

Introduction

1. Background

Following the heat wave in August 2003, InVS and Meteo-France collaborated to develop a heat health watch warning system (HHWWS), essentially based on a bio-meteorological indicator (BMI). The HHWWS also includes collection and analysis of indicators of mortality and morbidity at the local level: mortality in one city per department, emergency admissions to hospitals, intervention of emergency services (ambulance services, fire brigades).

The system was integrated into a national action plan.

- In 2004 and 2005, the plan was broken down into four action levels:
- a level of seasonal watch activated continuously from 1st June to 31st August (level 1),
 - a level of pre-alert when the National Weather Service (Météo-France) predicts that the BMI will be above the thresholds within 3 days (level 2),
 - a level of alert when the heat wave begins (level 3),
 - a level of maximum mobilization when the heat wave continues and other events than health appear: drought, electricity black-out (level 4).

The Institute for Health Surveillance (InVS) is responsible for collecting the information and for recommending an alert; however, the local authorities are responsible for implementing the alert.

2. Objectives

This study's objective was to evaluate that system in 2004 and 2005 in order to pinpoint the strengths and to propose some scientific and organisational improvements.

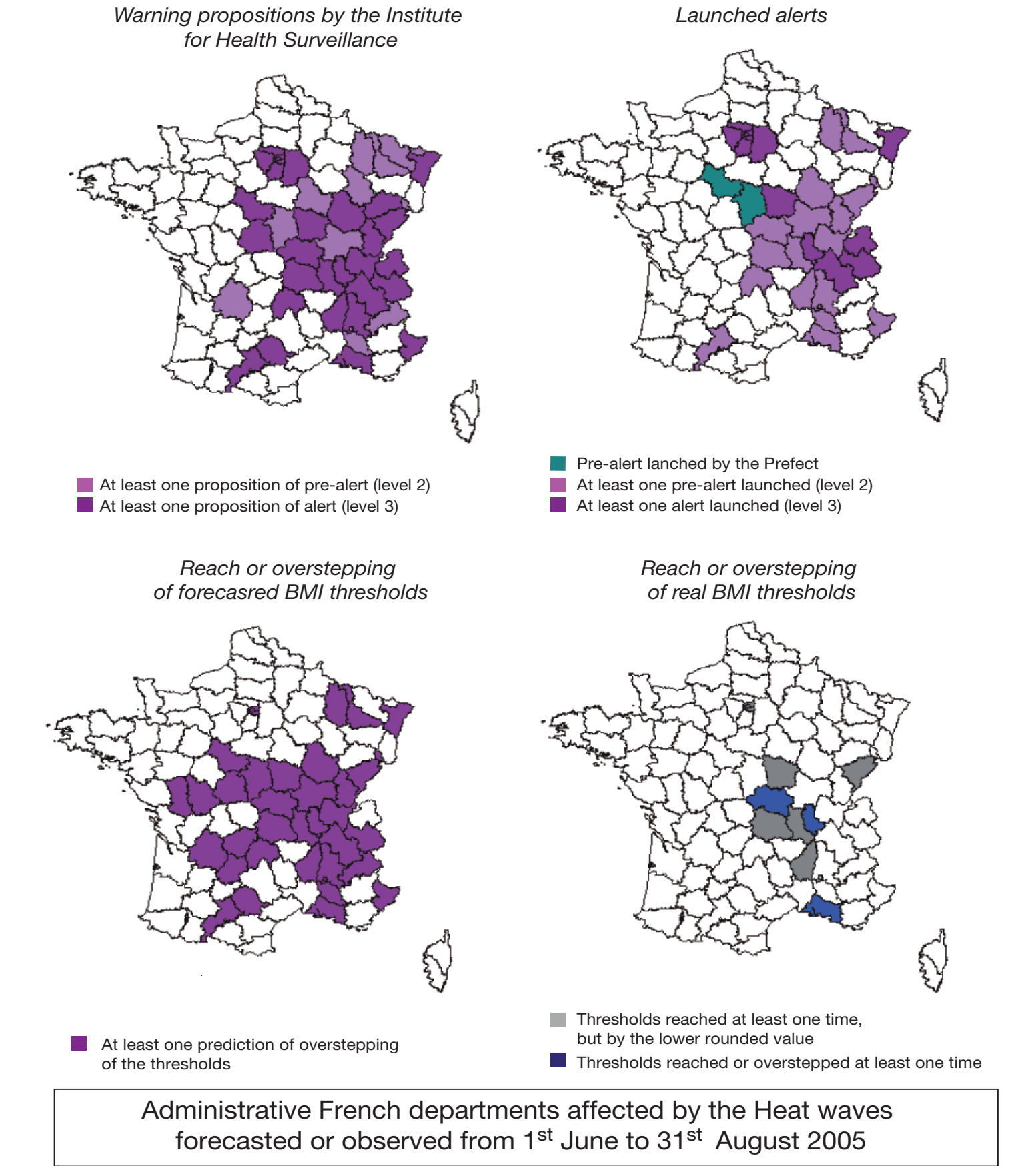
Methods

- The evaluation was carried out at the InVS and with the help of external partners:
- working group included the InVS, the National Weather Bureau and a research laboratory in Climate and Health,
 - consultants (Cemka-Eval),
 - international workshop.

- This evaluation took into account the following factors:
- scientific aspects: choice of the bio-meteorological indicators and determination of alert thresholds, choice of the meteorological stations, quality of the meteorological forecasts,
 - efficiency of the system: sensitivity of the system, simplicity, flexibility, traceability, adaptability,
 - organisation: cooperation between the different partners, collection and analysis of health data, communication,
 - cost estimated from the direct costs (person/time) and then estimated for the number of protected persons (children under one year and elderly above 75).

Results (1)

- Scientifically, the evaluation demonstrated:
 - that the alert thresholds were not always appropriate. The determination of the thresholds was based on a 30-year mortality-temperature study in 14 pilot cities, and then it was demonstrated that the thresholds were close to the 98th percentile of the temperature distribution. What should have been considered was the distribution of the BMI and not temperatures,
 - that we should take into account the uncertainties inherent in meteorological forecasts,
 - that we should integrate qualitative criteria such as atmospheric pollution and that some meteorological stations which were not very representative should be changed.
- In terms of the efficiency of the system, the evaluation demonstrated:
 - that the system proved to be adaptable, even during the period of operation, easily traceable (data, information) and based on good relations between the different partners. However, the alert was usually launched late in the evening, delaying the implementation of protective measures by the authorities and health services.
 - concerning efficiency, the number of alert recommendations in 2005 was high (74) compared to the number of observed BMI threshold (25), because of uncertainties in the meteorological forecasts and also because of the qualitative criteria taken into account in addition to the main indicator (see maps). Moreover, no alert was missed. This is an indication of quite a **protective system**.



Results (2)

- In terms of the organisation of the system, the evaluation demonstrated:
 - that it was difficult for the partners to understand the bio-meteorological indicator and all the parameters taken into account in the decision to launch an alert. This implied that the recommendation for an alert was not always followed by the authorities (see maps).
 - the 2004 evaluation indicated the necessity of setting up **monthly committees** which included partners having worked on alerts during the past month [mainly the weather services, national center for heatwaves and InVS regional offices (CIREs)].
 - the heavy use of **health data** will require better automation. The health data were collected in each region by the InVS regional offices and analysed before being sent the national level.
- As regards the cost of the system, the evaluation demonstrated that the cost per protected person was 13.7 euro cents.

Conclusion

This first evaluation allowed improvements to the system at a scientific and organisational level:

- some alert **thresholds** were shown to need an improvement as soon as 2004, and they were revised in 2005 and **qualitative criteria** as well as meteorological uncertainties were taken into account as well as **meteorological uncertainties**,
- we tried to improve the **communication** of alert criteria between InVS and the health ministry,
- the 2004 evaluation indicated the necessity of setting up **monthly committees**. These were set up in 2005 and proved to be very useful for the organisation and the evolution of the system

Automation of the health data collection and analyses was set up for 2005 and further improved in 2006 (Internet website for InVS and its regional office network). **A better coordination** between health and meteorological services has been set up.

The discussion of risk criteria was brought forward in the afternoon (as opposed to late evening) and as many decisions as possible were made during the meeting in order to begin the implementation of protective measures at an early stage.

Perspectives

Further improvements to the HHWWS should be considered, in particular the use of air masses as possible indicators of heat wave.

But the results of the evaluation has still shown that each country is specific in terms of available data, human resources, financial resources, objectives, and that it might not be useful to try to define a single system adaptable everywhere.