An integrated public health approach for extremes in Québec

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Budgets from the Ouranos Consortium and the Québec government’s 2006-2012 Climate Change Action Plan (PACC) both included an adaptation component with a number of health-related projects. The plan started for good in late 2007. It has been recently renewed until 2020.
Our approach is illustrative of what can be done at a province or state level. It includes:

Research/
Emergency preparedness/
Preventive actions

Official mandate from Ministry (2005) for 7 southern regions to operate a heat watch system by 2007 at the latest

Guide for floods as of 2014
Many priority actions in the PACC had deliverables focused on surveillance systems:
- for heat waves (2010)
- for all other extreme meteorological events (2012)
- for zoonotic and vector-borne diseases (2013)
A Common Platform

- We also decided in 2008 that we would prepare for all Extreme Meteorological Events (EME); a common platform for all EME became a natural conclusion.

- We decided to go for Open Source, real-time, Web services to access data and parameterable variables.
Methodology

An open source web application for the surveillance and prevention of the impacts on public health of extreme meteorological events: the SUPREME system

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Abstract

Background
The strengthening of monitoring systems included a research component, as well as improving forecasts in collaboration with Environment Canada and universities on various R&D projects. This includes transfer/adaptation to low-income countries such as Morocco and Niger within the IRIACC-FACE initiative of the IDRC in Canada.
Historical analyses of excess mortality as a function of heat episodes and the setting of new alert levels by geographic region (four regions with enough daily deaths).

International Journal of Biometeorology
October 2012

A general and flexible methodology to define thresholds for heat health watch and warning systems, applied to the province of Québéc (Canada)

Fateh Chebana, Barbara Martel, Pierre Gosselin, Jean-Xavier Giroux, Taha B. M. J. Ouarda
Grouping regions to get enough daily deaths for analysis...
Système de surveillance et de prévention des impacts sanitaires des événements météorologiques extrêmes
The Purpose of Surveillance

- Current indicators (province-wide): all warnings for weather, forest fires, floods, smog, etc.; current air pollution levels; urban heat islands 20m resolution; flooding areas; historic extremes; population density; chronic diseases index; deprivation index; age distribution; recent immigrants numbers; air conditioning by DA; location of swimming pools, cooling centers, green spaces; dwelling quality; location of all public institutions; daily deaths, hospital admissions, emergency room visits; infoHealth calls; ambulance calls; implemented steps in emergency plan; other contextual geographic info.
A vulnerability tool was developed within the SUPREME
By health region or for the whole province
All variables can be parameterized
By proportion or by number of people affected
Shows dissemination areas (DA) in the defined segment (e.g. top 10%)
Adaptation to heat in 3500 families living in the most deprived DA of our 9 most important cities (and a comparison between public housing and regular housing), in a multilevel analysis, due 2014.

Virtual cohort on cardiovascular disease and weather/climate (1996+), includes hospital admissions, deaths, medical visits; in progress, due 2015.
Automated calls for vulnerable people receiving home care (as determined locally) for smog and heat alerts (from the SUPREME system); detailed evaluation of behaviours and services consumption compared to control group. Due 2015.
Pilot projects to reduce UHI in deprived urban areas

$15 M for 38 projects with 2 to 1 co-funding (around $ 45 M worth)

Included white/green roofs; school yards; child care units; public housing; parkings; alleys and public spaces; urban agriculture.
Prevention projects

Urban Heat Island Mitigation Strategies

http://www.inspq.qc.ca/pdf/publications
Prevention projects

Avant

Après
Prevention projects

Avant

Après
Prevention projects

- Evaluation of cooling effect through numerical modelling of urban atmosphere (with Environment Canada)
- On site temperature/humidity, before/after
- Questionnaires on perception of cooling effects and usability for tenants
Prevention projects

Standard on parking planning and improvement for CC

Bureau de normalisation du Québec
Lessons learned from use in heat waves (and more):

- Portal very useful and appreciated by end users as a common and shared source of alerts, at risk areas (e.g. UHI) and vulnerabilities (age, poor housing, etc.); used for preparedness AND preventive actions (e.g. greening)
- Integration for the end user is the key concept behind the whole approach
Lessons learned

- The UHIs map is now used by several ministries, as is the parking standard
- Same for municipalities throughout province
- Demand and enthusiasm for greening projects is higher than ever, very visible and appreciated by the political class, so we are developing a greening consortium...
Thank you

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