Practical strategies for prevention and treatment of heat-induced illness

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Heat-related illnesses can present with symptoms such as fatigue, cramps, and edema, and without intervention can progress to heat exhaustion or heat stroke. Across Canada, the number of days per year with temperatures above 30°C and nights per year with temperatures above 22°C is expected to increase owing to climate change, resulting in increased heat-related morbidity and mortality (**Figure 1**).[1-3]

Heat-related morbidity and mortality are preventable.[1] Prevention strategies are best employed by primary care providers in spring and early summer, as the risk of heat-related illness and death is greatest when individuals have not yet acclimatized to the heat.[1]

Identify vulnerable patients

Several groups are more vulnerable to heat-related illness than the general population.

Children and the elderly. Compared with adults, children have a lower thirst response to dehydration, less sweat production, and a larger ratio of surface area to mass, resulting in greater heat transfer from the environment.[4] The cardiovascular systems of older people are less able to compensate for the increased cardiac output required for peripheral heat dissipation.[2,4,5]

Patients with chronic diseases. Patients with chronic diseases, including cardiovascular, respiratory, neurologic, and renal illnesses, as well as diabetes, are at increased risk.[2,4] In addition, being confined to bed, inability to perform self-care, and psychiatric illnesses are also associated with risk of death during heat waves.[6]

Patients taking medications. Many commonly prescribed medications increase the risk of heat-related illness. Chief among these are the "anti" medications (anticholinergic agents, including antihistamines, antidopaminergics, tricyclic antidepressants, and antipsychotics), sympathomimetic medications, and diuretic medications.[2,4] Medications that cause vomiting or diarrhea, such as colchicine or cholinesterase inhibitors, can contribute to dehydration and worsen heat-related illness.[4]

Athletes and outdoor workers. Activity increases heat production and it might be difficult to adequately replace sweat loss in hot weather, leading to exertional heat stroke. Further, athletes and workers might be required to wear protective equipment that prevents adequate heat dissipation.[4]

Vulnerable populations. Socioeconomic factors and poor housing play a key role in determining risk of heat-related illness. Residences without air conditioning and on the upper floors of buildings where heat builds up contribute to heat-related illness.[1,2,6] Patients experiencing social isolation or homelessness are also more likely to experience heat-related illnesses.[1,2]

Address modifiable risk factors

There are a number of recommendations you can provide to all patients to decrease their risk of heat-related illness, including the following.

- Restrict physical activity to the coolest period of the day.[2]
- Seek out air-conditioned buildings when possible.[2,4,6]
- Drink fluids frequently without waiting for the feeling of thirst.[2,4]
- Wear breathable, light-coloured clothing and a well-ventilated, wide-brimmed hat.[4]
- Know your community heat response or heat alert plan. Many communities issue heat warnings; open public air-conditioned buildings, cooling centres, and hydration centres; and extend hours for swimming pools.[1,4]

Patient handouts with these tips and others are available online from the Extreme Heat Events Program (**www.extremeheat.ca**).

Review with patients the signs and symptoms of heat-related illnesses and when to seek medical attention, especially with at-risk patients and families.[4] Recommend that patients in high-risk groups or their caregivers monitor hydration status throughout a heat wave, with regular weight checks and assessments.[2] Ensure dosages of medications that increase the risk of heat-related illnesses are optimized before the summer months. For patients who will start taking these medications during the summer, offer more frequent follow-up appointments to check for signs and symptoms of heat-related illness.[4]

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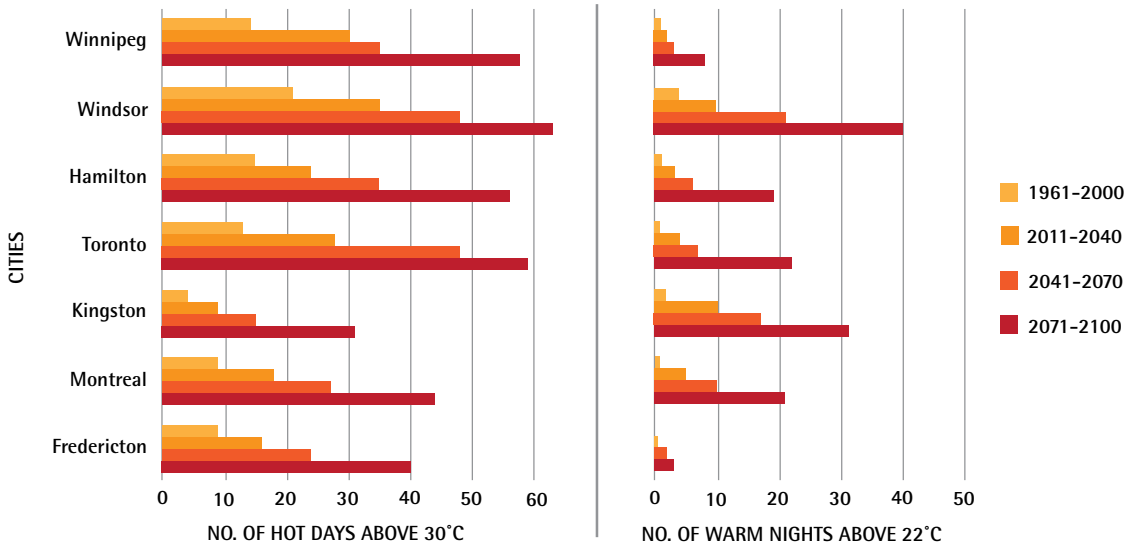
Figure 1. Historical and projected number of hot days and warm nights for Canadian cities



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Develop an office heat emergency response plan

Many public health units declare extreme heat alerts or have heat response plans during heat waves. These are typically periods of 3 or more days during which the temperature meets or exceeds 32°C.[1,4] Consider flagging the charts of patients in high-risk groups or developing some other mechanism with your team to recall or check on vulnerable patients during heat waves.[4] Be aware of publicly accessible air-conditioned locations in your community, such as libraries or malls, or other community resources, such as pools or water distribution centres, where you can direct patients to seek relief during heat waves. Join your local public health unit heat alert distribution list for further information.

Recognize heat-related illness in the office or emergency department

Patients with heat exhaustion—the most common presentation of heat-related illness—typically present alert and oriented with hot flushed skin, sweating, and a core temperature below 40°C. Supportive care and oral or intravenous rehydration are often enough to improve and resolve symptoms. In contrast, in classic heat stroke the patient's core temperature is above 40°C, the patient's skin is warm and dry (ie, the patient is not sweating), and the patient has an altered mental status, ranging from disorientation and incoherence to unconsciousness.[2,4] Heat stroke will progress to multiorgan failure and death without emergency resuscitation. Treatment must be immediate and include rapid cooling, intravenous rehydration, and supportive acute care. Protocols should be in place in advance for methods of external and internal cooling based on each emergency department's capacity. External cooling methods include immersion and evaporative cooling.[4]

Conclusion

The risk of heat-related illness is likely to increase owing to climate change. Family physicians should be prepared to prevent and treat heat-related morbidity and mortality.

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Competing interests
None declared

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