Public health end users' info needs around heat waves

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Context: Quebec Action Plan on CC

I have been asked today to present how urban heat islands mapping fits into our current SUPREME surveillance system and discuss users’ needs
Many priority actions in the Action Plan had deliverables focused on surveillance systems

- for heat waves (2010)
- for all other extreme weather events (2012)
- for zoonotic and vector-borne diseases (no specific date)
The strengthening of monitoring systems included a research component for exploring the state of the links in recent decades between health and meteorological variables both in the short term and for seasonal or decanal trends.

Collaboration with EC and universities on various projects.
Alerts thresholds were very important. Historical analyses of excess mortality as a function of heat episode and the setting of new alert levels by geographic region (four regions).

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

Fateh Chebana, Barbara Martel, Pierre Gosselin, Jean-Xavier Giroux, Taha B. M. J. Ouarda
Several adjustments made during first year of use
Notion of extreme heat (historic heat waves with mortality ≥60% over baseline), not Environment Canada’s humidex of 40

- Weighted over 3 days based on forecasts, and three levels depending on regions:
  - Tmax 33°C Tmin 20°C
  - Tmax 31°C Tmin 18°C
  - Tmax 31°C Tmin 16°C
- Check Humidex after forecast
Other research projects underway with Environment Canada (Quebec region) to improve upon existing alerts (e.g. take into account precipitation/lack of) where UHI could be non significant/worse from a public health point of view.

Also info on reliability of alerts to be provided; longer lead time with related uncertainty
Before, during and after the event

The variables of relevance to surveillance systems:
- exposure to extreme weather events
- risk factors and social determinants of health and vulnerability
- monitoring of health status
- monitoring of interventions

Real and quasi-real time; fast reports and annual reports

Permanent users’ committees (the BOSS)
Surveillance Approach

- Real and quasi-real time; fast reports and annual reports
- Permanent users’ committees from health regions and ministry (the BOSS)
Surveillance Approach

- Indicators determined through systematic reviews for all hazards of interest: heat, cold, snow, rain, wind, forest fires, lightning. Agreed upon by all health regions. Published online (French only) at: [http://www.inspq.qc.ca/publications/theme8.asp](http://www.inspq.qc.ca/publications/theme8.asp)

- Availability of data also a limiting factor, but not much in our province
- We also decided early on that we would prepare not just for heat waves but for all other Extreme Meteorological Events (EME) as we hadn’t really applied surveillance to those matters in the past
- A common platform for all EME became a natural conclusion
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
A Common Platform

- All Open source software
- Development costs: about 125k
- Annual software licenses costs: 0$
- Maintenance and continuous development: about 125k/year
- Current users: all health regions and MSSS through the health intranet
- Future development in 2013-2014: Internet access for partners (EC, big cities, others)
de surveillance et de prévention des impacts sanitaires des événements météor...
Système de surveillance et de prévention des impacts sanitaires des événements météorologiques extrêmes
The Purpose of Surveillance

- It is easy to add layers of information as they become available or needed
- And to monitor alerts and deployment of response plans in real time
- Areas at risk, or more vulnerable areas, can be identified for the purposes of prioritizing preventive interventions or high risk areas for emergencies.
The Purpose of Surveillance

- Current indicators (province-wide): all warnings for weather, forest fires, floods, smog, etc.; actual 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.
The Purpose of Surveillance

- 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%)
Vulnérabilité

 Sélectionner les indicateurs qui vous intéressent

Région: Ensemble du Québec

- Indice de défavorisation régional 2006
- Densité de population
- Âge
- Conditions des logements
- Immigrants reçus depuis 2001
- Individus ne parlant ni anglais, ni français
- Personnes de 65 ans et + vivants seules
- îlots de chaleur

Vulnérabilité

Quelle(s) tranche(s) d’âge désirez-vous?

- Proportion de la population d’un certain groupe d’âge, par aire de diffusion
- Nombre de personnes d’un certain groupe d’âge, par aire de diffusion

Identifier les aires de diffusion dont la proportion de personnes d’un certain groupe d’âge, par rapport à la population totale de l’aire de diffusion, se situe parmi les 5 % les plus élevées.

Pour sélectionner plusieurs groupes d’âge, garder la touche "Ctrl" du clavier enfoncée et cliquer sur les groupes désirés.
Système de surveillance et de prévention des impacts sanitaires des événements météorologiques extrêmes
Conclusion

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 (UHI) and vulnerabilities (age, poor housing, etc.); used for preparedness AND preventive actions (e.g. greening priorities)

- Integration for the end user is the key concept behind the whole approach
Lessons learned from use in heat waves:

- Group training prior to heat events is crucial as it brings common understanding of risk factors, meaning of thresholds/alerts and uncertainty around forecasts.

- Going into full intervention mode is a difficult decision to take locally, as it needs to be made before the heat wave really hits.
Lessons learned from use in heat waves (and more):

- When we designed the system in 2008, we thought using census data was the safest bet to follow social vulnerabilities over time.
- We were wrong, as the government of Canada abolished the compulsory long form questionnaire in 2010 and Statistics Canada now says that its 2011 data is not reliable at the small area level (within cities).
Lessons learned from use in heat waves (and more):

- So we now realize that our deprivation data is not reliable anymore in the 2011 « census survey », along with other key variables; a provincial census is being discussed.

- Let’s hope that the USA continue to run a strong satellite program for the coming years and that such invaluable data doesn’t disappear too!
Thank you

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