

North Carolina Climate and Health Program

BRACE

BUILDING RESILIENCE AGAINST CLIMATE EFFECTS

Evaluation Plan



NC DEPARTMENT OF
HEALTH AND
HUMAN SERVICES



Program Evaluation Plan

Introduction

This program evaluation is intended to guide evaluation of heat-health alert systems, heat syndromic surveillance reporting system, and wildfire education curriculum. The program evaluation will also inform Building Resilience Against Climate Effects (BRACE) program staff of the extent of current partner engagement in program activities by determining barriers and facilitators to participating in activities. This information will guide future partnership decisions (who to collaborate with, level of engagement, etc.), collaborative activities, and an action plan for increased partner engagement. The main guiding document for evaluation is the CDC Evaluation Framework.

Evaluation Framework

The CDC's Framework for Program Evaluation will be used to develop an effective program evaluation strategy to ensure the BRACE program is performing at its full potential and achieving the goals, objectives and required outputs outlined in the work plan. The Framework is comprised of six key steps: 1) engage stakeholders, 2) describe the program, 3) focus the evaluation design, 4) gather credible evidence, 5) justify conclusions and 6) ensure use and share lessons learned.

STEP 1: Stakeholder Engagement

Stakeholders play a vital role in ensuring a comprehensive and unbiased perspective of program activities and methods. Their involvement also helps assess the extent to which the evaluation meets the needs of program funders, BRACE staff, and most importantly, our partnering communities. We will continue to strengthen our relationships with stakeholders through regular communication to build trust and responding efficiently and effectively to local concerns. Our stakeholders come from a variety of disciplines, including the National Weather Service, the North Carolina Department of Labor, local health departments, and the Division of Public Health’s Public Health Preparedness and Response Branch.

Table 1. Roles and expectations for stakeholder engagement.

Table 1. Stakeholder Assessment and Engagement Plan				
Stakeholders	*Stakeholder Category	Interest or Perspective	Role in the Evaluation	How and When to Engage
North Carolina Division of Public Health BRACE Program	Primary	<ul style="list-style-type: none"> Run and implement the BRACE program 	<ul style="list-style-type: none"> Define program and context Prioritize evaluation questions Identify data sources Provide scientific perspective on logic model and intervention development Projection of long-term outcomes 	<ul style="list-style-type: none"> Direct role in evaluation process Interpret findings Disseminate and implement evaluation findings Enhance/improve the BRACE program Contribute to the published literature
Federal agencies (CDC, NOAA, EPA)	Primary	<ul style="list-style-type: none"> Interested in potential to decrease negative health outcomes Primary funding source for BRACE (CDC) 	<ul style="list-style-type: none"> Provide scientific perspective on logic model and intervention development Project long-term outcomes 	<ul style="list-style-type: none"> Receive snapshot of evaluation results in the form of briefs, white paper, etc. Consult for evaluation deliverables Contact for feedback on program aspects
State agencies (i.e. Division of Public Health; Division of Aging, Emergency Management, Department of Environmental Quality)	Secondary	<ul style="list-style-type: none"> Interested in potential to decrease negative health outcomes Participate in implementation of BRACE activities 	<ul style="list-style-type: none"> Provide scientific perspective on logic model and intervention development Project long-term outcomes 	<ul style="list-style-type: none"> Receive snapshot of evaluation results in the form of briefs, white paper, etc. Increase support for legislation to address adaptive planning Increase support for interventions that address climate change and its effects on health

Non-Profit agencies (Clean Air Carolina, Climate Justice, Sustainable Sandhills)	Secondary	<ul style="list-style-type: none"> ▪ Interested in potential to decrease negative health outcomes 	<ul style="list-style-type: none"> ▪ Provide scientific perspective on logic model and intervention development ▪ Project long-term outcomes 	<ul style="list-style-type: none"> ▪ Receive snapshot of evaluation results in the form of briefs, white paper, etc. ▪ Increase support for legislation to address adaptive planning ▪ Increase support for interventions to address climate change and its effects on health
Local universities (University of North Carolina at Chapel Hill and East Carolina University)	Tertiary	<ul style="list-style-type: none"> ▪ Interested in potential to decrease negative health outcomes ▪ Participate in implementation of BRACE activities 	<ul style="list-style-type: none"> ▪ Provide scientific perspective on logic model and intervention development ▪ Project long-term outcomes 	<ul style="list-style-type: none"> ▪ Help analyze data from interventions ▪ Develop specific environmental health projects ▪ Create questions based on environmental health surveillance data

Context

Evidence suggests that the world's climate is becoming warmer, increasing the potential for extreme weather events around the world. Longer and more intense heat waves, more frequent and severe droughts, heavier and more frequent precipitation events, flooding, and additional air pollution are some of the potential consequences of the climate becoming warmer (CDC, 2014).

Climate-Related Health Concerns

These environmental changes have a significant impact on human health. In North Carolina, health impacts include heat-related illness, injuries or deaths due to air pollution, extreme weather, and water-borne pathogens. Existing environmental exposures such as breaching of animal waste storage can result inland during extreme precipitation events.

Vulnerable Populations

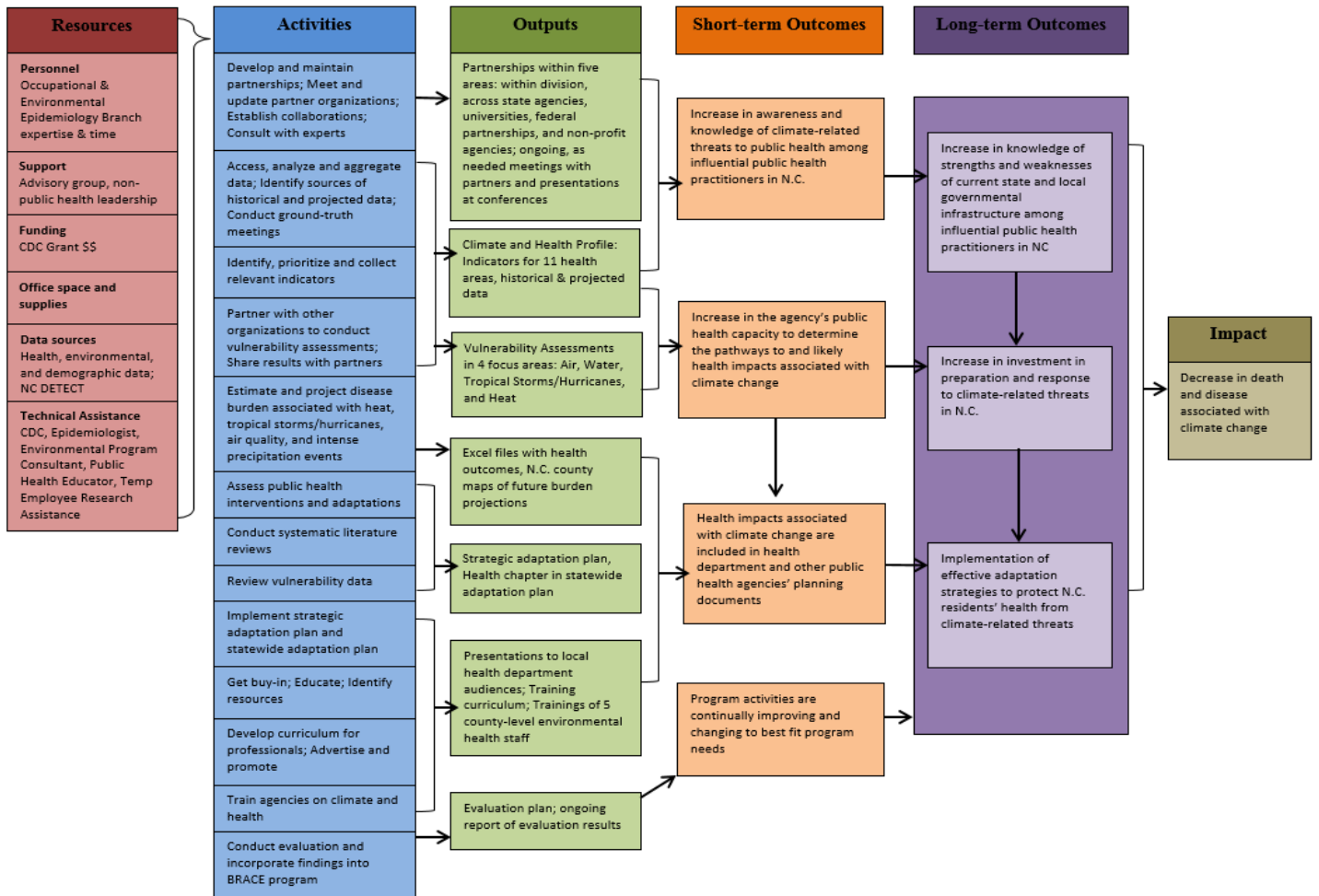
Peer-reviewed statistical analysis of data from our statewide syndromic surveillance system, North Carolina Disease Event Tracking and Epidemiologic Collection Tool (NC DETECT), has demonstrated that the highest rate of emergency department visits for heat-related illness occurs in the Sandhills – an 11-county region in the southeastern portion of North Carolina. To further refine our target population, we used Geographic Information Systems (GIS) as a tool to determine the counties most vulnerable to heat-related illness based on socioeconomic and health indicators of heat vulnerability. We met with local stakeholders to gather the most appropriate indicators of heat vulnerability in these communities. These indicators were mapped to illustrate the most vulnerable areas, and were overlaid with a map highlighting the areas with the highest rates of emergency department visits. The final maps indicated a five-county sub region in the Sandhills in which the population has both high vulnerability to heat-illness and a high burden of heat-related illness emergency department visits. During the next funding cycle, work will continue in these counties through implementation of public health interventions to assist in reducing the impact of heat-related illness.

Program Development

The Climate and Health Program was established through CDC's Climate-Ready States and Cities Initiative (CRSCI) in 2010. During this period, the program developed heat-illness prevention toolkits for children, older adults and those who work outdoors. The program also developed a communication plan for disseminating time-sensitive heat warning messaging; established partnerships with stakeholders across the state; enhanced surveillance capacity of heat morbidity and mortality; and developed GIS maps of vulnerable population distribution across the state

The Climate and Health Program has received additional funding through CDC to implement the BRACE framework into program activities over the next three years. The program will continue addressing heat-related illnesses as well as branch out to other climate and health effects such as drought, vector-borne diseases, wildfires, flash flooding, and air quality. The following logic model details the components of the program to address heat-related illness in North Carolina moving forward.

Building Resilience Against Climate Effects (BRACE) in North Carolina



STEP 3: Evaluation Focus (DESIGN)

After collecting data on climate-related health impacts and vulnerabilities in North Carolina, a framework was designed for evaluating the effectiveness of our program. This process included developing specific evaluation questions, data sources, modes of data collection, and appropriate indicators, as outlined in the table below. Some of these questions focus on the adaptation action plan, or implementation and monitoring strategies (IMS). The first table focuses on process, the second table focuses on outcome for heat-health work, and the third table focuses on outcome for wildfire work.

Intervention Component	Evaluation Questions
Stakeholder engagement	P1a. To what extent does the stakeholder team represent the needs and priorities of the community?
	P1b. How much do stakeholders value being involved in the development and implementation of the heat alert system?
	P1c. Were stakeholders adequately informed of the purpose, goals, and objectives of the heat alert system?
IMS preparation	P2a. Is the IMS based on the most current and accurate data?
	P2b. To what extent is the IMS coordinated with relevant regional and state climate adaptation plans?
	P2c. Does the IMS include all necessary components?
	P2d. How feasible is the IMS given local resources and constraints?
	P2e. Was the development of the IMS equitable and inclusive?
	P2f. How satisfied are participants/stakeholders with overall IMS?
	P2g. How satisfied are participants/stakeholders with IMS planning process/system development?
Plan communication	P3a. To what extent did relevant stakeholders/actors receive needed information about the heat alert system?
	P3b. How useful did authorities find the communications?
Plan Implementation	P4a. To what extent has the heat alert system been implemented? (timeline/benchmarks)
	P5b. What barriers and facilitators have authorities encountered in implementing the plan?
Data Collection/entry	P5a. To what extent were the follow-ups completed as planned
	P5b. To what extent has the data been recorded?

Outcome Evaluation Questions
O1. How effective is the heat alert system in communicating heat-related health risks to the public? (Barriers? Facilitators?)
O2. To what extent do citizens change their behavior based on receiving information from the heat alert system? (Barriers? Facilitators?)
O3. To what extent did the heat alert system reduce emergency department visits for heat-related illness?
O4. To what extent does the program increase the capacity of local organizations to adapt to climate change (increased heat?)
O5. To what extent does the program facilitate the integration of local, regional, and state level climate adaptation policy?
O6. Does the program contribute to the evidence base of public health adaptation to climate change? (external validity: feasibility, scalability, generalizability)

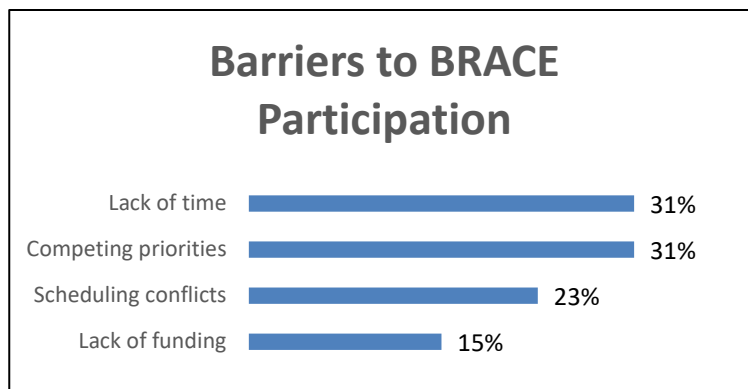
Outcome Evaluation Questions
O1. How effective is the wildfire curriculum in communicating wildfire-related health risks to the public? (Barriers? Facilitators?)
O2. To what extent did the wildfire curriculum reduce emergency department visits for respiratory conditions?
O3. To what extent does the program increase the capacity of local organizations to adapt to climate change?
O4. To what extent does the program facilitate the integration of local, regional, and state level climate adaptation policy?

STEP 4: Building Credible Evidence (DATA COLLECTION)

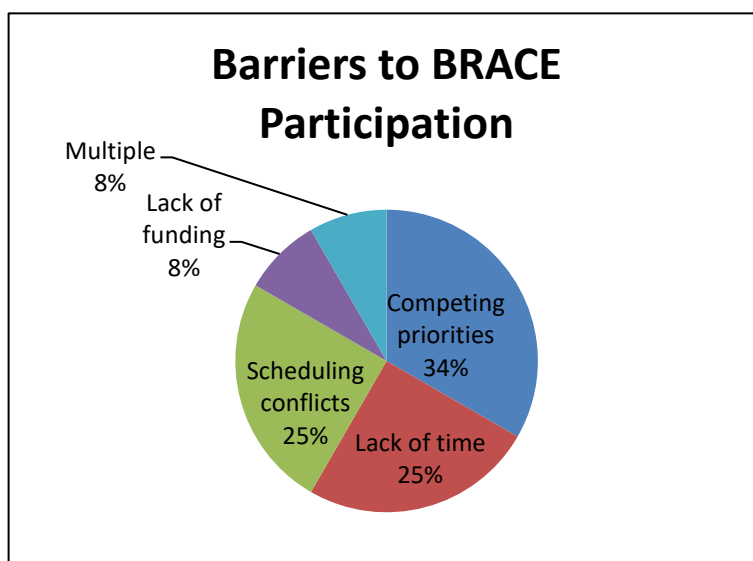
The information below describes how evaluation data were collected and summarizes the information collected in response to the evaluation questions created in Step 3. This is the first of several program evaluations we will conduct over the next funding cycle as more specific adaptations and interventions are developed. The findings from this evaluation will be used to inform future activities and ways to improve program performance during the next funding cycle. Process and evaluation data collected from questions used from Step 3 will be prioritized for future data sharing, and have been shared in presentations, publications, and reports to date. Below is some evaluation data from 2017 on BRACE project participation.

Barriers to BRACE Participation

The most common barriers to BRACE participation are lack of time and competing priorities.

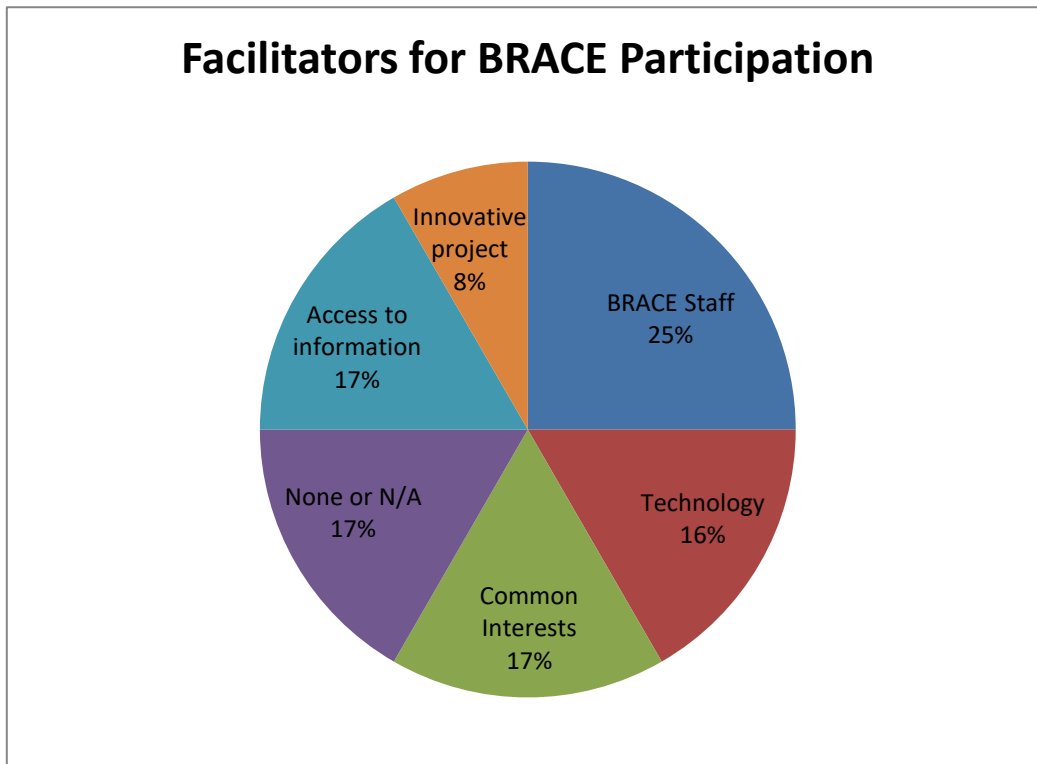


The second visual shows when multiple reasons contributed to non-participation.



Facilitators to BRACE Participation

The most common facilitator to BRACE participation is the BRACE staff.



The partnership survey highlighted limited time as the most common barrier to participating in BRACE activities. This is a common issue since our partners are employed by other agencies and have competing priorities and responsibilities. Unfortunately, given the North Carolina Department of Health and Human Service’s limited funding and capacity there is not much we can do to resolve this issue. The survey also highlighted that work shared at our advisory group, evaluation team, and heat illness group is being utilized outside of the meetings. Participants are distributing the information to colleagues, incorporating it into teaching, and using it to inform local climate adaptation.

STEP 5: Drawing Conclusions (DATA ANALYSIS)

It is important to make claims about the program based on the analysis, and to justify the claims by comparing the evidence against stakeholder values, as the evidence doesn't always speak for itself. Table 3 displays an overview of the data analysis process and a general interpretation of evaluation data.

Table 3. Data Analysis	
Question	Response
Who analyzed the data (and who coordinated this effort)?	The program health educator/temporary GIS analyst.
How were the data analyzed and displayed?	The survey was analyzed and displayed in Google Forms. The content scan was analyzed and displayed in a Word document.
How did you deal with conflicting interpretations and judgments?	Discuss the source of conflict and come to a compromise on the interpretations and judgments.
Are your results similar to what you expected? If not, why do you think they are different?	Yes
Are there alternative explanations for your results?	No

STEP 6: Ensuring Sustainability

The purpose of this evaluation is to identify barriers and facilitators that may be addressed to improve the function of the program, reduce the incidence of heat-related illness in North Carolina, and build the capacity of local communities to adapt to climate effects.

Table 4. Protocols for disseminating evaluation results.

Table 4. Evaluation Results Dissemination		
Evaluation Results	Target Audience	Dissemination Method
Accessibility of data on EPHT portal and OEE's drives	N.C. BRACE program	Summary report shared via OEE website
Results of partner survey administered to determine partnership engagement and barriers/facilitators to participation	Program partners (state agencies, heat-illness working group, advisory group)	Email, OEE website, evaluation team meeting and advisory group meeting

Continued Monitoring and Quality Improvement

Evaluation findings will be used to continually improve the North Carolina BRACE Program. Continue to share results from outcome heat-health alert system evaluation of changes in knowledges and skills from training curriculum and process wildfire curriculum evaluation of observations on implementation in the classroom.

Recent evaluation findings include:

- NC BRACE developed an evaluation plan for wildfire elementary curriculum using observation evaluation. Wildfire elementary curriculum observation evaluation at two elementary schools. Wildfire elementary curriculum pilot began fall 2019.
- NC BRACE developed a process evaluation plan for the heat syndromic surveillance program.
- NC BRACE conducted an outcome evaluation on the heat-health alert system work among older adults.
- Updating evaluation plan, including specific evaluation measures for adaptation actions outlined in implementation and monitoring strategies.

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