College of Public Health and Human Sciences

CIRC
Climate Impacts Research Consortium
A NOAA RISA TEAM

Using the Building Resilience Against Climate Effects (BRACE) Framework to Build Adaptive Capacity to Climate Change in a Coastal Washington County

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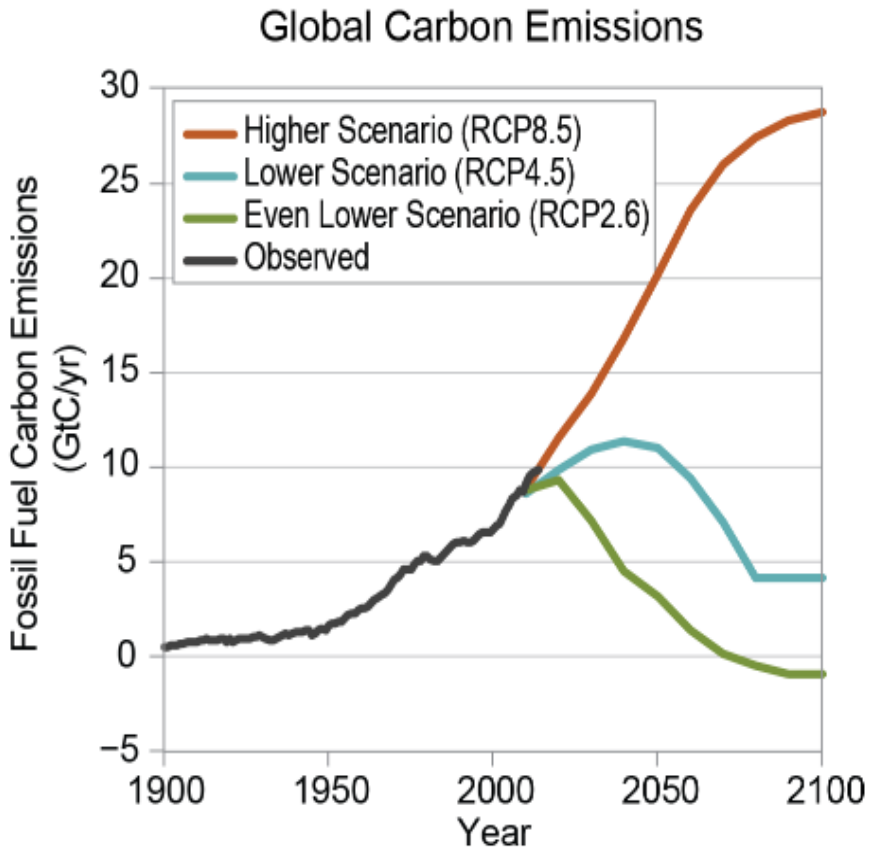
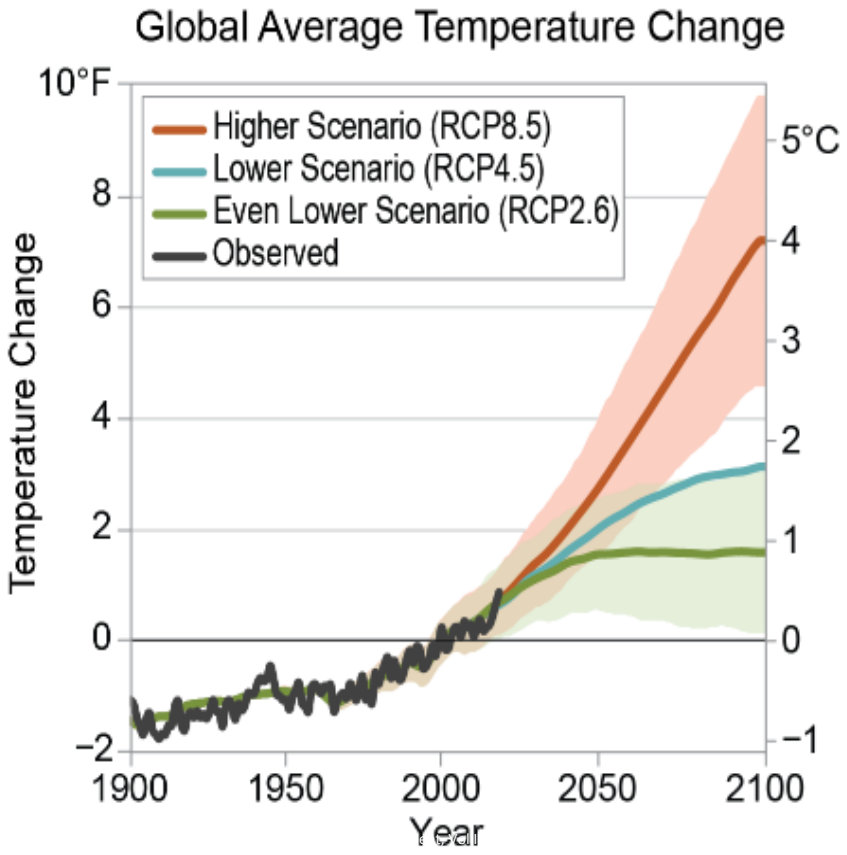
Our Changing Climate

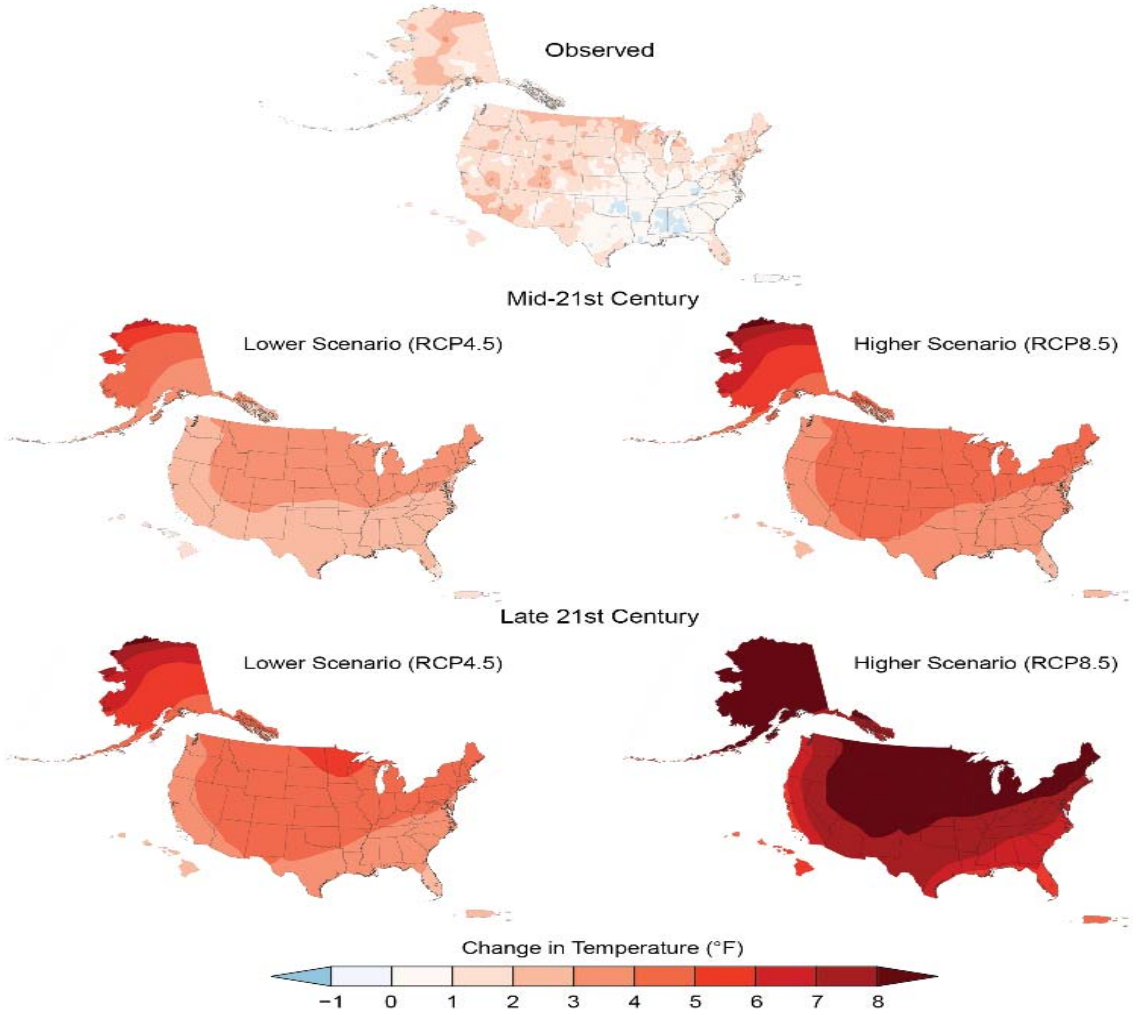




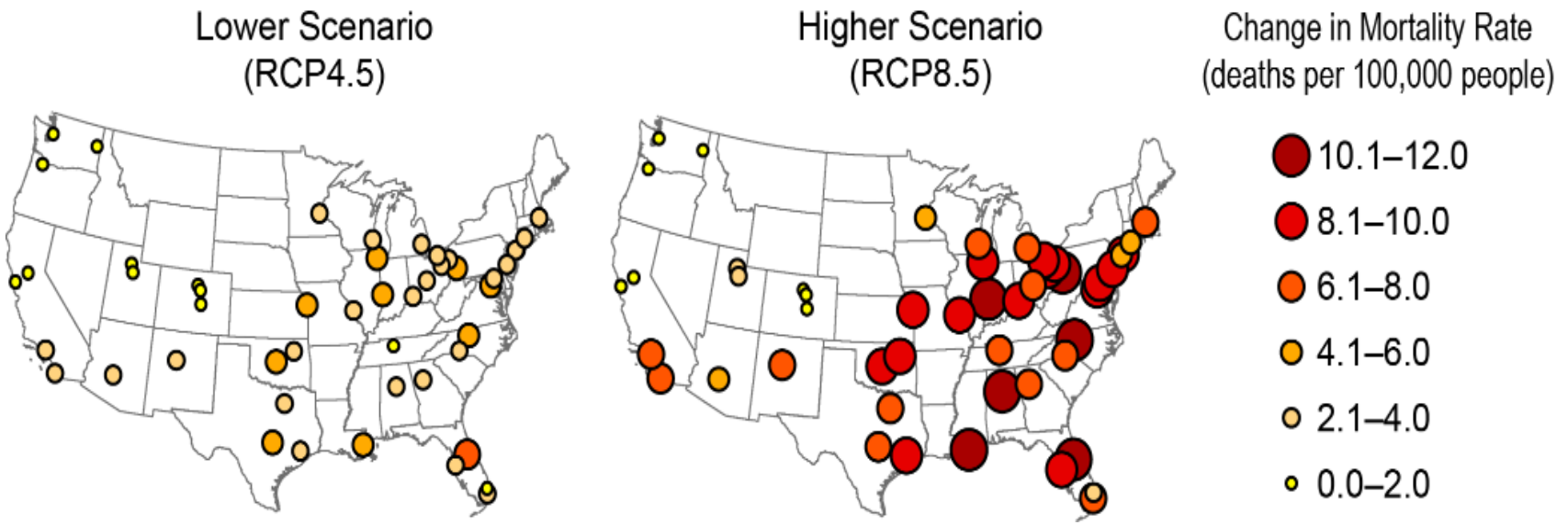
Fourth National Climate Assessment, Vol II. Ch 2. doi: 10.7930/NCA4.2018.CH2

Observed and Projected Changes in Annual Average Temperature

Annual average temperatures across North America are projected to increase, with proportionally greater changes at higher as compared to lower latitudes, and under a higher scenario (RCP8.5, right) as compared to a lower one (RCP4.5, left). This figure compares (top) observed change for 1986–2016 (relative to 1901–1960 for the contiguous United States and 1925–1960 for Alaska, Hawai'i, Puerto Rico, and the U.S. Virgin Islands) with projected differences in annual average temperature for mid-century (2036–2065, middle) and end-of-century (2070–2099, bottom) relative to the near-present (1986–2015). *Source: adapted from Vose et al. 2017.*[85]



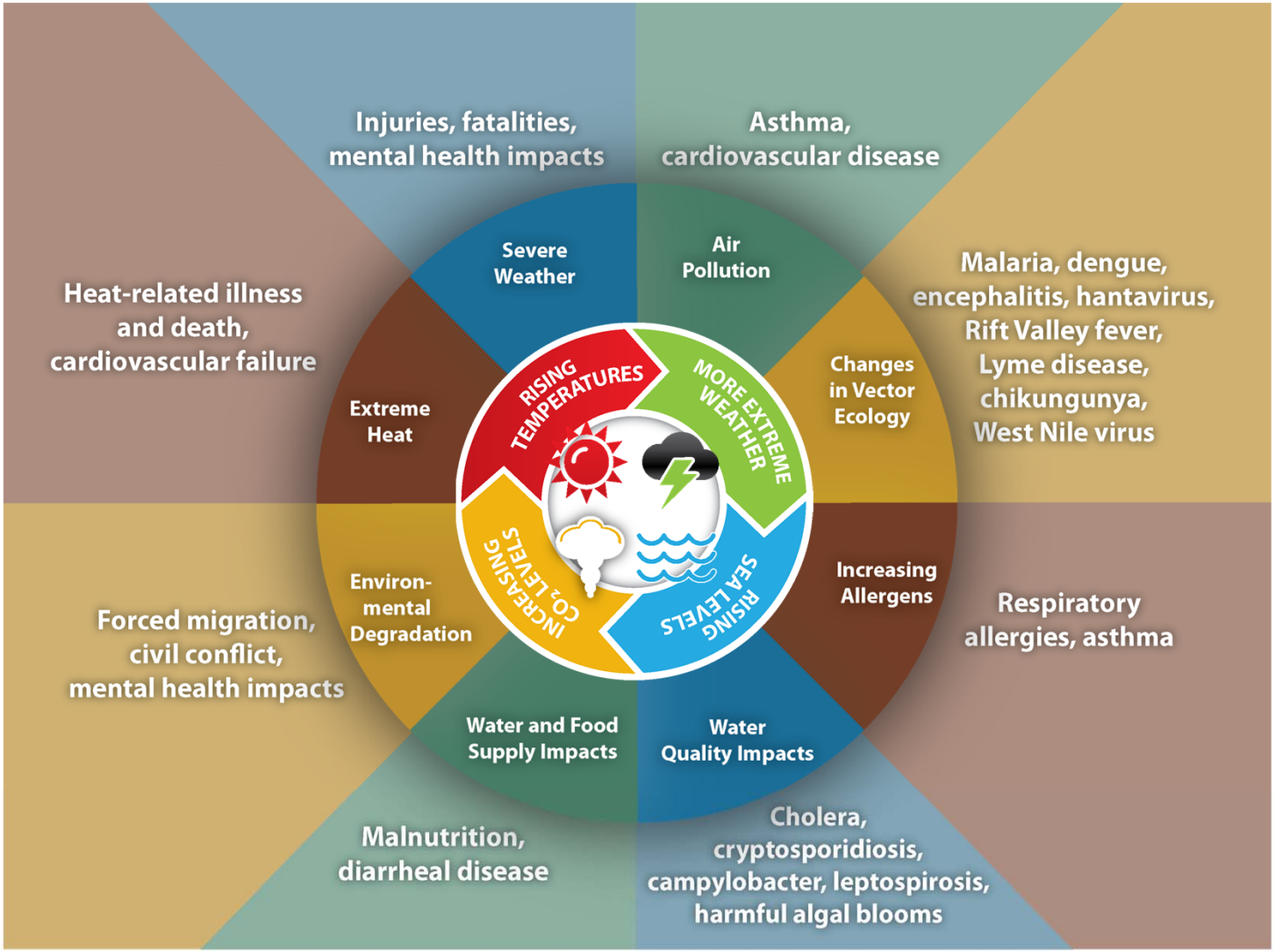
Projected Change in Annual Extreme Temperature Mortality, 2080-2099



RCP4.5: + 3,900 deaths
RCP8.5: + 9,300 deaths

Fourth National Climate Assessment, Vol II. Ch 2. doi: 10.7930/NCA4.2018.CH14

Impact of Climate Change on Human Health



Climate Change Adaptation

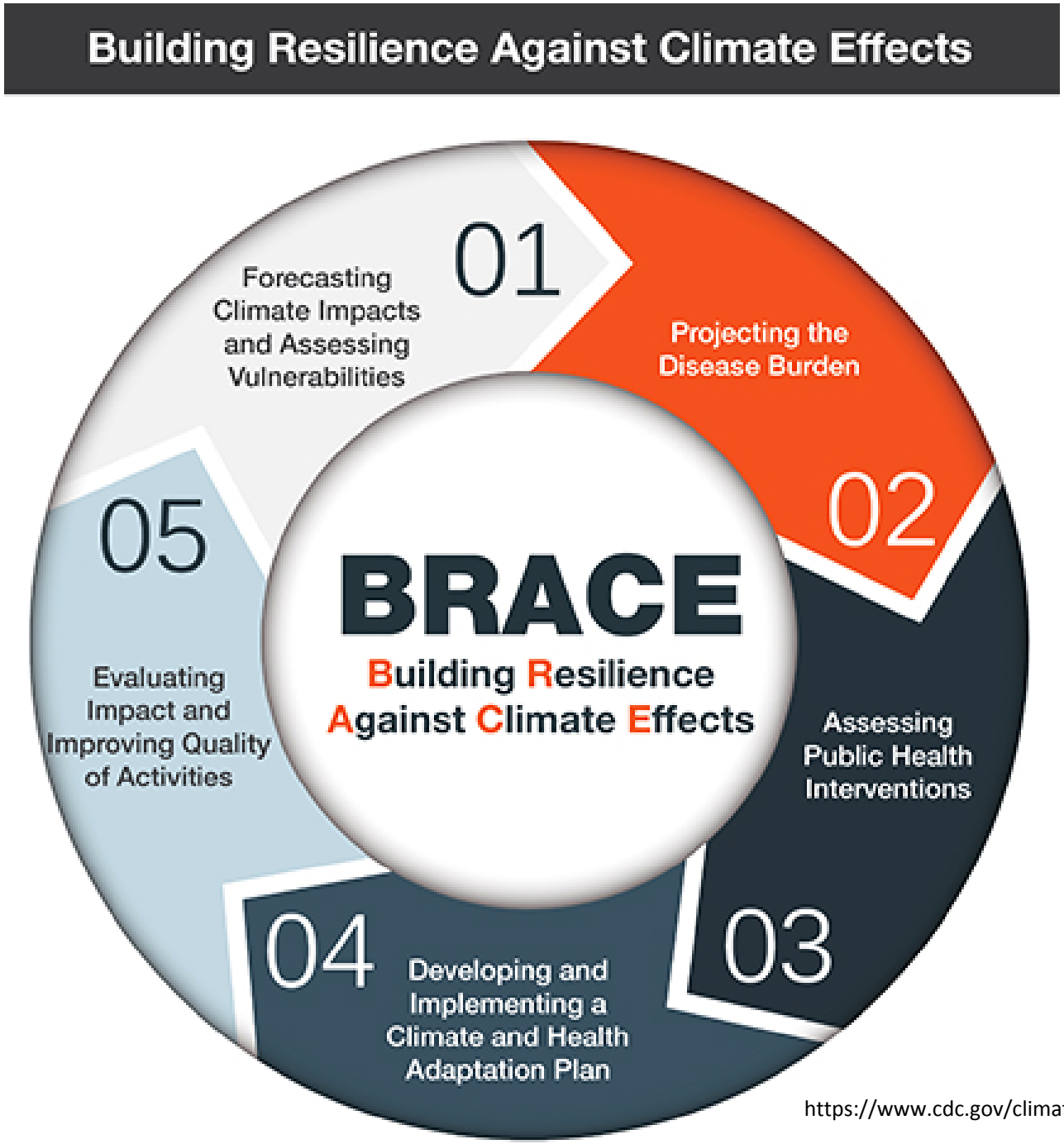
- Adaptation
  - Process of designing, implementing, monitoring, and evaluating strategies, policies, and measures intended to reduce climate change–related impacts and to take advantage of opportunities
- Capacity of communities to minimize adverse health effects is a function of social capital, socioeconomic conditions, infrastructure, government accountability, and institutional responsiveness
- Local health departments play a vital role in addressing the health effects of climate change

Ebi. Am J Prev Med. 2008;35(5)

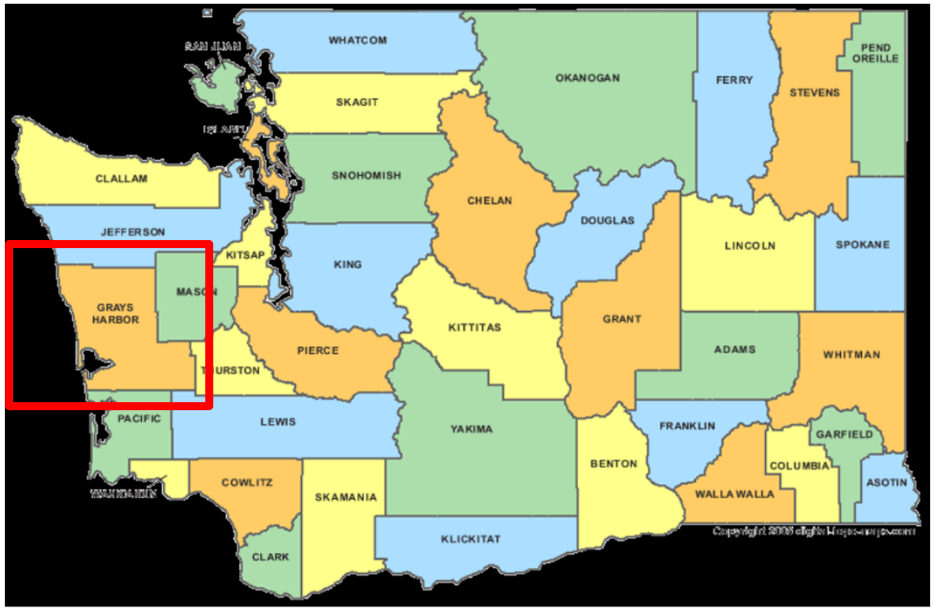
Climate Impacts Research Consortium (CIRC)

- Climate-science-to-climate-action team funded by the National Oceanic and Atmospheric Administration (NOAA)

- Acts in supporting role for communities, policy makers, and resource managers in Oregon, Washington, Idaho and western Montana as they work to adapt to a changing climate



https://www.cdc.gov/climateandhealth/BRACE.htm



Grays Harbor County

- **Population 71,000**

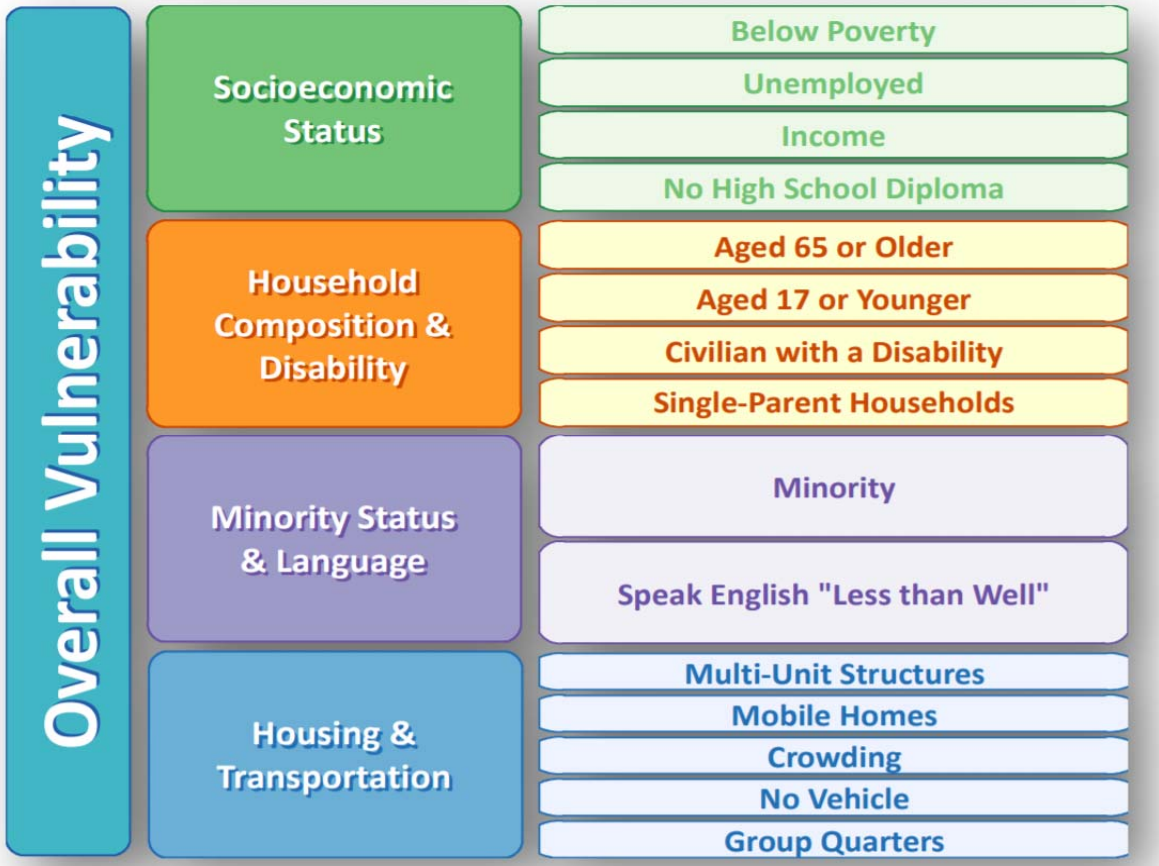
Grays Harbor County Public Health and Social Services / Environmental Health Program

Project Goals

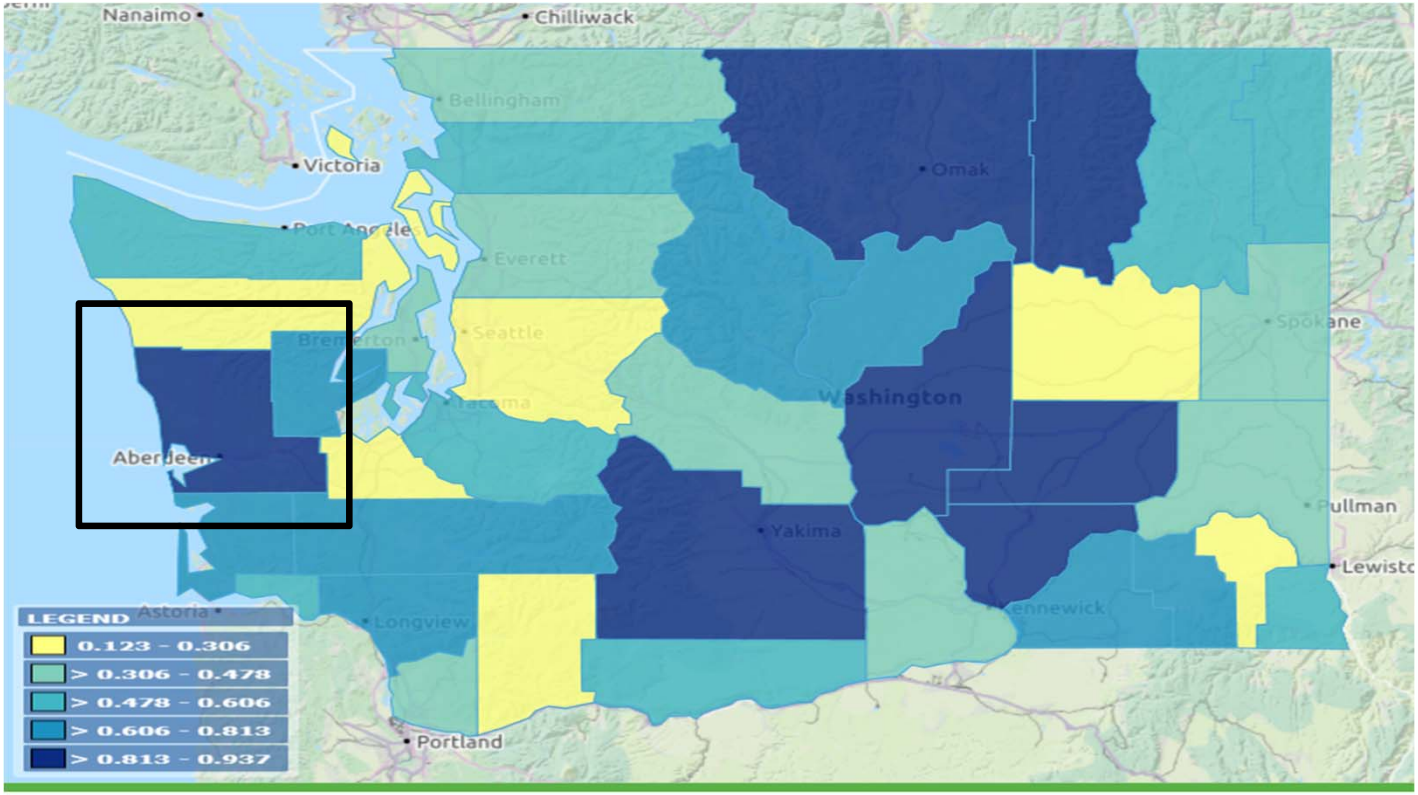
- Identify climate impacts and vulnerabilities
- Project the burden of identified climate-related health outcomes
- Identify feasible interventions

Step 1: Forecasting climate impacts and assessing vulnerabilities

CDC/ATSDR Social Vulnerability Index



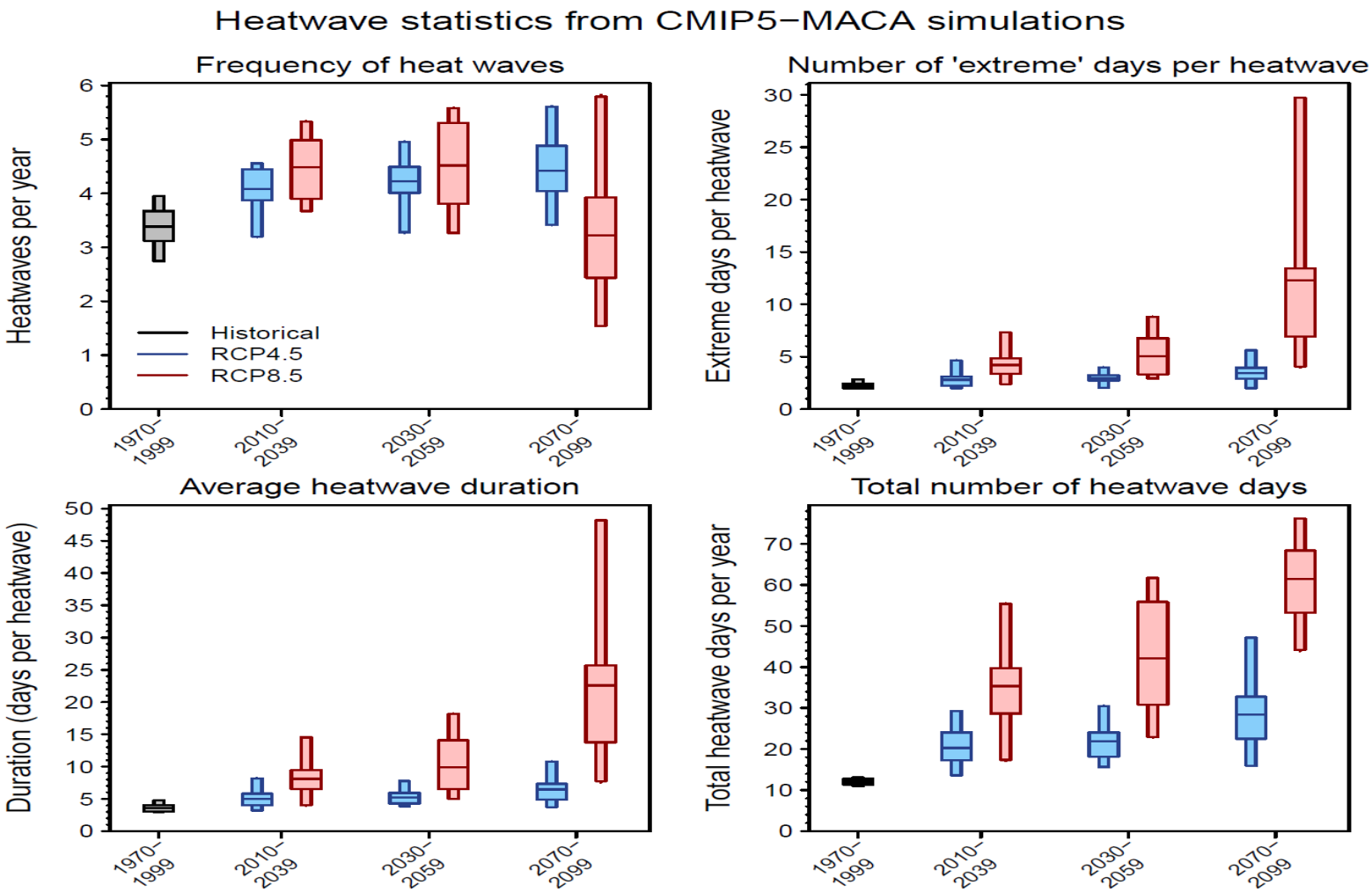
Social Vulnerability Index by county, 2014

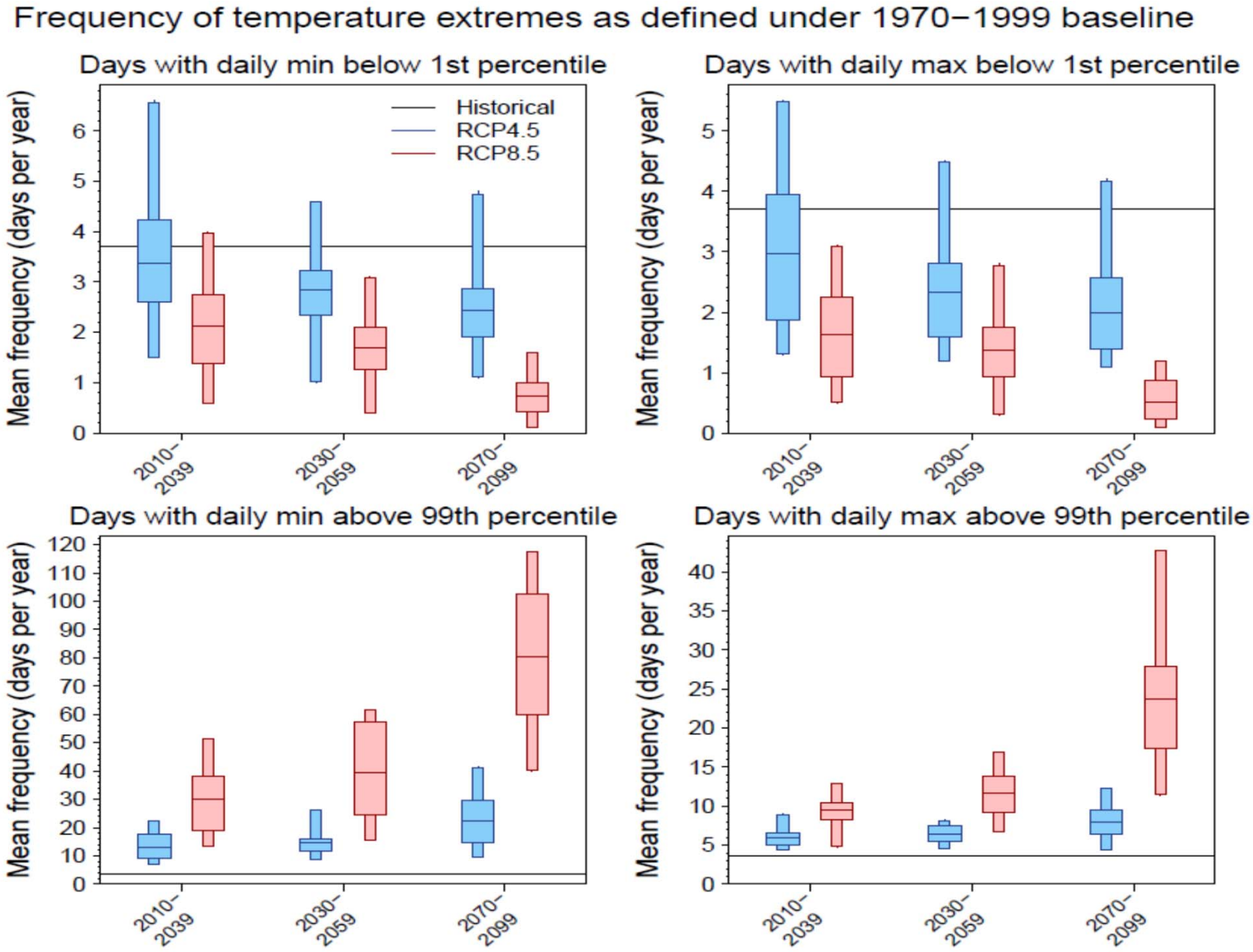


Vulnerability Assessment

- 13.4% of seniors live alone
- 20% of population living in poverty
- 14% unemployment in 2015
- 22% lack health insurance
- 21% ≥5 years reported having a disability

Projected heatwave statistics in GHC using the RCP 4.5 and 8.5 scenarios from CMIP5-MACA simulations compared to historical data (1970-1999)




Frequency of temperature extremes as defined under 1970–1999 baseline
Days with daily min below 1st percentile
Days with daily max below 1st percentile
Days with daily min above 99th percentile
Days with daily max above 99th percentile
Mean frequency (days per year)
Historical
RCP4.5
RCP8.5
2010–2039
2030–2059
2070–2099

Wildfires

- Assume potential is very low given maritime climate and very long fire return interval (500+ years)
- However, higher temperatures and reduced summer rainfall will likely increase fire potential
- Potential for very high levels of smoke *if a very large fire were to occur*
  - Large, relatively damp, evergreen forests emit large quantities of particulate matter when burned
- Large fires burning along eastern slope of Cascades can impact air quality in GHC when offshore lower level winds occur

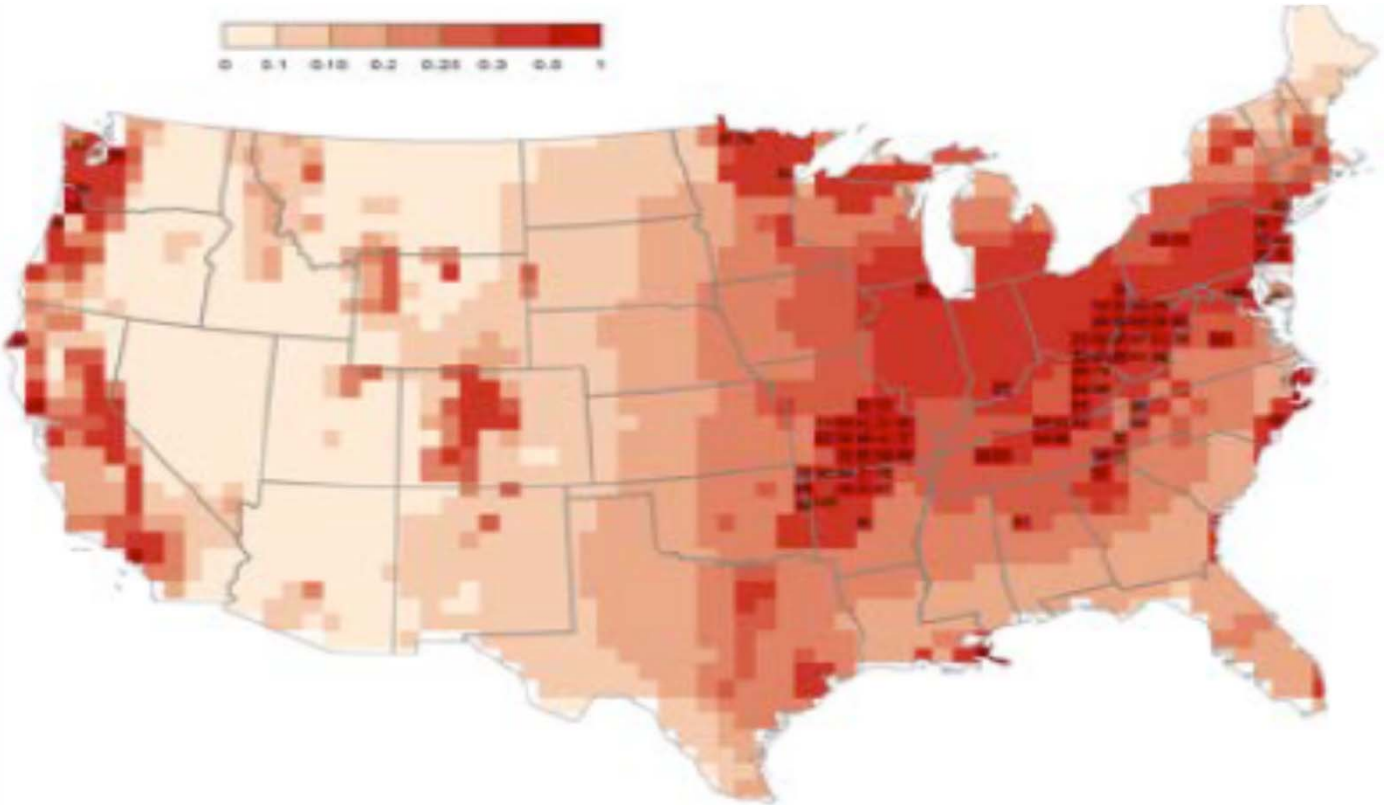


Fig. 2. Relative Smoke Impact Potential (SIP) where light colors are low impact and dark reds are high impact. SIP combines the potential emission rate if large wildfire were to occur with population and wind direction tendencies. From Larkin et al. (2015).

Step 2: Projecting disease burden

Health Impacts

- Heat-related illness
- Respiratory illness from wildfire smoke
- Mosquito-borne disease
- Harmful algal bloom-related illnesses
- Allergic disease

Step 3: Assessing public health interventions

Heat-Related Illness

Intervention	Effectiveness
Real-time data surveillance and warnings	Some evidence
Education and information	Some evidence
Built environment	Insufficient evidence
Health alert system	Sufficient evidence
Access to cooling	Some evidence
Zoning/Building regulations	Insufficient evidence
Hydration	Scientifically supported

CDC. Climate and Health Intervention Assessment: Evidence on Public Health Interventions to Prevent the Negative Health Effects of Climate Change. Climate and Health Technical Report Series. 2017

Wildfire-Related Illness

Intervention	Effectiveness
Evacuation	Scientifically supported
Air filtration – home, room, facility	Scientifically supported
Personal air masks	Some evidence
Forecast/warning systems	Some evidence
Public service announcements	Some evidence

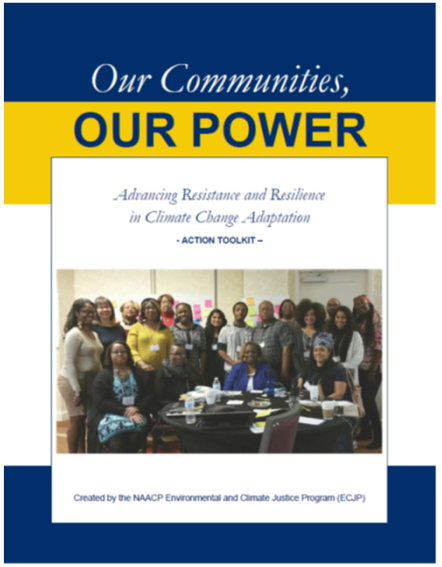
CDC. Climate and Health Intervention Assessment: Evidence on Public Health Interventions to Prevent the Negative Health Effects of Climate Change. Climate and Health Technical Report Series. 2017

Final Thoughts/Lessons Learned

- Local health departments play a vital role in addressing the health effects of climate change
- Role of academia in investigating health effects of climate change and building adaptive capacity
- Community-engaged projects are difficult!
  - Change in leadership in GHC necessitated a change in expectations and scope (BRACE-lite?)

Additional Resources

- BRACE technical reports series
- Essential actions for climate resilience in local health departments – NACCHO
- Environmental Public Health Tracking Network
- Our Communities, Our Power – NAACP



Acknowledgements

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Questions??