Health impact of climate change in France
What are the challenges for the French Institute for Public Health Surveillance (InVS)?

Summary

It is now recognized that climate change will affect human health through direct and indirect mechanisms. Since the first report of the Intergovernmental Panel on Climate Change (IPCC), observations and models have contributed to better understand observed and projected climate changes, and their impact on environment and society. These changes occur not only in a context of environmental, demographic, and social changes but also of economic globalization.

Current observations show that the mean annual temperature has been increasing at an unprecedented pace. Out of the 1995-2006 twelve-year period, eleven years are among the warmest years since 1850. Warming has been more pronounced in the last 50 years, with an increase of 0.13 degrees per decade [0.10 to 0.16 °C] between 1956 and 2005. In 2007, the IPCC concluded that there was a probability above 90 per cent that the current warming was due to human activity. The mean temperature increase simulated by different climate models by 2100 could be comprised between 1.1 and 6.4 °C.

Climate change may impact several health risks and environmental events. Those are generally identified in French and European reports: emergence or reemergence of infectious diseases, increased frequency and intensity of extreme events, dramatic environmental changes. Based on the literature and on its expertise, the French Institute for Public Health Surveillance (InVS) attempted to assess available knowledge for each risk, describe existing surveillance and alert systems concerned by climate-related risks, and identify issues raised by climate change in terms of knowledge and surveillance.

The main conclusion is that the expected impact of climate change does not justify the development of new surveillance systems. However, existing systems should be strengthened through:
- the implementation of systematic and standardized studies on the health impact of extreme events in the short, medium and long terms. This requires defining health and social impact indicators relevant to public health efforts;
- the quantification of interactions between air pollution and temperature;
- the integration of the population and habitat dimension;
- the development of tools able to integrate the impact of air, housing, and urban pollution in the evaluation of policies to reduce greenhouse gas emissions;
- the promotion of research programmes (in the area of water, UV exposure, chemicals...), related to changes in exposure modes, societal and environmental changes;

Moreover, general recommendations were made in terms of surveillance and knowledge:

**SURVEILLANCE**

Existing surveillance and alert systems should be strengthened. It is essential to ensure data sustainability, quality and accessibility. A better linkage and consistency between health and environmental monitoring systems is necessary to reach integrated and relevant environmental health surveillance.

Currently, exposure surveillance is often limited to monitoring environmental contamination. However, climate and environmental changes could lead to changes in determinants of exposure. This implies the need for improving the characterization of exposure and health impacts, as well as taking into account determinants of exposure, which would contribute to better understand potential impacts, and target prevention efforts.

Besides, climate change may lead to new and unknown situations, like the 2003 heat wave, where specific monitoring systems may not be adapted. Real-time non specific surveillance (syndromic surveillance) provides then useful information for crisis management and detection of unexpected events. It also generates routine epidemiological data that can be processed through traditional monitoring systems to better understand long-term impacts.

**KNOWLEDGE**

Systematic analyses of the impact of extreme events may contribute to better assess future impacts and to guide prevention, management, and evaluation efforts.

Another important issue for public health is to take into account the current health impacts of policies implemented to mitigate aerosols and greenhouse gas emissions (GGE). These gases are emitted by human activities that generate services and
risks for human health. It is necessary to develop methods that provide decision makers with information on co-benefits enabling them to adopt policies with the best records in the short and long-terms.

In a broader and integrated risk management scope, interdisciplinary partnerships are needed to explore complex systems and put health impacts of environmental, social and economic changes into perspective. For InVS, this implies the implementation of multi-disciplinary working groups, as well as the development of definitions shared by different specialities. The need for interdisciplinarity is also reflected in the interaction with research. In many areas, the lack of knowledge on the interactions between climate variability, environment and health does not allow to rule on the actual risks and their likely developments. In particular, it is important to encourage data acquisition at scales of time and space suitable for the development of public health policies.

Last but not least, the importance of international collaborations should be highlighted, both to encourage the sharing of knowledge and experiences, in particular by taking advantage of the concept of "similar countries", countries that are experiencing a climate similar to the one projected in the years to come, but also to ensure that international negotiations and decisions take greater account of health impacts of climate change.

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