

CASE STUDY

# ITERATIVE DEVELOPMENT AND TESTING OF A HEAT WARNING AND INFORMATION SYSTEM IN ALBERTA, CANADA

Authors: T. Morris, K. Thomas (Office of the Chief Medical Officer of Health, Alberta Health); B. Friesen (Alberta Health Services); P. Pytlak, R. Wright (Agrometeorology Applications and Modelling Section, Alberta Agriculture and Forestry); D. Henderson (Health and Air Quality Forecast Services, Meteorological Service of Canada, Environment and Climate Change Canada); D. Kulak (Prediction Services Directorate, Meteorological Service of Canada, Environment and Climate Change Canada); S. Dolan (Climate Change and Innovation Bureau, Health Canada).

## CONTEXT

Climate change is anticipated to increase the frequency and intensity of extreme heat events in northern latitudes, including in Canada (11-13). Such heat events can lead to increases in hospital admissions, morbidity and premature mortality, particularly among the most vulnerable groups (14, 15). The western Canadian province of Alberta had relatively little experience with severe heat waves of long duration. In 2012, consistent with Alberta's climate change adaptation framework (16), Alberta Health, the Provincial Government Department of Health, initiated a high-level vulnerability assessment that led to the development of a Heat Warning and Information System (HWIS) involving collaboration between several agencies with expertise outside of public health.

## NEW APPROACHES

Starting in 2012, Alberta Health initiated a process to develop a HWIS based on two core principles:

1. Leveraging existing partnerships and networks: Alberta Health partnered with the Meteorological Service of Canada (MSC) and Health Canada (two federal departments), the Provincial Department of Agriculture and Forestry (AF), and Alberta Health Services (local community level). Through these strategic partnerships, Alberta Health was able to access advice (e.g. epidemiological analyses) and infrastructure (e.g. climate forecasting systems) to design the roll-out of the HWIS.
2. Building on existing best practices and lessons learned: Alberta Health completed a survey, with the assistance of Health Canada and the MSC, of best practices and lessons learned relevant to the provincial context. The results of this survey fed directly into the development of both the structure of the HWIS (e.g. the thresholds), as well as the corresponding communication plan.

After approximately 24 months of development, Alberta Health initiated a pilot of its provincial HWIS during the summers of 2014/15. The goals of the pilot were threefold. The first was to test the effectiveness of the proposed thresholds and associated responses (see Figure 4.7). The thresholds were determined by evaluating historical summertime meteorological conditions alongside emergency room department visits and mortality statistics. During the pilot season, the final decision on initiating a response action was the responsibility of the local medical officer in the ministry of health. The second goal was to promote awareness among key decision-makers and the general public through a targeted communication initiative. The third goal was to test the web-based infrastructure that AF developed in collaboration with Alberta Health. Using an existing information systems platform, the AgroClimatic Information Service of AF developed a web-based mapping application that monitored communities and their corresponding threshold level, as well as an information content feed for local ministries of health so that they could be notified when thresholds were exceeded (see Figure 4.8).

There were three heat events during the summers of 2014 and 2015 for which public health actions were taken. The events were short duration (2 to 3 days), and involved several communities. The pilot will be evaluated to further develop the system for future years.

**Figure 4.8** Criteria to trigger different levels of heat warnings.

DESCRIPTION	CRITERIA
<p><b>Heat warning</b></p> <p>MSC provides early notification to ministries of health that a heat event is building, and provides guidance on duration, severity and geography of the event.</p> <p>MSC issues a heat warning to the public.</p> <p>The local ministry of health monitors the local situation and adjusts the public health response.</p>	<p>When the weather forecast is for two or more consecutive days above the 95th percentile of maximum and minimum temperatures.</p>
<p><b>Extended heat warning</b></p> <p>MSC maintains the heat warning, notifies the ministries of health and provides guidance on severity, duration and geography of the event.</p> <p>The local ministry of health may contact municipalities, vulnerable population organizations to implement response measures.</p> <p>The local ministry of health may notify emergency management services and hospitals to be prepared for surge during and after the event.</p>	<p>Observed maximum and minimum temperatures are above the 95th percentile for for three consecutive days and are forecast to continue.</p>

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Figure 4.9 Screen view of the Alberta HWIS real-time weather monitoring website.



(Source: www.weatherdata.ca/health)

## ACKNOWLEDGEMENTS

The authors acknowledge the efforts by all individuals from the partner organizations who contributed to the successful implementation and ongoing development of this initiative.



## BENEFITS AND LESSONS

The Alberta HWIS project can be characterized as a success story. Before the initiation of this work, Alberta did not have a coordinated approach or shared understanding of the potential health threat of heat events, mitigation plans or an effective heat information system. Collaboration among agencies at the local, provincial and federal levels enabled sharing of expertise, skills and resources to allow for the rapid development and deployment of a province-wide HWIS pilot. Since this was an initial pilot, the health benefits have not been quantified.

Expertise and resources developed by Health Canada, such as the McMaster University Extreme Heat Events website provided the basis for the development of the HWIS and tools used in communications and public messaging. Forecast support for heat events and expertise/data provided by the MSC allowed for historical analyses to develop meteorological thresholds. AF had unique technical expertise. Having local ministries of health champion the project helped create credibility and encouraged other local organizations to participate. The genuine passion and goodwill exhibited from agencies working on the project contributed to the successful development and execution of the pilot within its two-year time frame.

Figure 4.10 Alberta Health Service's Online Heat Warning Information Portal.

The image is a screenshot of the Alberta Health Services website's "Heat Warning Information" page. At the top, there are logos for "Alberta Health Services" and "811 Health Link". A navigation menu includes "ABOUT AHS", "FIND HEALTHCARE", "INFORMATION FOR", "CAREERS", "NEWS", and "AHS IN MY ZONE". The main heading is "Heat Warning Information". The page is divided into three columns. The left column is titled "When a Heat Warning is in Effect:" and lists precautions such as rescheduling outdoor activities, taking breaks indoors, drinking water, and wearing protective clothing. The middle column is titled "Monitor for symptoms of heat stroke, including:" and lists symptoms like high body temperature, lack of sweat, disorientation, fainting, and unconsciousness. The right column is titled "Heat Warnings" and "Learn more about Heat on:" and provides information on how to receive weather alerts and seek medical attention. The bottom of the page has a footer with the text "RESEARCH TO INFORM CLIMATE SERVICES" and the number "4".

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This case study was featured in WHO/WMO. (2018) Climate Services for Health: Improving public health decision-making in a new climate. Eds. J.Shumake-Guillemot and L.Fernandez-Montoya. Geneva.

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