

Seminar for European and American Research on Climate and Health

The impacts of climate change on infectious diseases

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Washington

This report was initially prepared by Mathilde Pascal and Anne-Catherine Viso to allow information sharing within InVS. Therefore the report is not meant to be the formal minutes of the seminar as it represents their views from an InVS perspective, the French health agency responsible for early warning, alert and surveillance (www.invs.sante.fr).

This two-day seminar was organized by the Embassy of France, climate change being one of the priorities defined by the Scientific Office for 2009. This seminar focused on infectious diseases and could be the first of a series of seminars dedicated to climate change and health.

Participants from the US originated from universities (Michigan, Maryland, Princeton, and Columbia), National institute for health (NIH), National Ocean and Atmosphere Administration (NOAA), Centres for diseases control (CDC), Environmental protection agency (EPA). Participants from France came from the University of La Rochelle, Afsset, IRD, Ifremer, the French Ministry of Health and Sports and InVS.

Presentations from the universities were mainly focused on the analysis of meteorological variables to explain outbreaks in Africa and Asia (malaria, cholera, Chagas, meningitis...). Few presentations concerned the US territory, although the CDC showed that vector borne diseases and zoonoses were of major concern in the US.

Yet, the seminar allowed for fruitful discussions:

Climate change is still a sensitive topic:

Kris Ebi, representing the IPCC, could not attend the seminar as she was requested to stay in Copenhagen given the on-going debates on the IPCC report.

Mercedes Pascual, University of Michigan, highlighted the difficulties to organise fair peer-review of proposals and publications. Overall, the lack of evidence-based publications in the area of climate change and health was acknowledged compared to the large number of position papers.

The question was raised on maintaining scientific independence in the context of decision making in such a sensitive and political topic.

The IPCC Process: next steps (Kris Ebi, by phone)

The next IPCC (5th Assessment) report will be completed in March 2014. The report of impacts (IPCC working group 2) will have two parts: PART A for the global and sectoral aspects and PART B for regional aspects. In PART A there will be a chapter dealing with human health, another on human security and a third one dealing with livelihoods and poverty (among many others topics).

There is a need to reassess the information available in the previous (4th assessment) report. The human health chapter will cover extreme events, air quality, food and waterborne diseases, vector borne diseases and malnutrition as well as water quality, availability and sanitation, vulnerable groups and health inequalities. There will be a special report dedicated to the management of risk of extreme events and disasters to advance climate change adaptation.

Co-benefits of mitigation strategies will be covered by the mitigation report (IPCC working group 3).

The call for authors will be open from Jan-March 2010. Authors have to apply through their national IPPC contact point. The selection of the author teams will be done in May 2010.

Research (All)

Several projects presented at the seminar highlighted the impact of changes in land use (reforestation of agricultural lands, urban development), of socio-economic factors affecting the contacts between hosts, vectors and pathogens, of the ageing population and their associated diseases (e.g. CVD), of changes in behaviours.

The seminar highlighted all the complexity to interpret climate signal in health outcomes in the context of numerous other sociological, biological influences.

There is a confusion between correlation (mostly linked to seasonality) and causality. This aspect correlation vs causality was very much debated during the seminar. Many studies identified seasonal correlations and then try to make a hypothesis to support such correlations (for instance sea surface temperature and cholera). Climate change is too often used as a way to obtain funding (for instance from NOAA to use remote sensing data), without clear scientific added-value with regard to climate change and health issues.

There is also confusion between meteorological parameters, climate variability and climate change. Most projects are not working on climate change *per se*. Meteorological parameters can interfere in several ways with infectious diseases as:

- one of the drivers or as major driver.
- amplifiers
- initiators
- or they can «end » an outbreaks

There was also long discussion about the scale for studying climate change and health outcomes (importance to downscale models, non linear relationships).

Overall there is a lack of climate-change related projects, which does not mean that climate change is not real but rather represents biases resulting from the funding opportunities. Key issues identified are:

- Need to develop models to understand causalities
- Need to develop ways to downscale models
- Need to develop model of vulnerability taking into account different development pathways and different adaptation strategies.
- Need to develop different approaches for spatial and temporal modelling
- Opportunities provided by social epidemiology to study the dynamics of outbreaks.

NIH has launched a trans-NIH research agenda on the health effects of climate change. The preliminary goals are; understanding the aetiology and epidemiology of health threats, identifying most vulnerable populations, doing predictive modelling of health effects of climate change.

NIH has identified several projects dealing with of climate-related research which can grouped as follows

- Studies on health impacts or interventions directly related to climate and studies of the impact of inter annual variability of environmental factors. (7 projects funded in 2008)
- Studies on the effects of meteorological variables on biological systems, diseases, and public health (85 projects funded in 2008)
- Studies on diseases that are known to be climate-sensitive, but climate is not the main axis of the project (706 projects funded in 2008)
- In 2009, 5 new climate change projects were funded in the area of predictive modelling of the health effects of climate change: one on heat wave, one of respiratory morbidity linked to forest fires, and three on infectious diseases.

Social epidemiology (Mark Wilson)

The seminar offered an excellent opportunity to discuss the value of the integration of social epidemiology in the climate change and health debate. A very interesting debate took place on the integration of social factors in causal pathways. Questions addressed were: How to integrate social drivers in climate change and infectious diseases issues? How to create new conceptual framework? What are the most important

drivers of the web causation? What kind of models should be used?

Surveillance and warning systems (CDC)

CDC- National Centre for Zoonotic Vector Borne and Zoonotic Diseases:

CDC is looking at the impact of climatic factors on VBZDs:

- Distribution and abundance of vector and vector borne pathogens : definition of geographical limits of vector and reservoir species
- Role of climatic factors in predicting disease occurrence
- Role of climatic factors on disease transmission efficiency

CDC-NCEH is currently employing 9 persons on climate change, including 2 post doc currently based at Boulder University (VBD and Environmental health). The need to promote workforce development was acknowledged. Because of climate change we will face unexpected events like the 2003 heat wave that are far beyond historical experiences. There is a need to develop new ways of thinking, and to avoid disciplinary biases. To do so, CDC is planning to promote double training of post doc: one year training in climate or environmental sciences, one year in epidemiology.

Considering infectious diseases, they are approaching the question through the « one health paradigm »

Considering environmental health, heat wave prevention remains CDC 's priorities.

CDC has limited access to daily mortality and morbidity data, the French experience (heat wave, syndromic surveillance...) is thus very interesting for CDC-NCEH

Communication and perception (Sabrina McCormick, Science and Technology Fellow presently based at EPA)

S. Mc Cormick presented the West Nile Case Study in NYC (1999, 7deaths/59 cases in 1999) when Mayor of NYC decided to spray NYC with pesticides while aerial spraying had not been used since the 50s.

Main issues discussed depending on phases of concern:

- ↳ Diagnosis (Institutions, training, patients experiences)
 - Local to national engagement
 - NYC DOHMH, NY state, CDC Vector Borne programme
 - Human to animal health agencies (Bronx zoo and US army collaboration allowed the diagnosis of West Nile). There was an initial lack of communication across agencies.
- ↳ Public health interventions (social systems, behaviours)
 - Aerial spraying, communication thru media channel (media analysis in the New York Post and Washington Post with regards to articles in relation to interventions) about interventions. There was no consistency of messages about adequate interventions.
- ↳ Community response (media, governance, risk perception : community's perception or acceptance of the risks, trust of government)
 - Initial confusion, fear, anger.
 - Looking at media reporting: Government (++++), Expert (++) , Community (very little).
 - Lack of participatory governance with regards to pesticides applications, no consideration of risk perception (long term effects of cancer from pesticides vs West Nile...)
 - Law suits
- ↳ Prevention and Preparedness

This case study illustrates the communication problems resulting in a large population campaign against the use of pesticides (including court judgement). The problems were a lack of interaction between agencies and between the local and national level, associated to an inconsistent risk communication through the media.

For the future:

- ↳ Need for further exploration of the social dimension of emergent infectious diseases
- ↳ Attention to institutional factors in disease management
- ↳ Process for risk perception

Better communication channels between disciplines will lead to open up innovation pathways.

During the discussion, it was clear that huge lessons were learned with the West Nile outbreak. The public health system in the US has undergone major changes. Less vertical support to public health is growing not only to support CDs.

Issues of communication at local level were discussed:

- Local level is where community has to face the disease ;
 - The declaration of emergency has drawbacks (money flows but the emergency

situation is scary for the general public)

- Emerging disease is also scary in the general public. Perception and strategies were different in NYC and in the South (aerial spraying and foggers in houses)
 - The public was against the aerial spraying of pesticides. There were more concerned of cancer in 20 years than of West Nile given the small number of deaths in NYC.. Climate change is not as tangible as a friend undergoing chemotherapy (every one knows someone with cancer)
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- Changes in the use of media between 1999 and 2009: How to conduct a similar analysis today? How to approach the multiplicity of the media and how the different sources affect the public perception?

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