

## **Preliminary Survey on Heatwave Perception and Private and Public Heatwave Management Strategies - A case study in Bordeaux, France -**

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### **Synopsis**

This paper presents a preliminary study regarding extreme heat event management, in private homes and at the public policy level, as well as heat perception, focusing on the case of Bordeaux Metropole, an intercommunal structure centered around the city of Bordeaux, France. This preliminary study, notably through an ethnographic approach and long interviews, explores 1) public policies related to heat and heatwave events management, 2) individual perception of the heat and heatwave events, 3) individual measures taken to respond to the heat and heatwave events.

**Keywords:** heatwave, risk perception, risk management, public policy

### **1. Introduction**

Extreme heat events, or heatwaves, are generally characterized by several consecutive days of higher than average temperatures, often accompanied with high minimum temperatures at night.

These extreme temperature events can have a significant impact on society, with wide-ranging consequences such as agricultural losses, added strain to infrastructures and resources (for instance, in the form of power or water shortage), and socio-economic impact (for instance, on retail and tourism). Known to cause a surge in mortality and morbidity, heatwaves also have a significant health-related impact. When in conjuncture with other atmospheric factors such as pollution and high-humidity, or social factors such as aging population, heat-related health risks can increase further.

The possible extent of extreme heat events has been brought to public attention in recent years by the

large number of heat-related deaths during the 2003 heatwave throughout Europe and the 2010 heatwave in Russia.

With predictions of extreme temperature events, including heatwaves, increasing in frequency and length in the future, the impact on health in particular and society at large is likely to increase as well. Taking into consideration these predictions and the potential impacts of extreme heat events, the appropriateness and effectiveness of heat management measures, both at the private and public levels, need to be considered and assessed.

This paper presents the first step of a preliminary study regarding extreme heat event management, in private homes and at the public policy level, as well as heat perception. This study focuses on the case of Bordeaux Metropole, an intercommunal structure centered around the city of Bordeaux, France.

This preliminary study, notably through an ethnographic approach and long interviews, explores 1) public policies related to heat and heatwave events

management, 2) individual perception of the heat and heatwave events, 3) individual measures taken to respond to the heat and heatwave events.

The main results of this preliminary study highlight 1) the French national heatwave management plan ("Plan Canicule") and the way it is implemented at the regional and municipal levels, 2) as the result of long interviews, a generally poor awareness of heatwave measures implemented in the town of residence despite mild to pronounced concerns regarding extreme heat events.

## **2. Extreme heat events, impacts and public policy**

Extreme heat events, or heatwaves, can have a significant impact on society, with wide-ranging consequences such as agricultural losses, added strain to infrastructures and resources (in the form of power or water shortage), and socio-economic impact (on retail and tourism).

Known to cause a surge in mortality and morbidity, heatwaves also have a significant health-related impact. When in conjuncture with other atmospheric factors such as pollution and high-humidity, or social factors such as aging population, heat-related health risks can increase even further.

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With predictions of extreme temperature events, including heatwaves, increasing in frequency and length in the future, the impact on health in particular and society at large is likely to increase as well.

Taking into consideration these predictions and the potential impacts of extreme heat events, the general public's perception, knowledge and awareness of

heatwaves, as well as the appropriateness and effectiveness of heat management measures, both at the private and public levels, need to be considered and assessed.

### **2.1 Understanding Heatwaves: Definition & Thresholds**

There is no universal definition of the heatwave phenomenon: the temperatures and duration used to characterize it vary depending on geographical location and perspective (climatological point of view, purpose of research activity, meteorological vigilance measures, etc.).

However, a heatwave, or "canicule" in French, is generally considered as an episode of above average temperatures, with little difference between day and night temperatures, and a minimum duration of 3 consecutive days and nights.

While the above criteria are somewhat subjective, the French Meteorological Institute (Météo-France) also uses temperature thresholds. These thresholds differ from one department to another, taking into account seasonal normals and apparent temperatures, as well as the level of resistance or adaptation of the residents. The highest heatwave alert threshold is min.  $> 21\text{ }^{\circ}\text{C}$  and max. above  $>36\text{ }^{\circ}\text{C}$ , while the lowest heatwave alert threshold is min.  $> 18\text{ }^{\circ}\text{C}$  and max. above  $>31\text{ }^{\circ}\text{C}$ .

### **2.2 The 2003 Heatwave: a public policy game changer?**

The 2003 heatwave in France highlighted how the consequences of a heatwave result from the combination of natural causes and socio-political factors. While possible health impacts linked to heatwaves were known prior to 2003, few preventive measures were planned and the impact of previous episodes on mortality (as in the 1976 heatwave) remained unnoticed or unaddressed. Heatwaves have

been a highly underestimated risk in the French context, which can partly explain the high number of victims (est. 19000~25000).

### **3. Understanding the heatwave national management plan: “Plan National Canicule”**

Established in 2004, following the 2003 heatwave crisis, this plan is intended to inform and implement actions to protect people at risk in the event of a heatwave. It is activated annually between June 1st and August 31st (or longer if September temperatures warrant it). It is divided in four distinct levels, each activated on the base of biometeorological indicators, and each prompting a series of actions and implementation of measures at the local, departmental and/or national levels. Please see below a general outline of each level.

#### **Level 1: Seasonal watch**

- Monitoring of weather conditions and temperatures to identify the arrival of a possible heatwave.
- The French national meteorological service (Météo-France) and the French Institute for Public Health Surveillance (InVS) monitor several biometeorological indicators (3-day averages of minimum and maximum temperatures, intensity, duration, extension, expected geographical, atmospheric pollution, etc.).
- A hotline, "heatwave information service", (free call from a landline) is open Monday to Saturday, 8am to 8pm. from June 21<sup>st</sup>.

#### **Level 2: Heat warning**

- Activated in case of significant probability of going to the next level in the following days.
- Reinforced communication actions with the public.
- Possible increase in the level of surveillance of vulnerable citizens (retirement homes, health workers in relation to elderly people, such as home nurses).

#### **Level 3: Heatwave alert**

- Activated by department prefects in the event of an alert issued by the General Directorate of Health, after an evaluation by Météo-France and the Institute for Public Health Surveillance.
- Reinforced information and preventative actions targeting vulnerable people (due to age or disability). Health facilities must stock up on water and health supplies specific to extreme temperatures. The plan also reminds outdoor workers to take special precautions.
- Common sense measures are reminded to the entire population (keeping the house cool by closing windows and shutters during the day and opening them at night and in the evening if it is cooler. Drink, wet body and go to cool places like cinemas or libraries).

- Activation of Blue Plan (specific to housing facilities for the elderly), White Plan (specific to medical facilities), Vermeil Plan (specific to isolated handicapped and/or elderly individuals) and Red Plan (specific to civil defense and fire departments to respond to extraordinary circumstances).

#### **Level 4: Maximal mobilization**

- Activated at the national level on instruction from the Prime Minister if the heatwave is aggravated by other factors (ex.: drinking water shortage, overcrowded health facilities).
- It allows the use of additional civil or military means as necessary.
- To date, it has never been activated.

### **4. Preliminary Results**

These preliminary results outline the general trends gathered from interviews conducted Dec. 2017~Jan. 2018. The entire narrative data collected during these interviews will need to be further categorized and analyzed to gain more precise results.

#### 4.1 Managing heat in private homes

Interviewees in the sample tend to rely on the “natural” isolation of their home. Few (<10%) are equipped with air-conditioning systems or fans.

Opening windows at night and closing windows and shutters during the day was the most commonly mentioned measure (>90%).

Interviewees in their 50s and older also mentioned the use of hand-held fans (approx. 30%). Several interviewees (in their 40s) also mentioned staying at work longer in air-conditioned buildings.

#### 4.2 Perception of heat/heatwave & Awareness of public measures

While interviewees had mostly positive associations for “heat”, associations for “heatwave” revolved mainly around “pénibilité” (harsh conditions) and “nuisance” (no mention of “danger”).

Little correlation between dislike of the heat and/or reported high sensitivity to the heat and knowledge of public measures related to heatwaves.

#### 4.3 Monitoring vulnerable people

Since 2004, town halls are required to register the most vulnerable people and mobilize to do so local postal service branches, bakeries and associations. Based on this registration, associations/public services can call to check on them. If a registered person does not answer the phone when they are supposed to be home, a referral person (or the fire department) will be immediately notified.

Overall poor knowledge/understanding of this measure within the sample. Interviewees who were aware of the measure (<10%) hadn't registered due to misunderstanding regarding the registration process.

### 5. Conclusion

The complete collected data has yet to be fully categorized and properly analyzed. However a few distinctive trends are already emerging. One of them highlights the overall poor awareness/knowledge of heatwave-related public measures, despite reported mild to serious concerns regarding heatwaves across the intergenerational sample of interviewees. Elderly interviewees in particular knew “some measures have been put in place”, but most of them knew little about the local implementation of the heatwave management plan and how to benefit from them.

Next steps in this study will focus on 1) risk perception related to heatwaves, reach and efficacy of heatwave-related communication and management plans, 2) implementation of heatwave-related public policies at the local level and the weight of the heatwave management plan on local administrations.

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#### References

- Fouillet A, Rey G, Wagner V, et al. (2008): Has the impact of heat waves on mortality changed in France since the European heat wave of summer 2003? A study of the 2006 heatwave. *International Journal of Epidemiology*, vol.37(2), pp. 309-317.
- Institut de Veille Sanitaire. (2003) : Les conséquences sanitaires liées à la canicule, alerte nationale, Rapport annuel.  
[http://www.invs.sante.fr/publications/2004/rapport\\_annuel\\_2003/alertes\\_canicule\\_2003.pdf](http://www.invs.sante.fr/publications/2004/rapport_annuel_2003/alertes_canicule_2003.pdf)
- Laaidi K, Ung A, Wagner V, Beaudou P, Pascal M. (2012): Système d'alerte canicule et santé :

- principes, fondements et évaluation. 19 p.
- Le Tertre A, Lefranc A, Eilstein D, et al. (2006):  
Impact of the 2003 heatwave on all-cause mortality  
in 9 French cities. *Epidemiology*, vol.17(1), pp.  
75-79.
- Ledrans M. (2006): Impact sanitaire de la vague de  
chaleur de l'été 2003 : synthèse des études  
disponibles en août 2005. *Bulletin épidémiologique  
hebdomadaire*, vol.19-20, pp. 130-137.
- LeTertre A., Laaidi K, Jossieran L, Wagner V, Jouglà  
E, Empereur-Bissonnet P. (2007): Première  
estimation de l'impact de la vague de chaleur sur la  
mortalité durant l'été 2006, France. *Bulletin  
épidémiologique hebdomadaire*, vol.22-23, pp.  
190-192.
- Ministère des Solidarités et de la Santé (2007) : Plan  
National Canicule 2017.  
[http://solidarites-sante.gouv.fr/IMG/pdf/pnc\\_actua  
lise\\_2017.pdf](http://solidarites-sante.gouv.fr/IMG/pdf/pnc_actua<br/>lise_2017.pdf)
- Rey G, Fouillet A, Bessemoulin P, Frayssinet P,  
Dufour A, Jouglà E. et al. (2009): Heat exposure  
and socio-economic vulnerability as synergistic  
factors in heatwave-related mortality. *European  
Journal of Epidemiology*, vol.24(9), pp. 495-502.
- Vandentorren S, Bretin P, Zeghnoun A,  
Mandereau-Bruno L, Croisier A, Cochet C. et al.  
(2006): August 2003 heat wave in France: risk  
factors for death of elderly people living at home.  
*European Journal of Public Health*, vol.16(6),  
pp.583-591.

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