



National Institute of Environmental Health Sciences  
*Your Environment. Your Health.*



# ***Climate Change and Health Resilience: Overview and Approaches***

**John Balbus, MD, MPH**  
**Senior Advisor for Public Health, NIEHS**  
**PEPH Climate Change Resilience Webinar**

**June 30, 2016**

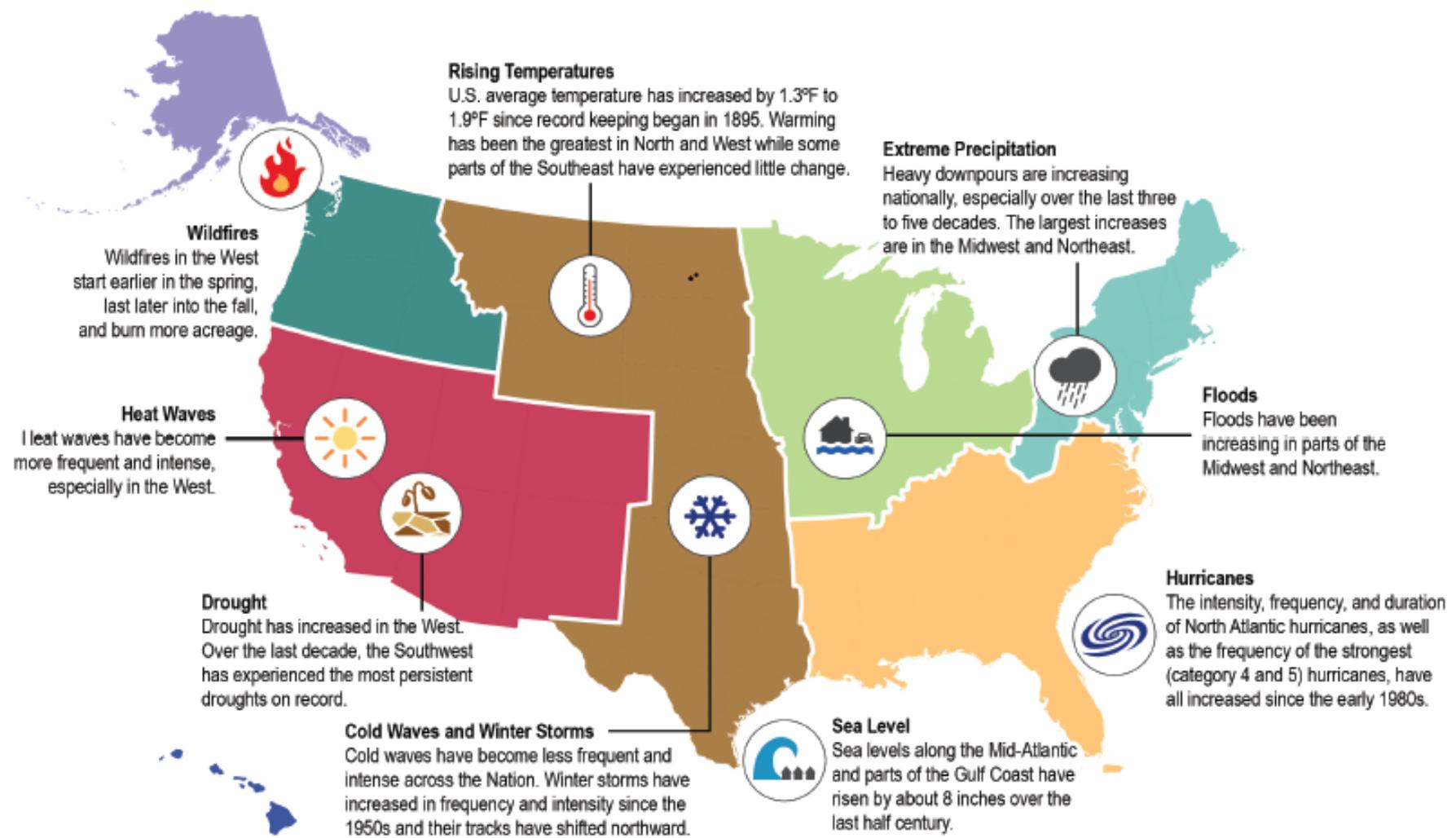


# GCRP Climate Health Assessment definition of resilience

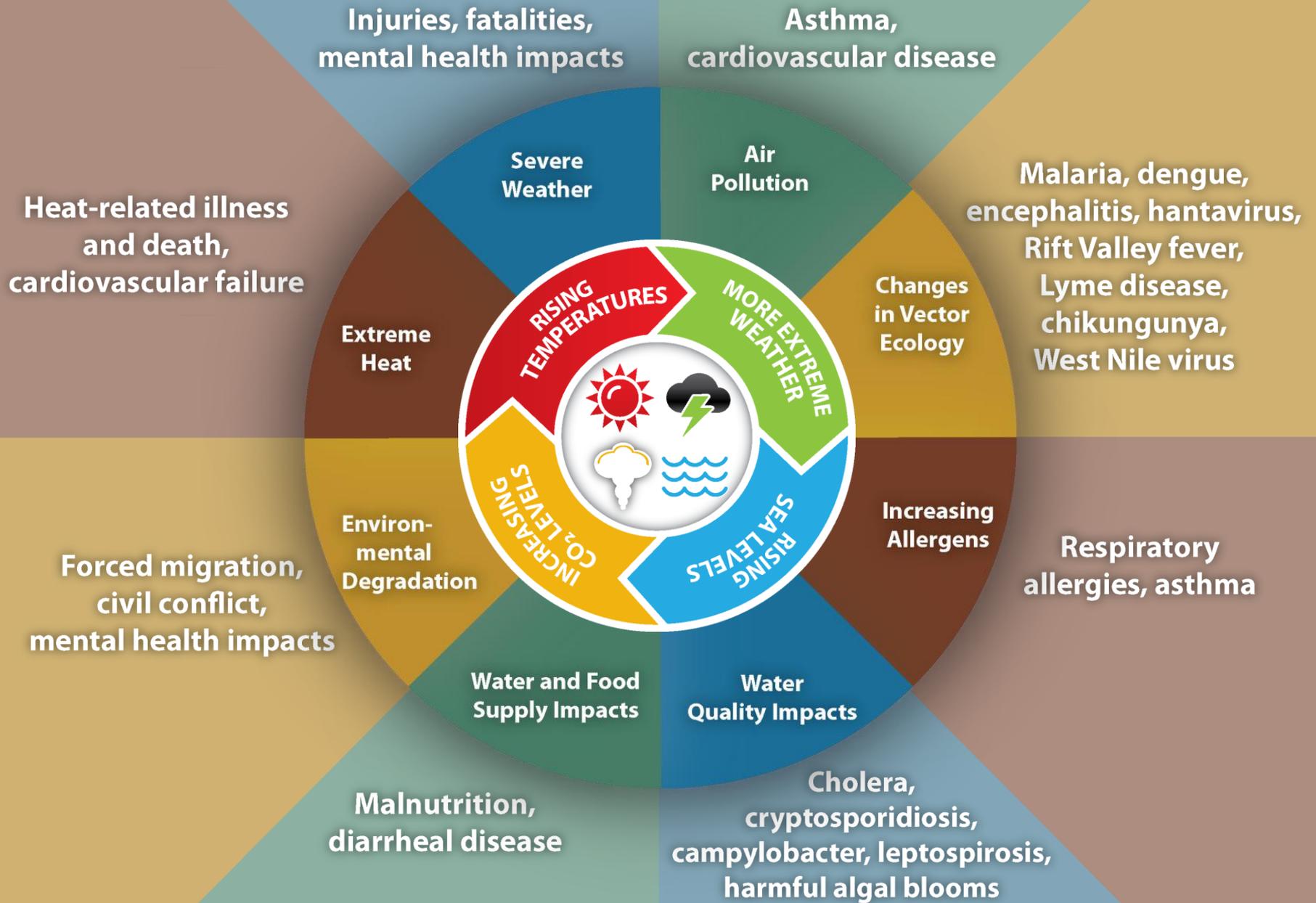
***Resilience* is the ability to prepare and plan for, absorb, recover from, and more successfully adapt to adverse events.**

**People and communities with strong adaptive capacity have greater resilience.**

# Major US Climate Trends



# Impact of Climate Change on Human Health



## Health disparities contribute to climate vulnerability

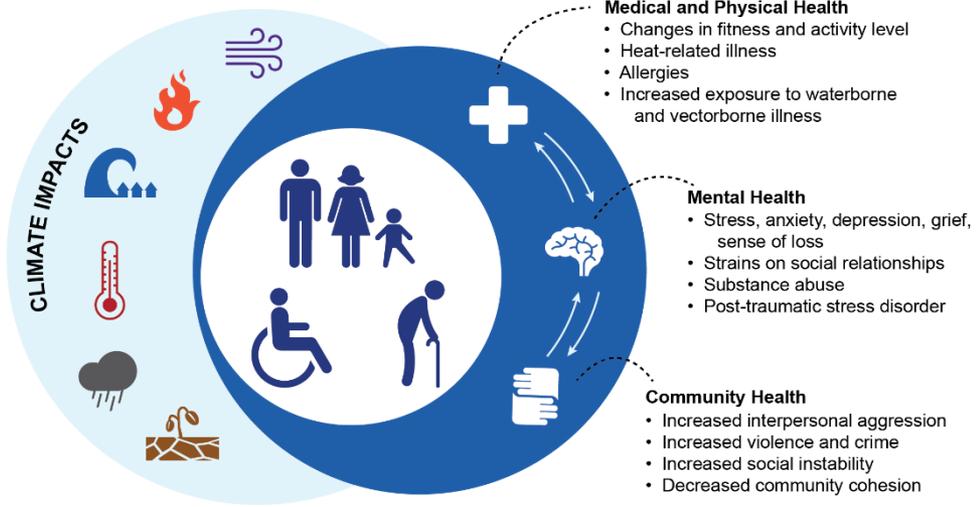
- Rates of diseases are associated with race and poverty
  - Stroke and cardiovascular mortality
  - Diabetes
  - Asthma
  - “Mentally unhealthy days”
- Deaths and hospitalizations increase with heat in people with:
  - Cardiovascular diseases
  - Diabetes
  - Respiratory Diseases
  - Psychiatric

**Reducing health disparities: part of the climate justice agenda**

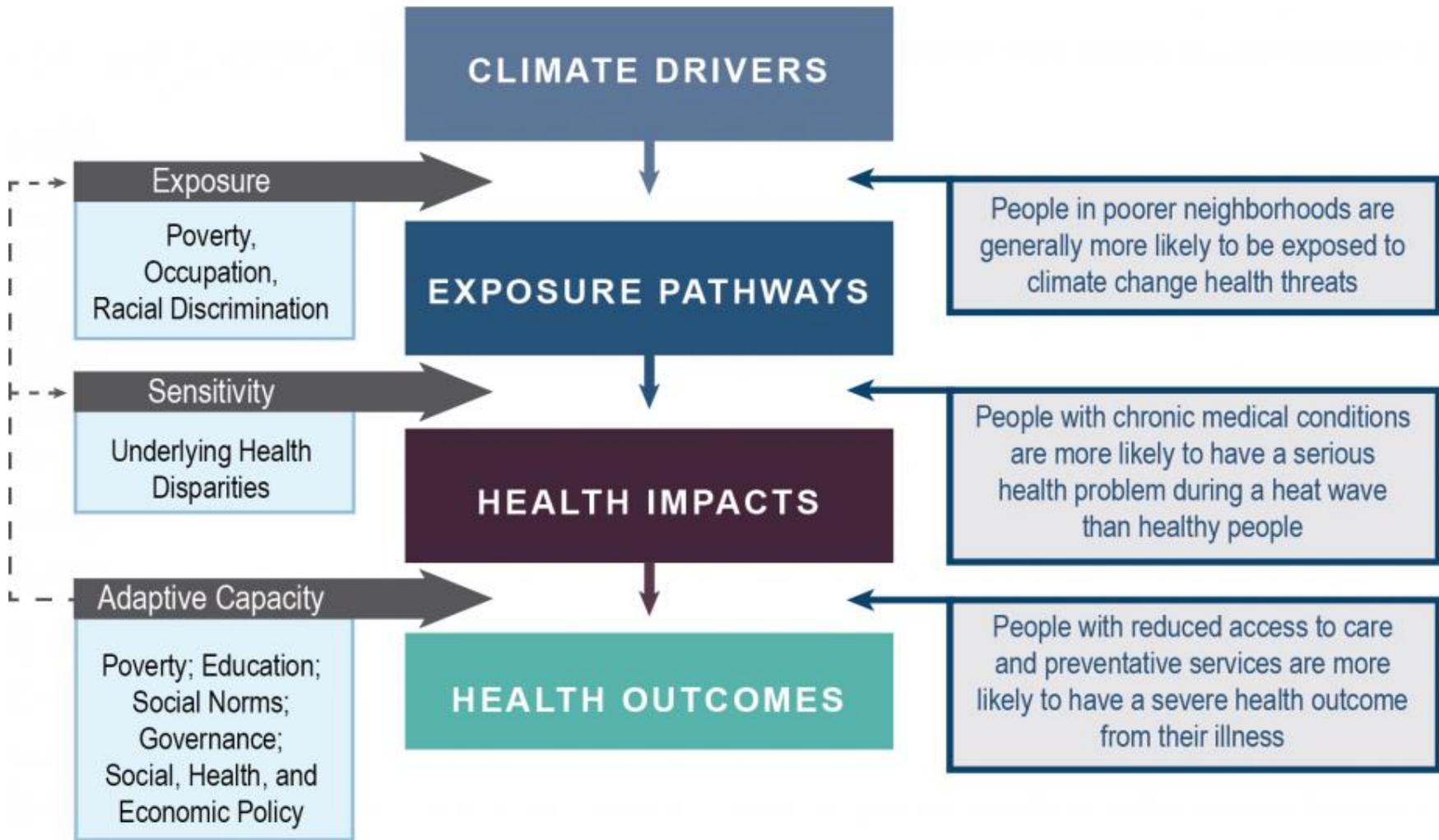
# Mental Health and Well-being

- Exposure to disasters results in mental health consequences
  - PTSD
  - Depression and anxiety
  - Suicide
- Specific groups of people are at higher risk
- Direct and secondary exposure to climate change can result in mental health consequences
- Extreme heat risks are higher for people with mental illness

Impact of Climate Change on Physical, Mental, and Community Health



Climate and Health Assessment, 2016

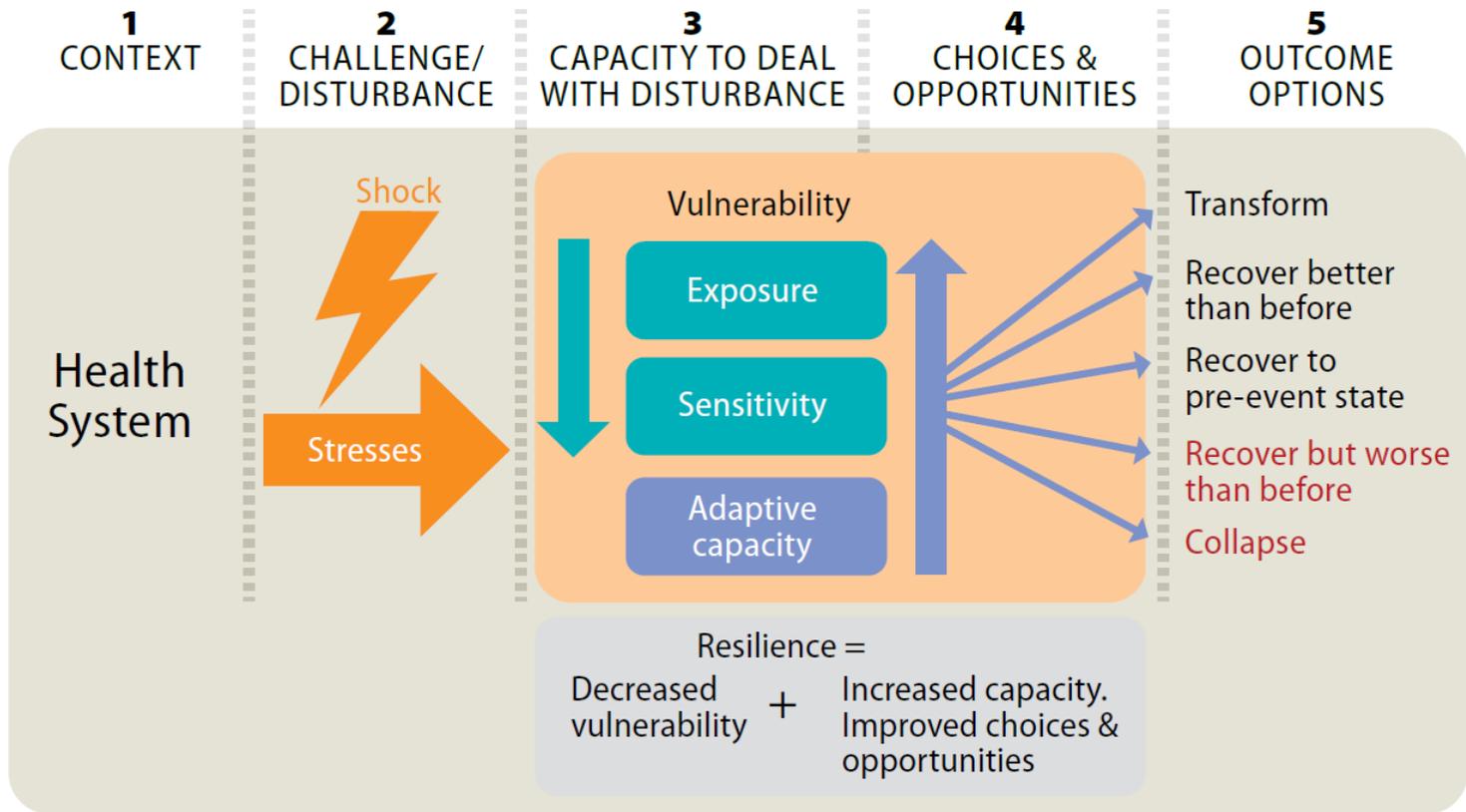


➔ Elements of Vulnerability

□ Social Determinants of Health

← □ Examples

# WHO framework for health system resilience



# Promoting Resilience in the Health Sector: The President's Climate Action Plan

- White House Climate Resilience Toolkit
  - <http://toolkit.climate.gov/>
- Sustainable and Climate Resilient Healthcare Facilities
  - Development of a “Tool Kit”
  - Public Private Partnership for information gathering, vetting and disseminating
- Community Health Resilience
  - Builds on CDC's Climate Ready Cities and States Initiative
  - Development and Dissemination of the BRACE framework



# Meet the Challenges of a Changing Climate

The Climate Resilience Toolkit provides resources and a framework for understanding and addressing the climate issues that impact people and their communities.

- 1 Identify the Problem
- 2 Determine Vulnerabilities
- 3 Investigate Options
- 4 Evaluate Risks & Costs
- 5 Take Action



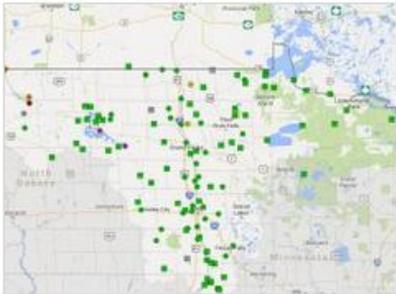
Find Out How People Are Building Resilience



## Tools

Filter by parent topic: ▼ Filter by functionality: ▼

Tools are available from many U.S. federal science agencies to help you manage your climate-related risks and opportunities, and to help guide you in building resilience to extreme events. Browse the list below, or select any of the terms in the boxes above to filter the tools list according to your interests.



### Advanced Hydrologic Prediction Service

Individuals and communities consult this comprehensive suite of graphical forecast products to anticipate and plan for potential flooding or drought.



### Airborne LIDAR Data Processing and Analysis Tools

Provides transparent and automatic filtering algorithms to classify ground and non-ground lidar measurements, as well as auxiliary



### Beach-fx

Coastal managers considering shore protection projects can download Beach-fx software and use it to model and measure the costs and benefits of protecting existing infrastructure against erosion, inundation, and wave attack



### CanVis

This downloadable photo-editing program gives you the power to generate "after" pictures illustrating possible futures. Use it to show how sea level rise will change a familiar scene, or to help stakeholders develop a clear,

## Taking Action

Filter by topic: ▼ Filter by steps toward resilience: ▼ Filter by region: ▼

Communities and businesses all across the nation are taking action to reduce their vulnerability to climate-related impacts and to build resilience to extreme events. Below is a list of "taking action" stories illustrating the application of one or more of the tools and datasets available here in the Toolkit and on the climate.data.gov website. Browse the stories below, or click on any of the terms in the boxes above to filter the story list according to your interests.



### From Forests to Faucets: Improving Water Quality for Denver

Two major fires and subsequent flooding events wreaked havoc on a critical watershed and reservoir



### Crop Insurance Smooths Income Fluctuations for Ranchers and Forage Farmers

Raising livestock on grasses or hay depends on receiving the right amount of rain at the right time of



### Vulnerability Assessment for Sea Level Rise in Coastal Georgia

NOAA's Sea Level Rise and Coastal Flooding Impacts Viewer helped the barrier island community of



### Alabama Farmer Increases His Odds of Success with Climate Outlooks

From weeks-long dry spells to extreme precipitation events, farmers face significant challenges



Topics > Human Health >



## Human Health

### Key points:

- *Climate variability and change threaten human health and well-being in the United States. These climate impacts come from increased extreme weather events, wildfire, decreased air quality, threats to mental health, and illnesses transmitted by food, water, and disease carriers such as mosquitoes and ticks.*
- *Some people are more vulnerable than others to climate impacts on health; vulnerable populations include children, the elderly, the sick, the poor, and some communities of color.*
- *Extreme storms and temperatures can disrupt the delivery of health services and damage hospitals, clinics, wastewater treatment plants, and other facilities. Climate also impacts economic sectors that support health, such as energy, transportation, and agriculture.*
- *Steps taken to prepare for climate variability and change can improve health and provide other societal benefits, such as sustainable development, disaster risk reduction, and improvements in quality of life.*

[Adapted from the Third National Climate Assessment.](#)

### Browse Topics

- > Arctic
- > Coastal Flood Risk
- > Ecosystem Vulnerability
- > Energy Supply and Use
- > Food Resilience
- ✓ **Human Health**
  - + Extreme Heat–NIHHIS
  - Extreme Events
  - Increased Levels of Air Pollutants
  - Food- and Water-Related Threats
  - Changing Ecosystems and Infectious Diseases
  - + Building Health Care Sector Resilience

# The NIEHS Climate Change and Environmental Exposures Challenge

**Goal:** To help **decision makers** around the country understand and address climate change's effects on environmental health by creating **data visualization tools and maps** that connect current science on climate change to the exposure pathways for environmental hazards and risks.

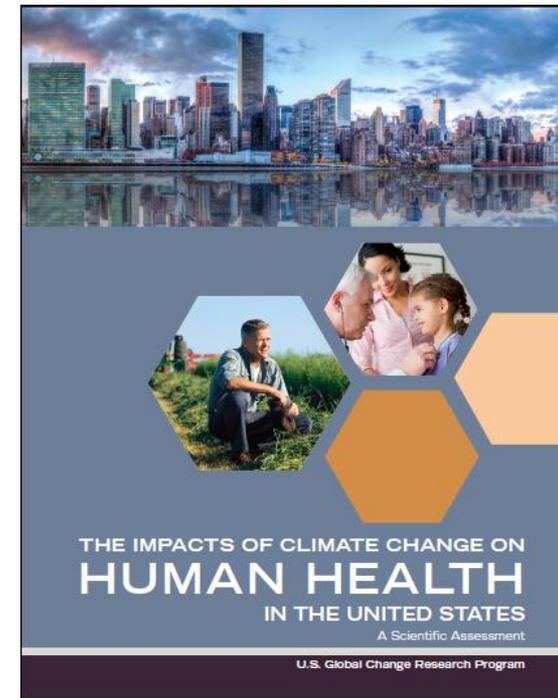
- Extends the goals of the President's Climate Action Plan



NIEHS  
CLIMATE CHANGE  
AND ENVIRONMENTAL  
EXPOSURES CHALLENGE

## Resources for information, data and tools

- USGCRP Climate Health Assessment
  - <https://health2016.globalchange.gov/>
- WH Climate Resilience Tool Kit
  - <https://toolkit.climate.gov/topics/human-health>
- WH Climate Data Initiative
  - <http://www.data.gov/climate/humanhealth/>
- CDC's BRACE framework and guidance documents
  - <http://www.cdc.gov/climateandhealth/default.htm>
- 3<sup>rd</sup> National Climate Assessment
  - <http://nca2014.globalchange.gov/report/sectors/human-health>



## Summary

- Climate change is exacerbating existing hazards associated with health impacts and health disparities
- In some communities, climate change is creating unprecedented challenges to community and individual resilience and wellbeing
- A new focus on enhancing resilience of people, infrastructure, and communities is needed to preserve health and wellbeing



# Thank you!



[John.balbus@nih.gov](mailto:John.balbus@nih.gov)  
<http://www.niehs.nih.gov/geh>

