

The Aftermath of a Heat Wave: a Research Challenge

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The European summer heat waves (2003) triggered numerous investigations (Conti et al. 2005; Grize et al. 2005; Heudorf and Meyer 2005; Holstein et al. 2005; Johnson et al. 2005; Pounadere et al. 2005; Simon et al. 2005; Stephan et al. 2005; Vandentorren et al. 2004). The majority of the studies focused on effects on mortality. This issue of SPM publishes two studies that made use of health service data, namely ambulance services (Cerutti et al. 2006) and symptom related calls to a National help line (Leonardi et al. 2006). The study in the southern part of Switzerland observed no clear increase in mortality but higher rates in ambulance services (Cerutti et al. 2006). The UK analyses reported higher total call rates but no clear association of the heat wave with specific symptoms apart from calls due to 'heat/sun stroke' problems (Leonardi et al. 2006). Both contributions demonstrate research challenges to provide interpretable information about the public health relevance of heat waves.

First, availability of well standardized health monitoring data is crucial to observing the consequences of an environmental change. From a public health and planning perspective, effects on morbidity and health services might be at least as important as the increase in deaths. Given that the effectiveness of the emergency response to a heat wave may affect the death toll, ambulance calls might be a more sensitive measure (Cerutti et al. 2006). Leonardi et al. had rather unique surveillance data available, namely NHS Direct which is a call line where people with health problems get first advice (Leonardi et al. 2006). However, data used in these two studies are neither readily available nor is data collection internationally standardized.

Second, size and characteristics of the underlying population is crucial. Both studies demonstrate major limitations in this regard. Cerutti et al (2006). investigate heat wave effects in a rather small population, thus the power of the analysis is limited.

As shown by Grize et al., effects of the heat wave on mortality were rather strong in the Northern part of Switzerland – with >14000 observed deaths during the relevant period – but not clear in the South, where only 700 death occurred (Grize et al. 2005).

Third, the definition and degree of a heat wave is relevant, and the studies suggest a need for standardizations of methods. Else, results will not be comparable across studies, year, or regions. The heat wave was much less extreme and shorter in the Southern part of Switzerland (Cerutti et al. 2006; Grize et al. 2005), thus, the expected excess risk is smaller, and given the limited size of the region it comes with no surprise that the mortality results remain inconclusive. One can only speculate rather than investigate why ambulance calls but not death rates increased during the heat wave (Cerutti et al. 2006).

Last but not least, adequate analytic approaches are needed to fully understand the public health impact of environmental changes. The UK team opted for the unfortunate presentation of associations between temperature and the proportion of symptom specific calls rather than the changes in the absolute number of cause-specific calls. Whereas this crude analytic approach may be sufficient for monitoring purposes in a health department, it is not appropriate to investigate whether changes in environmental conditions (e.g. temperature) do affect a specific health ailment (e.g. breathing problems). Whereas Figure 2 convincingly shows that total calls increase with temperature, the association between temperature and the proportion of calls due to fever, vomiting, or breathing problems are not informative. These latter quantities depend clearly on changes in calls due to all other causes.

In summary, the studies show the potential use and limitations of survey data in environmental health tracking. To understand the contribution of heat waves on health, and to

serve public health and policy makers, it is crucial to standardize health surveillance, to use data sets large enough to test hypotheses, and to employ state of the art statistical approaches. One has to be aware that the presentation of 'negative findings' due to lack of power or other methodo-

logical problems can mislead policy makers and the public to believe that heat waves may not be a problem, thus not require preparedness nor preventive action. As seen in 2003, the consequences of such judgments may be fatal (Vandentorren et al. 2004).

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