



Canadian communities show leadership adapting to **EXTREME HEAT**

Extreme heat events have become more frequent in Canada under our changing climate. Over the years, evidence has shown that increased mortality and morbidity have been associated with extreme heat events. Climate experts are projecting that warming will continue to happen in Canada, and that future warming will come with changes in weather patterns, including a predicted increase in frequency and severity of heat waves.

In Canada, the risk of illness or death generally starts to increase in urban centres when the temperature is above 25°C, and increases significantly when it reaches 35°C. Certain groups of the population (such as infants, young children, older adults, people with chronic illnesses, and individuals working outside) are particularly vulnerable to very hot temperatures. While extreme heat events represent a threat to the health of Canadians, most heat related deaths and illnesses are preventable when communities plan and prepare for these events.

Many Canadian communities have developed and implemented initiatives to address the health risks associated with extreme heat. Across the country, public health officials in city and regional governments are developing creative strategies to protect people's health during extreme heat events. Local efforts are often supported by provincial and federal governments, and by a number of other stakeholders taking action now to increase the resilience and safety of communities.

To celebrate the leadership of Canadian communities in adapting to extreme heat, experts from the Institute for Catastrophic Loss Reduction and Health Canada gathered 20 case studies of Canadian municipalities and regions that have implemented

initiatives to prepare for a higher occurrence of extreme heat events. In *Cities adapt to extreme heat: Celebrating local leadership*, the case studies fall under two broad categories of actions:

- heat alert and response systems; and
- preventative actions.

Heat Alert and Response Systems

Heat alert and response systems are approaches developed to reduce the risk of illnesses and fatalities during extremely hot days. They include five core elements:

- community mobilization and engagement;
- an alert protocol;
- a community response plan;
- a communication plan; and
- an evaluation plan.

The 10 case studies identified in this first section of the book were selected for being particularly strong in at least one of these five elements.

One of the case studies is drawn from the City of Vancouver where, in 2009, the city conducted a review of its extreme weather emergency services. The review resulted in recommendations to implement services that would reduce heat health risks for street homeless and other vulnerable groups of the population. The city then developed an "Extreme Heat Initial Response Guideline," which details the actions that should be taken by various city business units and key external partners during extreme heat events.

After thorough research on best practices and lessons learned from other municipalities, the Extreme Heat Planning Committee, which was overseeing the development of the guideline, identified four types of response activities to be un-

dertaken by the city. All response activities focused on reducing heat health risk for vulnerable populations. The four types of responses identified included increasing access to drinking water, opening cooling centres, monitoring outdoor space for at-risk populations, and public outreach and notifications.

These four categories of responses contained a list of specific actions to be undertaken. For instance, increasing access to drinking water involved the pre-positioning of water fountains before the beginning of summer, as well as the deployment of additional portable fountains based on risk assessment outcomes. Monitoring outdoor spaces for at-risk populations contained actions like driving through parks and commercial areas of the city to inform vulnerable populations of the location of nearby water fountains and assisting individuals suffering from heat-related illnesses during hot days.

Preventative Actions

Preventative actions to adapt to extreme heat can take multiple forms, from implementing strategies to reduce the urban heat island effect in urban centres to assessing heat health vulnerability within a community.

Several communities are working to mitigate the impact of a phenomenon called the "urban heat island effect," which tends to be exacerbated by extreme heat events. The urban heat island (UHI) ef-

SOPHIE GUILBAULT M.Arch, M.Sc. has been Research Coordinator at the Institute for Catastrophic Loss Reduction since 2013. Recently, her work has focused on municipal adaptation to extreme rainfall and extreme heat, as well hurricane warning communication. She can be reached at <sguilbault@iclr.org>.

fect happens when an urban area becomes warmer than its rural surroundings. As cities develop, their landscape gets transformed to include higher ratios of buildings and paved surfaces over vegetated surfaces, resulting in greater heat retention. These changes tend to increase the temperature of urban areas significantly and create an “island” of higher temperatures – estimated to be one to three degrees Celsius warmer than surrounding areas. The UHI effect also contributes to reduce nighttime cooling in urban settings.

There are various ways communities can mitigate the impact of the UHI effect. For instance, some might decide to increase their urban forest coverage, while others may choose to transform different types of urban surfaces by using alternative types of pavements or roofs. One of the case studies presents the story of a Montreal borough that implemented regulatory measures to promote the construction of green or cooling roofs. The implementation of green or “cool” roofs addresses UHI by

reflecting solar radiation away from the roof (e.g., white and reflective roofs) or by removing heat from the air through evapotranspiration (e.g., green roofs). Unlike traditional roofs, cool roofs are designed with materials that give them both high reflectance and high emissivity, allowing for minimal absorption of solar radiation and greater release of outgoing radiation. When used on several buildings within a community, cool roofs can help reduce local air temperatures and lower peak electricity demand.

Located east of the downtown core in a central area of the City of Montreal, the borough of Rosemont-La Petite-Patrie is highly populated and densely built. In 2010, the borough undertook a study looking at various adaptation measures that could mitigate the impacts of the UHI effect in the area. As the borough counts a large number of flat roofs with dark surfaces, one of the recommendations of the study was to promote the construction of cool roofs in the area. The borough there-

fore decided to revise its zoning by-law to mandate property owners to obtain a permit before either building a new roof or retrofitting an existing one. This amendment comes with the addition of new regulatory measures specifying that property owners wishing to replace or build a new roof must install a green (vegetative) roof, a white roof, a highly-reflective roof, or a combination of these different types. Approximately 2,000 roofs have been retrofitted since the implementation of the by-law, which represents roughly 10 percent of the flat roofs in the borough.

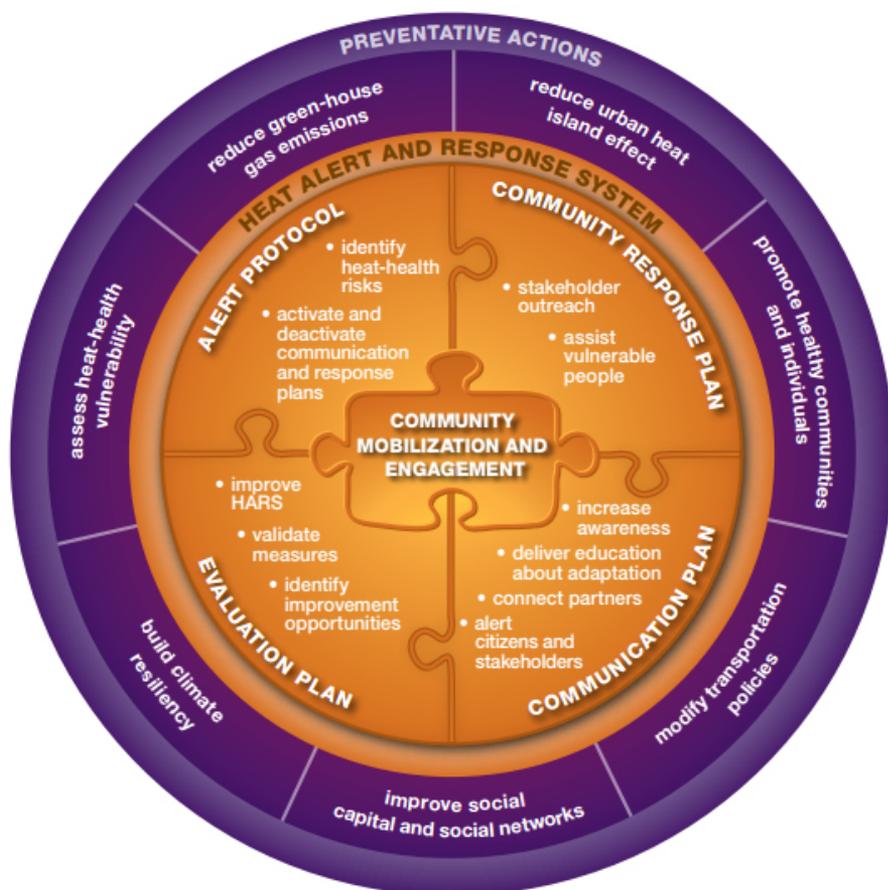
Celebrating Municipal Resiliency

The case studies in the book reflect heat adaptation initiatives that are happening at several levels across the country. While many communities have showcased strong leadership in adapting to extreme heat on many fronts, the idea is to highlight one specific initiative in each community’s approach. The different case studies presented highlight the creativity of local leaders in their efforts to build heat resiliency within their communities.

One of the key takeaways is that leading communities are taking action *now*. The risk to the health of Canadians from extreme heat events is present today and will increase over time. *Cities adapt to extreme heat: Celebrating local leadership* seeks to recognize and honour local and regional governments that are taking action now. While extreme heat events can lead to higher rates of morbidity and mortality, it is important to remember that many actions can be taken by municipal, regional, and provincial orders of government to minimize heat health risks for Canadians.

The 20 cities highlighted in this report are among many other Canadian municipalities that have been proactive in developing adaptive programs to mitigate the impacts of extreme heat events. These local actions all have the potential to be replicated in other municipalities and will hopefully speak to other community leaders in the future.¹ **MW**

Figure 1
Heat Alert Response and Preventative Actions



Reference: Heat Alert and Response Systems to Protect Health: Best Practices Guidebook, Health Canada

1 *Cities adapt to extreme heat: Celebrating local leadership* is available for download from <www.iclr.org/citiesadaptheat>.