

Case Study 2

How Winnipeg Chose its Heat Alert and Response System Alert Triggers

Winnipeg, Manitoba, developed a multi-level alert protocol with multiple triggers as part of its HARS. The alert levels include:

- ▶ **Heat Pre-Alert**—communication only to internal partners
- ▶ **Heat Alert 1**—communication to the public and community stakeholders, as well as initiation of some response measures if required
- ▶ **Heat Alert 2**—activation of some response measures and enhanced messaging
- ▶ **Heat Alert 3**—delivery of aggressive response measures, more targeted messaging and increased community mobilization

The Winnipeg HARS Advisory Committee, which is responsible for guiding the development of the HARS, established a Heat Scientific Group led by the provincial Medical Officer of Health (Environmental Health). The Group includes officials from provincial public health, the Winnipeg Regional Health Authority, Environment Canada, provincial communications office and provincial health emergency management. Its mandate includes evaluating existing evidence demonstrating that heat is a health risk in Manitoba (rural and urban), identifying HARS best practices and deciding on alert triggers. To develop appropriate triggers, multiple factors were considered, including humidity and temperature, the location of vulnerable populations, accuracy of weather forecasts, and existing capacity for surveillance of heat illnesses. Historical data and their correlation with mortality were also examined.

Through this process, the Group decided that a heat alert would be issued when specific temperature or humidex triggers were reached. Humidex was chosen because of its physiological relevance and its known correlation with mortality. Humidity reduces the ability of a body to cool through sweat evaporation. It is also a measure of perceived temperature that is widely understood in Canada. Humidex is not currently forecasted by Environment Canada publicly; however, the Weather Network does provide this service. Temperature was also chosen as the basis of a second trigger because, although it is less physiologically relevant, longer historical records of temperature exist in Manitoba and it is forecasted with higher accuracy than humidex.

The specific triggers for issuing alerts using humidex and temperature were based in part upon evidence of the correlation between these two variables and daily deaths in Winnipeg (Figure 10). The triggers also account for nighttime temperatures by identifying minimum, in addition to maximum trigger values, that have to be reached to issue each alert level. The alert protocol takes into consideration the intensity and duration of the extreme heat event and the lack of certainty associated with forecasts. Greater weight is placed on occurring weather conditions, rather than forecasted values, in the decision to activate higher alert levels.^m



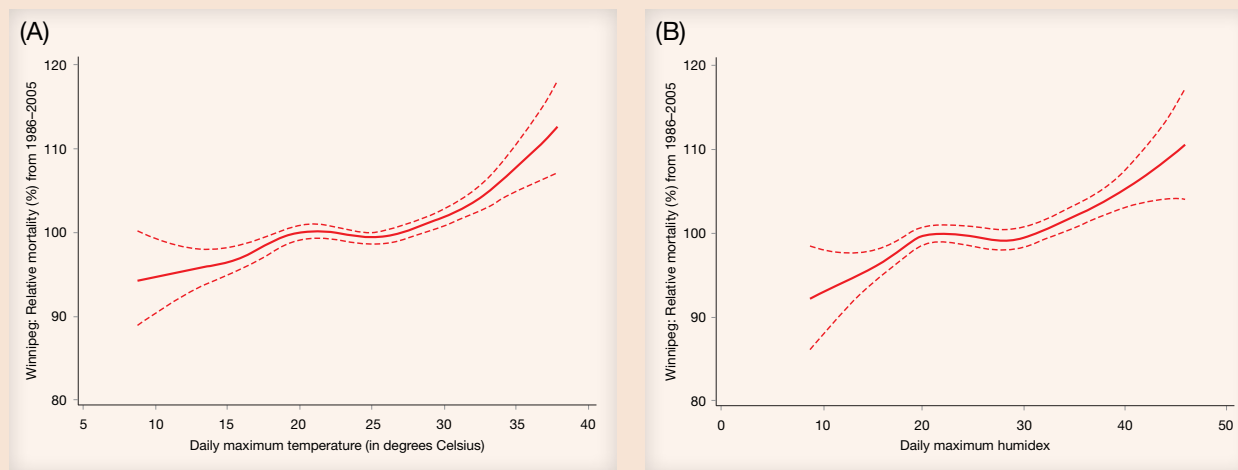
Source: Government of Manitoba

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Figure 10: Association between non-traumatic daily deaths and maximum daily temperatures (A) or humidex (B) in Winnipeg, 1986–2005ⁿ



Source: Adapted from B. Casati and A. Yagouti, *in press*.⁵⁰

Before any notifications of a heat alert are made, a risk assessment is conducted that considers environmental parameters, as well as any additional information about health outcomes during extreme heat events. For example, this may include identification of impacts of heat on health from real-time surveillance and anecdotal reports of heat-related incidents by front-line medical staff, private physicians and community workers, among others.

The alert is deactivated when the forecast no longer meets the trigger criteria and the lead provincial Medical Officer of Health and Manitoba Health's Office of Disaster Management decide that heat is no longer a health risk. The efficiency and accuracy of the triggers will be evaluated at the end of each extreme heat event and each heat season and, if necessary, will be re-calibrated to reflect experiential knowledge, optimize the use of resources and maximize the public's responsiveness and adaptation to extreme heat events.

For more information on the Winnipeg HARS, visit www.gov.mb.ca/health/publichealth/environmentalhealth/heat.html.

^m Draft HARS alert triggers include:

Heat Pre-Alert: Forecast of at least three days with maximum temperature (Tmax) average $\geq 32^{\circ}\text{C}$ plus minimum temperature (Tmin) average $\geq 19^{\circ}\text{C}$ OR forecast of humidex with at least one day ≥ 37 .

Heat Alert 1: Forecast of at least three days with Tmax average $\geq 33^{\circ}\text{C}$ plus Tmin average $\geq 20^{\circ}\text{C}$ OR day one with humidex ≥ 40 OR forecast of at least one day with humidex ≥ 40 .

Heat Alert 2: Day one with Tmax $\geq 33^{\circ}\text{C}$ plus Tmin $\geq 20^{\circ}\text{C}$ plus a forecast for at least next two days with Tmax average $\geq 33^{\circ}\text{C}$ and Tmin average $\geq 20^{\circ}\text{C}$ OR day one with humidex ≥ 40 plus a forecast of at least one more day with humidex ≥ 40 .

Heat Alert 3: Days two or more with Tmax average $\geq 33^{\circ}\text{C}$ plus Tmin average $\geq 20^{\circ}\text{C}$ plus a forecast for at least next two days or more with Tmax average $\geq 33^{\circ}\text{C}$ plus Tmin average $\geq 20^{\circ}\text{C}$ OR day two or more with humidex ≥ 40 plus a forecast of at least one more day with humidex ≥ 40 OR forecast of at least one day with humidex ≥ 45 plus a forecast of at least one more day with humidex > 40 .

ⁿ A best-fit curve is shown with a thick solid line and a 95% confidence interval is shown with two thin dotted lines.