

# Climate Change and Public Health: CDC's Role



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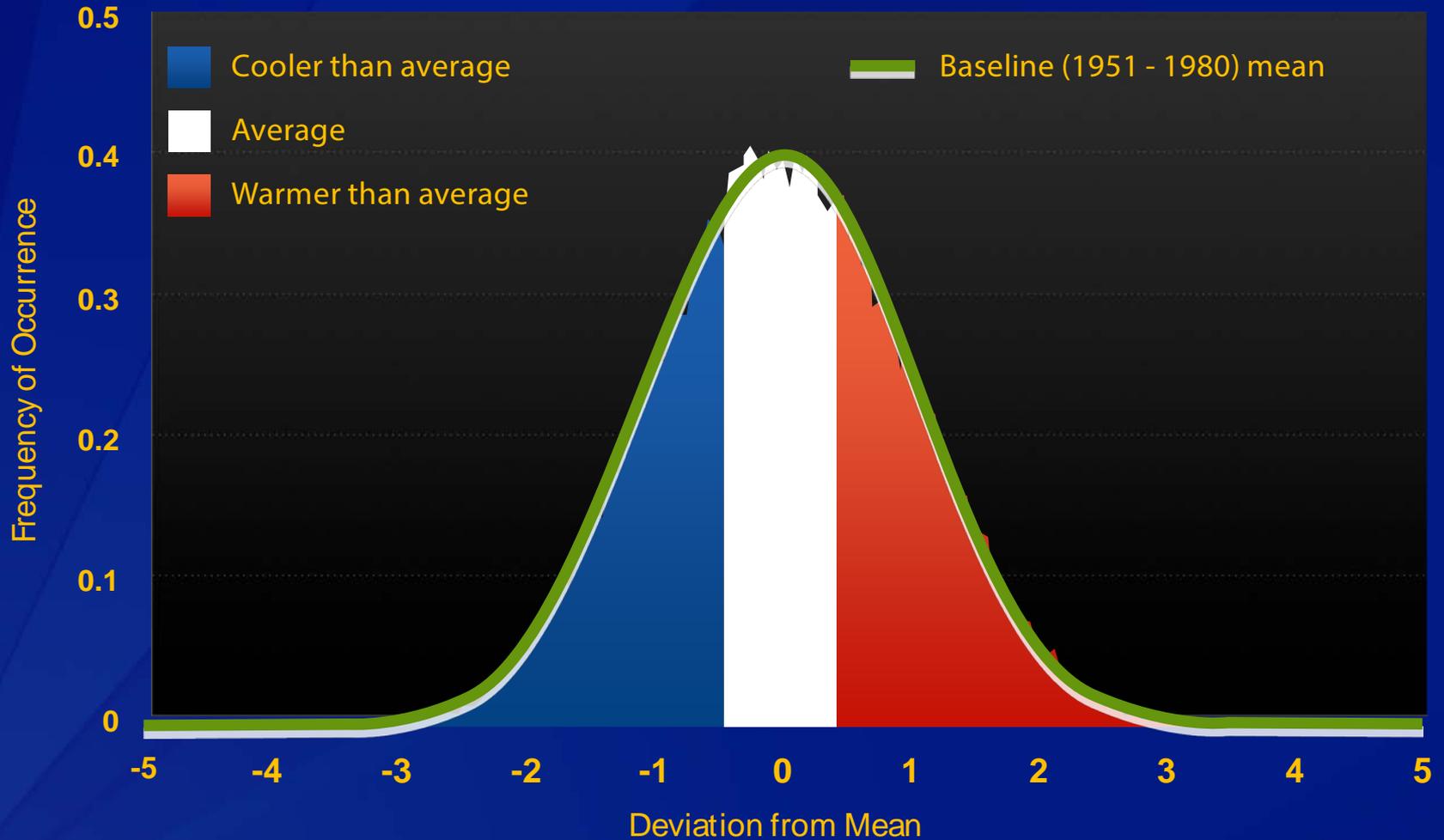
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National Center for Environmental Health  
Centers for Disease Control and Prevention

# Climate Change Science: Key Findings

- ❑ Climate change is altering both the average (mean) global temperature *and* the global frequency of extremely hot temperatures (variance)
- ❑ The impacts of climate change will vary significantly by region; some places are warming faster than others.

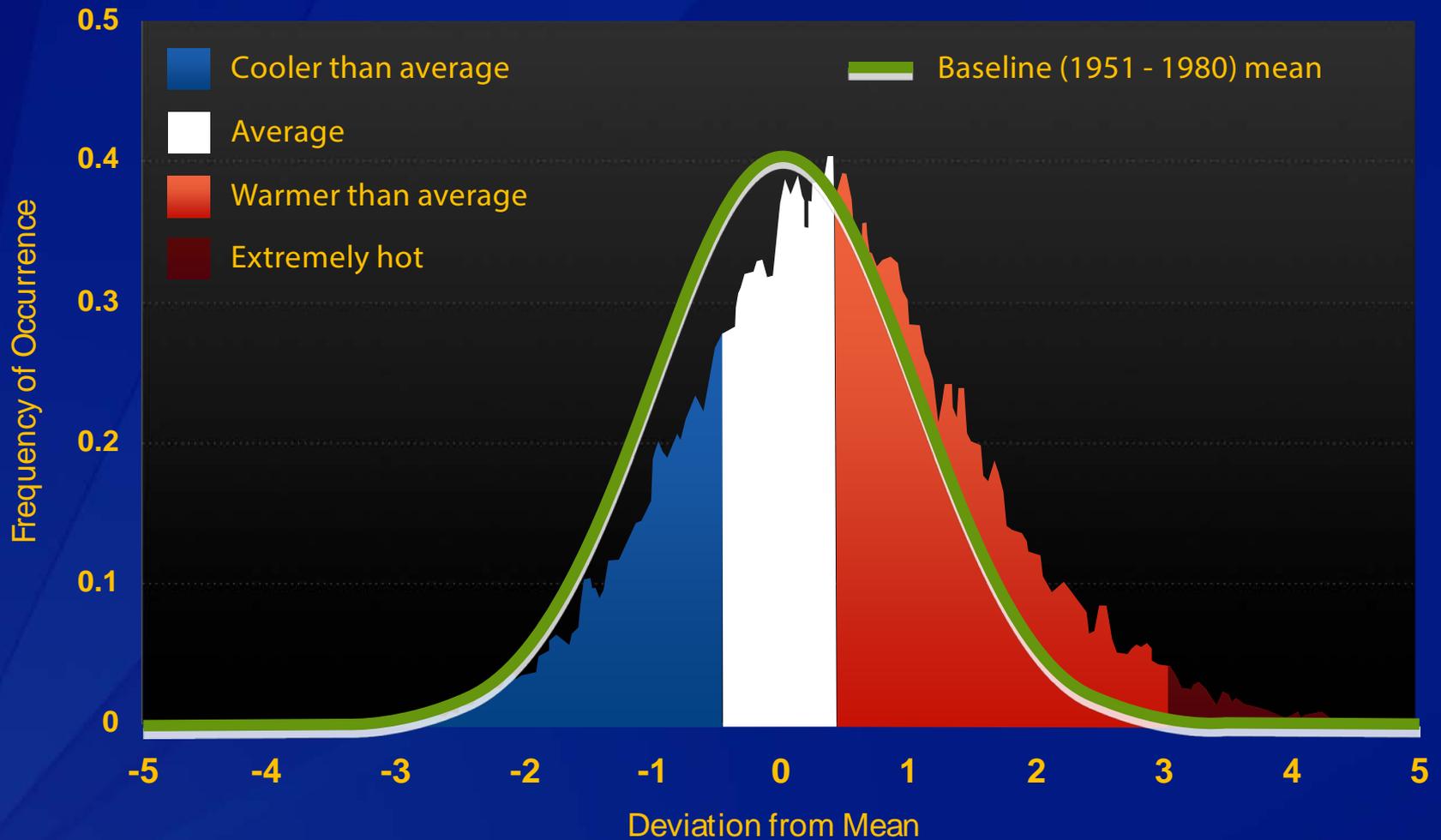


# Summer Temperatures 1951–1980



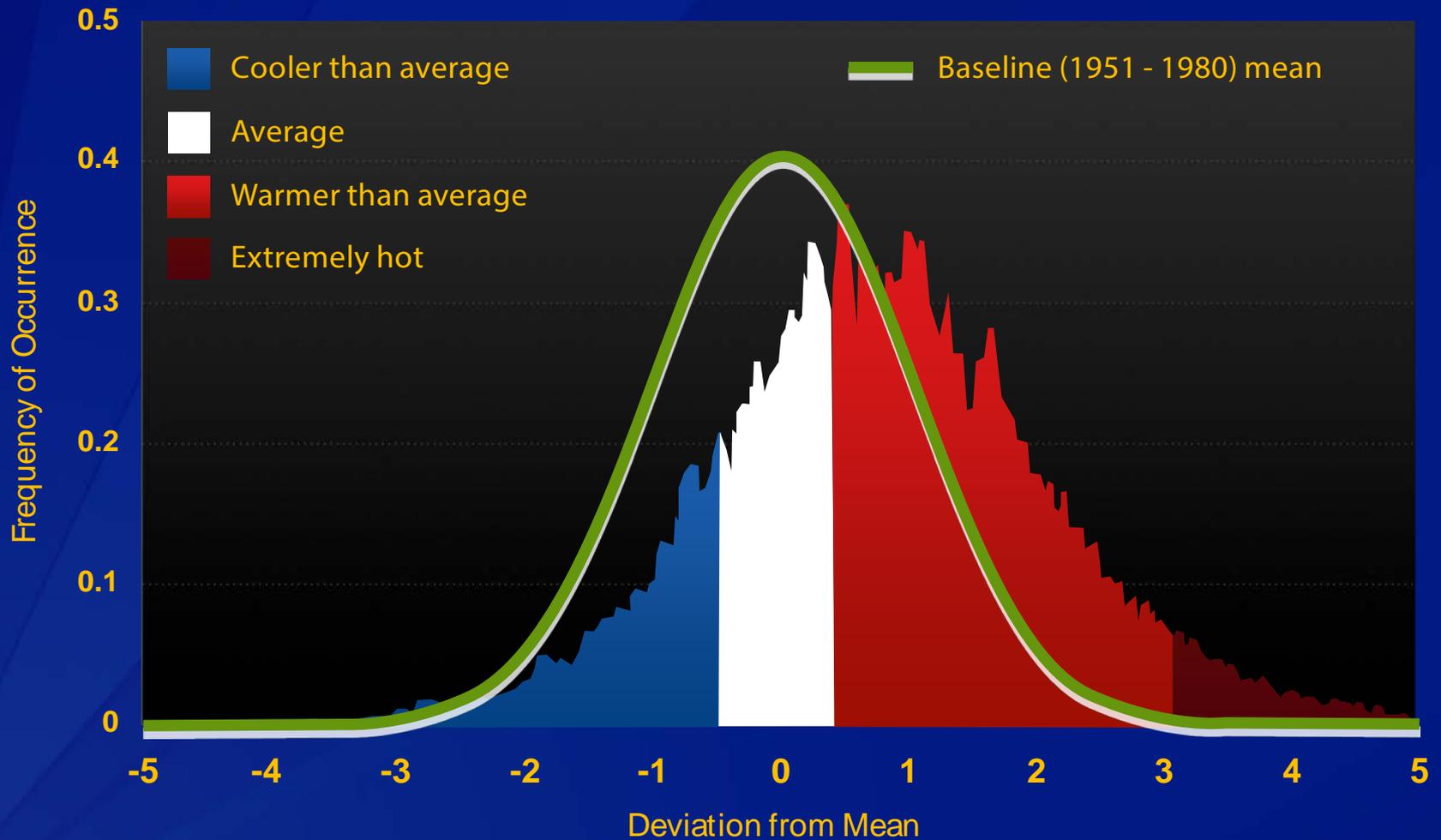
Source: NASA/GISS; Hansen, et al., "Perceptions of Climate Change," Proc. Natl. Acad. Sci. USA 10.1073, August 2012

# Summer Temperatures 1981–1991



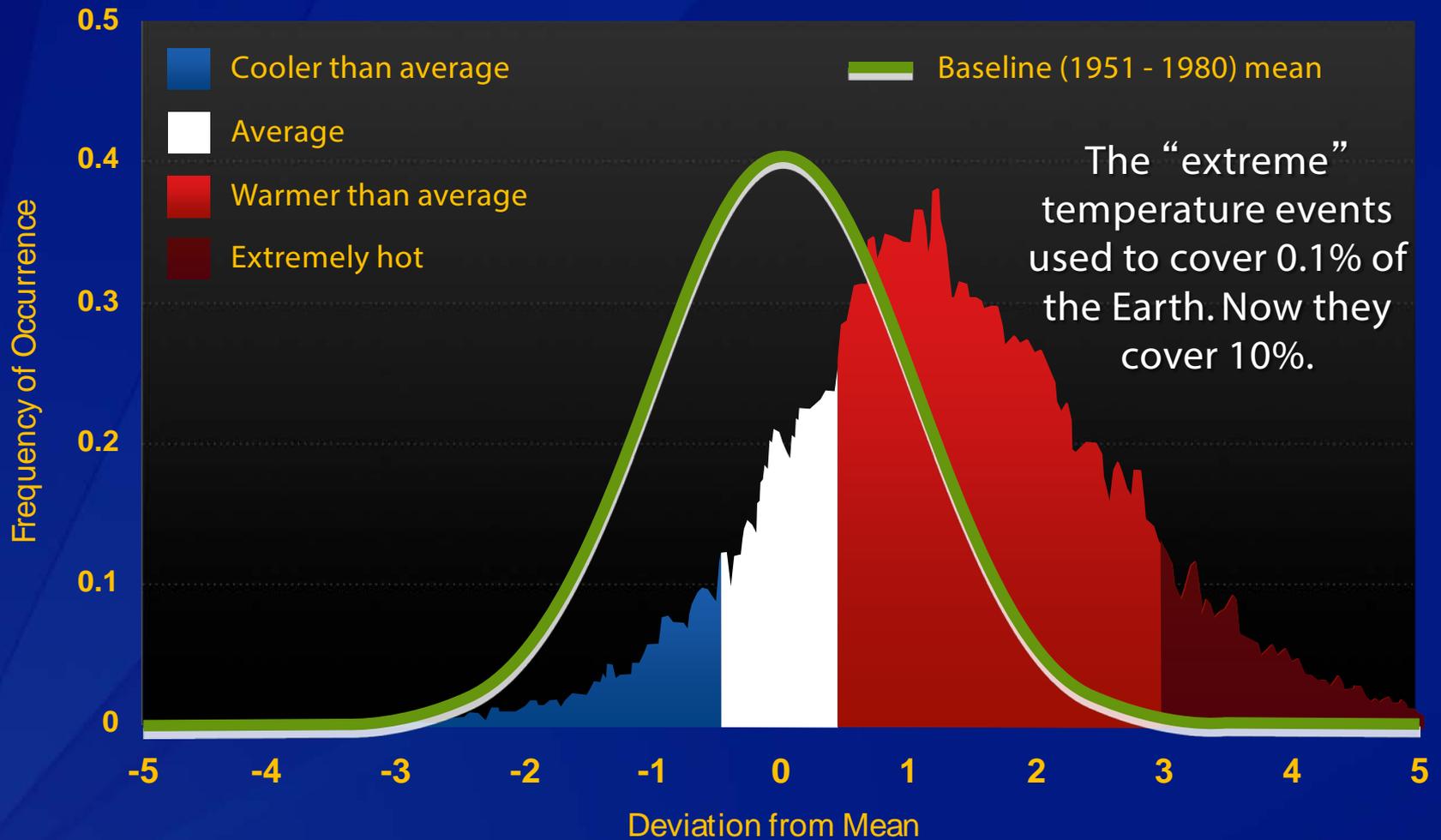
Source: NASA/GISS; Hansen, et al., "Perceptions of Climate Change," Proc. Natl. Acad. Sci. USA 10.1073, August 2012

# Summer Temperatures 1991–2001



Source: NASA/GISS; Hansen, et al., "Perceptions of Climate Change," Proc. Natl. Acad. Sci. USA 10.1073, August 2012

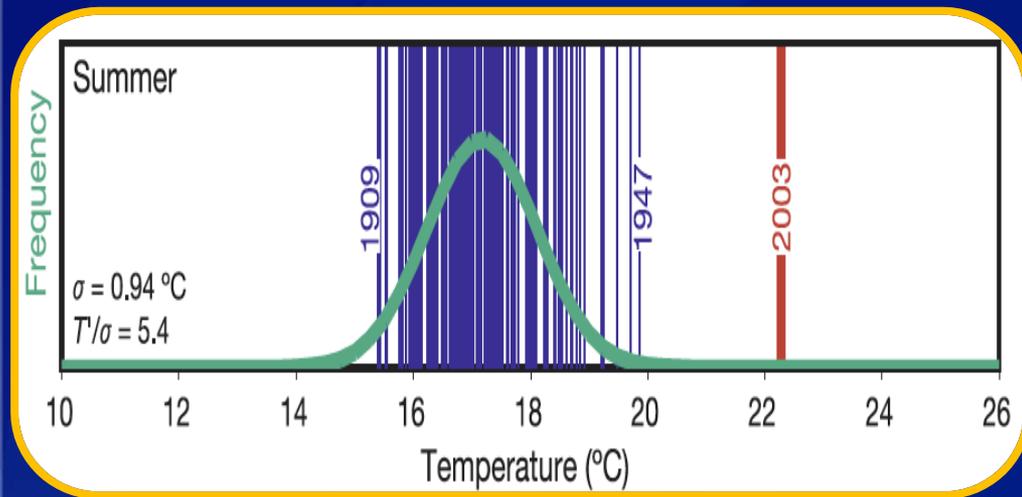
# Summer Temperatures 2001–2011



Source: NASA/GISS; Hansen, et al., “Perceptions of Climate Change,” Proc. Natl. Acad. Sci. USA 10.1073, August 2012

# Heat Waves Impact Human Health

## European Heat Wave of 2003



## Excess Mortality

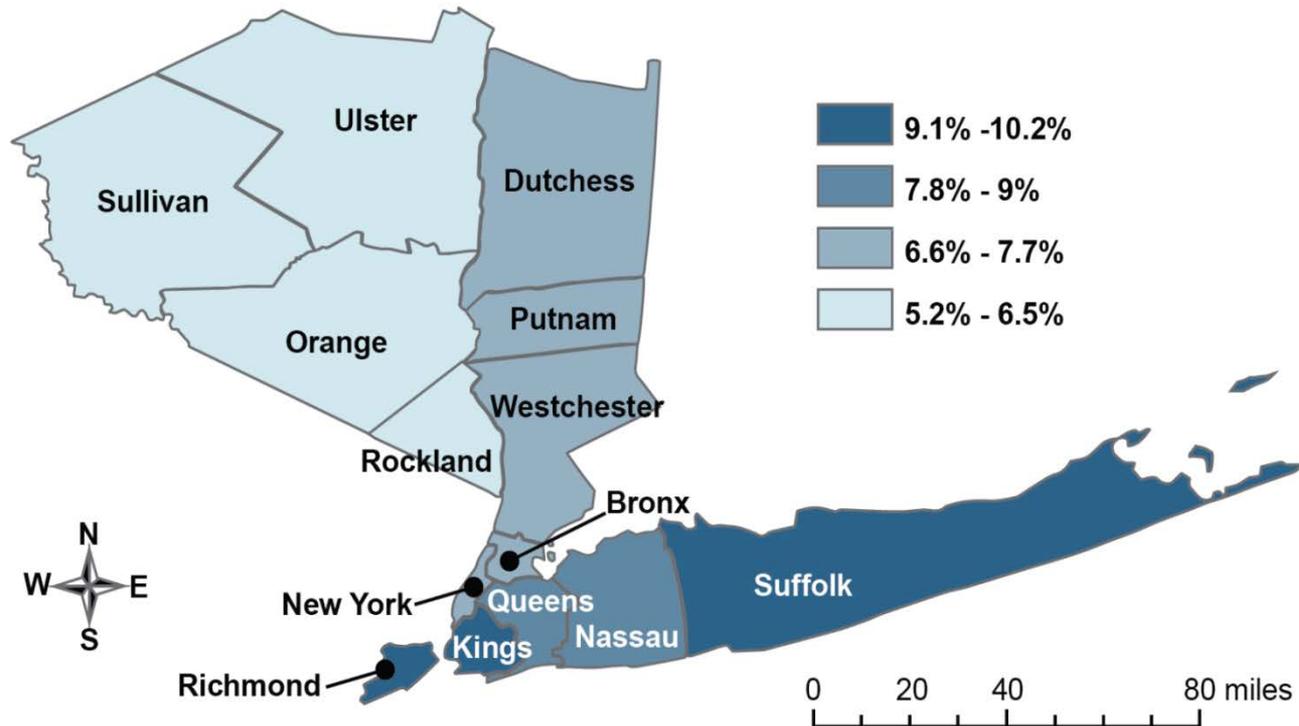
UK	2,091
Italy	3,134
France	14,802
Portugal	1,854
Spain	4,151
Switzerland	975
Netherlands	1,400-2,200
Germany	1,410
<b>TOTAL</b>	<b>29,817-30,617</b>

Vandentorren et al. *Am J Public Health* 2004; 94(9):1518-20.

Haines et al. *Public Health* 2006;120:585-96.

# Impact of Increased Ozone: Projected Increase in Pediatric ED Visits for Asthma in 2020

Projected Climate Change Worsens Asthma



Source: Sheffield PE, Knowlton K, Carr JL, Kinney PL. 2011. Modeling of Regional Climate Change Effects on Ground-Level Ozone and Childhood Asthma. *American Journal of Preventive Medicine* 41(3):251-257

# Climate Change Impacts Air Quality: Pollen

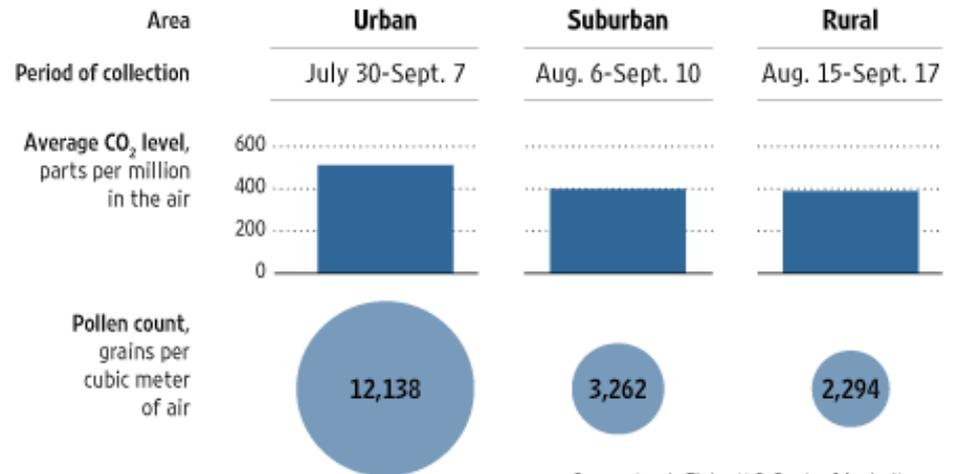


## □ Ragweed

- ↑ CO<sub>2</sub> and temperature
- ↑ Pollen counts, longer growing season

### Something in the Air

Researchers at the U.S. Dept. of Agriculture planted ragweed in and around Baltimore in 2001 to test how the plant responds to different concentrations of CO<sub>2</sub>. The results:

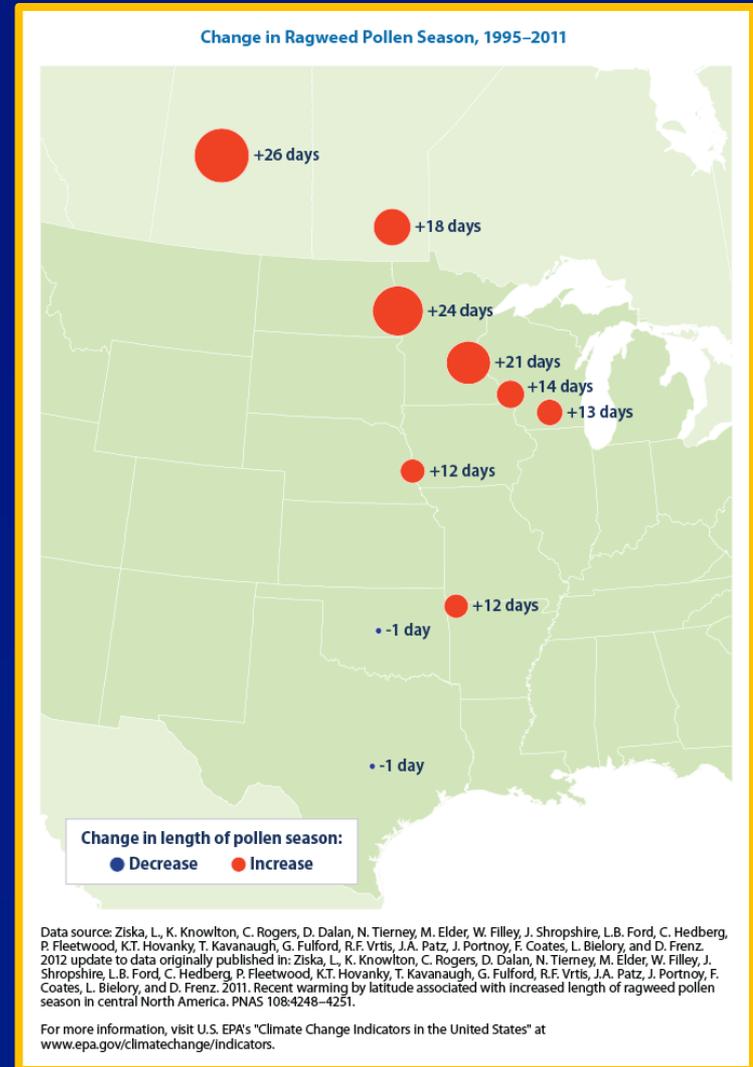


Source: Ziska et al., *J Allerg Clin Immunol* 2003;111:290-95;  
Graphic: *Wall Street Journal*, 3 May 2007.

Source: Lewis Ziska, U.S. Dept. of Agriculture

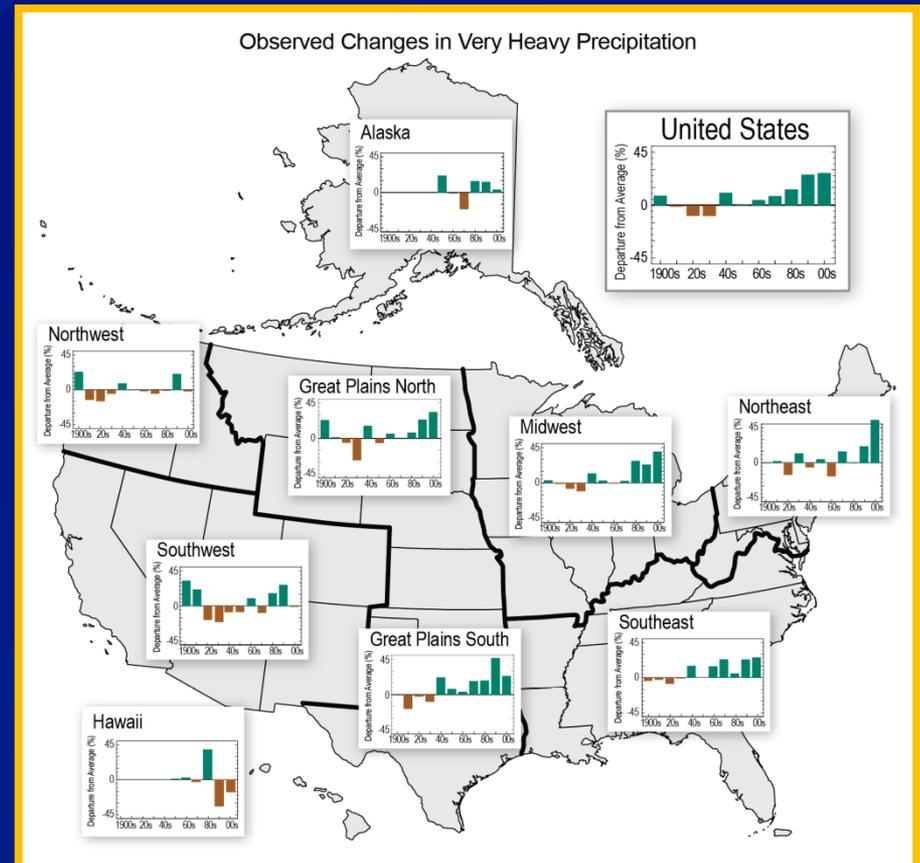
# Pollen and Health

- ❑ **Seasonal Allergic Rhinitis affects 15%-20% of adults** (Grammer, Greenberger, 2009)
- ❑ **Ragweed pollen seasons are lengthening in the northern latitudes** (Ziska et al., 2012)
- ❑ **Increased CO<sub>2</sub> concentrations and warmer temperature were associated with increased ragweed pollen production and an earlier pollen season.** (Ziska et al., 2003)



# Extreme Precipitation Events Impact Human Health: Waterborne Disease

- 67% of waterborne disease outbreaks preceded by precipitation above 80<sup>th</sup> percentile (across 50 year climate record)
- Heavy precipitation events projected to occur more frequently



Observed Increases in Very Heavy Precipitation (heaviest 1% of all events) 1901 to 2011

Curriero, Patz, et al, 2001.

Source: Walsh et al. 2013: *Draft NCA Report*, Chapter 2

# Heavy Precipitation and Water-borne Disease:

## Milwaukee 1993

Cryptosporidiosis epidemic

405,000 cases, 54 deaths

Preceded by heaviest rainfall in 50 years (Curriero et al., 2001)

\$31.7 million in medical costs

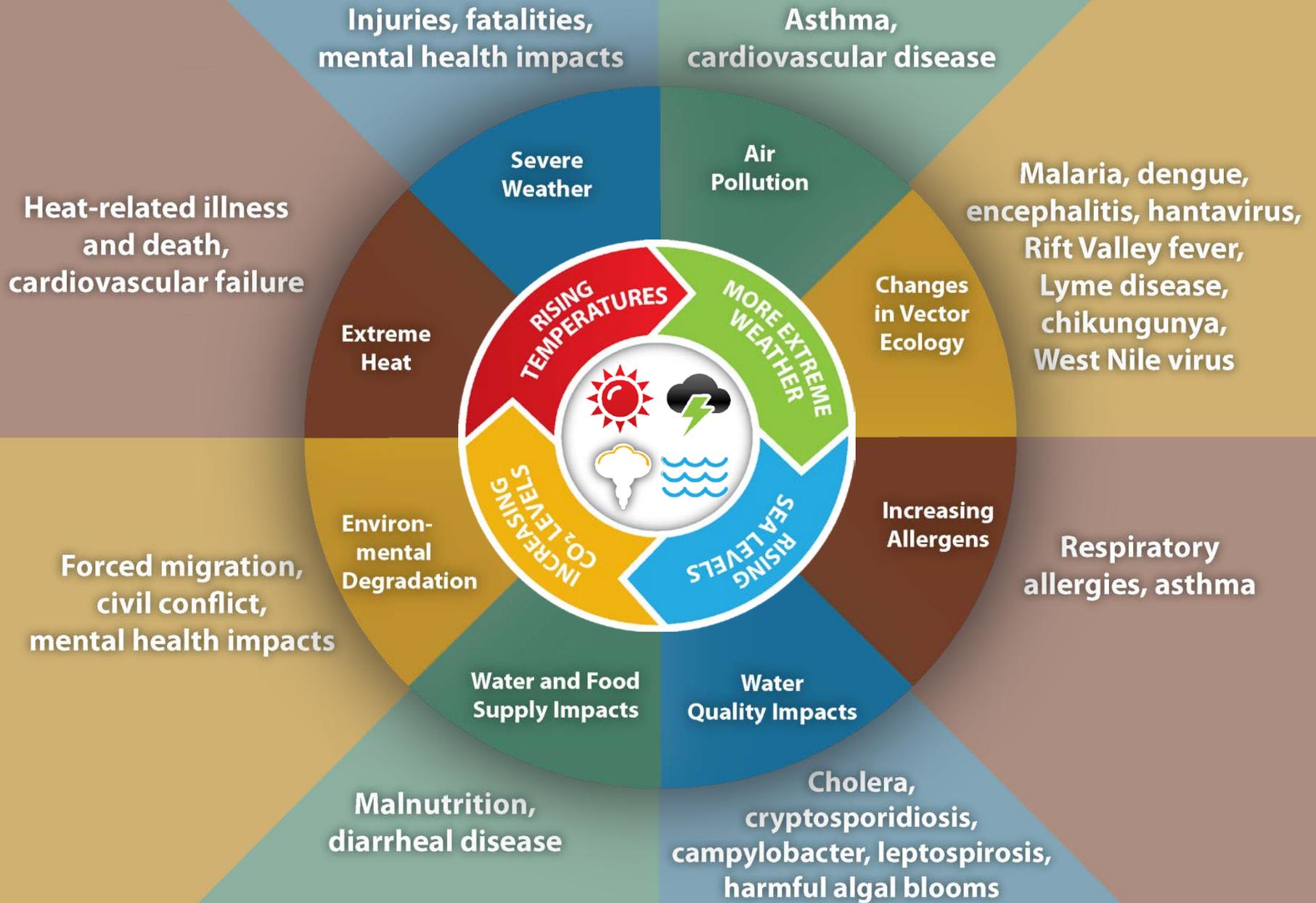
\$64.6 million in lost productivity

(Corso et al., 2003).

## Investigation Continues Into Outbreak



# Impact of Climate Change on Human Health



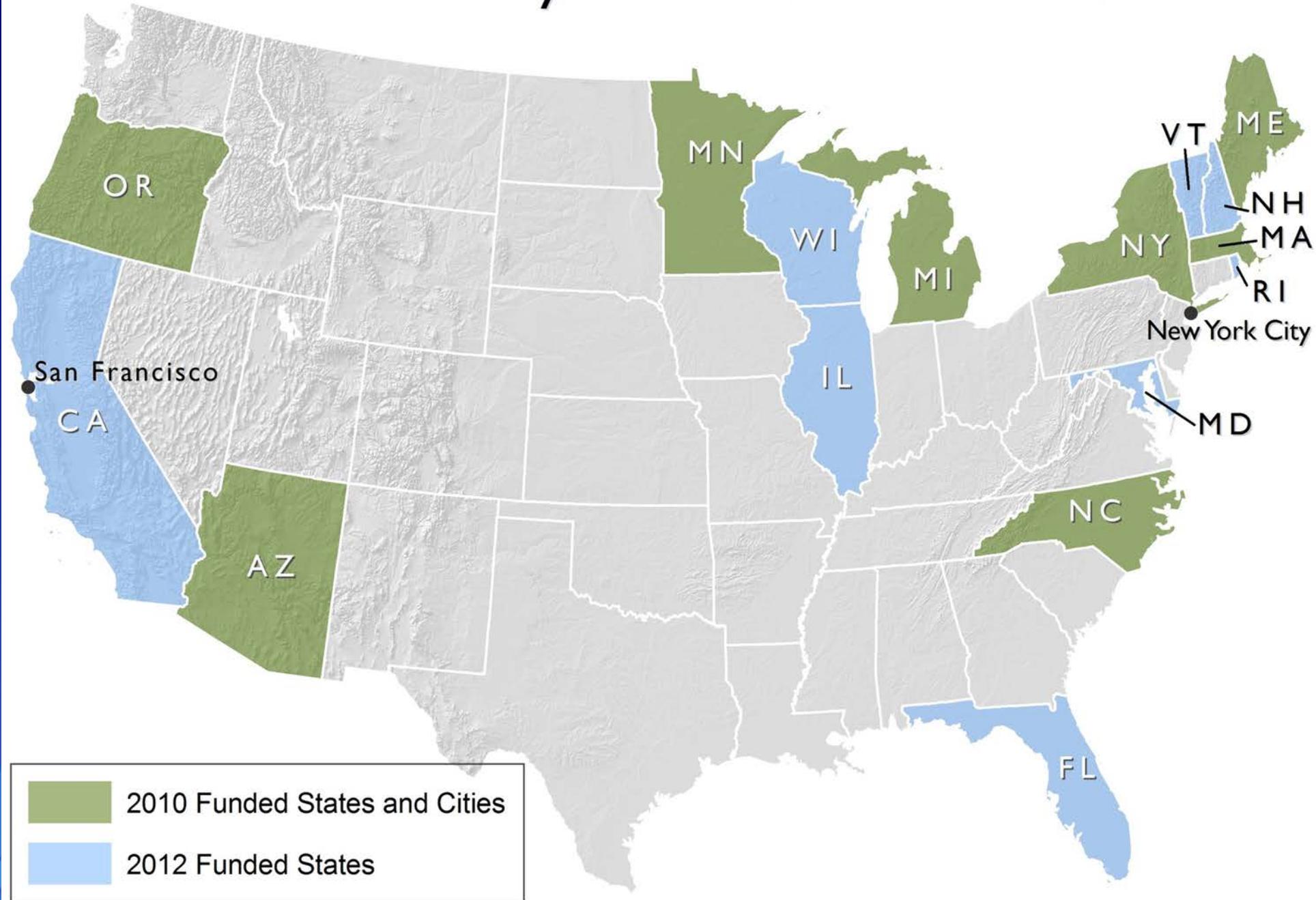
# What is CDC doing to prepare for health effects of climate change?

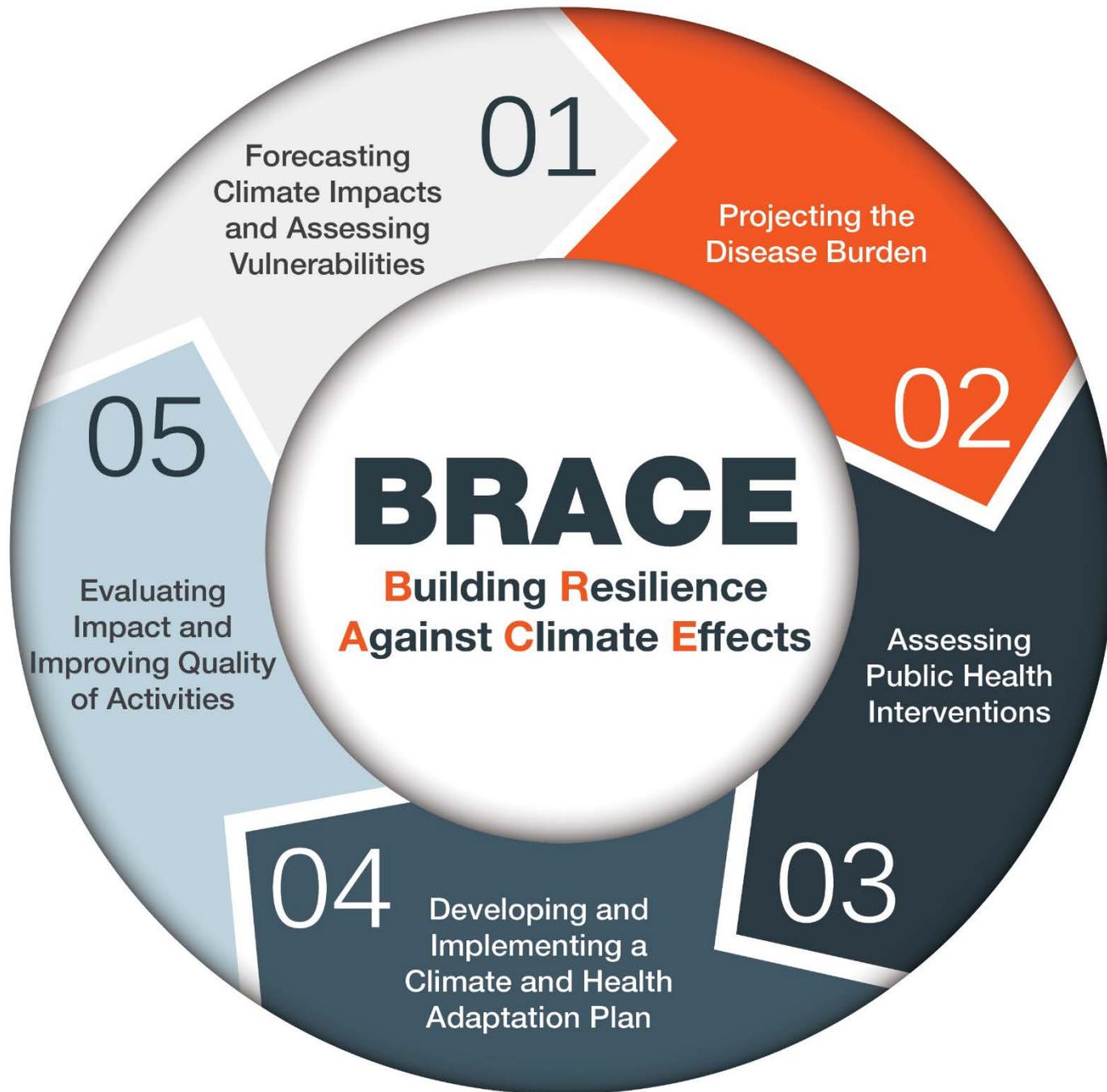
- ❑ CDC helps states and cities prepare for health challenges of climate change by
  - Providing scientific guidance
  - Developing decision support tools
  - Ensuring public health concerns are considered in climate change adaptation and mitigation strategies
  - Creating partnerships between public health and other sectors
- ❑ CDC's Climate and Health Program –only Federal investment in climate change preparedness for public health sector

# Climate-Ready States and Cities Initiative

- ❑ CDC effort to enhance capacity of state and local health agencies to deal with health challenges associated with climate change
- ❑ CDC accomplishes this by
  - Funding 18 state and local health departments
  - Providing a framework [BRACE} and tools for planning, implementing, and evaluating climate adaptation strategies
    - Tools to identify populations and places vulnerable to climate impacts
    - Materials to help communicate climate and health issues to public health partners (e.g., extreme heat toolkit)

# CDC Climate Ready States and Cities Initiative





# BRACE Technical Guidance

## Climate Models and the Use of Climate Projections:

A Brief Overview for Health Departments



Climate and Health Technical Report Series  
Climate and Health Program, Centers for Disease Control and Prevention

Paul J. Schramm<sup>1</sup>, Christopher K. Uejio<sup>2</sup>, Jeremy J. Hess<sup>3,4\*</sup>,  
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## Assessing Health Vulnerability to Climate Change

A Guide for Health Departments



Climate and Health Technical Report Series  
Climate and Health Program, Centers for Disease Control and Prevention

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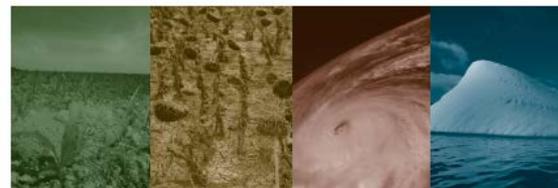
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## Projecting Climate-Related Disease Burden:

A Guide for Health Departments



Climate and Health Technical Report Series  
Climate and Health Program,  
Centers for Disease Control and Prevention

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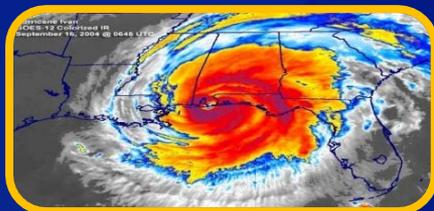
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The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

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