



# CAROLINAS INTEGRATED SCIENCES & ASSESSMENTS

## About CISA

The Carolinas Integrated Sciences & Assessments (CISA) is 1 of 11 NOAA-funded Regional Integrated Sciences & Assessments teams. CISA works at the intersection of climate with water, coasts, and health to create, tailor, and provide climate information to improve planning and management approaches that build healthier, safer communities in the Carolinas.

CISA supports a Climate-Health Integration and Outreach Associate to help engage decision makers and stakeholders in addressing the impacts of climate variability and change on public health.

## CISA Connects Climate and Health Science to Decision Making Through

- » Applied research to produce relevant climate information
- » Assessments of climate impacts
- » Processes to support and inform community planning
- » Fostering climate networks and climate communities of practice

## Climate and Health Partners

- » North Carolina Department of Health and Human Services
- » Southeast Regional Climate Center
- » State Climate Office of North Carolina

# FOCUS AREA: CLIMATE AND HEALTH

## How does climate affect human health?

It is important to distinguish between people's vulnerability versus exposure to climate events. The severity of a climate impact often depends upon both a person's vulnerability and exposure to climate and weather extremes.

**Vulnerability** refers to the predisposition to suffer negative effects when exposed to a climate event. Vulnerability is rooted in many social, economic, demographic, and geographic factors. For example, an individual's vulnerability to heat-related illness depends upon factors such as age, weight, and how much they are acclimated to the heat. This vulnerability would not vary if they were exposed to the same level of heat in one location or another, such as a rural or an urban area.

**Exposure** refers to the degree of contact. As the magnitude and frequency of extreme events such as hurricanes or high heat days increases, an individual's exposure, and thereby risk of negative health effects, also grows. While exposure and vulnerability often work together to influence the impact of a climate event, it is not necessary to be both highly exposed and vulnerable to be affected. For example, an otherwise healthy person exposed to high temperatures may suffer from heat-related illness even though he or she would not be considered "vulnerable."

## Climate Impacts to Public Health

- » Temperature
  - › Rising temperatures
  - › Hotter and longer heat waves
- » Extreme Weather Events
  - › Increased heavy rain and flooding
  - › More severe impacts
- » Deterioration of air quality
  - › Increased length and severity of allergy seasons
- » Changes in Vector Habitat
  - › Increased length of warm seasons
  - › Changes in precipitation regimes
  - › Expanded ranges of vector habitat



## Vulnerable Populations in the Carolinas

- » The elderly due to pre-existing health conditions, income limitations, and social isolation
- » Outdoor and manufacturing workers (agriculture, natural resources, or construction) who are more likely to become dehydrated and suffer from heat-related illness
- » Student athletes who play or practice outdoors during high heat months, particularly when the humidity is also high, interrupting the body's normal cooling mechanisms
- » People without sufficient access to air conditioning, especially during prolonged periods of high heat when temperatures remain elevated overnight
- » Those who live in low-lying coastal areas or floodplains and are vulnerable to flooding from heavy precipitation, hurricanes, and storm surge events
- » People who suffer from chronic illnesses such as diabetes or respiratory diseases such as asthma due to a diminished capability to regulate body temperature during high heat periods and may also suffer negative respiratory responses due to poor air quality

Source: Fayetteville Observer

# CLIMATE AND HEALTH PROJECTS

## Convergence: Climate-Health Vulnerabilities

### Working to Reduce Vulnerabilities to Climate-Related Health Impacts

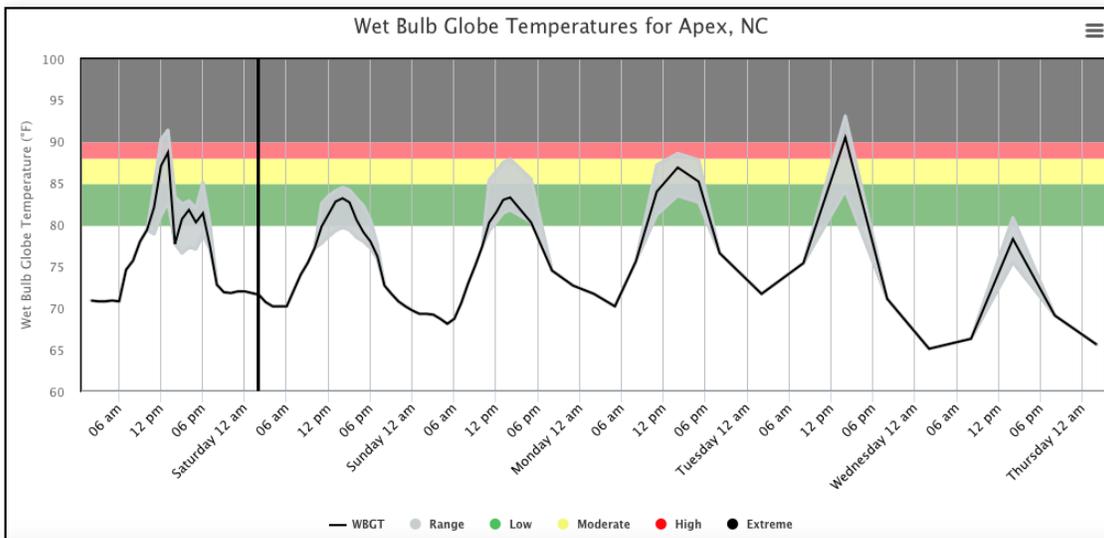
CISA seeks to better understand the relationships between climate and health. This work improves the knowledge of weather-related public health impacts, risk communications such as heat advisories, and the adoption of long-term risk reduction strategies. The Convergence website is a repository for a variety of tools and resources we have developed to support community stakeholders in climate and health decision making.

Convergence houses climate and health decision support tools, an open source journal article database, visualizations of health vulnerabilities in the Carolinas, and infographics to build knowledge about climate concepts and health impacts. As we move forward, we are continuing to expand and improve products available through Convergence in order to support community decision making and build community capacity. Access Convergence at <https://convergence.unc.edu>.

### A Wet-Bulb Globe Temperature (WBGT) Heat Stress Tool

Wet-bulb globe temperature is a way to measure heat stress. Like the heat index, the WBGT takes into account temperature and humidity, but also considers the effects of solar radiation (e.g. heat stress is greater in the sun) and wind speed (e.g. heat stress is much greater when the winds are not blowing). WBGT is used by athletes, the military, outdoor workers, and recreation professionals as a guide to managing workload and level of activity during the heat season.

The Southeast Regional Climate Center, in partnership with CISA and the NC State Climate Office, has developed the WBGT tool which uses National Weather Service forecast products to estimate WBGT over a period of five days. Users can select their location and receive a five-day forecast as shown below.



**Above:** The WBGT tool provides a five-day forecast of possible heat stress. The horizontal black line represents the forecasted WBGT. The shaded area around the WBGT line represents the possible range of values from full sun exposure (top of shaded area) to full shade (bottom of shaded area). The color bands from green to black represent increasing warning levels as outlined by the NC High School Athletes Association, which have corresponding recommendations for action and heat stress prevention. The WBGT forecast is updated every day around 6:30 am and 12:30 pm.

### HERA: The Hazardous Extremes for Risk Assessment Tool

Another tool in development for the Convergence website is the Hazardous Extremes for Risk Assessment (HERA) tool. HERA is intended to assist state-wide and community agencies in planning and preparedness for hazardous events. HERA displays information about the number of hazardous weather and climate events by county that have occurred historically and the probability of future occurrences based on historical data. This county-level information is intended to help prepare Hazard Vulnerability Assessments (HVAs) that healthcare coalitions across the Carolinas develop on an annual basis for their emergency preparedness plans.

HERA will provide decision support for planning and preparedness through:

- » County-level data, visualizations, and information on hazardous weather and climate events
- » Information on the probability or likelihood for certain hazardous events to occur in a county
- » Comparisons across counties and with regional and state averages
- » Information on event-specific impacts



## Contact Information

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## Other Ways to Connect

CISA publishes a quarterly newsletter, the Carolinas Climate Connection, and manages the Carolinas Climate Listserv in order to share information about climate research, upcoming events, funding opportunities, or other relevant news. Visit our website to subscribe and stay up-to-date on the latest climate news in the Carolinas.

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