

# Climate Change and Public Health

United States Senate  
Committee on Environment and Public Works  
25 February 2009

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Centers for Disease Control and Prevention



# Mitigation:

## The need for Health Impact Assessment



# Potential Health Effects of Climate Change

## Climate change:

- Temperature rise
- Sea level rise
- Hydrologic extremes



HEAT



Heat stress, cardiovascular failure

SEVERE WEATHER



Injuries, fatalities

AIR POLLUTION



Asthma, cardiovascular disease

ALLERGIES



Respiratory allergies, poison ivy

VECTOR-BORNE DISEASES



Malaria, dengue, hantavirus, encephalitis, Rift Valley fever

WATER-BORNE DISEASES



Cholera, cryptosporidiosis, campylobacter, leptospirosis

WATER AND FOOD SUPPLY



Malnutrition, diarrhea, harmful algal blooms

MENTAL HEALTH



Anxiety, post-traumatic stress, depression, despair

ENVIRONMENTAL REFUGEES



Forced migration, civil conflict

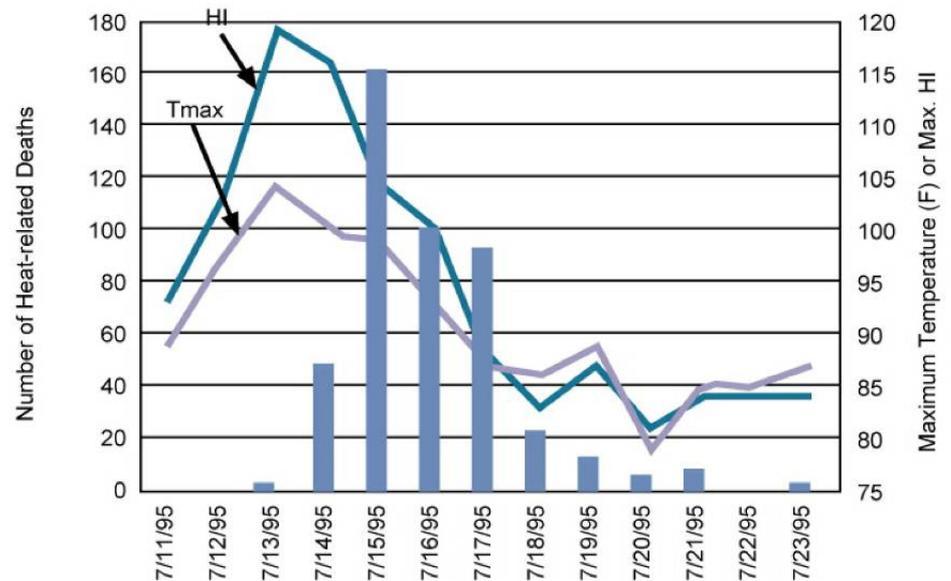
# Heat: A well understood threat

## U. S. Agents in Chicago Track a Subtle Health Hazard: Heat



Federal health agents are in Chicago trying to determine the contributing factors to the more than 500 deaths related to the heat in July. Coffins containing the bodies of unclaimed victims loaded on a truck by a Cook County morgue worker this summer for a mass burial.

### Heat Related Deaths in Chicago in July 1995



# Infectious diseases: Complex, much to learn

OPEN ACCESS Freely available online



## Warmer Weather Linked to Tick Attack and Emergence of Severe Rickettsioses

Philippe Parola<sup>1</sup>, Cristina Socolovschi<sup>1</sup>, Luc Jeanjean<sup>2</sup>, Idir Bitam<sup>1</sup>, Pierre-Edouard Fournier<sup>1</sup>, Albert Sotto<sup>3</sup>, Pierre Labauge<sup>2</sup>, Didier Raoult<sup>1\*</sup>

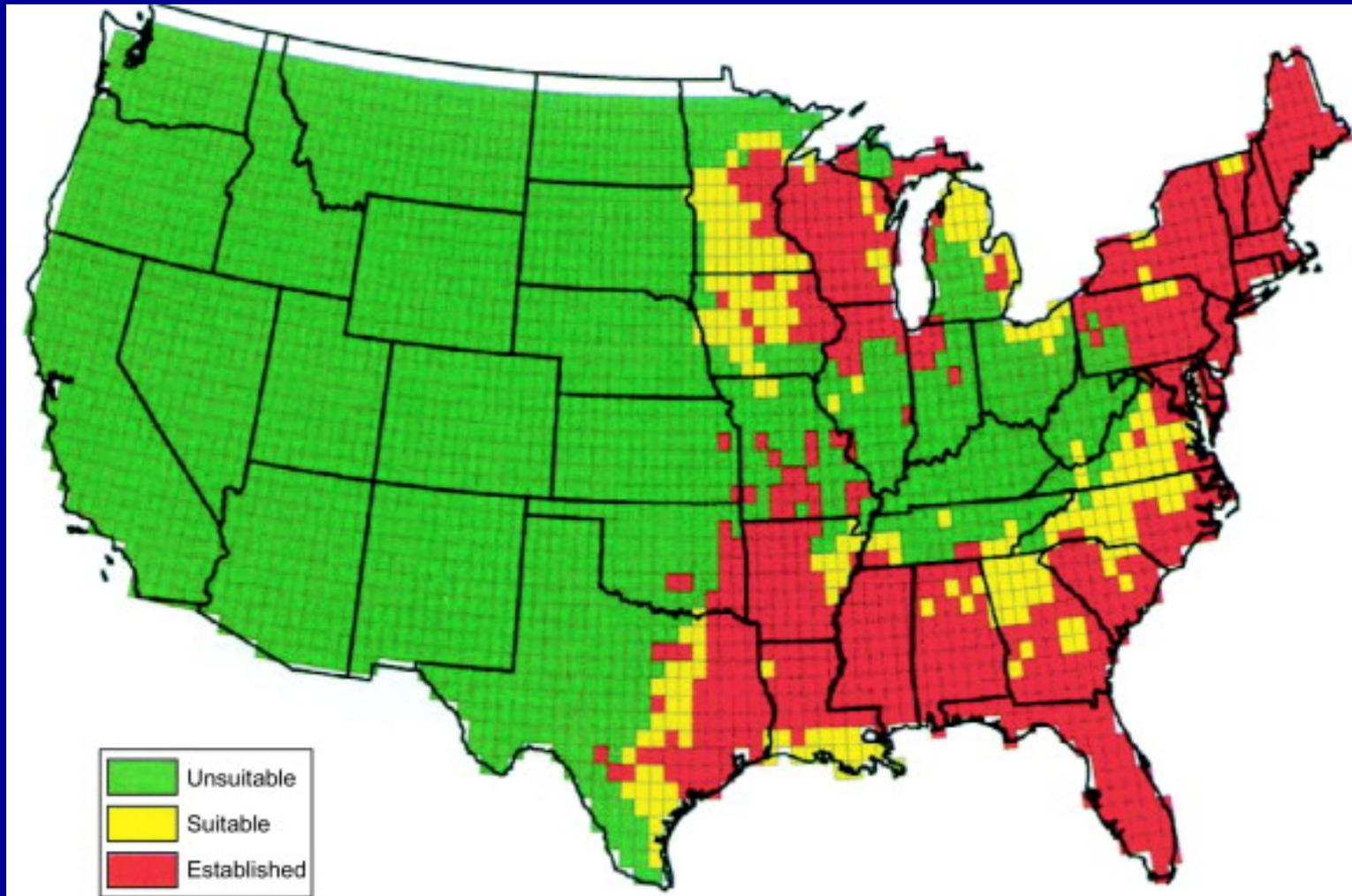
<sup>1</sup> Unité de Recherche en Maladies Infectieuses et Tropicales Emergentes, CNRS-IRD UMR 6236, WHO Collaborative Centre for Rickettsial and Other Arthropod Borne Bacterial Diseases, Faculté de Médecine, Marseille, France, <sup>2</sup> Consultation de Neuro-Ophthalmologie, CHU Nîmes, France, <sup>3</sup> Service des Maladies Infectieuses, CHU Nîmes, France

### Abstract

The impact of climate on the vector behaviour of the worldwide dog tick *Rhipicephalus sanguineus* is a cause of concern. This tick is a vector for life-threatening organisms including *Rickettsia rickettsii*, the agent of Rocky Mountain spotted fever, *R. conorii*, the agent of Mediterranean spotted fever, and the ubiquitous emerging pathogen *R. massiliae*. A focus of spotted fever was investigated in France in May 2007. Blood and tissue samples from two patients were tested. An entomological survey was organised with the study of climatic conditions. An experimental model was designed to test the affinity of *Rh. sanguineus* for biting humans in variable temperature conditions. Serological and/or molecular tools confirmed that one patient was infected by *R. conorii*, whereas the other was infected by *R. massiliae*. Dense populations of *Rh. sanguineus* were found. They were infected with new genotypes of clonal populations of either *R. conorii* (24/133; 18%) or *R. massiliae* (13/133; 10%). April 2007 was the warmest since 1950, with summer-like temperatures. We show herein that the human affinity of *Rh. sanguineus* was increased in warmer temperatures. In addition to the originality of these cases (ophthalmic involvements, the second reported case of *R. massiliae* infection), we provide evidence that this cluster of cases was related to a warming-mediated increase in the aggressiveness of *Rh. sanguineus*, leading to increased human attacks. From a global perspective, we predict that as a result of globalisation and warming, more pathogens transmitted by the brown dog tick may emerge in the future.

Parola P, Socolovschi C, Jeanjean L, Bitam I, Fournier P-E, et al. (2008) Warmer weather linked to tick attack and emergence of severe rickettsioses. *PLoS Negl Trop Dis* 2(11): e338. doi:10.1371/journal.pntd.0000338

# Range of suitable conditions for *Ixodes scapularis*, the Lyme disease vector



Source: Hess J, Malilay JN, Parkinson AJ. Climate change: The importance of place. *Am J Prev Med* 2008;35:468-78.

# Mental health: The need for a holistic approach



## Mental Health Problems From Katrina Persist

By Dorie Turner  
Associated Press  
Thursday, November 9, 2006; Page A12

ATLANTA (AP) — Hurricane Katrina left thousands of houses and

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#### 'A Very Long Recovery'

A psychologist talks about the emotional fallout from disasters like Hurricane Katrina and what can be done to help the victims cope.



Carlos Barria / Reuters

Mental health workers say many hurricane survivors may need psychological help in the weeks to come



## Katrina Survivors' Psychiatric Needs Unpredictable

'Cascade of disasters' magnifies trauma.

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## Is New Orleans Having a Mental Health Breakdown?

By RUSSELL MCCULLY/NEW ORLEANS

Tuesday, Aug. 01, 2006

Over the past several months, psychiatrist James Barbee has witnessed a disturbing trend among his patients in New Orleans — a noticeable slide from post-Katrina anxiety to more serious, and harder to treat, cases of major depression. At the same time, the city's system for dealing with mental health care is suffering a major breakdown of its own. "People are just wearing down," says Barbee. "There was an initial spirit about bouncing back and recovering, but it's diminished over time, as weeks have become months."

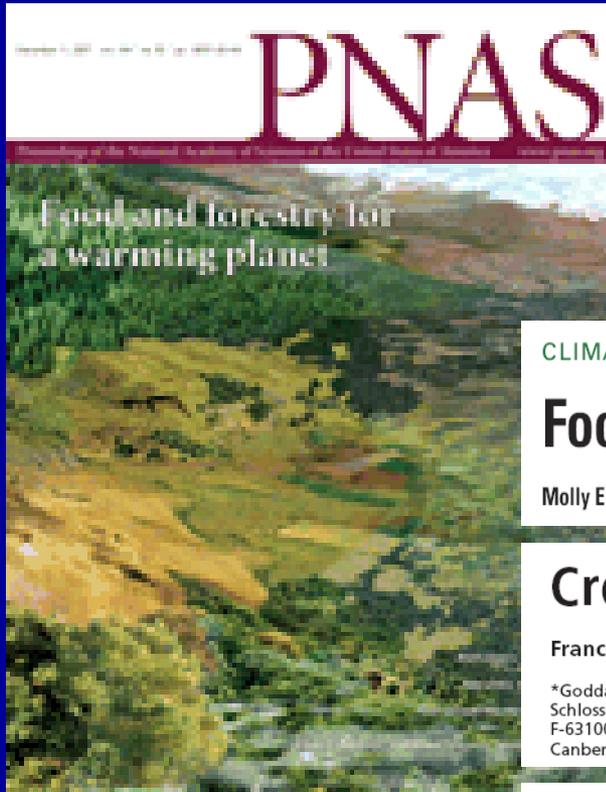
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# Food: The need to look “upstream”



## CLIMATE

### Food Security Under Climate Change

Molly E. Brown and Christopher C. Funk

Food insecurity is likely to increase under climate change, unless early warning systems and development programs are used more effectively.

### Crop and pasture response to climate change

Francesco N. Tubiello<sup>\*\*†</sup>, Jean-François Soussana<sup>§</sup>, and S. Mark Howden<sup>¶</sup>

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### Global food security under climate change

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# Public Health Action on Climate Change: Key Steps

- Surveillance and data collection
- Modeling and forecasting
- Direct actions to protect the public
- Communication
- Training and capacity building
- Research