NC Department of Health and Human Services

Community-focused Efforts to Mitigate the Health Effects of Climate Change

Sarah Hatcher, PhD
Climate and Health Program Lead

Autumn Locklear, MSPH
Climate and Health Epidemiologist

Courtney Williams, MPH
Program Analyst

Chris Douglas, MSEM, NRP
Sandhills Regional Climate Change Adaptation Specialist

September 27, 2023

Presentation Objectives

1. Learn the established connection between climate change and health impacts in NC.
2. Learn about current programs to address heat-related illness.
3. Learn about evaluation findings from current programs.

Outline

- Land Acknowledgment
- Climate and Health in North Carolina
- Implementation and evaluation of extreme heat adaptation programs
- Group Discussion

Land Acknowledgement

NC Tribal and Urban Communities Map

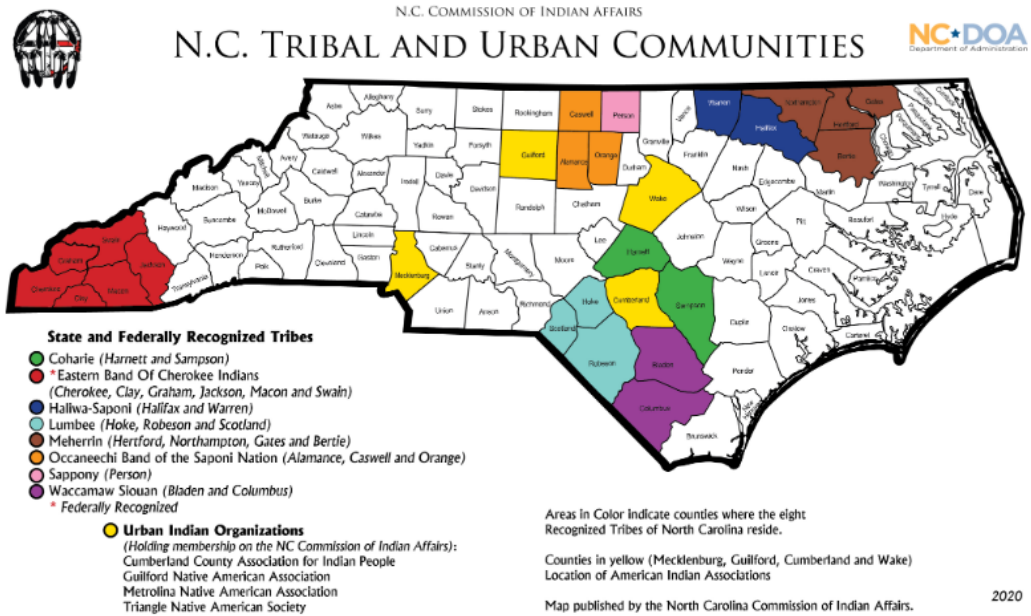
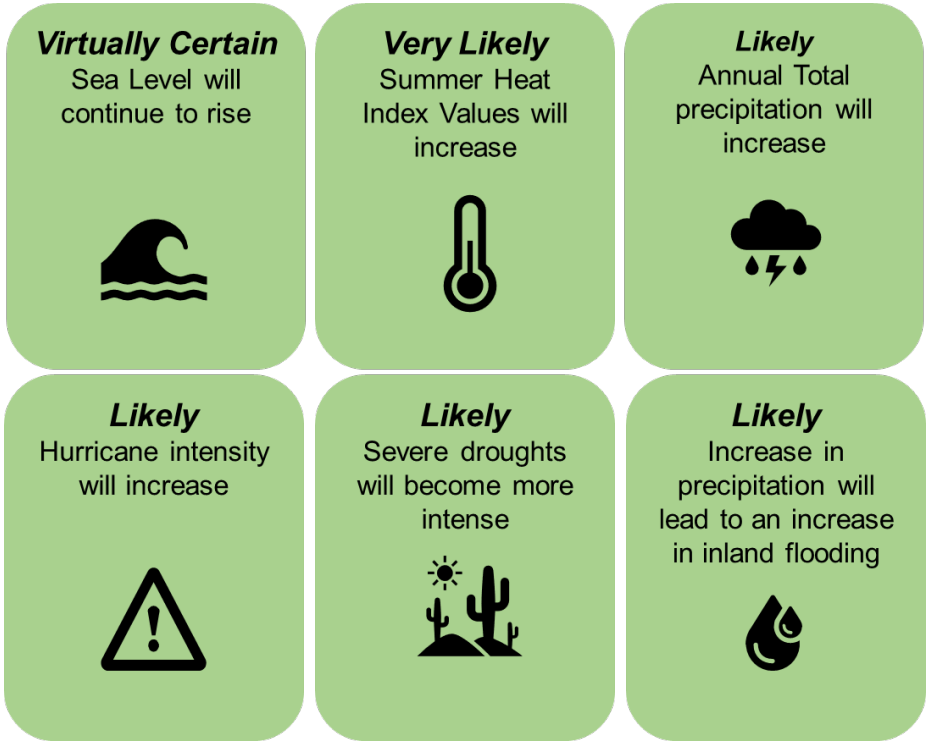


Image: https://ncadmin.nc.gov/about-doa/doa-division-indian-affairs

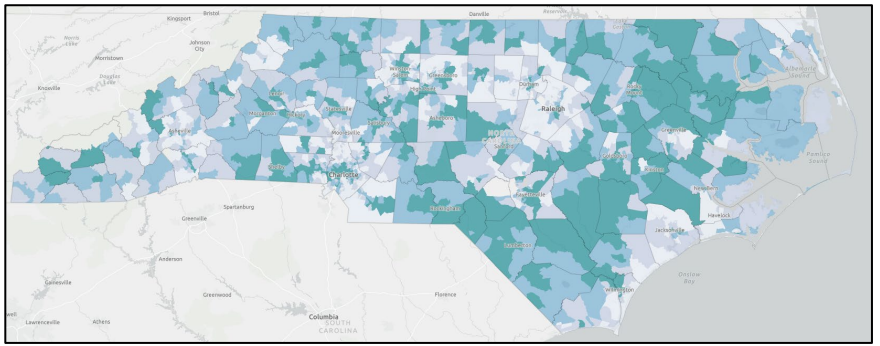
North Carolina's Climate is Changing



SOURCE: North Carolina Climate Science Report (2020); North Carolina Climate Risk Assessment and Resilience Plan (2020)

NCDHHS Climate and Health Team

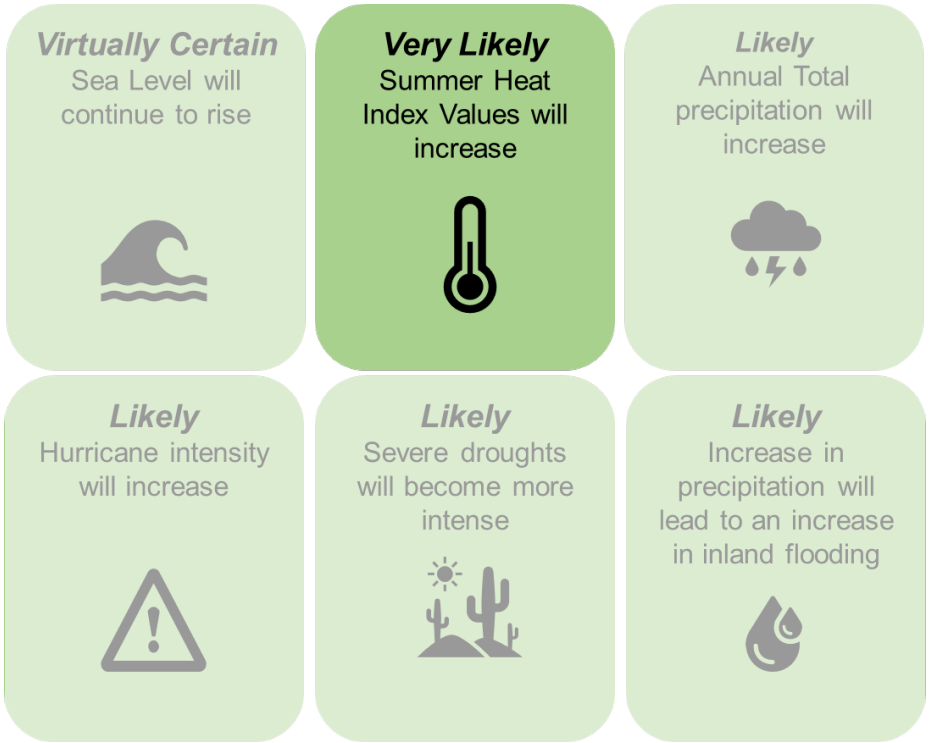
- **Builds community resilience against climate change and its impact on public health**
- **Funded by CDC since 2010**
- **Adaptation actions historically focused on Eastern NC, now expanding**
- **Works across DHHS and with other state agencies to support Executive Orders 80, 246, and 271**



Environmental Justice Index by Census Tract, North Carolina

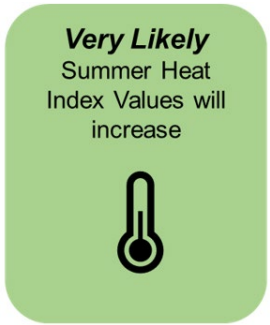
Image (top): https://web.lib.unc.edu/nc-maps/browse_location.php; Source (bottom): NC Environmental Health Data Dashboard

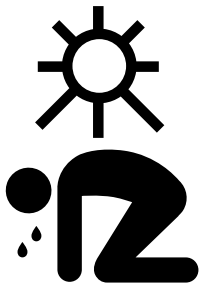
North Carolina's Climate is Changing



SOURCE: North Carolina Climate Science Report (2020); North Carolina Climate Risk Assessment and Resilience Plan (2020)

Increasing Summer Heat Index





Created by Luis Prado
from the Noun Project

Increases in:

- **Temperature throughout all seasons**
- **Summer heat index values**
- **Number of hot and very hot days**
- **Number of warm and very warm nights**
- **Frequency, duration, and intensity of extreme heat events**

Health effects include:

- **Respiratory and cardiovascular issues**
- **Kidney injury**
- **Heat related illness**
  - **Heat cramps**
  - **Heat exhaustion**
  - **Heat stroke**

SOURCE: North Carolina Climate Science Report (Kunkel et al 2020); North Carolina Risk Assessment and Resilience Plan (2020); Chapman et al (2021)

Populations disproportionately affected by extreme heat

Created by ludovic gicqueau from the Noun Project

North Carolina counties with the highest fuel poverty also experience a greater number of extreme heat days compared with the rest of the state.

Source: North Carolina Climate Risk Assessment and Resilience Plan (2020)

Populations disproportionately affected by extreme heat

Created by ludovic picqueau from the Noun Project

Created by Luis Prado from Noun Project

North Carolina counties with the highest fuel poverty also experience a greater number of extreme heat days compared with the rest of the state.

During 1992-2006, the heat related fatality rate among crop workers was 20 times that of all U.S. civilian workers.

Source: North Carolina Climate Risk Assessment and Resilience Plan (2020); Luginbuhl et al 2008

Populations disproportionately affected by extreme heat

Created by ludovic cicqueau from the Noun Project

Created by Luis Prado from Noun Project

Created by Lisole from Noun Project

North Carolina counties with the highest fuel poverty also experience a greater number of extreme heat days compared with the rest of the state.

During 1992-2006, the heat related fatality rate among crop workers was 20 times that of all U.S. civilian workers.

During May-September 2022, older adults (aged 65+ years) accounted for 20% of all heat-related Emergency Department visits.

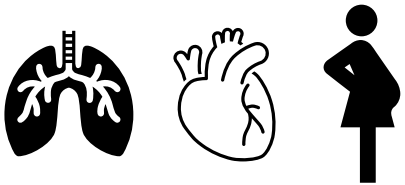
Source: North Carolina Climate Risk Assessment and Resilience Plan (2020); Luginbuhl et al 2008; NC DHHS Summer 2022 Heat Report Summary

Populations disproportionately affected by extreme heat

North Carolina counties with the highest fuel poverty also experience a greater number of extreme heat days compared with the rest of the state.

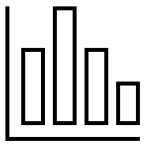
During 1992-2006, the heat related fatality rate among crop workers was 20 times that of all U.S. civilian workers.

During May-September 2022, older adults (aged 65+ years) accounted for 20% of all heat-related Emergency Department visits.



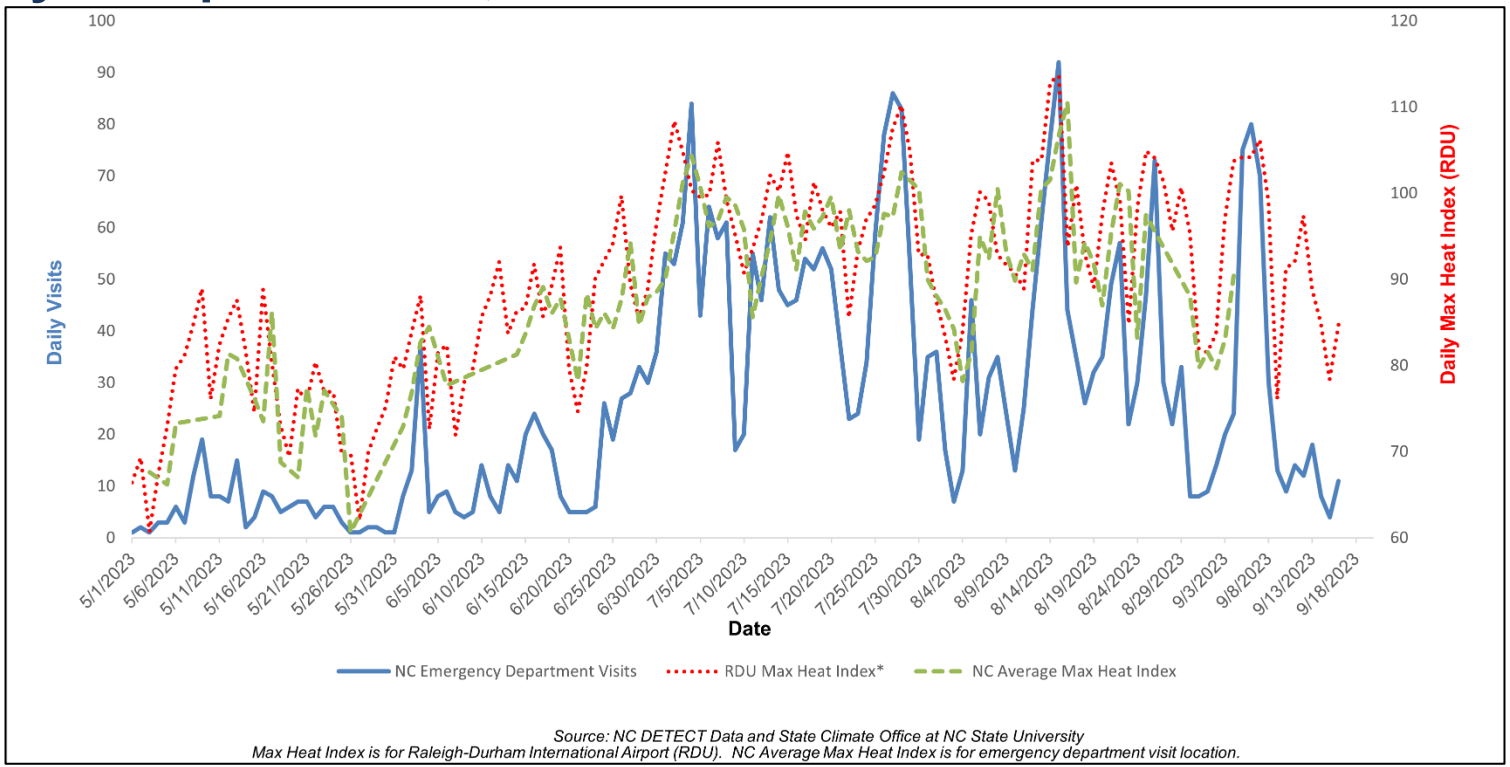
People with chronic health conditions and pregnant people are more sensitive to the effects of heat.

Source: North Carolina Climate Risk Assessment and Resilience Plan (2020); Luginbuhl et al 2008; NC DHHS Summer 2022 Heat Report Summary



Heat-related illness surveillance

Emergency Department Visits for Heat Related Illness—May 1–September 16, 2023



Source: NC DHHS Heat Report

Heat-Related Illness Surveillance Evaluation

- Periodic surveillance system evaluations help ensure the surveillance system is serving a useful public health function.
- Evaluations include recommendations for improving quality and efficiency of the system.
- Recommendations will be incorporated into 2024 HRI surveillance.

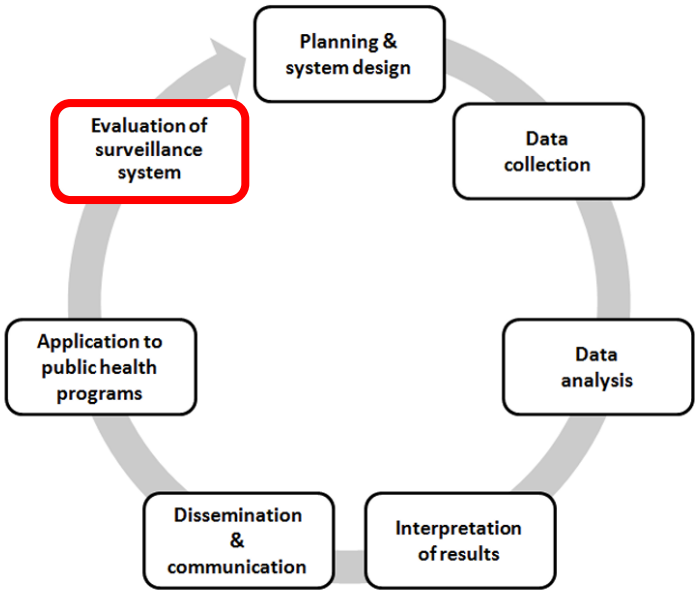


Figure 2. The Surveillance Cycle

Source: Klaucke, D. N., Buehler, J. W., Thacker, S. B., Parrish, R. G., & Trowbridge, F. L. (1988). Guidelines for evaluating surveillance systems.
Figure retrieved from: https://www.astdd.org/docs/state-based-oral-health-surveillance-systems-cste-whitepaper-oct-2013.pdf

Adding Regional Heat-related Illness Surveillance in 2024

North Carolina Heat Report

August 27–September 2, 2023

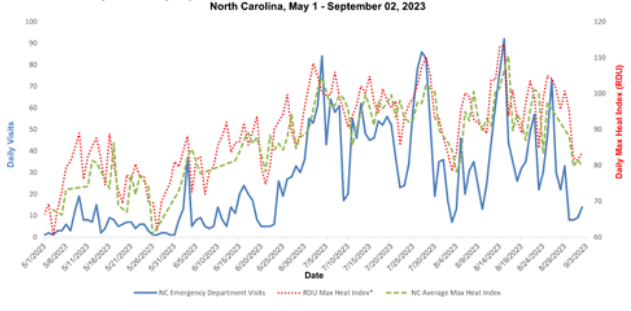
This Week

- Daily maximum heat indices ranged from 81°F to 101°F (median = 95°F) at Raleigh-Durham International Airport (RDU)
- 124 emergency department visits for heat-related illness were identified (Figure 1)
  - 63% of visits were among males (Table 1)
  - The highest proportion of visits were among patients aged 65 and over (35%) (Table 1)
  - The most frequent heat related diagnosis code was Heat Exhaustion (n = 36) (Table 2)
  - The highest proportion of visits occurred in hospitals in the Piedmont (61%) and Coastal (55%) regions
  - 20% of visits occurred in hospitals in the Sandhills sub-region[1]
- During August 27–September 2, the proportion of emergency department visits for heat-related illness was 0.13%, lower than the 2018-2022 average of 0.17%. (Figure 2)

Season to Date (September 2, 2023)

- 3,442 emergency department visits for heat-related illness have been identified (Figure 1)

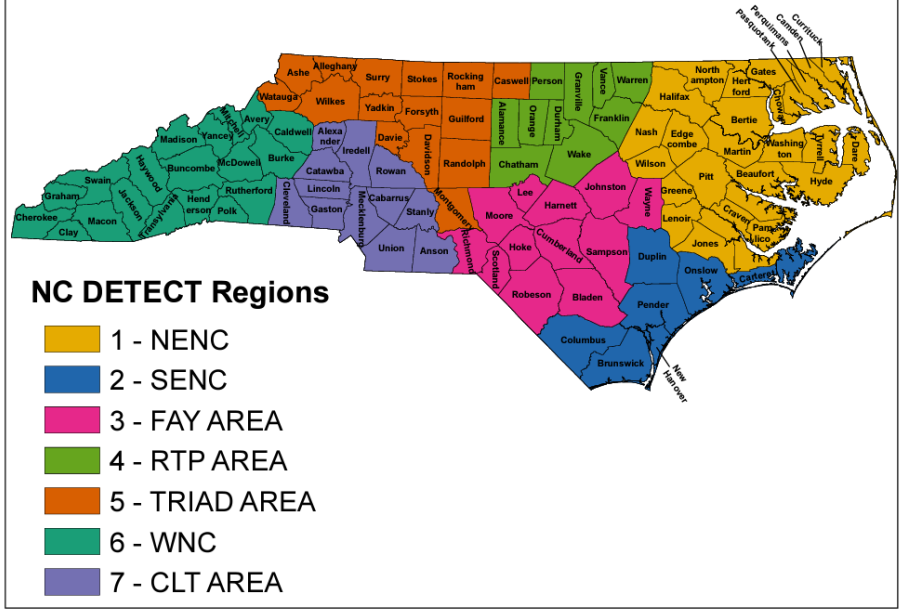
Figure 1. Emergency Department Visits for Heat-Related Illness and Maximum Heat Index -- North Carolina, May 1 - September 02, 2023

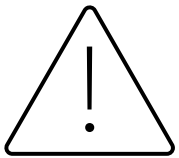


Source: NC DETECT Data and State Climate Office at NC State University
Max Heat Index is for Raleigh-Durham International Airport (RDU). NC Average Max Heat Index is for emergency department visit location.

[1]The Sandhills sub-region is comprised of the following counties from the Piedmont and Coastal regions: Bladen, Cumberland, Harnett, Hoke, Lee, Montgomery, Moore, Richmond, Robeson, and Scotland.

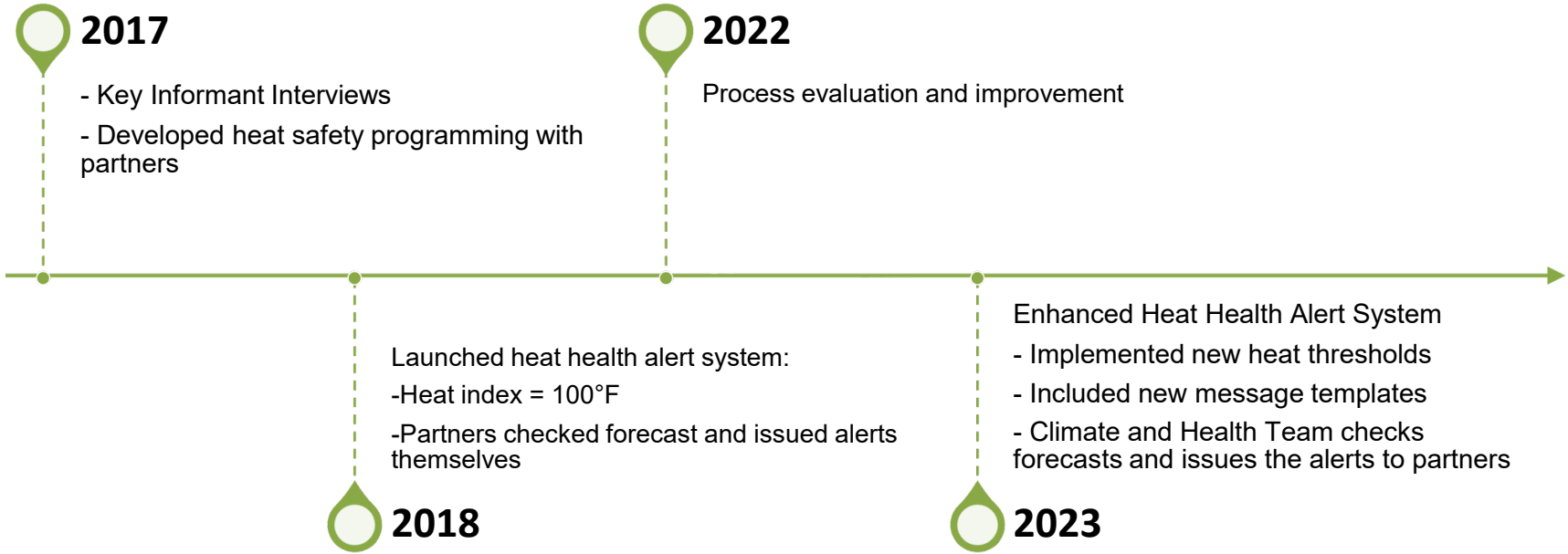
NC DETECT Regions





Heat Health Alert System

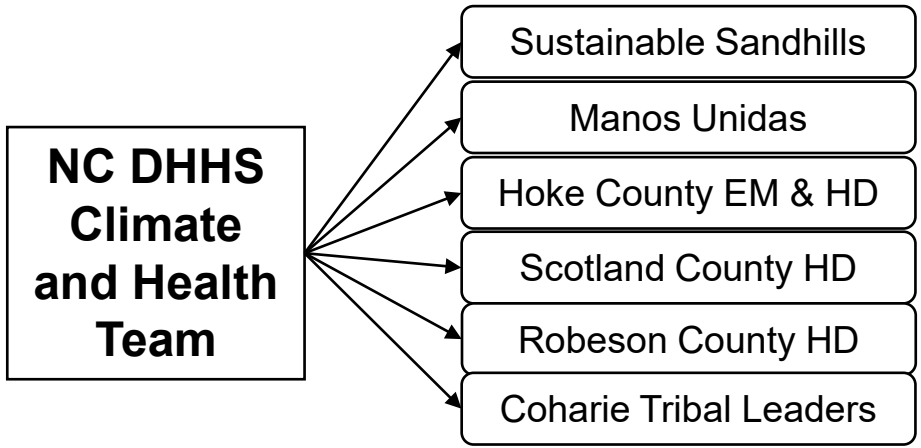
History of NCDHHS Heat Health Alert System



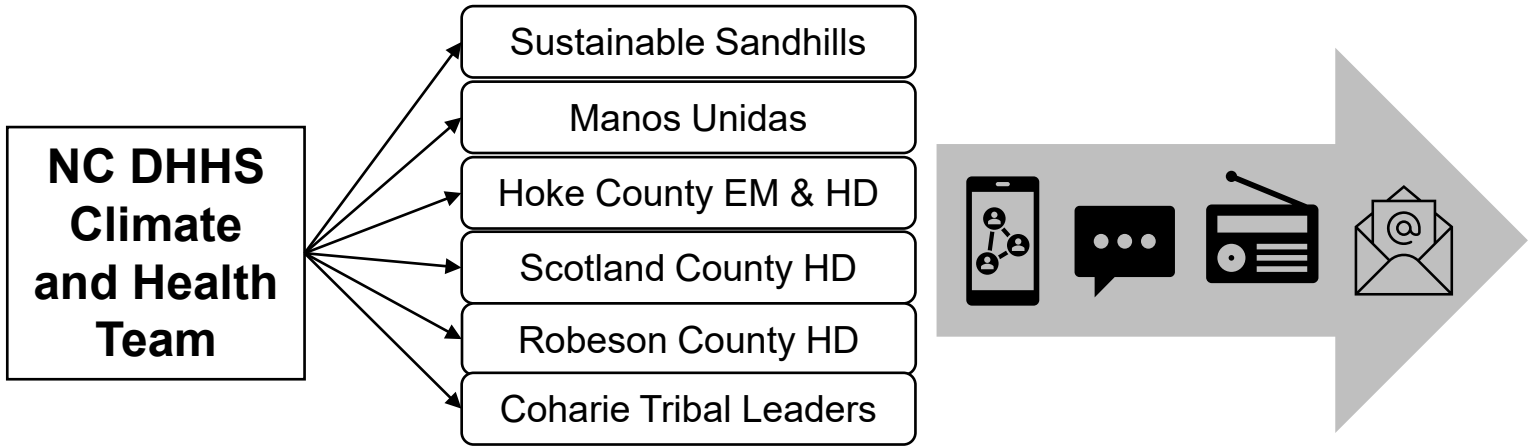
NCDHHS Heat Health Alert System

NC DHHS Climate and Health Team

NCDHHS Heat Health Alert System



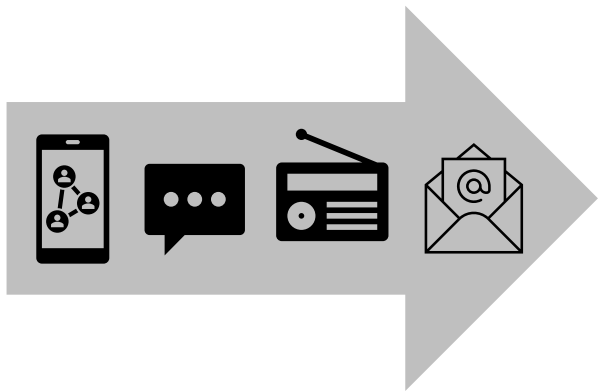
NCDHHS Heat Health Alert System



NCDHHS Heat Health Alert System

NC DHHS Climate and Health Team

- Sustainable Sandhills
- Manos Unidas
- Hoke County EM & HD
- Scotland County HD
- Robeson County HD
- Coharie Tribal Leaders

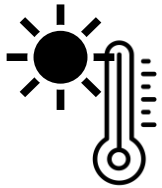


- **Community Health Workers**
- **Mobile Home Park Managers**
- **Nursing Home Administrators**
- **Farmworker Mobile Health Clinics**
- **Farmworkers**
- **Local HD Staff**
- **Youth Sports Coaches**
- **General Public**
- **Other Community Leaders**

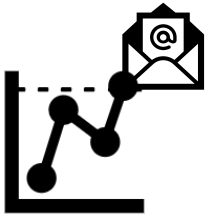
NCDHHS Heat Health Alert System Evaluation Questions

- **Did NCDHHS send out alerts when the heat index threshold was met?**
- **Did partners share alerts when NCDHHS sent alert notifications?**
- **To what extent did alerts reach intended populations?**

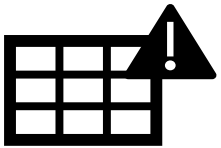
NCDHHS Heat Health Alert System Evaluation Data



National Weather Service heat index data



Threshold notification logs



Heat alert tracking logs

Social media

Awareness Survey

Taskforce Debrief

NCDHHS Heat Health Alert System Evaluation Indicators

Question	Indicators
Did NCDHHS send out alerts when the heat index threshold was met?	Percent of days during heat season when heat index threshold was met
	Percent of days threshold was met AND NCDHHS sent heat alerts

NCDHHS Heat Health Alert System Evaluation Indicators

Question	Indicators
Did NCDHHS send out alerts when the heat index threshold was met?	Percent of days during heat season when heat index threshold was met
	Percent of days threshold was met AND NCDHHS sent heat alerts
Did partners share alerts when NCDHHS sent alert notifications?	Percent of days during heat season when threshold met AND heat alerts shared by partners

NCDHHS Heat Health Alert System Evaluation Indicators

Question	Indicators
Did NCDHHS send out alerts when the heat index threshold was met?	Percent of days during heat season when heat index threshold was met
	Percent of days threshold was met AND NCDHHS sent heat alerts
Did partners share alerts when NCDHHS sent alert notifications?	Percent of days during heat season when threshold met AND heat alerts shared by partners
To what extent did alerts reach intended populations?	Percent of survey participants reporting awareness of heat alerts
	Percent of survey participants who work with people disproportionately impacted by extreme heat AND report that the people they work with are aware of heat alerts
	Number of different ways partners share heat alerts (e.g., social media, radio announcements, e-mail)

Hoke County Heat Alerts for Youth Athletic Coaches

Sandhills Regional Adaptation Specialist

- **Subcontract with County of Hoke Emergency Management**

- **Provides additional local support in the Sandhills counties of Bladen, Hoke, Robeson, Sampson, and Scotland:**
  - **Local climate and health adaptation activities**
  - **Extreme heat education and prevention materials distribution**

- **In FY2023, piloted a Heat Alert System for youth athletics coaches**

Hoke County Heat Alert Pilot

Problem Statement: How does Hoke County Parks and Recreation Department utilize mass notification and/or an internal alerting system to disseminate heat threshold and advisory warnings to coaches, staff, and families aimed at reducing the number of heat-related injuries during summer sports leagues?

Goals:

1. Reduce heat-related injuries during Summer Parks and Recreation league(s)
2. Increase awareness of heat injuries
3. Increase dissemination of heat warning advisories

Desired Outcome: A reduction in the number of heat-related injuries throughout Hoke County during the summer Parks and Recreation sports leagues.

Hoke County Heat Alert Pilot

Stakeholders are the people, groups, organizations and institutions affected by, have an interest in or are somehow involved in the issue being addressed.

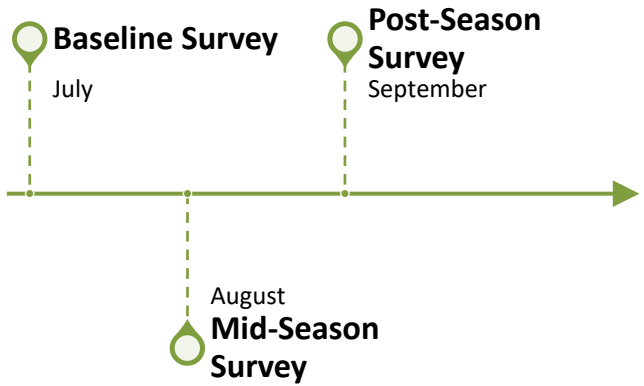
- State of North Carolina
- Department of Health and Human Services (DHHS)
- Hoke County Government
- Hoke County Emergency Management
- Hoke County Parks and Recreation
- Parks and Recreation Coaches
- Parks and Recreation Staff
- Parents of Summer Youth League Participants
- Youth Participants ranging in age from 7-13
- Officiating Staff (County and NCHSAA)

Heat Alerts were sent via text message (SMS), Facebook® posts, email, and Staff Alerting App.

- 19 Alerts sent over a 60-day period to Coaches and Staff
- 25 county-wide alerts published
- Average Social Media reach was 10,463 people
- EMS data results pending

Evaluating Hoke Co. Heat Alert Pilot

- **3 surveys distributed to coaches via REDCap**
  - Assessed:
    - Coaching experience
    - HRI knowledge, beliefs
    - Frequency of HRI among athletes
    - Prevention activities in use
    - Perceptions of heat alerts
    - Recommendations for improvement

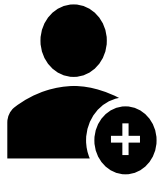


SOURCE:

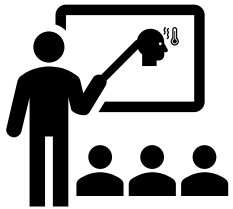
Improving 2024 Hoke Co. Heat Alert System

Increase engagement

Consensus on purpose



Increase NCDHHS support



Conduct HRI prevention trainings

Evaluate Summer and Fall leagues

SOURCE:

Acknowledgements

- **NCDHHS Occupational and Environmental Epidemiology Branch:** Virginia Guidry and Alverina Hall-Clay
- **Community/local partners:** County of Hoke Emergency Management; Sustainable Sandhills; Scotland, Robeson, and Hoke Co. Health Departments; Coharie Tribe; Manos Unidas
- **State agency partners:** NC Office of Recovery and Resiliency, NC Farmworker Health Program
- **Scientific partners:** NC State Climate Office, National Weather Service (Raleigh), Duke Heat Policy Innovation Hub

This work is supported by the Centers for Disease Control and Prevention Climate-Ready States and Cities Initiative, Building Resilience Against Climate Effects (BRACE) Cooperative Agreement No. 5 NUE1EH001449-03-00

Group Discussion and Activity

Adding Regional Heat-related Illness Surveillance in 2024

North Carolina Heat Report

August 27–September 2, 2023

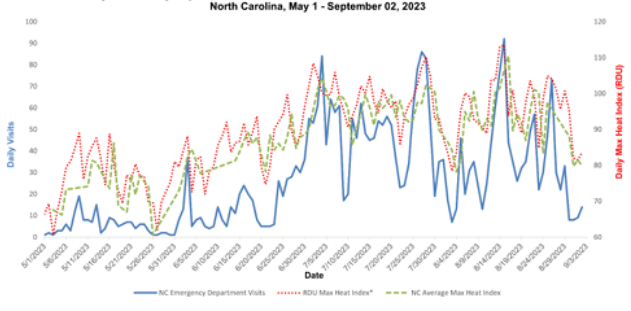
This Week

- Daily maximum heat indices ranged from 81°F to 101°F (median = 95°F) at Raleigh-Durham International Airport (RDU)
- 124 emergency department visits for heat-related illness were identified (Figure 1)
  - 63% of visits were among males (Table 1)
  - The highest proportion of visits were among patients aged 65 and over (35%) (Table 1)
  - The most frequent heat related diagnosis code was Heat Exhaustion (n = 36) (Table 2)
  - The highest proportion of visits occurred in hospitals in the Piedmont (61%) and Coastal (55%) regions
  - 20% of visits occurred in hospitals in the Sandhills sub-region[1]
- During August 27–September 2, the proportion of emergency department visits for heat-related illness was 0.13%, lower than the 2018-2022 average of 0.17%. (Figure 2)

Season to Date (September 2, 2023)

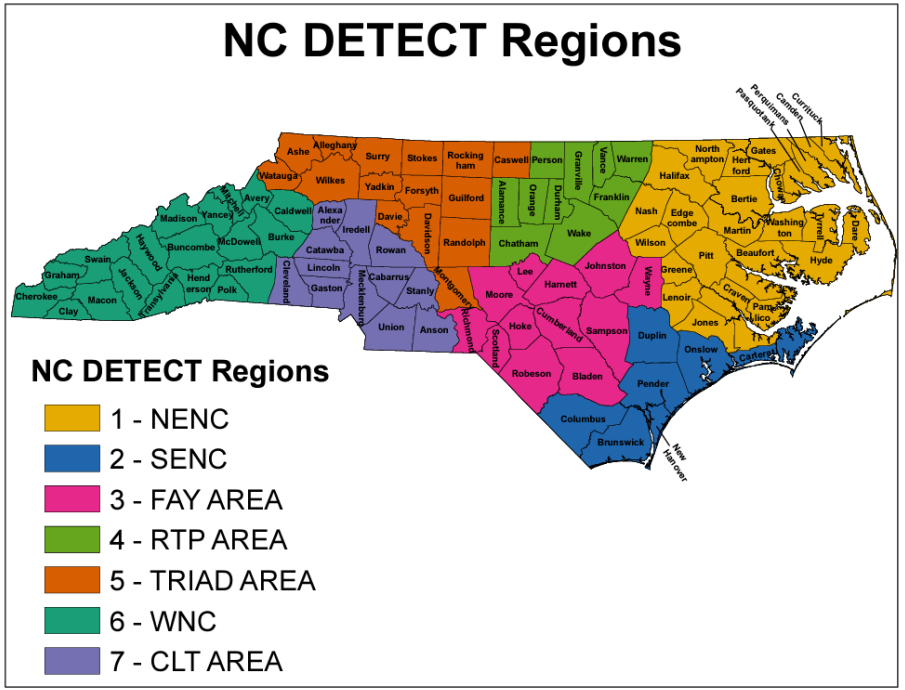
- 3,442 emergency department visits for heat-related illness have been identified (Figure 1)

Figure 1. Emergency Department Visits for Heat-Related Illness and Maximum Heat Index -- North Carolina, May 1 - September 02, 2023



Source: NC DETECT Data and State Climate Office at NC State University
Max Heat Index is for Raleigh-Durham International Airport (RDU). NC Average Max Heat Index is for emergency department visit location.

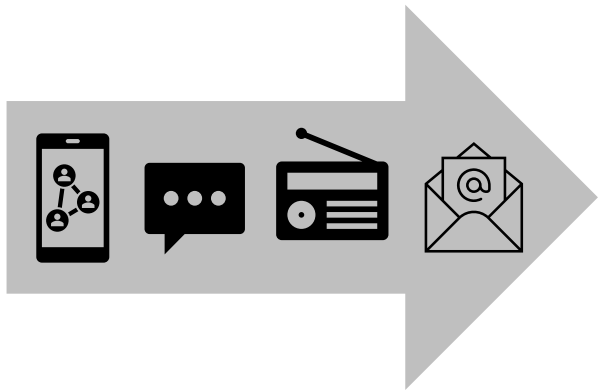
[1]The Sandhills sub-region is comprised of the following counties from the Piedmont and Coastal regions: Bladen, Cumberland, Harnett, Hoke, Lee, Montgomery, Moore, Richmond, Robeson, and Scotland.



2024 NCDHHS Heat Health Alert System Expansion

NC DHHS Climate and Health Team

- Sustainable Sandhills
- Manos Unidas
- Hoke County EM & HD
- Scotland County HD
- Robeson County HD
- Coharie Tribal Leaders



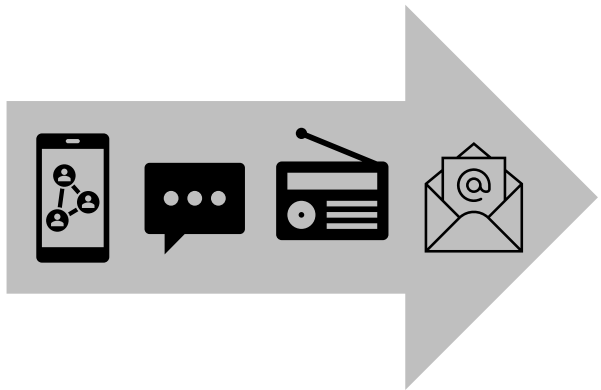
- **Community Health Workers**
- **Mobile Home Park Managers**
- **Nursing Home Administrators**
- **Farmworker Mobile Health Clinics**
- **Farmworkers**
- **Local HD Staff**
- **Youth Sports Coaches**
- **General Public**
- **Other Community Leaders**

2024 NCDHHS Heat Health Alert System Expansion

NC DHHS Climate and Health Team

- ***Automate forecast check***
- ***Health-based thresholds***

- Sustainable Sandhills
- Manos Unidas
- Hoke County EM & HD
- Scotland County HD
- Robeson County HD
- Coharie Tribal Leaders



Community Health Workers

Mobile Home Park Managers

Nursing Home Administrators

Farmworker Mobile Health Clinics

Farmworkers

Local HD Staff

Youth Sports Coaches

General Public

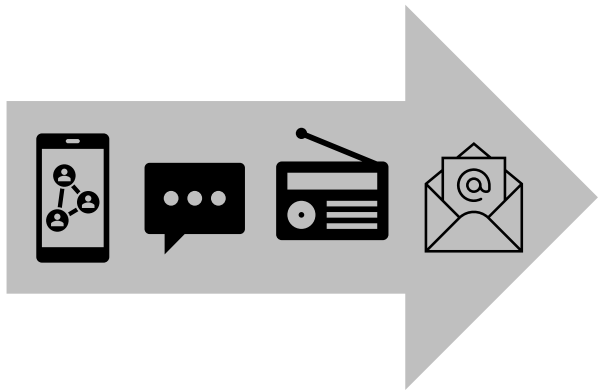
Other Community Leaders

2024 NCDHHS Heat Health Alert System Expansion

NC DHHS Climate and Health Team

- ***Automate forecast check***
- ***Health-based thresholds***

- Sustainable Sandhills
- Manos Unidas
- Hoke County EM & HD
- Scotland County HD
- Robeson County HD
- Coharie Tribal Leaders
- ***Your Jurisdiction or Organization?***



Community Health Workers

Mobile Home Park Managers

Nursing Home Administrators

Farmworker Mobile Health Clinics

Farmworkers

Local HD Staff

Youth Sports Coaches

General Public

Other Community Leaders

Group Discussion

Please return the feedback worksheet before you leave!

PUTTING CLIMATE AND HEALTH RESOURCES INTO ACTION

Your job title:

Geographic area you serve:

HEAT-RELATED ILLNESS REGIONAL REPORTS

How would you use the regional report?	Who would you share it with?
1.	1.
2.	2.
3.	3.

What would you do if you saw an increase in Heat Related Illness ED visits in your region?

USING HEAT HEALTH ALERTS

How would you share the heat alerts with people in your jurisdiction?

1.

2.

3.

What populations in your jurisdiction are disproportionately affected by extreme heat? How would you reach them?

Population	How to reach them
1.	1.
2.	2.
3.	3.

FEEDBACK FOR CLIMATE AND HEALTH TEAM

Your job title:

Geographic area you serve:

HEAT-RELATED ILLNESS REGIONAL REPORTS

What information would you want to see in the report? (e.g., rates, work-related, ED visits, etc.)

USING HEAT HEALTH ALERTS

What languages do you use to communicate health information to your community?	How would you want to receive alerts? (e.g., email, text message)
1.	1.
2.	2.
3.	3.

What agencies, institutions, or organizations should we consider distributing alerts to?

1.

2.

3.

Thank you!