf?meetingId=4484&documentType=Agenda&itemId=127813&publishId=80576&isSection=false

12. Smith, K.R., A.Woodward, D. Campbell-Lendrum et al. (2014) Human health: impacts, adaptation, and co-benefits. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel,A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L.White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 709-754

13. Climate Data.(n.d.) Halton, ON. Retrieved from https://climatedata.ca/explore/location/?loc=FBLID&location-select-temperature=tn_min&location-select-precipitation=r1mm&location-select-other=tr_20

14. ClimateData.ca. (2023). Understanding Shared Socio-economic Pathways (SSPs) — ClimateData.ca. Retrieved from https://climatedata.ca/resource/understanding-shared-socio-economic-pathways-ssps/

This highlight report provides a high-level overview of this impact category. The full Climate Change and Health in Halton Region report is available upon request by contacting 311 or 905-825-6000 or by emailing accesshalton@halton.ca.

For more information on Halton Region's climate change initiatives visit halton.ca.

Last updated: December 2024

Foodborne and Waterborne Illness and Food Insecurity in Halton

Climate change & health

Climate change

is projected to alter the frequency, seasonality, and intensity of contamination events, and increase exposure to and transmission of foodborne and waterborne illness

Foodborne and waterborne illnesses involve gastrointestinal symptoms and are caused by bacteria, parasites, and viruses that contaminate a food and/or water source. It is estimated that a relatively small proportion of foodborne and waterborne illnesses are actually reported to public health officials.[1]

Did you know?

Hotter and drier summers, when followed by extreme precipitation events, are more likely to increase the risk of outbreaks of both food and waterborne illness due to increased chances of bacteria growth, contaminated water and compromised food safety practices.

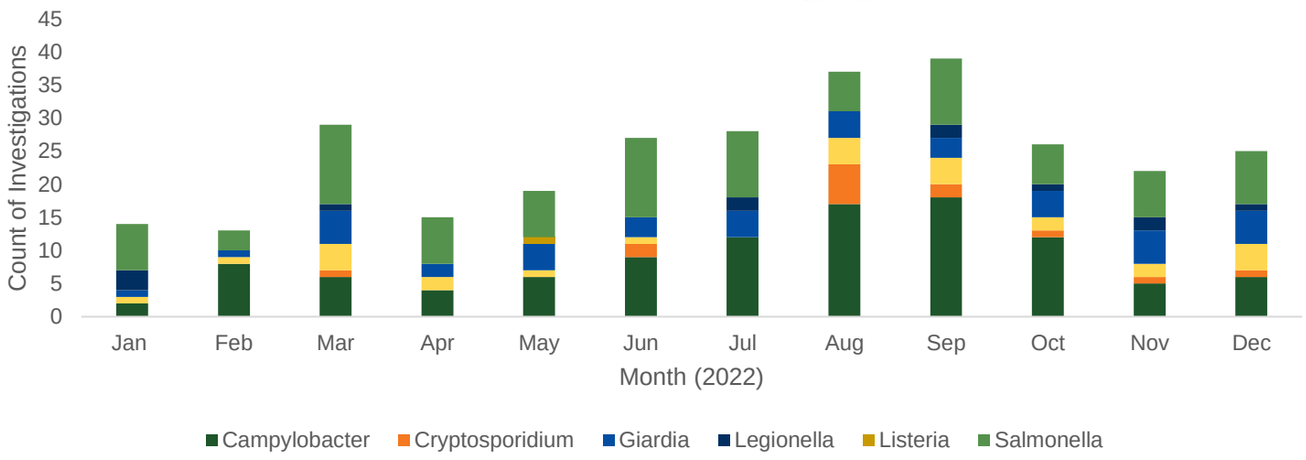

Figure 1. Count of Investigations for Commonly Reported Food and Waterborne Illnesses in Halton, 2022

Cases can fluctuate based on seasonality. Figure 1 shows the number of investigations for commonly reported foodborne and waterborne illnesses in Halton in 2022. There were more case investigations during the summer months.

Interruptions to electricity impact food access and food safety. Refrigerated or frozen foods may not be safe to eat after the loss of power. Power outages can also result in deficiencies in cold-chain management, which can encourage pathogen growth and result in foodborne illnesses.

Private Drinking Water Wells

Heavy rainfall leading to flooding is associated with drinking water-related illness, especially for individuals who drink from private wells.

In 2023, it was estimated that the number of residential private wells in Halton Region was 5,633.

Between 2018-2023, approximately 80% of all submitted private drinking water samples showed no significant evidence of bacterial contamination.

Recreational Water

Climate Change can impact recreational water areas, specifically beaches, through increased water levels, damage to beaches from intensifying waves, and storm surges.

Table 1. Summary of Beach Monitoring Data for Halton Region, 2019-2023

Year	# of Monitored Beaches	# of times Samples Collected	# of Unacceptable Samples
2019	7	61	7
2020	8	103	27
2021	8	132	51
2022	8	125	33
2023	8	102	18

After a big storm, a beach is not considered safe for swimming for two days as heavy rainfall increases the risk that the water will be contaminated by disease-causing pathogens.

Food Insecurity

The adaptive capacity of the food system locally, nationally and globally will be essential to ensure a sustainable food supply and support our community's adaptation to the health impacts of climate change

Data from the Canadian Income Survey showed that 13% of households in Halton were food insecure between 2018-2020.[2] Results from the 2019 Canadian Health Survey on Children and Youth indicate approximately 7% of Halton children aged one to 17 were food insecure.[3]

Halton Food Connect supports Ontario Works clients with their food needs. Eligible clients can get free food packages sent directly to their homes. For more information visit halton.ca.

Priority Populations

Food and waterborne illness

Older adults 65 years or over are at a higher risk of health complications from food and waterborne diseases, due to the diminished functionality of their immune response, and the fact that older populations are more likely to have chronic conditions.

Children under the age of five are sensitive to foodborne and waterborne illnesses as they have developing immune systems and are more reliant on caregivers to translate risk messaging and engage in protective behaviours such as avoiding potentially contaminated water sources.

Individuals with compromised immune systems (e.g., autoimmune disorders) are more susceptible to serious illness due to a suppressed immune response.

Food Insecurity

Older adults may have difficulty accessing affordable, safe, and nutritious food after extreme weather event disruptions. Older adults are more susceptible to poor nutritional status than the general population due to biological changes that can happen in the body with age.

Those living in poverty may be less able to prepare for, respond to, or recover from extreme weather events impacting the food system. For example, they may live in housing that does not have adequate insulation or cooling (if there are power outages, they may not have the resources to replace lost food).Rising food prices due to climate change may worsen existing household food insecurity.

Inadequate nutrient intake during pregnancy can increase risk of complications during delivery, and low birth weight; impact infant feeding behaviors and sustainability of breastfeeding or chestfeeding and increase risk of newborn death.

References

1. Public Health Ontario. (n.d.) Enteric Diseases and Food-Borne Diseases | Public Health Ontario. Retrieved from https://www.publichealthontario.ca/en/diseases-and-conditions/infectious-diseases/enteric-foodborne-diseases
2. Government of Canada, Statistics Canada. (2022) Canadian Income Survey – 2020 (CIS). Retrieved from https://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=5200
3. Public Health Ontario. (2023). Canadian Health Survey on Children and Youth (CHSCY): Food Insecurity among children. Retrieved from https://www.publichealthontario.ca/-/media/Documents/C/2023/food-insecurity-children-youth-canada-survey.pdf?rev=a55120772eb047768ef680dc82015b5c&la=fr

This highlight report provides a high-level overview of this impact category. The full Climate Change and Health in Halton Region report is available upon request by contacting 311 or 905-825-6000 or by emailing accesshalton@halton.ca.

For more information on Halton Region's climate change initiatives visit halton.ca.

Last updated: December 2024

Air Quality in Halton

Climate change & health

Climate change

and air quality are closely linked. Key air pollutants produced by fossil fuel combustion are sources of greenhouse gas emissions and wildfires. These pollutants are increasing as a result of climate change.

Climate change is impacting air quality in Canada and many air pollutants directly contribute to climate change

Air Pollution

The effects of pollution on health

Outdoor air pollution is a globally recognized cause of premature mortality from heart disease, stroke, and lung cancer.[1]

Exposure to ambient air pollution, particularly fine particulate matter (PM2·5), exacerbates respiratory conditions such as asthma. It is the largest global environmental risk factor for premature mortality, and worldwide, results in several million premature deaths from cardiovascular and respiratory diseases every year.[2]

In 2023, there were 1,182 emergency department visits for asthma and 382 admissions for asthma in Halton hospitals. There were more children under the age of 10 visiting emergency rooms for asthma-related diagnoses than any other age group.[3]

Air pollution is expected to exacerbate asthma and other respiratory conditions.

Priority Populations

Older adults are at a higher risk of health complications resulting from poor air quality, particularly if they have co-morbid cardiovascular or respiratory conditions

Outdoor workers may have greater exposure to poor air quality due to higher levels of exposure to ambient air pollution while on the job [4,5]

Children living in low-income areas, racialized populations, and immigrants may be exposed to higher levels of air pollution[6]

Health Outcomes in Halton

In 2015, across Halton Region there were:

41,000 asthma symptom person-days

470,000 acute respiratory symptom person-days

950 child acute bronchitis person-days

associated with exposure to air pollution[7]

Air pollution in Halton Region has a number of sources including, but not limited to: transportation; burning of fossil fuels for electricity and heating; industrial activities; and transboundary air flows.

In 2015, the transportation and industry sectors contributed to most health outcomes.

The Government of Canada estimates that above-background air pollution, including air pollution from human sources in North America, contributes to 15,300 premature deaths per year in Canada with an economic cost of $114 billion, including 6,600 premature deaths annually in Ontario.

Wildfires

After a brief decrease in 2020-2021, likely due to staying indoors during pandemic restrictions, rates of respiratory conditions such as asthma and chronic obstructive pulmonary disease began to increase. Wildfire Special Air Quality Statements happened on June 5-9, June 18-19, and June 27-June 29, 2023 in Halton. Figure 1 illustrates the number of emergency department visits for respiratory conditions from June 1 to 30, 2023. The fire icons show the days where there was a special air quality advisory in effect.

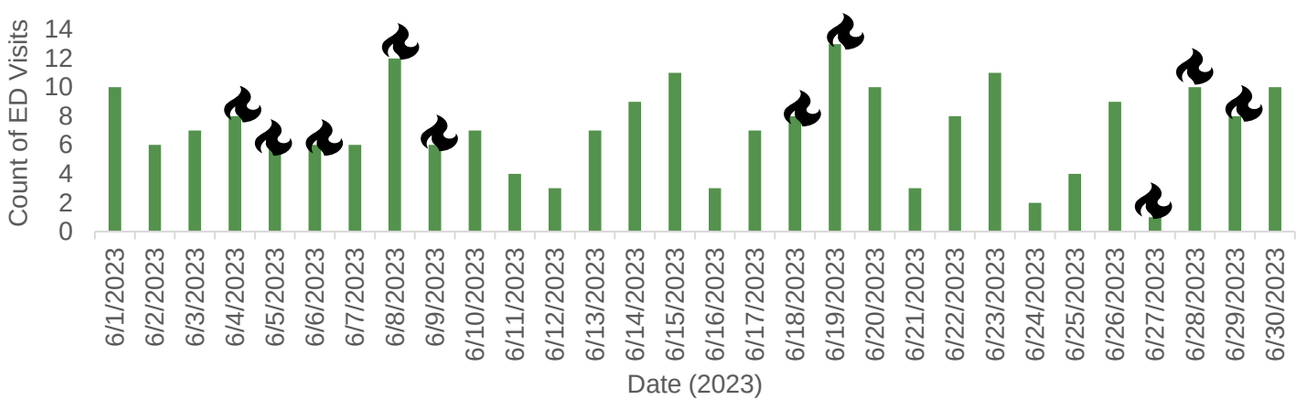

Figure 1. Count of emergency department visits for respiratory conditions at Halton hospitals, June 1-June 30, 2023. Source: NACRS & DAD, IntelliHealth, Ministry of Health, ICD-10 CA codes J40-47.

Priority populations including those who exercise heavily outdoors, children and older adults, should pay close attention to the Air Quality Health Index (AQHI) – a scale designed to help people understand the health risks of air quality. AQHI values are communicated via Environment and Climate Change Canada and Air Quality Ontario.

Did you know?

Exposure to wildfire smoke is associated with an increase in all-cause mortality and respiratory infections, as well as exacerbations of asthma and chronic obstructive pulmonary disease. Wildfires have caused Halton Region to closely monitor air quality levels and communicate Special Air Quality Statements (SAQS).

References

1. World Health Organization. (2024). Ambient (Outdoor) Air Pollution. Retrieved from https://www.who.int/news-room/fact-sheets/detail/ambient-(outdoor)-air-quality-and-health

2. Institute for Health Metrics and Evaluation (IHME). (2024). Global Burden of Disease 2021: Findings from the GBD 2021 Study. Retrieved from https://www.healthdata.org/sites/default/files/2024-05/GBD_2021_Booklet_FINAL_2024.05.16.pdf Health Impacts of Air Pollution in Canada 2021 Report - Canada.ca

3. IntelliHealth, Ministry of Health. NACRS & DAD, ICD-10 CA codes J40-47. Extracted on May 30, 2024.

4. Cui, S. et al., 2017 as referenced in Buse, C. et al. (2022). Climate Change and Health Vulnerability Assessment for Waterloo Region, Wellington County, Dufferin County, and the City of Guelph. Waterloo and Guelph, ON: Region of Waterloo Public Health and Wellington-Dufferin-Guelph Public Health Unit. Retrieved from https://www.regionofwaterloo.ca/en/health-and-wellness/resources/Documents/Climate-Change-and-Health-Vulnerability-Assessment.pdf

5. Bell, M.L. et al., 2014 as referenced in Buse, C. et al. (2022). Climate Change and Health Vulnerability Assessment for Waterloo Region, Wellington County, Dufferin County, and the City of Guelph. Waterloo and Guelph, ON: Region of Waterloo Public Health and Wellington-Dufferin-Guelph Public Health Unit. Retrieved from https://www.regionofwaterloo.ca/en/health-and-wellness/resources/Documents/Climate-Change-and-Health-Vulnerability-Assessment.pdf

6. Pinault et al., 2016b; Pinault et al., 2017 as referenced in Egyed, M., et al. (2022). Air Quality. In P. Berry & R. Schnitter (Eds.), Health of Canadians in a Changing Climate: Advancing our Knowledge for Action. Ottawa, ON: Government of Canada. Retrieved from https://changingclimate.ca/health-in-a-changing-climate/chapter/5-0/#:~:text=The%20health%20impacts%20of%20air,to%20result%20by%20mid%2Dcentury

7. A. Anastasopolos and M. Rouleau, Air Sectors Assessment and Exposure Science Division, Health Canada. Personal communications, (June 2024).

This highlight report provides a high-level overview of this impact category. The full Climate Change and Health in Halton Region report is available upon request by contacting 311 or 905-825-6000 or by emailing accesshalton@halton.ca.

For more information on Halton Region's climate change initiatives visit halton.ca.

Last updated: December 2024

Vector Borne Diseases in Halton

Climate change & health

Climate change

is affecting the risk of exposure to infectious diseases. An individual's risk of becoming infected by a vector-borne disease is affected by three factors: presence of the disease, protective behaviours by the individual, and their sensitivity to the pathogen. Climate change directly or indirectly impacts all three factors.

Vector Borne Diseases

The incidence of vector borne diseases, such as West Nile Virus and Lyme disease, is expected to increase due to the geographic expansion of their vectors' ranges. Warmer temperatures, changes in precipitation, and sea level rise impacts the distribution, seasonality, mating and reproduction cycles, and competence of disease-carrying vectors like mosquitoes, ticks, and mice.[1]

Lyme disease

Lyme disease is a bacterial infection spread by the bite of an infected blacklegged tick. Blacklegged ticks have only recently become established in Halton Region.

As our climate gets warmer, blacklegged ticks, which used to only be found in more southern areas, can now survive further north, including most of Halton Region.[2]

Ticks are known to carry a variety of different pathogens. As our climate continues to get warmer, it is likely we will see both an increase in the number and variety of ticks, but also in the diseases they carry.

Priority Populations

- Hikers and other outdoor enthusiasts
- Children, as they tend to spend more time outdoors
- Farmers and other outdoor workers
- Golfers, hunters and those who spend time outdoors

Since 2019, Halton Region has been considered an established risk area for blacklegged ticks

Positivity Rate

Since 2018, Halton Region Public Health staff have been conducting active surveillance twice a year. Testing of ticks identified during tick surveillance can identify the proportion of ticks that carry tick-borne pathogens (positivity rate). The positivity rate increased from **0% in 2018** to **17% in 2023**

2018	0%
2019	4%
2020	-
2021	8%
2022	7%
2023	17%

- Testing not conducted

The figure below shows the number of Lyme disease cases among Halton residents between 2014 and 2023. There is a clear increasing trend in the number of cases over time.

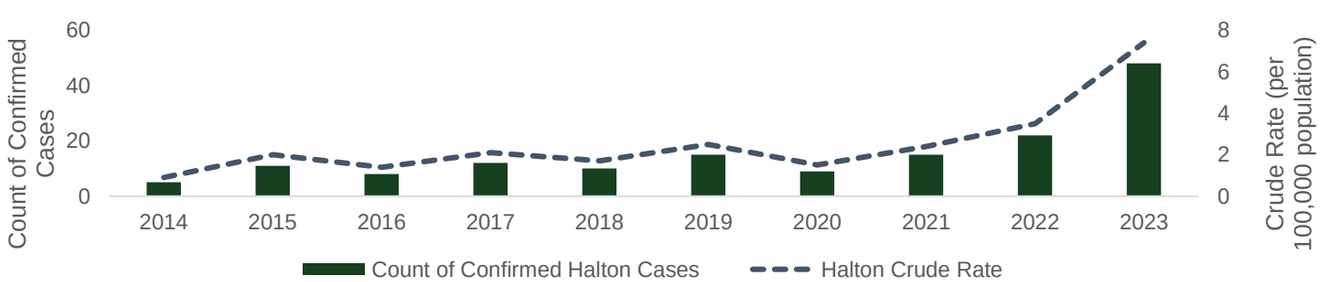

Figure 1. Lyme disease rates and cases for all ages and sexes, Halton, 2014-2023, Public Health Ontario using the Integrated Public Health System (iPHIS)

West-Nile Virus

West Nile Virus (WNV) is a mosquito-borne viral disease that is transmitted to humans. Certain species of mosquitoes acquire the virus through biting an infected bird.

The first human case of West Nile Virus (WNV) in all of Canada occurred in 2002.[3] In 2002, 60 residents of Halton were confirmed to have WNV infection.

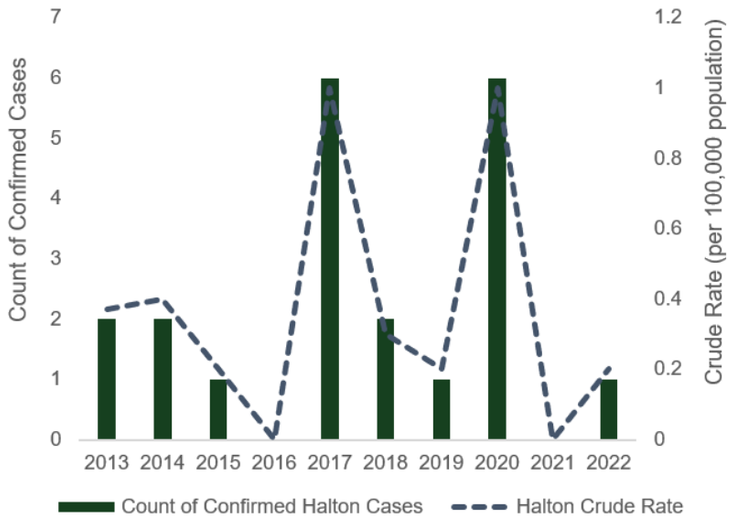

Figure 2. West Nile virus Illness rates and cases for all ages and sexes, Halton, 2013-2022, Public Health Ontario using iPHIS

Action

Individuals can take precautions to protect themselves from the spread of climate-sensitive vectors:

- Covering up by wearing long-sleeved, light-coloured shirts and pants with tightly woven fabric.
- Wearing shoes that cover the entire foot, avoiding sandals or open shoes.
- Spraying clothing and exposed skin with an insect repellant containing DEET or Icaridin
- Checking clothing and body for ticks, especially around the groin, armpit. and hairline, after spending time outdoors.
- Showering or bathing within two hours of being outdoors to wash away loose ticks
- Keeping bushes and shrubs clear of overgrowth and debris.
- Avoiding areas with known harmful vector (e.g., blacklegged ticks).
- Avoiding outdoor activities during dusk and dawn when mosquitoes are most active.
- Checking pets regularly for ticks as they could carry them inside.
- Removing standing water. Water that sits for more than seven days creates an ideal breeding ground for mosquitoes.

Data Notes

Data retrieved from the Integrated Public Health System (iPHIS) was extracted April 16, 2024. iPHIS is a dynamic disease reporting system which allow ongoing updates to data previously entered. Therefore, data in this report may differ from previous or subsequent reports and should not be compared to previous versions.

An established risk area is a location where blacklegged ticks have been identified or are known to occur and where people have the potential to encounter infective ticks.

References

1. Paz S. (2015). Climate change impacts on West Nile virus transmission in a global context. Philosophical transactions of the Royal Society of London. Series B, Biological sciences, 370(1665), 20130561. https://doi.org/10.1098/rstb.2013.0561
2. Public Health Ontario. (2024). Ontario Blacklegged Tick Established Risk Areas 2024. Retrieved from https://www.publichealthontario.ca/-/media/Documents/O/24/ontario-blacklegged-tick-established-risk-areas-2024.pdf?rev=d7dafd390245466483d51e910f02c882&sc_lang=en
3. Public Health Agency of Canada. (2024). Surveillance of West Nile virus. Retrieved from https://www.canada.ca/en/public-health/services/diseases/west-nile-virus/surveillance-west-nile-virus.html

This highlight report provides a high-level overview of this impact category. The full Climate Change and Health in Halton Region report is available upon request by contacting 311 or 905-825-6000 or by emailing accesshalton@halton.ca.

For more information on Halton Region's climate change initiatives visit halton.ca.

Last updated: December 2024