



**Congressional Roundtable:**

**Addressing Climate Change Impacts on the  
World's Poorest Communities and U.S. Foreign Policy**

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**NIEHS**

National Institute of  
Environmental Health Sciences

*The mission of the National Institute of Environmental Health Sciences is to reduce the burden of human illness and disability by understanding how the environment influences the development and progression of human disease.*



# HEALTH EFFECTS OF CLIMATE CHANGE



*Temperature Rise* <sup>1</sup>

*Sea level Rise* <sup>2</sup>

*Hydrologic Extremes*

<sup>1</sup> 3°C by yr. 2100  
<sup>2</sup> 40 cm " "  
IPCC estimates

**Urban Heat Island Effect**

→ Heat Stress  
Cardiorespiratory failure

**Air Pollution & Aeroallergens**

→ Respiratory diseases, e.g.,  
COPD & Asthma

**Vector-borne Diseases**

Malaria  
Dengue  
Encephalitis  
Hantavirus  
Rift Valley Fever

**Water-borne Diseases**

Cholera  
Cyclospora  
Cryptosporidiosis  
Campylobacter  
Leptospirosis

**Water resources & food supply**

→ Malnutrition  
Diarrhea  
Toxic Red Tides

**Mental Health & Environmental Refugees**

→ Forced Migration  
Overcrowding  
Infectious diseases  
Human Conflicts

*Patz, 1998*



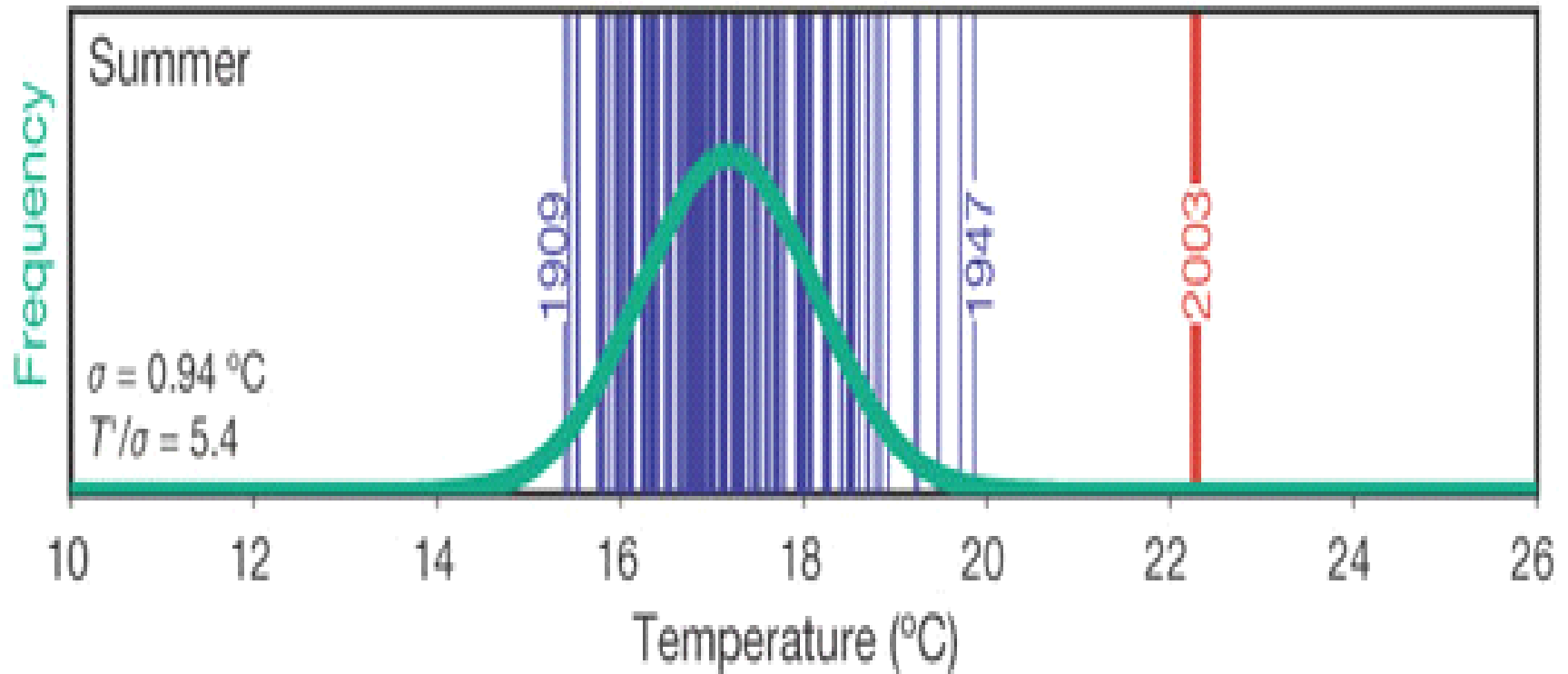
# HEAT WAVE - EUROPE



> 70,000  
deaths over  
11 days

**Heat Index Summer 2003**

# Comparing the 2003 Heatwave to past summer climate



European heat wave of 2003, from Schär et al., 2004

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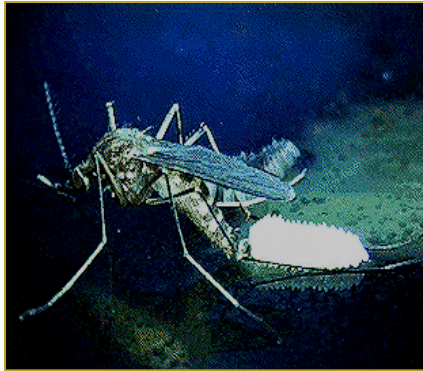
HEALTH PROFESSIONALS AND SCIENTISTS WARN OF SPREADING INFECTIOUS DISEASES.

# Global Warming's **greatest** threat may also be the **smallest.**



# West Nile Virus Transmission Cycle in Old World

Mosquito vectors  
Culex species



VIRUS



Dead - end Hosts



VIRUS



VIRUS



Avian re



**Source: R.J. Novak**  
USGS, National Wildlife  
Health Center



## New Findings: West Nile Virus

- **“The strain of West Nile virus (WNV) that emerged for the first time in North America during the record hot July, 1999, requires warmer temperatures than other strains. The greatest WNV transmissions during the epidemic summers of 2002-2004 in the U.S. were linked to above-average temperatures.”**

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# Vulnerable Groups Include:

- **Children < 5 years old (88% burden – WHO)**
- **Coastal populations**
- **Urban groups, including poor, elderly, marginalized**
- **Those living in drought prone regions, subsistence farmers**
- **Those with weakened immune systems**
- **Indigenous groups**
- **Subsistence Farmers**
- **Socio-economic**
- **Underlying Chronic Condition**



# Opportunities for International Cooperation

- **Strengthen science base to understand impacts, prevention**
  - define, measure**
- **Train interdisciplinary leaders in science and health**
- **Work with partners on systems approach that incorporates health more fully into decisions on adaptation and mitigation strategies**