

# Performances of a syndromic surveillance system during a heat wave

Loïc Josseran, MD, MPH (1), Nadège Caillère, MS (1), Dominique Brun-Ney MD(2), Laurent Filleul, PhD (1), Laure Beaujouan MS(2), Danièle Ilêf, MD(1), Pascal Astagneau MD, PhD (3).

(1) French Institute for Public Health Surveillance (InVS), (2) Assistance Publique des Hôpitaux de Paris, (3) Public Health Department – Université de Paris 6

## OBJECTIVE

This paper describes the performances of a syndromic surveillance system based on emergency departments (ED) during a heat wave.

## BACKGROUND

The 2003 heat wave in France (15,000 extra deaths in 10 days) led the French institute for public health surveillance to modify its public health surveillance system. One of the major objectives of this program was a real time surveillance based on emergency departments. Trials experiments started in 2004 with a daily automatic data collection from 20 hospitals in the Paris area (1). The objectives of this new system were: 1) to detect early all threats for public health; and 2) to measure the impact of an identified phenomena.

In 2006 France was concerned by a new heat wave. It was the opportunity for recording health data during a hot period through this real time system.

## METHODS

The study covered the period from June to August 2006 corresponding to the annual activation of the national heat wave plan. The evaluation was based on ED located in Paris and surrounding areas which are similar in terms of population, temperatures and health consequences.

A previous study revealed the reliable indicators for evaluating the impact of hot weather on diverse population using a syndromic surveillance system (2). Based on these results, sensitivity and predictive value positive (PVP) were calculated for the different syndromes and age groups. An alert detection algorithm was adapted from Semenza (3) and the gold standard used for this calculation was based on the temperatures (max and min) recorded for the target area.

The stability, timeliness of the system and the acceptability to medical staff were also assessed (4).

## RESULTS

Fifteen hospitals were selected and 118,119 visits were recorded during the 3 months.

Sensitivity and PVP were calculated and results varied according to diseases and age groups. For example, a sensitivity of 0.92, a PVP of 0.30 were found for the syndrome “hyponatremia all age” and a

sensitivity of 0.77, a PVP of 0.67 for the syndrome “hyperthermia all age”.

The stability of the system is good interesting with only 0.51% of missing data for the all period. Data were received each morning around 6am from the previous day. The complete analyses were published daily for the Ministry of Health before 1pm. No ED or medical staff refused to participate in the surveillance system.

## CONCLUSION

The good sensitivity and PVP for different syndromes allow the use of syndromic surveillance in a heat wave context. But additional indicators need to be considered.

If weather forecasts are necessary for organizing the a systematic response to a heat wave, real or near real time health data are essential. For emphasizing health consequences of heat waves. The timeliness, is a key point of such system. It allows stakeholders to gain several hours or days in managing critical situations due to hot weather. With this system, an adapted public health response is possible the day after the event. The acceptability of the system by medical staffs comes from the full automation of the data recording, selection, and transmission. It increases the reliability of the system in case of a massive outbreak or major public health event

Our results indicate that a syndromic surveillance may be applicable to other public health concerns from infectious diseases to environmental health consequences. Syndromic surveillance has a strong potential to improve public health early warning systems for extreme weather events. Additional research on the system and public health outcomes are needed.

## REFERENCES

- 1 -Josseran L, Nicolau J, Caillère N, Astagneau P, Brücker G. Syndromic surveillance based on emergency department activity and crude mortality: 2 examples. *Euro Surveill* 2006,11(12):225-29
- 2 – Josseran L, Caillère N, Brun-Ney D, Rottener J. Impact of the 2006 heat wave on the activity of emergency departments in France *BEH* 2007 22-23 :197-200
- 3 Semenza JC, Mc Cullough JE, Flanders D et al. Excess hospital admissions during the July 1995 Heat wave in Chicago. *Am J Prev Med* 199;16(4):269-277.
- 4 CDC Updated guidelines for evaluating public health surveillance systems. *MMWR* 2001/50(RR13);1-35

Further Information: Loic Josseran, MD, l.josseran@invs.sante.fr