



Extreme Heat

What causes extreme heat?

- Increasing Greenhouse Gas Emissions (GHGs) and the burning of fossil fuels
- Increase in impermeable surfaces (e.g., pavement)
- Lack of natural systems and trees to provide cooling, shade
- Atmospheric conditions (e.g., high-pressure system)

What is the Urban Heat Island (UHI) Effect?

- UHI describes the higher temperature difference between urban and rural areas, including surface temperatures, air temperatures, or in some cases both
- This can result from many factors including the removal of vegetation, dark surface materials (which absorb light), and waste heat (e.g., air conditioners, cars, industrial activities)

By 2070, Brampton is expected to see:

- **More extreme heat days:** Under a high-emissions scenario, the number of extreme heat days (where temperatures exceed 30°C) will increase 3 times, from 25 days per year currently to nearly 78 days per year.
- **Increased health risk:** Heat-related illnesses and death are anticipated to rise, particularly for seniors, children, those with pre-existing health conditions, and outdoor workers. This includes dehydration, heat exhaustion, and heat stroke.

- **Changes to natural systems** – Higher temperatures and drought will stress Brampton's plant and animal species, leading to the loss of many habitats. This will bring about more pests and diseases such as Ticks (carrying Lyme disease) and Spongy Moth (moth that destroys trees) that are already being seen in Brampton. Extreme heat will also cause warmer water temperatures, degrading certain aquatic habitats.
- **Deterioration of infrastructure** – Increased demand for air conditioning is anticipated to strain the electrical grid, causing more frequent power outages. This places pressure on other building systems, shortening their lifespan and increasing maintenance. Extreme heat will also accelerate the deterioration of roads and bridges (e.g., strength and durability) requiring additional maintenance.

What can we do?

Reducing the impacts of extreme heat on our natural systems, communities, and infrastructure is essential to ensuring Brampton is resilient. Some examples include:

- Increasing and preserving tree canopy to reduce UHI
- Having access to more cooling centres & extended hours
- Installing low-carbon heating/cooling systems to provide more thermal comfort in homes and lessen the load on the electrical grid

Unequal Health Vulnerability in a Heatwave

Certain populations are more vulnerable to the impacts of climate change, and disproportionately experience health harms from it, widening existing health disparities. This graphic shows how four people in an urban area are impacted by a heatwave, which are becoming more frequent and severe due to climate change, to highlight examples of vulnerability and adaptation.

						
		Risk factor Protective factor				
Key Health Risk		Asthma attack from air pollution	Birth complications	Death from heatstroke	Heat-related heart failure	
Vulnerability Category	Susceptibility	Child Asthma Otherwise healthy	Young adult Pregnant Healthy	Middle age High blood pressure Medication increases heat sensitivity	Older age Heart condition Medication increases heat sensitivity	
	Exposure	Person of colour* Lives by sources of air pollution Air pollution worsened by heat	Apartment with poor insulation Subway to work doesn't have A/C A/C at work	Person of colour* Works outside in the sun No A/C at home	Person of colour* Room on top floor Poor A/C in nursing home	
	Ability to adapt	Inadequate health insurance Middle class Good family support	Health insurance Poor Lack of social support	No health insurance Undocumented immigrant Good social support	Health insurance Middle class Limited mobility	
Health Outcome						
		Visits emergency department for an asthma attack	Struggles to protect herself from heat but delivers a healthy baby	Develops heatstroke and nearly dies	Long hospitalization for heart failure	
Adaptation Action		Real-time air-quality surveillance program sends warnings to vulnerable residents when pollution levels are high	Doctor is further educated on how heat impacts clinical practice and proactively counsels on heat risk throughout pregnancy	Health officials institute new heat-safety regulations to protect outdoor workers	Nursing home implements a heat emergency protocol to protect patients and invests in A/C improvements	

*Statistically, people of colour are exposed to environmental harms at disproportionately higher rates, and as such, have been included as a factor in this table.

Source: Lancet Countdown on Health and Climate Change, 2019