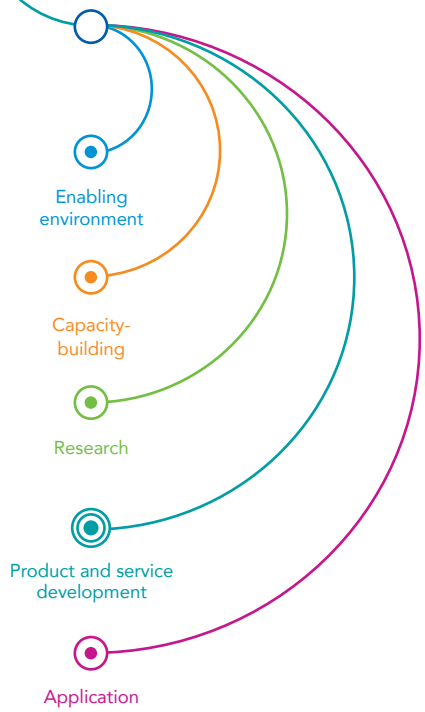
CASE STUDY



EARLY WARNING SYSTEMS

SUPREME: AN INTEGRATED HEAT HEALTH WARNING SYSTEM FOR QUEBEC

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CONTEXT

The southern and central regions of Québec can experience heat waves that are responsible for a substantial increase in human death and morbidity over urban and suburban areas *(63)*. By 2050, significant growth in summer temperatures is very likely *(64)*, along with a probable increase in the occurrence and severity of heat waves. The rapidly ageing population in Québec, the management of heat waves, the capacity of the population to adapt in urban areas, all constitute a major challenge for public health authorities. These problems cannot be addressed without the exchange of expertise between the health and hydro-meteorological communities.

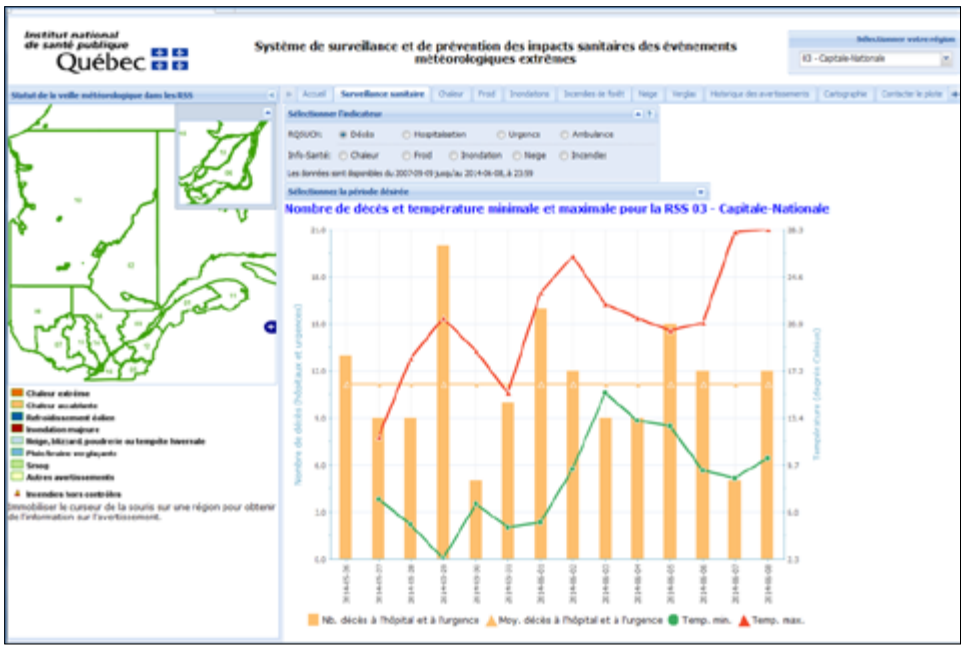
NEW APPROACHES

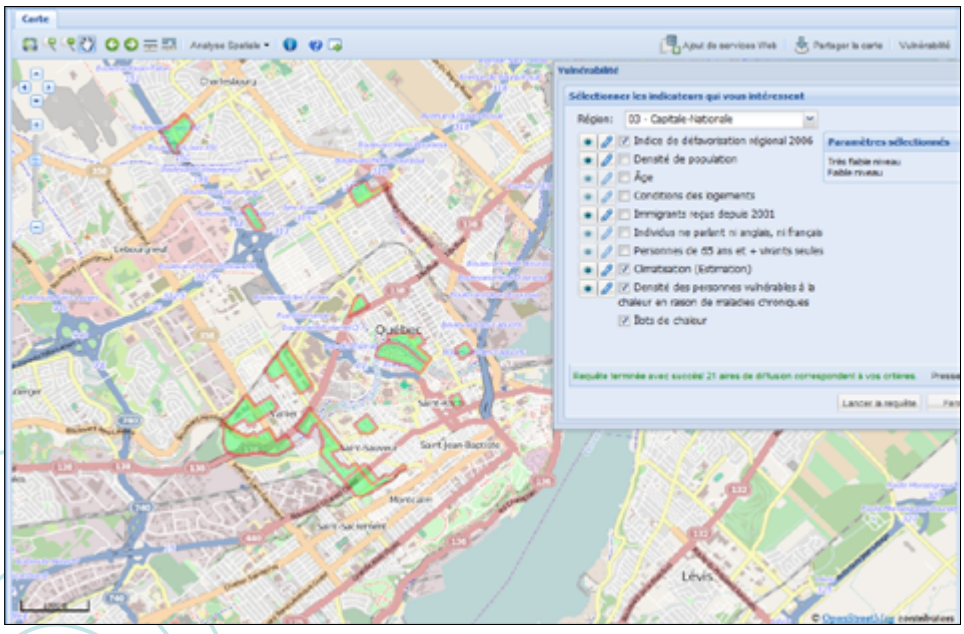
We present here an integrated platform developed for emergencies (weather vigilance), the result of a collaboration between the Institut National de Santé Publique du Québec (INSPQ), the Ministry of Public Security (Québec), and Environment and Climate Change Canada's (ECCC) Meteorological Service of Canada (MSC).

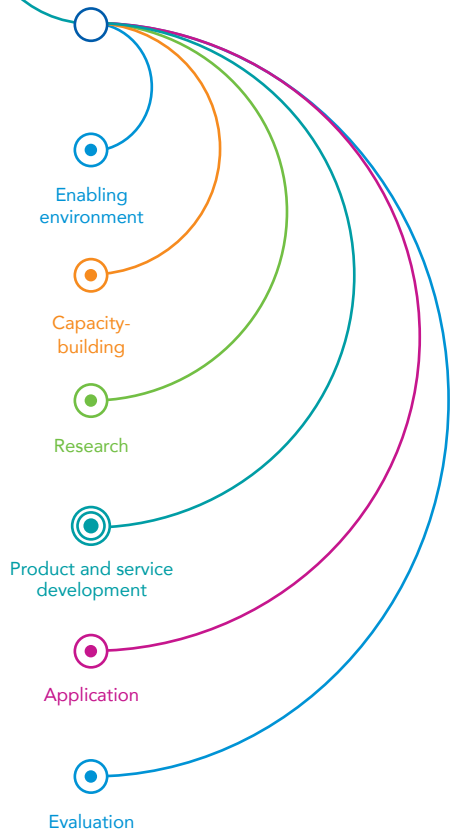
The SUPREME system, developed by the INSPQ in 2010 *(65)* together with a users committee, provides access to indicators that relate exposure to hazards (temperatures, urban heat islands, etc.), socioeconomic characteristics of neighbourhoods (population density, deprivation index, etc.), health problems (deaths, emergency room admissions, etc.), and follow-up during and after an intervention by field teams. Post-event reports are produced regionally and aggregated annually.

In Québec, SUPREME (Figure 5.25) currently represents the sole common source of relevant and real-time information at the provincial level for extreme weather hazards. The SUPREME system was implemented through group training sessions in 2010 and 2011, which helped develop a common understanding of extreme heat thresholds and essential preventive interventions. The system stimulates mobilization and collaboration between neighbouring regions, the ministry of health and the INSPQ that now cooperate for field intervention harmonization and comparison of vulnerability analysis. In 2008, the definition of intervention thresholds and the need for public health authorities to better understand the strengths and limits of weather forecast led to an intense collaboration between the INSPQ and the MSC that has endured.

Figure 5.25 Upper: Home page for the SUPREME system surveillance component. Lower: Example of a result of a query on heat vulnerability in Québec City. The zones in green simultaneously present a very high deprivation index, a very high chronic disease index and location within an urban heat island.







BENEFITS AND LESSONS

Since 2010, weather warnings from the ECCC MSC have fed SUPREME. The MSC can also provide early notification (up to a week ahead of the expected event) to INSPQ and the health network about upcoming threatening conditions.

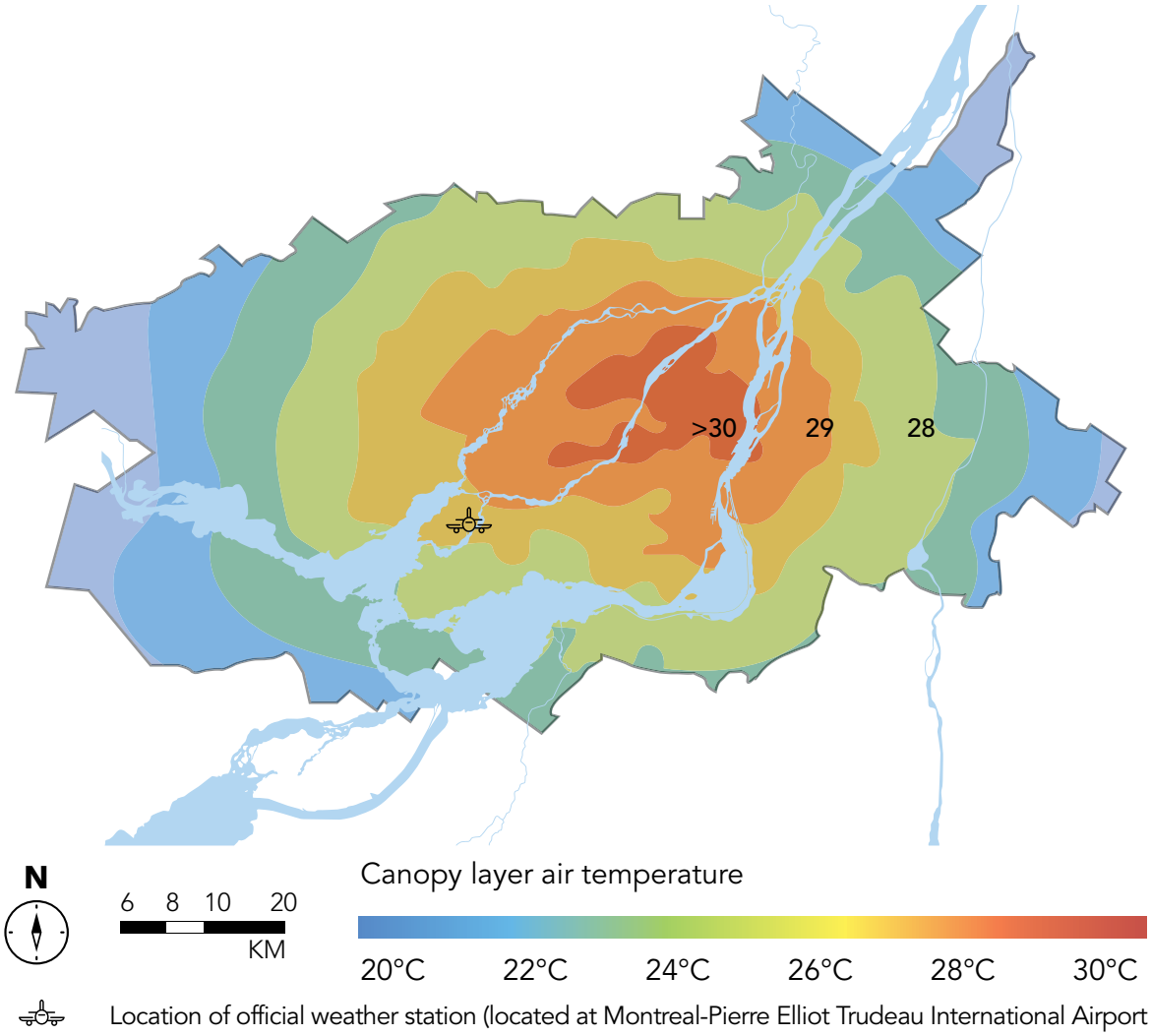
In metropolitan areas, regional health agencies base their heat alert thresholds and mortality/morbidity statistics on official weather stations, mostly located at airports, which are protected from urban influence. With environmental characteristics of residential areas significantly different from those found at airports, urban meteorological monitoring has now demonstrated that heat alert thresholds can be reached in certain localized areas (see Figure 5.26) before being observed at those official stations *(66)*.

Such meteorological measurement campaigns – such as the ones conducted during the summers of 2013 and 2014 in Montreal – allow the ECCC MSC to provide more precise air temperature information, allowing for targeted intervention strategies to help mitigate the risk from heat-stress on more vulnerable populations located in various urban sub-regions.

Risk communication theory highlights the importance of reaching vulnerable people and the general public with one voice. Working together on the heat health warning system enabled an essential understanding between partners to communicate heat health risk with one consistent risk communication.

The development of an integrated heat, health and warning system requires a robust understanding of meteorological and climatic conditions, and of the factors affecting population health, including vulnerability and exposure. The system discussed has also been applied to other hydro-meteorological hazards (cold waves, flood events, etc.) and over other areas, such as Northern Québec, where vulnerability and adaptation vary significantly.

Figure 5.26 Intra-urban air temperature variability in the Greater Montreal area (July 16, 2013, 9:00 PM).



ACKNOWLEDGEMENTS

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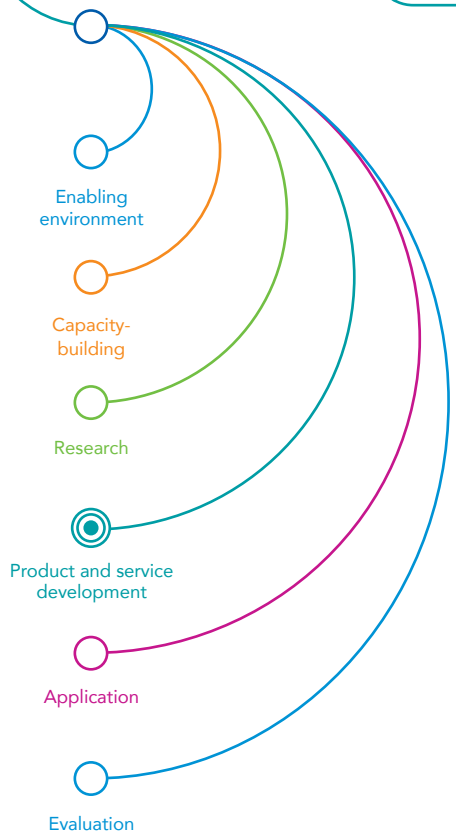
The system has been evaluated twice since 2010 for level of use, usefulness and general satisfaction. The system is considered very useful and overall satisfaction of the public health authorities using it was very high.

A simpler version of the system was also recently implemented in Niger and Morocco as a common platform to manage various weather-related problems, and to serve as a climate service for health application. This capacity-building initiative was part of a five-year research programme in climate change adaptation between governmental and academic institutions from Canada, Niger and Morocco, funded by the International Development Research Centre (IDRC), Canadian research agencies and various levels of government.



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