

A young girl with dark hair in pigtails, wearing a pink floral dress and white sandals, is smiling and playing in a public fountain. She is standing in the water, with her hands clasped in front of her. The fountain has several jets of water spraying upwards. In the background, there are trees with yellowing leaves and a brick building. A semi-transparent teal box is overlaid on the bottom half of the image, containing the title and author information.

# BEST PRACTICES

A comprehensive local plan

*By Paul Kovacs*

*Source: Adobe Stock Photo*

Local and regional health authorities across Canada are taking actions to reduce the risks of adverse health impacts from extreme heat events. Leading communities have developed and implemented comprehensive plans, which generally include two broad strategies to confront the health risks from extreme heat. First, it is critical to enhance local preparedness for future heat waves. Many communities have implemented Heat Alert and Response Systems, systems that alert the public when there are dangerously hot days and put in place a strategy to inform and protect the community from health risks associated with extreme heat. These systems may include a plan to make cooling centres available, to distribute water to those in need, and to inform the most vulnerable when an extreme event strikes. Second, communities are making investments in preventative measures to reduce the risk of extreme heat events resulting in health issues. Preventative actions may include an expansion of the tree cover, promoting green and cool roofs, and efforts to increase social networks among vulnerable populations. The implementation of these actions can have long-term benefits within a community. For instance, the expansion of tree cover can mitigate the effects of urban heat islands and the implementation of cool roofs can help reduce heat absorption by buildings and enhances thermal comfort for their occupants. A comprehensive local plan to adapt to extreme heat events combines a strong Heat Alert and Response system with preventative actions.

## **ASSESSING LOCAL RISKS**

The foundation for a comprehensive Heat Alert and Response System begins with an assessment of heat-health risks in the community. This includes a review of historic weather information from Environment and Climate Change Canada. It also consists of a review of how often the local temperature has been above the community threshold at which adverse health outcomes begin to occur. Communities need to look at how often they have experienced several consecutive days of hot weather. In addition, it is important to remember that extreme humidity increases the risk of adverse health impacts. As such, Canadian municipalities need to evaluate what is the likelihood of high humidity coinciding with extreme heat, and whether or not there are any trends in the frequency of high-humidity days. Other factors can also be assessed such as air quality and the risk of power failure.

Environment and Climate Change Canada, Health Canada, and university-based climate experts, like the Institute for Catastrophic Loss Reduction, can assist with the assessment of historic weather data and other factors leading to vulnerability to extreme heat. For example, it is important to also assess climate projections of future risk of extreme heat events. The climate is changing; temperatures are warming and the frequency and severity of extreme heat events is expected to increase across the country. Detailed climate projections of future extreme heat events can be used at the local level to inform better alerts. Environment and Climate Change Canada and a number of provincial, regional and academic organizations (including Ouranos, Pacific Institute for Climate Solutions, Prairie Adaptation and Research Collaborative, and Ontario Ministry of the Environment and Climate Change) offer local climate projections.

An important, but sometimes difficult dimension of assessing local risks is the challenge of obtaining historical information about the consequences of extreme heat on people's health. Important questions for local health practitioners include: Can local hospitals share information about the impact of extreme heat on admissions with cities and local health authorities to help them better prepare for and respond to extreme heat events? Is there evidence specific to the community that shows the relationship between temperature and the risk of fatality? Is there any local information about the impact of air pollution and extreme heat on health?

Efforts to date stress the value of undertaking a high-quality vulnerability assessment to better understand local health risks from extreme heat. The information collected in vulnerability assessments provides the foundation for action to establish and maintain an effective Heat Alert and Response System. A detailed local vulnerability assessment is also critical to support investments in prevention as it will allow for the identification of priority actions. Importantly, communities that have completed heat-health assessments found that extreme heat events result in an increased risk of illness and death, and much of this increase is preventable. It is therefore crucial to ensure that extreme events are identified, warnings are issued, and appropriate response takes place throughout the community.

## **EXTREME HEAT ALERT AND RESPONSE SYSTEMS**

Alert and warning programs can be managed by provincial, regional or local governments, with specific aspects of the system managed by different agencies. Officials need to ensure that there is no duplication or lack of uniformity in the warnings that are provided. Heat Alert and Response Systems need to be evidence-based, using clearly defined processes and measures of success. Engagement of key stakeholders, like partners in the media and response professionals, is critical to an effective program. It is important, for example, to build local awareness about the distinction between a 'heat alert' and a 'heat warning'. Determination of an alert trigger will benefit from stakeholder engagement. During an extreme heat event, it is particularly challenging to ensure that everyone within a community receives the appropriate information that will ensure their health and the health of their families is protected from particularly high temperatures.

Local and regional leadership is essential for preparedness efforts. Health Canada has identified five critical elements in an effective alert and response system:

### **I. Community mobilization and engagement**

Efforts to reduce the risk of adverse health impacts from extreme heat are most effective when local and regional health officials engage social service providers, voluntary agencies, and other stakeholders in the development and implementation of a response plan. This may include emergency response organizations, home care providers, homeless services, tourism centres, faith-based groups, and a number of municipal agencies.

Community engagement can assist in the assessment of local vulnerability to the health impacts of extreme heat. Engaging various stakeholders such as local health authorities, community groups, and city officials is useful to assess awareness of health issues among individuals in the community. It is also useful to determine which existing networks in the community could be used for sharing heat alerts and information about protective actions that should be taken when an extreme heat event strikes.

It is important that the engagement effort be as detailed as possible to determine the specific heat-health risks faced by individuals living at a specific location in the municipality.

## **2. Alert protocol**

Public health authorities need to establish an alert protocol to identify weather conditions that could result in increased adverse health conditions for the community. There are differences in the details of the protocols and alert triggers presently in place across Canada, with no single approach emerging as superior in all respects. Protocols are based upon the risk of unusually high temperatures during the day, sustained high temperatures through the evenings, the risk that these conditions will continue for several days without easing, and complication associated with high humidity.

There is value in distinguishing between heat events that are expected to exceed the identified thresholds, and very severe heat events that may significantly exceed the ability of individuals to cope. The alert protocol identifies different levels of threat and makes this information available to the community at risk.

Evidence-based information for when to call an alert provides an important foundation for building public awareness about heat-health risks in the community, and public confidence about the value of the warnings.

## **3. Community response plan**

An effective response plan relies on the outreach capacity of participating government agencies and non-governmental organizations. It needs to be tailored to the specific needs of the community and its vulnerable populations.

The response plan needs to take into account heat-vulnerable groups and the specific challenges each group faces. For example, the best mechanisms to alert and assist older adults may differ from those used to reach tourists, recreational athletes, the homeless, people who work outdoors, infants, those with chronic illness, and those with low incomes.

Most response plans include the provision of cooling centres, access to drinking water, and information about how to take protective actions. Local cooling facilities may include libraries, community centres, city halls, swimming pools, and spray pads. These facilities can be supplemented by arrangements with places of worship, shopping malls, senior centres, and movie theatres.



**Figure 24:** Many programs seek to engage the community before heat season begins.  
(Source: Adobe Stock Photo)

#### **4. Communications plan**

Experience in Canada and elsewhere around the world consistently identifies communications as a difficult element in Heat Alert and Response Systems. Some people remain unaware of the threat despite aggressive alert and warning communication and many people fail to act on the advice provided. Many programs seek to engage the community before the heat season, during the heat season, and during an extreme event with different messages.

Before the heat season, there is scope to build awareness about individual and family preparedness, community options for risk reduction, the signs of heat illness, and details about where to get more information. The communication plan should strive to establish a network of stakeholders able to bring forward consistent information about the nature of the threat and the best options to prepare.

In the summer, there is often greater public interest in heat-health issues. During these months there is scope to work with partners to raise awareness about the potential adverse impacts of extreme heat and focus on identifying actions that should be taken when an event occurs. The opportunity also exists to focus on prevention by advising people to ensure that their air conditioners are working properly, raising awareness about the importance of staying cool and well hydrated, and promoting the planting of shade trees to provide shade and cooling.

During an event, the communication goal is to get people to take protective measures. The communication plan could include a press release to have the media issue the appropriate alert or warning, as well as the sharing of information with established partners to implement the agreed strategy to engage the community.

#### **5. Evaluation plan**

A formal evaluation of performance is an important tool to refine and improve Heat Alert and Response Systems. Evaluation is a common process for public health and many other policy areas, but it is an emerging tool for Heat Alert and Response Systems.

Two types of evaluation can be undertaken – process and outcome. A process evaluation is used to determine if each component of the Heat Alert and Response System operated effectively during an event. An outcome evaluation focuses on assessing the impact of the program toward achieving its goals and objectives. Both processes can provide specific advice to health authorities concerning scope for improvement.

An evaluation that emphasizes collaboration and stakeholder feedback can enhance partnerships that strengthen capacity and the effectiveness of future responses. The evaluation process can be applied following a major event and can also employ use of a tabletop exercise to discuss a simulated emergency situation. A tabletop exercise, with a focus on process, can be part of the creation of a new Heat Alert and Response System, or evaluation of an existing program.

## PREVENTATIVE ACTIONS – REDUCING URBAN HEAT

Long-term investments to keep communities and their residents cool can enhance the resilience of a community and prevent heat-health threats. A longer-term plan to invest in prevention complements a Heat Alert and Response System where the focus is on near-term preparedness. Health Canada has identified seven preventative strategies for reducing the risk of adverse heat-health impacts in a community:

### **1. Reducing urban heat island effects**

The air temperature in urban centres may average 1°C to 3°C higher than surrounding areas. Urban environments tend to be built with non-reflective and impermeable materials that are better at absorbing heat during the day and slower to release the heat at night than are surrounding areas. The differences are greatest when there is a decrease in natural land cover, particularly mature trees, which provide shade and cool the air through evapotranspiration.

Some measures that reduce urban heat islands include the use of green infrastructure, cool roofing, and urban forests. Additional options include the use of permeable materials for parking and roads, bio-swales for storm-water management, as well as green roofs, tree planting programs, and landscaping guidelines.

### **2. Promoting healthy communities and individuals**

Recreation master plans can promote local actions that increase tree shading in parks, increase the area available for recreation, and generally enhance the health of the community. Active and healthy people are generally more resilient to extreme heat, so general public health promotion efforts also reduce the risk of adverse heat-health issues.

### **3. Modifying transportation policies**

The provision of trails for walking, biking, and jogging can also reduce the risk of heat illness and death if people take protective measures during heat events. Coupled with appropriate lighting and repairs to older infrastructure, these actions can encourage healthy transportation alternatives for citizens throughout the community. During extreme heat events, it is also extremely valuable to provide transportation to cooling centres.

### **4. Improving social capital and social networks**

Effective Heat Alert and Response Systems work with existing social networks to communicate heat-health risk information and organize response during extreme heat events. Cultivating strong social networks within a community can result in a greater awareness of heat-health risks among residents as well as a greater response capacity during extreme heat events. Strong social networks are particularly important in smaller and rural communities where municipal resources might be more limited.

## **5. Building climate resiliency**

Efforts to address extreme heat are best situated within an overall local climate resiliency strategy. Extreme weather and climate change is expected to threaten local infrastructure through increased urban flooding, coastal flooding from sea level rise, and more local storms and wildfires. Extreme heat is one of many climate threats that can be effectively managed by local governments.

## **6. Assessing heat-health vulnerability**

The initial establishment of a Heat Alert and Response System should include an assessment of vulnerability of individuals and of the broader community to extreme heat events. A long-term prevention strategy can be informed by an assessment of expected trends in vulnerability associated with an aging population, disease prevalence, urbanization, and change in the climate.

## **7. Reducing greenhouse gas emissions**

Local governments can replace older vehicles with fuel-efficient models, improve the energy efficiency of public buildings, and encourage action by citizens to reduce the use of greenhouse gases. Reduced emissions can slow the pace of global warming and the rate of increase in extreme heat events. Some measures to reduce greenhouse gases can also help people stay cooler during extreme heat events (e.g. insulating homes).