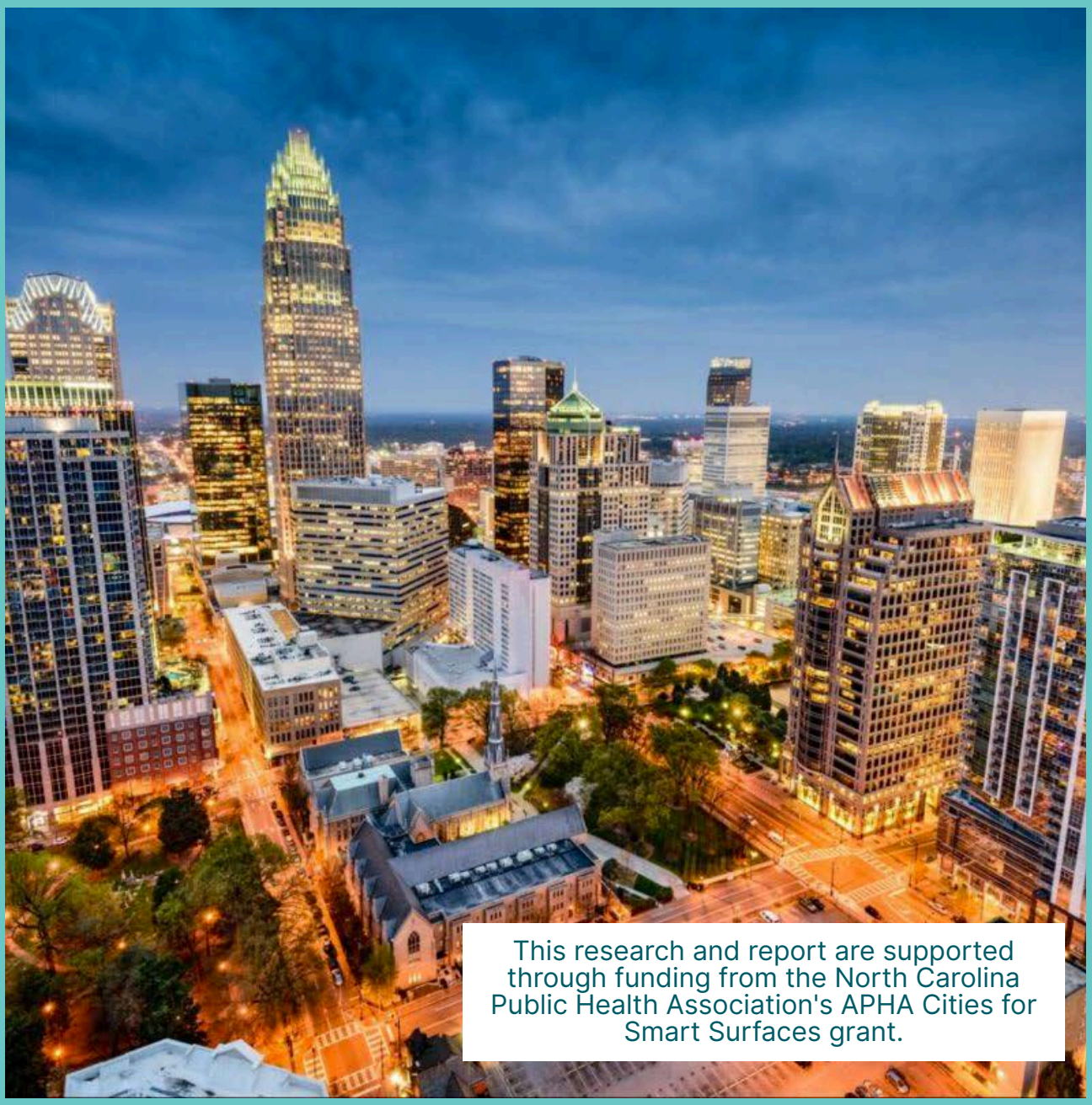
North Carolina Public Health Association

EXPLORING THE POTENTIAL OF HEAT SOLUTIONS FOR HEAT MITIGATION IN HIGH-EXPOSURE AREAS



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EXECUTIVE SUMMARY

This report presents community-based findings on the rising challenges of extreme heat in Charlotte's high-exposure neighborhoods and offers actionable strategies for local leaders, health professionals, and community organizations. Through five focus groups conducted in the summer of 2025, including community members, faith-based participants, emergency responders, and healthcare providers, the study captured the lived experiences of those most affected by prolonged and intense heat events.

COMMUNITY IMPACTS

Participants described how excessive heat disrupts daily life, alters work schedules, and limits outdoor activity. Health concerns such as heat exhaustion and heat stroke were common, and many households face higher energy bills as air conditioning use rises. Emergency responders confirmed a growing number of heat-related calls, particularly involving the elderly, young children, and residents of low-income neighborhoods. Healthcare providers highlighted that many patients struggle to recognize early signs of heat-related illness, further increasing risk.

RECOMMENDATIONS & NEXT STEPS

Participants called for a coordinated response that blends immediate and long-term strategies. Short-term actions include expanding public cooling facilities, deploying hydration stations, and launching targeted education campaigns. Medium-term strategies involve tree planting, creating shaded pedestrian corridors, and improving transportation infrastructure such as covered bus stops. Long-term planning should integrate heat mitigation into city zoning and development policies, with dedicated funding to sustain community engagement and ensure equitable protection for vulnerable populations.

This report underscores the urgent need for Charlotte to treat extreme heat as a public health and infrastructure priority. The findings provide a clear roadmap for collaborative action to safeguard health, reduce energy burdens, and build climate resilience.

KEY THEMES:

Across all groups, recurring priorities emerged:

- **Shade and Tree Canopy** – Protecting existing trees and planting new ones to reduce urban heat and create cooler streets and bus stops.
- **Cooling Centers and Hydration Stations** – Expanding access to free, well-publicized cooling sites and water sources.
- **Energy Costs and AC Access** – Reducing financial strain and providing support for households without reliable cooling.
- **Education and Awareness** – Strengthening public outreach so residents can recognize heat risks and know where to find help.
- **Community Involvement** – Empowering faith-based networks, neighborhood leaders, and first responders to co-design and implement local solutions.

Methods Overview

This project utilized qualitative research methods to gather community perspectives on heat mitigation issues and potential smart surface solutions. Five focus groups were conducted in July and August 2025, with sessions held both virtually and in person.

Process

1 PARTICIPANT RECRUITMENT

Participants were recruited through community networks, local organizations, and targeted outreach to individuals with lived experience of extreme heat impacts in Charlotte.

2 DATA COLLECTION

Each focus group session lasted approximately an hour and a half, and participants included residents, community leaders, faith-based leaders, emergency responders and healthcare providers.

A semi-structured discussion guide was developed to ensure consistency across sessions while allowing for open-ended responses.

3 DATA PREPARATION

Audio recordings were transcribed. To protect confidentiality, identifying information was removed, and all direct quotes used in the analysis were anonymized.

Transcripts and notes were manually coded in Word for thematic analysis.

4 DATA ANALYSIS

A thematic analysis approach was used to identify recurring ideas, concerns, and priorities across the five focus groups.

Focus Group Meetings

Focus groups were conducted with diverse participant groups to ensure comprehensive representation and to amplify the voices of all residents in high heat–exposure areas.

> *“A lot of people don’t know where to go for help when the heat gets extreme.”*

Focus Group Types:

01. Residents from Impacted Areas

02. Faith-based Communities

03. Emergency & First Responders

04. Healthcare Providers

Focus Group Discussion Topics:

- Perceived impacts of extreme heat on daily life and community well-being.
- Existing strategies used to cope with heat.
- Community priorities for heat mitigation.
- Feedback on potential smart surface solutions.

The Data Analysis Focused on:

- Commonly expressed concerns regarding heat impacts.
- Strategies currently used by community members to reduce heat exposure.
- Perceived benefits and challenges of proposed smart surface solutions.
- Underlying values and priorities guiding community preferences.

“We know what our neighborhood needs better than anyone.”

An Overview of Key Themes

Key themes throughout the focus group meetings centered on the need for increased resources, community-led decisions, and raising awareness on the impacts extreme heat can have, particularly in vulnerable populations.

Shade and Tree Canopy

Participants emphasized the urgent need to preserve existing trees, expand tree planting, and create shaded public spaces, especially along transit routes and pedestrian areas.

Water Access

Access to free, clean drinking water and cooling features (misters, fountains, splash pads) was a recurring request.

Cooling Centers and Hydration Stations

Strong support for more accessible, well-publicized cooling centers and public water access points, particularly in heat-vulnerable neighborhoods.

Energy Costs and AC Access

High electricity bills and lack of air conditioning in some homes were major barriers to staying cool; participants called for assistance programs and policy solutions.

Community Involvement in Solutions

Desire for residents, faith groups, and first responders to be active partners with government in implementing and maintaining heat mitigation measures.

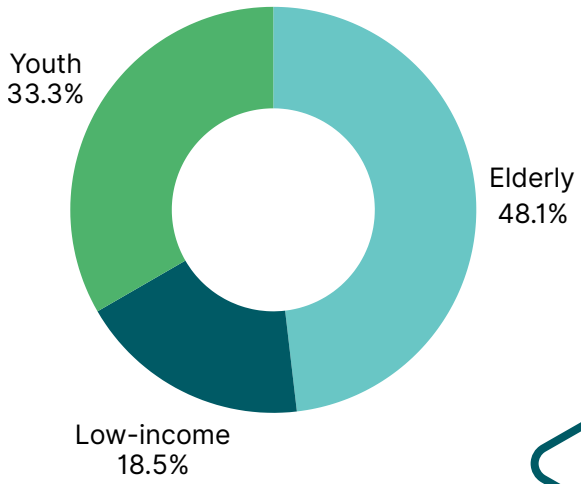
Vulnerable Populations

Elderly, young children, people with health conditions, and low-income households were identified as most at risk and in need of targeted interventions.

Education and Awareness

Participants stressed the need for clear, widespread communication on heat risks, prevention strategies, and available resources.

Vulnerable Populations Most Affected by Extreme Heat

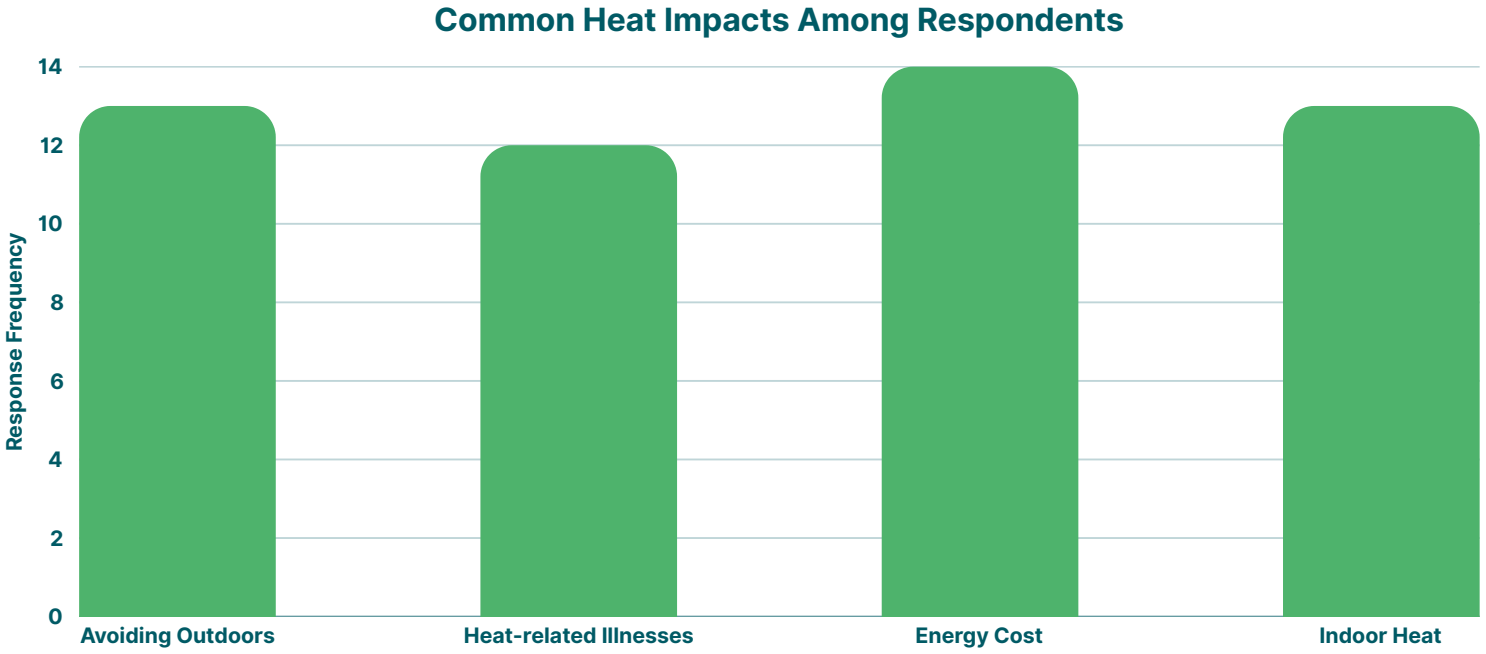


*Out of 54 responses

"The world is getting hotter."

Impact of Extreme Heat

Community members shared numerous examples of how extreme heat affects their daily lives, citing challenges such as altered work schedules, reduced outdoor social activities, heat-related illnesses, and increased financial strain from higher energy costs.



Community Testimonials

“I feel like I'm also missing out on some things I'd like to go to, because I just don’t want to go out there in the heat.”

“I’ve seen some of the dangers of people being exposed to the extreme conditions, so I try to take precautions and limit my time outside.”

“It just has a tremendous impact from a financial standpoint for us.”

“It was unbearable inside our home.”

“I experienced my first heat stroke last month.”

“It is hindering me from doing things that I enjoy and like.”

“The heat has been quite excruciating for me and my family.”

> **“There are no trees anymore.”**

COMMUNITY OBSERVATIONS

> **“Charlotte is becoming a concrete city.”**

The common theme across the two community focus groups was the lack of greenspace and trees in their neighborhoods which have led to the absence of shade and protection from the heat.

MORE TREES. MORE SHADE.

Inaccessibility

Community utilizes the available greenspaces when accessible.

Transportation

Community relies on public transportation, but notice a lack of shade and protection around bus stops.

Replacement

Community expressed its frustration with the removal of trees and increase in concrete areas.

Faith-Based Focus Group

The biggest barrier to effectively address heat-related issues in this community was the lack of access to resources.

A common solution presented throughout the faith-based focus group on mitigating heat risk was establishing programs that raise community awareness on heat-related illnesses and prioritizing a collaborative approach that include residents, community organizations, and local government.

"Need for a more comprehensive support system."

"It would be great to have community awareness programs that would teach people how to stay safe during extreme heat."

Access to Resources

The following are the 4 main resources the faith-based focus group felt should be addressed to mitigate extreme heat risk in the community.

Water

- More water fountains
- Access to water in church
- Programs to provide water to residents

Cooling Stations

- Opening church as cooling center
- Creating more places for cooling stations

Air Conditioning

- Lack of access to AC in homes
- Reliable AC for church
- Support to families who don't have AC

Fans

- Rechargeable fans
- More ceiling fans in churches
- Offering fans during service
- Plans to assist church members with fans

Recognizing
The Symptoms

Healthcare Providers Experience

Healthcare providers were asked on a scale of 1 (very unfamiliar) to 10 (very familiar) how well do they think patients recognize the symptoms of heat exhaustion or heat stroke.

70%

of healthcare providers in the focus group session selected 4 out of 10.

Description

Each of the 10 healthcare providers who responded to the prompt selected either 4 or 5 out of 10, regarding how well patients recognize symptoms of heat stroke or heat exhaustion.

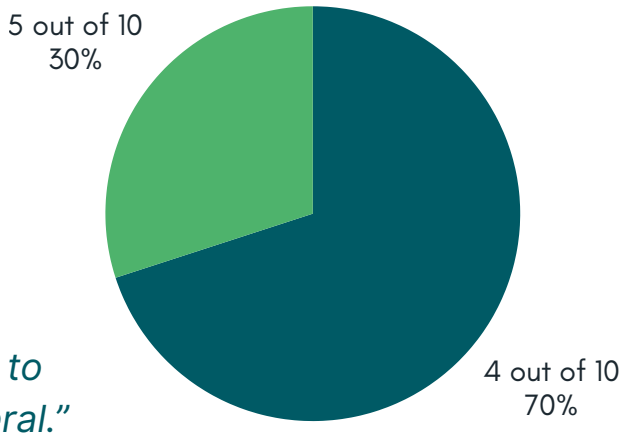
During summer months, healthcare providers explained that they see patients who have suffered from heat exposure on a weekly basis, with some being seen multiple times a week.

"More attention should be given to heat and heat mitigation in general."

-Healthcare provider

How Well Patients Recognize Symptoms

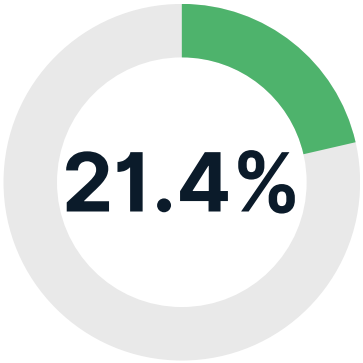
On a scale from 1 to 10



Effective Heat Mitigation & Prevention Strategies

According to Healthcare Providers

Several healthcare providers, including various doctors, nurses, doulas, lactation consultants, and other professionals provided their professional insight and recommendations to patients and other community members dealing with extreme heat.



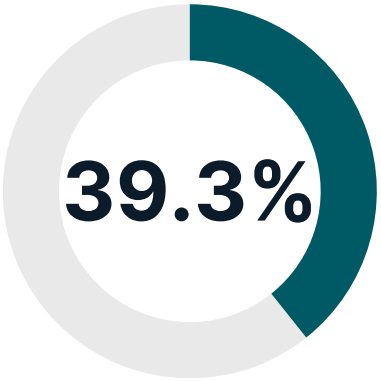
21.4% advocated for more green solutions.

Green solutions

Many respondents advocated for more green spaces, suggesting that industrial areas with fewer tree canopies are most vulnerable to extreme heat.

"We need to plant more trees."

"It would be great to have more green spaces in urban areas."



39.3% suggested a lack of education and outreach leads to heat-related illnesses.

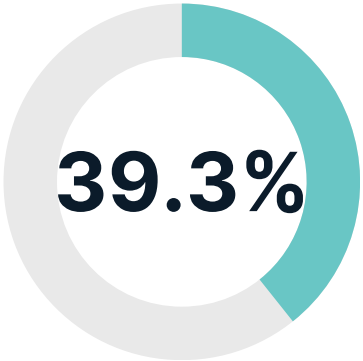
Outreach & Education

Professionals explained that a lack of education and outreach to the community is one of the main causes for heat-related illnesses.

"People don't take heat seriously until it is too late."

"There are always gaps in information when it comes to pregnant people."

"Educate people on what heat can do."



39.3% suggested access to cooling centers will mitigate heat impacts.

Cooling centers & systems

Along with education and outreach, access to cooling centers was the most recurring response from healthcare providers when discussing effective solutions to mitigating heat impacts.

"There should be cooling centers for extreme heat. With a medical professional present."

"Ensuring accessible cooling centers, like libraries, churches, and malls."

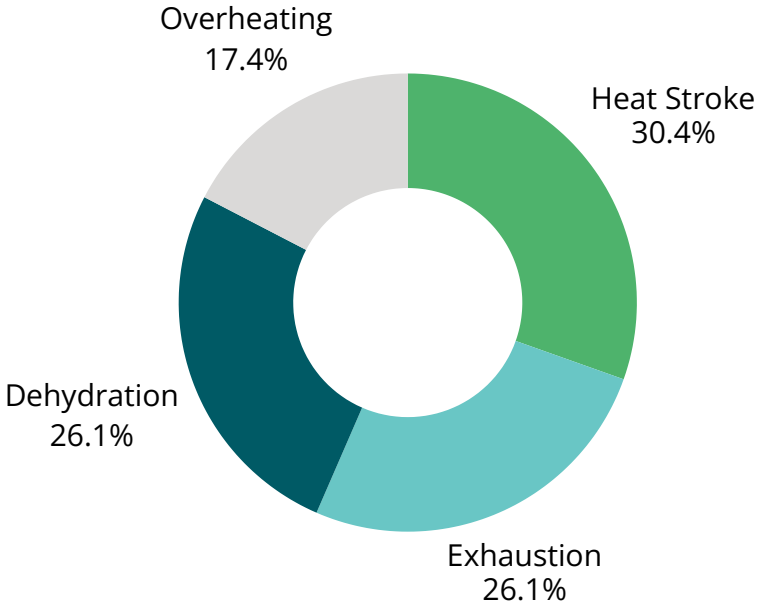
**Out of 28 responses*

"Make heat a priority like any other emergency."

First Responders Focus Group

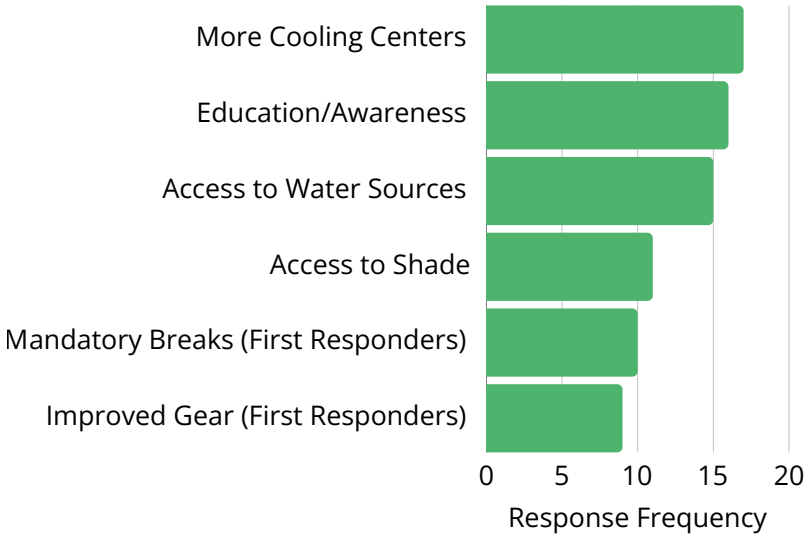
First responders have noted a trend in the number of heat-related emergency calls where most cases tend to be among vulnerable populations in low-income areas.

Preventative measures and the lack of resources were the focus of many first responders during their meeting. Several responders attributed the lack of resources and education as the main drivers for heat-related emergencies.



Heat-related Illnesses and conditions responded to by First Responders

Examples offered to mitigate heat risks among residents and first responders:



QUOTES FROM FIRST RESPONDERS

"Preventing another heat emergency is just as important as treating the current one."

"There are more calls than we have people to respond to."

"Sometimes we'll respond in areas that don't really have shade or ventilation, which makes the treatment harder."

"We don't get the break we used to have."

HOW TO STAY COOL

WHAT THE FOCUS GROUPS SAY

Residents have utilized numerous ways to stay cool amid the rising temperatures. The quotes provided below illustrate how innovative the community is and the need for sustainable solutions:

KEY QUOTES

“I do utilize a lot of the greenways.”

“We had to do more takeout, you know, because cooking also increases the temperature of the entire house and it becomes unbearable.”

“I had to get some blocks of ice and then put it in the bathtub and fill it with water just to cool off.”

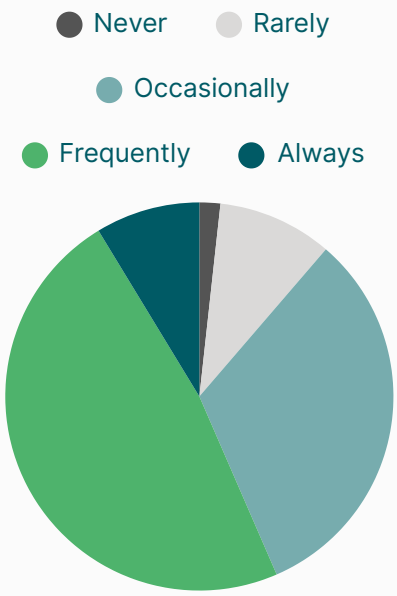
“I avoid walking or biking in the afternoons because it feels quite unsafe because of the heat.”

“Very hot, so we had to, you know, keep the house dark.”

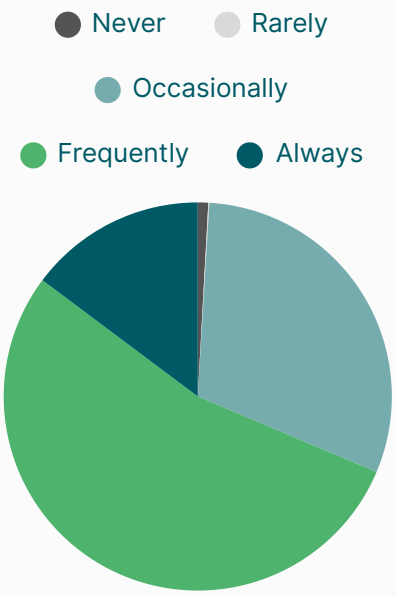
Intake Survey Responses Statistics

Provided below are more insights into the ideas, actions, and recommendations among the 115 individuals from the various focus groups.

How often respondents experience extreme heat conditions in their daily lives



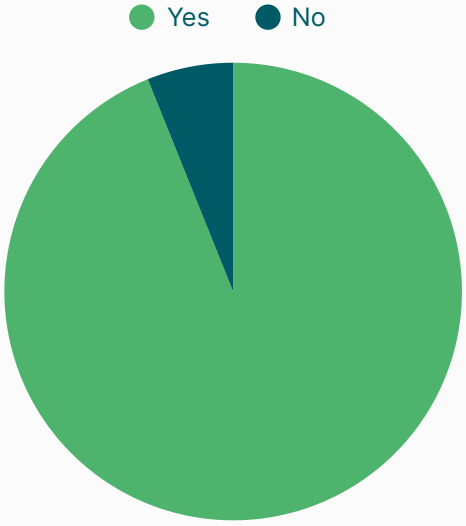
How often respondents change routines to avoid heat exposure



Respondents experiencing heat-related illnesses* within the past year

**Heat-related illnesses included heat exhaustion, heat stroke, and dehydration*

Interest in adopting new heat mitigation solutions if easily accessible



THANK YOU

To a Cooler, Healthier Charlotte

This report underscores the urgency of addressing extreme heat as both a public health and environmental challenge. Through collective action, city leaders, health professionals, community organizations, and residents, Charlotte can implement smart surfaces as heat mitigation solutions, such as increased tree canopy, reflective roofs, and green spaces.

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> **“It can’t be a handful of people. It has to be a unified effort.”**

We thank the residents, faith-based leaders, healthcare providers, and emergency responders who shared their time and experiences. Their insights form the foundation for the strategies and solutions presented here.