

Centers for Disease Control and Prevention Agency for Toxic Substances and Diseases Registry



Julie Louise Gerberding, M.D., M.P.H.

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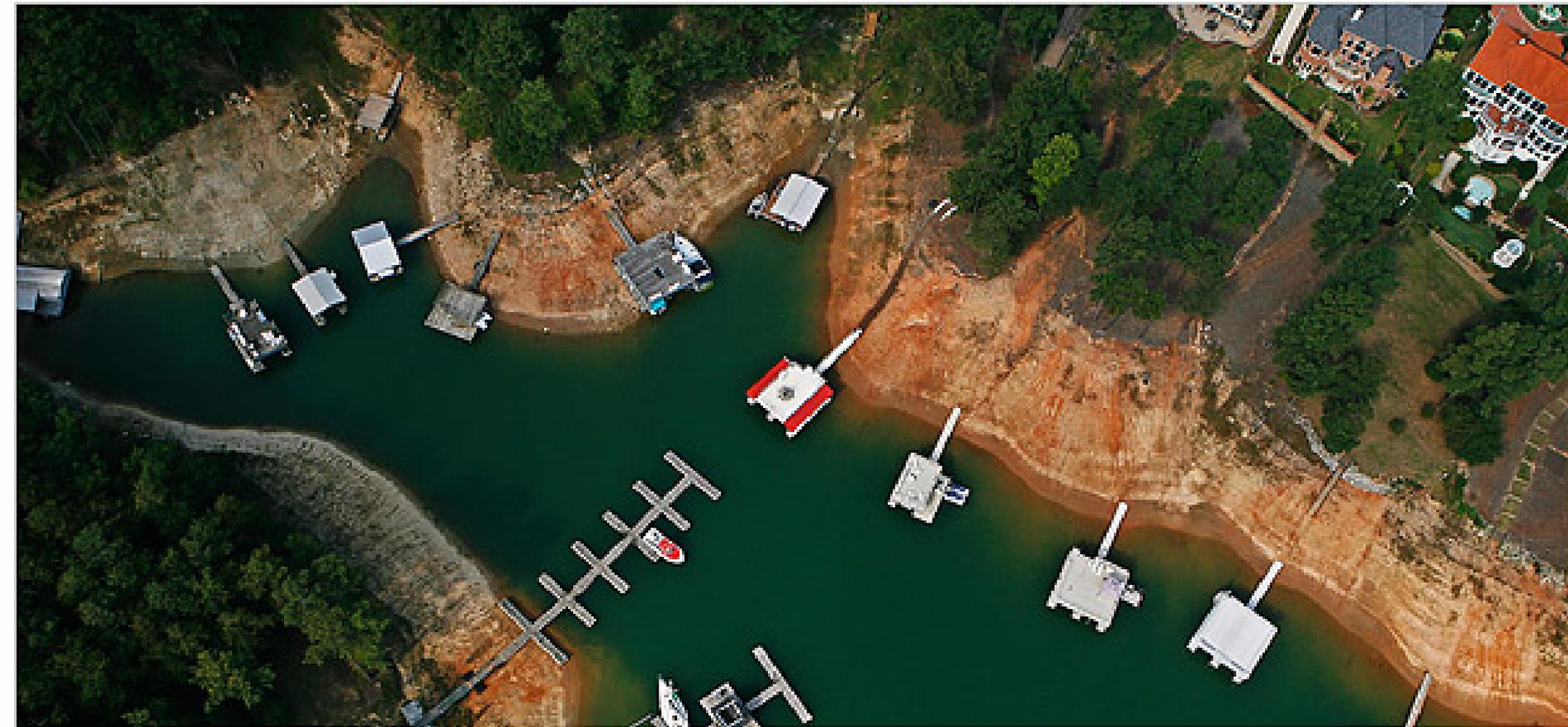
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The New York Times

By BRENDA GOODMAN

Published: October 16, 2007

Drought-Stricken South Facing Tough Choices



Poruya Dianat/The Atlanta Journal-Constitution

Climate Change: Potential Negative Health Impacts

Climate change:

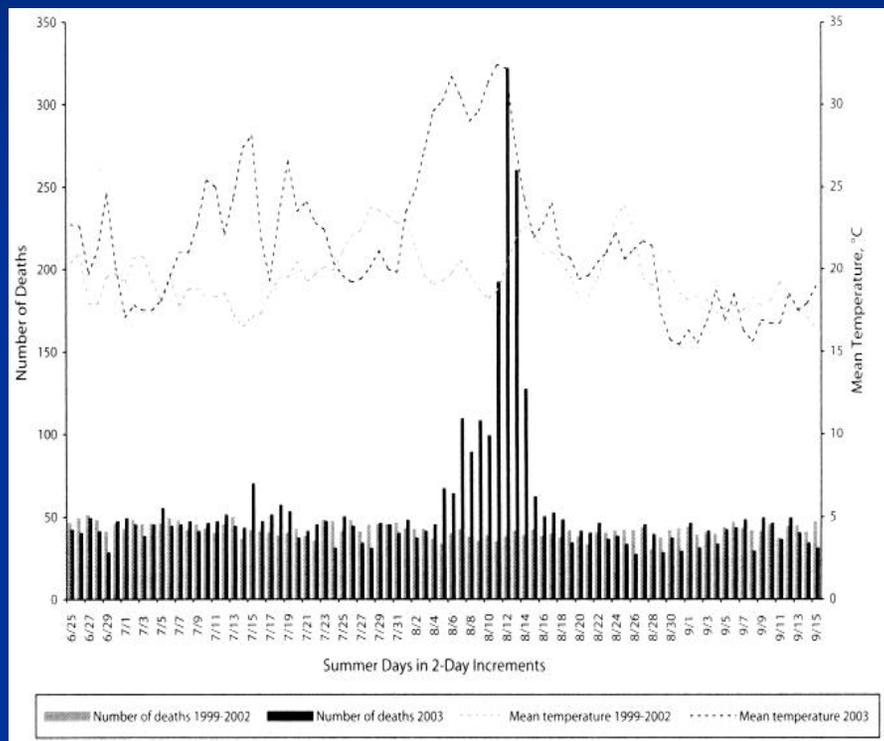
- Temperature rise
- Sea level rise
- Hydrologic changes



- ➔ Heat stress, cardiovascular failure
- ➔ Injuries, fatalities
- ➔ Asthma, cardiovascular disease
- ➔ Respiratory allergies, poison ivy
- ➔ Malaria, dengue, hantavirus, Rift Valley fever
- ➔ Cholera, cryptosporidiosis, campylobacter, leptospirosis, Vibriosis, Naegleria
- ➔ Malnutrition, diarrhea, harmful algal blooms, hygiene-related diseases
- ➔ Anxiety, despair, depression, post-traumatic stress
- ➔ Morbidity, mortality and migration

Health Impact of Extreme Weather European Heat Wave, 2003

TIME LINE (FRANCE)



Vandentorren et al. Mortality in 13 French cities during the August 2003 heat wave. *Am J Public Health* 2004; 94(9):1518-20.

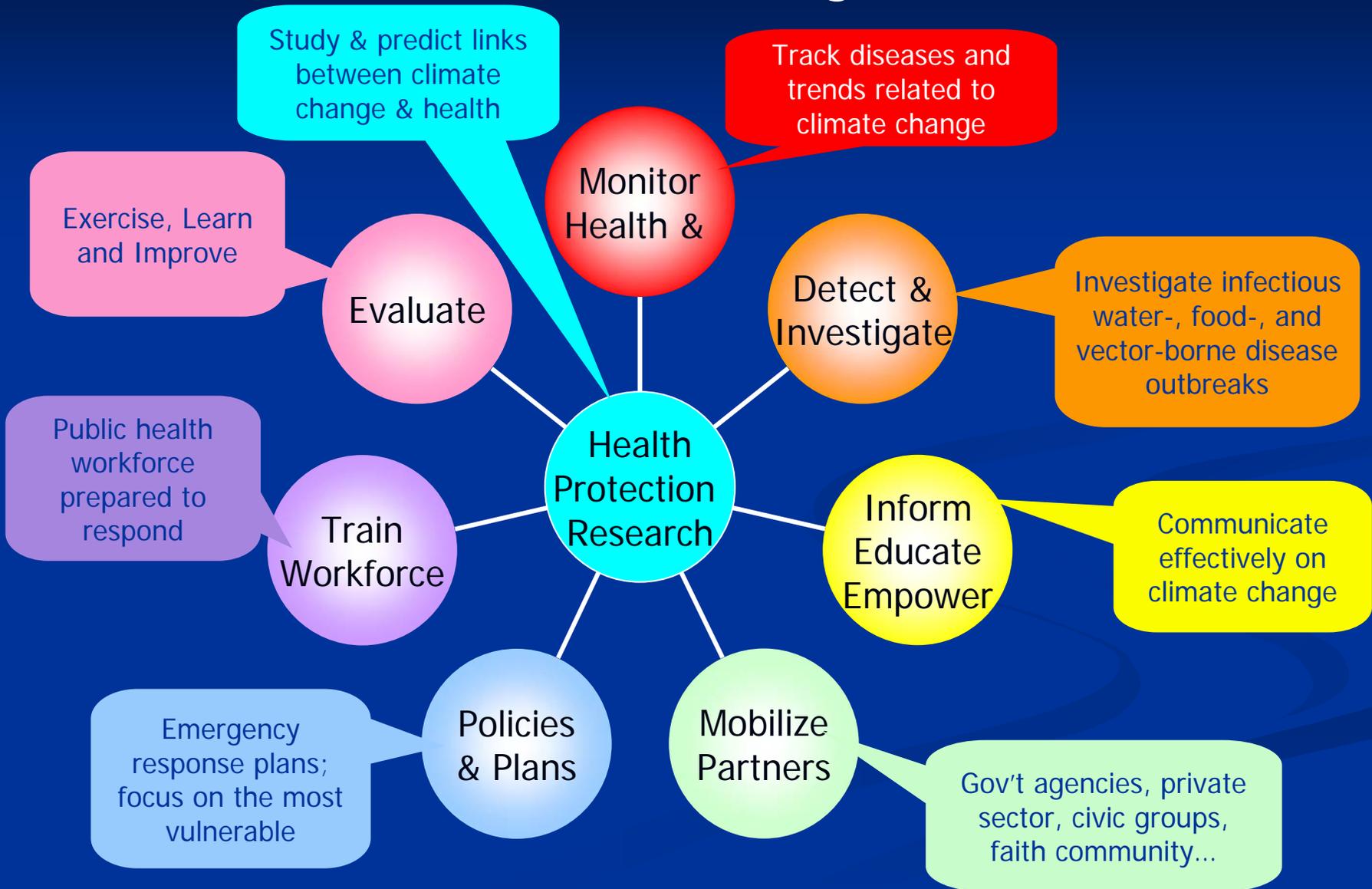
CONFIRMED MORTALITY

UK	2,091
Italy	3,134
France	14,802
Portugal	1,854
Spain	4,151
Switzerland	975
Netherlands	1,400-2,200
Germany	1,410
TOTAL	29,817-30,617

Haines et al. Climate change and human health: Impacts, vulnerability and public health. *Public Health* 2006;120:585-96.

CDC/ATSDR: Protecting Health

Climate Change



CDC's Health Protection Research

Articles

The Ecology and Evolutionary History of an Emergent Disease: Hantavirus Pulmonary Syndrome

TERRY L. WATZ, JAMES N. MILLS, CHERYL A. PARMENTER, THOMAS G. KEARZEE, ROBERT R. PARMENTER, JOHN R. VANCE CASTLE, OSWALD H. CALIGHER, STUART T. NICHOL, KENNETH C. ABBOTT, JOHN C. YOUNG, MICHAEL L. MORRISON, BARRY J. BEATTY, JONATHAN ROBERT J. BAKER, JORGE SALAZAR-BRUNO, AND CLARENCE J. PETERS

In the spring of 1993, a previously undescribed disease emerged in the Southwest, killing 10 people during an 8-week period in May and June. Early during this period, victims experienced flu-like symptoms for several days, but their condition suddenly and rapidly deteriorated as their lungs filled with fluid; death usually occurred within hours of the onset of this crisis period. There was no cure, no successful medication or treatment, and the disease agent (virus, bacterium, or toxin) was completely unknown. For the first few weeks, the mortality rate was 70%.

Researchers from many disciplines immediately focused on the outbreak, attempting to identify the agent and understand the causes and dynamics of the disease. Within weeks, scientists at the Centers for Disease Control and Prevention (CDC) identified the agent as a previously unknown hantavirus (Hantavirus), subsequently named Sin Nombre virus, or SNV (Nichol et al. 1993). Because hantaviruses are known to be transmitted by rodents, investigators undertook an intensive small mammal field sampling campaign in the border region of New Mexico and Arizona. Shortly thereafter, CDC identified the vertebrate host as a common and widely distributed rodent, the deer mouse, *Peromyscus maniculatus* (Soper & Childs et al. 1994). During the identification period, on-site medical staff physicians and medical students rapidly progress in developing treatment methods, and substantial progress in patient survivorship; nonetheless, the mortality rate fell only to about 40%, where it remains today.

The emergence of this new disease prompted many questions about its history, causes, and dynamics. Was this a truly

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MMWR

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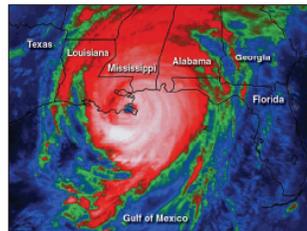
Public Health Response to Hurricanes Katrina and Rita — United States, 2005

On August 29, 2005, Hurricane Katrina struck the U.S. Gulf Coast, the eye making landfall at Plaquemines Parish, Louisiana (Figure 1). The event that followed made Katrina the deadliest hurricane since 1928 and likely the costliest natural disaster on record in the United States (1). Devastating storm surge, strong winds, and heavy rains caused widespread destruction in Louisiana, Mississippi, Alabama, and Florida (2). Storm-induced breaches in the levee system surrounding New Orleans flooded 80% of the city (3). The disaster was compounded when Hurricane Rita made landfall 26 days later near the Texas-Louisiana border, forcing cessation of hurricane-response activities in New Orleans and evacuation of coastal regions of Louisiana and Texas. The economic and health consequences of Hurricanes Katrina and Rita

extended beyond the Gulf region to affect states and communities throughout the United States. *MMWR* is highlighting the public health response to Hurricanes Katrina and Rita with two special issues. The first issue, published January 20, 2006, focused on public health activities in Louisiana. This second issue focuses on activities in other states directly or indirectly affected by the two hurricanes.

Hurricane activity is cyclical (2). Since 1995, the Atlantic Basin has been in an active hurricane phase, and the 2005 Atlantic hurricane season was the most active on record (Figure 2). Katrina was one of 27 named storms (i.e., tropical storms or hurricanes) observed in the Atlantic Basin (2), edip-

FIGURE 1. Colors of a satellite infrared image indicate varying cloud-top temperatures of Hurricane Katrina at landfall — August 29, 2005



Photo/Associated Press/National Oceanic and Atmospheric Administration

The Potential Impacts of Climate Variability and Change on Temperature-Related Morbidity and Mortality in the United States

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As observed following a 1980 heat wave in Kansas City, Missouri, heatstroke victims show low mortality rates in the absence of heat stroke (1,2). The onset of heatstroke occurs rapidly, including progressively severe symptoms, including delirium, and coma (4,5). Survivors of heatstroke often experience a 1-year mortality (6). Death within 1 year and heat-related mortality from all causes appear to peak within 1 to 2 days following heat exposure (6,7,8). One epidemiologic study of elderly nursing and following a heat wave indicated that a rise in the heat index (HI) is followed by an increase in the number of deaths due to heat (Figure 1) (9). The heat index is a measure of heat stress that combines air temperature and humidity (10). During periods of excessive heat, emergency room reports of acute increases in visits specifically for fainting, nausea, dizziness, and heat stroke (11,16). A Chicago study of elderly individuals with a wide range of underlying medical conditions who were hospitalized during the 1995 heat wave, in addition to heat-related conditions, these included stroke and respiratory disease, diabetes, and cardiovascular system disorders.

Exposure to extreme and prolonged heat is associated with cardiac, respiratory, and renal failure (7). The initial human physiological response to heat is vasodilation, thereby promoting heat loss through radiation, convection, and heat evaporation (8). The ability to respond to heat stress is limited by the capacity to increase the maximum cardiac output to increase the maximum rate of convective heat loss (12). The maximum cardiac output in man is a function of maximal heart rate, stroke volume, and venous return. Under mild heat stress, stroke volume is increased, but the body's ability to maintain temperature balance becomes a common cause of death and the temperature of 101.0°F (38.3°C) is a condition associated with a high risk of death (13). Other studies have included systemic heat distress, respiratory distress, dizziness, headache, and heatstroke (14). Heatstroke is a medical emergency, and mortality is not currently recorded close to heat stroke.

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CDC's Health Protection Research



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