Partnership Between A Better City, The Boston Foundation, Boston University School of Public Health, and City of Boston Shares Results from Temperature Sensor Pilot Measuring the Lived Experience of Extreme Heat in Boston's Hotspot Communities

B-COOL Initiative installed sensors throughout Boston to help close data gaps in measuring temperature data across Boston's neighborhoods, provide more accurate indicators for heat waves and official heat emergency declarations, and to guide data-informed resource allocation

B-COOL Heat Sensor Pilot Project Team Releases Key Takeaways from 2024 Pilot Study. Photo Credit: A Better City and Boston University.
Left to right: Zoë Davis (City of Boston), Isabella Gambill (A Better City), Jonathan Lee (Boston University), Ben Hires (Boston Chinatown Neighborhood Center), Ameera Saba (Boston University), Julia Howard (The Boston Foundation), and Dr. M. Patricia Fabián (Boston University)

(Boston, MA) January 22, 2025 – A Better City, in partnership with The Boston Foundation, Boston University's School of Public Health, and the City of Boston's Office of Climate Resilience, celebrates the completion and preliminary results of a heat sensor pilot program to address the data gaps in measuring temperature data across Boston's hotspot neighborhoods, which can be 10-15 degrees warmer than surrounding neighborhoods. A total of 15 sensors were installed at 12 A Better City member and partner properties, as well as on three City-owned trees, across hotspot neighborhoods in Boston. This pilot program aims to provide neighborhood-specific temperature data to augment National Weather Service station data and to better inform city

officials in declaring heat emergencies and advisories and in supporting vulnerable Bostonians. The results of this pilot will help inform the city, local institutions, and community-based partners on how to distribute available resources to heat-vulnerable residents, workers, and neighborhoods on hot days. Data may more broadly guide future policy initiatives for community heat resilience undertaken by both the public and private sectors.

Currently, there is only one National Weather Service temperature sensor in the City of Boston, located at Logan Airport, which determines the official temperature for the entire city. To reach a declared heat emergency in Boston, the National Weather Service sensor at Logan must register 95 degrees Fahrenheit or higher for two consecutive days when nighttime temperatures do not fall below 75 degrees, yet B-COOL pilot sensor data confirm temperatures in some hotspot neighborhoods are reaching this threshold much sooner and more frequently. The data collected by the 15 sensors will be used to inform future research and compare neighborhood readings against the official National Weather Service temperature readings to help provide a better understanding of the existing data gaps and inform heat relief efforts.

Through this pilot program, which ran from June-September 2024, sensors were placed in hotspot neighborhoods as defined and identified in the [City of Boston 2022 Heat Plan,](#) and in close proximity to socially vulnerable populations, including in the neighborhoods of Chinatown, Dorchester, East Boston, Mattapan, and Roxbury, as well as in Allston-Brighton and Jamaica Plain. This pilot builds upon existing research done by the City of Boston, C-HEAT, Wicked Hot Boston, Wicked Hot Mystic, and others.

Key Takeaways
- In analyzing heat events during the summer of 2024, sensor data during heat advisory and heat emergency declarations reflected the City of Boston's 2022 Heat Plan findings that heat island hotspot neighborhoods have exposure to higher temperatures and heat index during heat events compared to the National Weather Service station data, as well as longer duration of exposure to extreme heat. As the Heat Plan and B-COOL sensors found, the hottest neighborhoods include Chinatown, Dorchester, East Boston, Mattapan, and Roxbury, with additional high heat exposure in Allston-Brighton and parts of Jamaica Plain as demonstrated by B-COOL sensors.
- On hot days, temperatures in hot spot neighborhoods can be significantly higher than the National Weather Service (NWS) Station, with heat advisory and emergency thresholds being met in hotspot neighborhoods but not at the NWS station, and with heat advisories and emergencies starting before and extending past NWS-based declarations of heat advisory or emergency for Boston.
- Within-neighborhood temperatures can vary significantly, with heat advisory/emergency thresholds being met in some local areas and not others, suggesting that some sub-neighborhoods of hotspot communities are at even higher risk from heat exposure.
- *Where* sensors are located to measure temperature is important for planning and emergency response.
- Temperature sensors can be a powerful engagement tool for framing emergency preparedness and response across hotspot neighborhoods, as well as for local

businesses, community-based organizations, and institutions to learn more about how to protect the residents, workers, and community members that they serve during heat events.

- Where people live, commute, work, and play can impact their heat vulnerability, both in terms of the intensity of high heat temperatures that they might experience as well as in the duration of heat exposure in their neighborhoods.
    - Proximity to cooling features also impacts vulnerable neighborhoods' adaptability to heat, as reflected in Boston's Heat Plan. B-COOL sensor data affirms that proximity to cooling features like coastal breezes, urban forestry and other green infrastructure, can impact residents' and workers' heat vulnerability.
- B-COOL sensor data affirms what was clarified in Boston's Heat Plan: extreme heat is a racial justice and climate justice issue, with our environmental justice neighborhoods and communities of color experiencing higher heat and longer duration of extreme heat during heat events in Boston than surrounding neighborhoods, and when compared to the NWS data. Solutions for heat resilience must embed equity and community-based action to support neighborhood heat resilience and adaptability, and neighborhood-specific temperature data could be a helpful tool to inform response and preparedness.
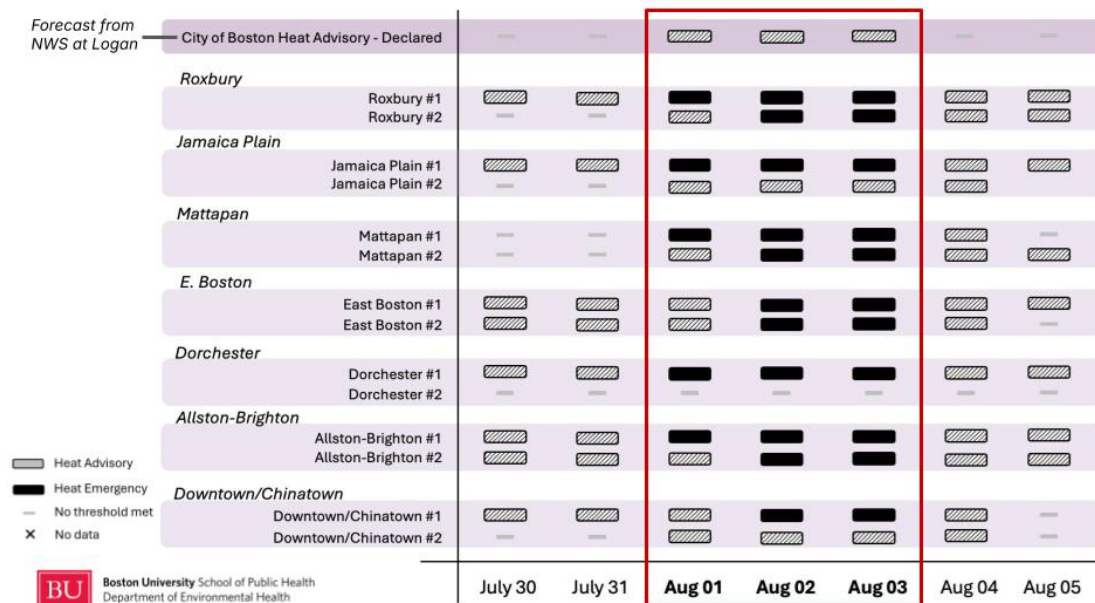
During one declared heat advisory event in summer 2024, there were several sensors that recorded hotter temperatures, breaking the heat emergency threshold, whereas one of our cooler sensor locations never reached heat advisory or emergency conditions for that timeframe. This indicates significant differences in where heat advisory or emergency conditions are being felt across the city (differences both within and across neighborhoods), and for how long neighborhoods are exposed to high heat, compared to the National Weather Service station at Logan Airport.

The pilot project team is grateful for the partnership of A Better City member and partner organizations: Arnold Arboretum (Harvard University), Bay Cove Human Services, Boston Children's Hospital, Boston Chinatown Neighborhood Center, Boston Green Academy, Boston Medical Center, Charles River Community Health, City of Boston's Urban Forestry Division, Franklin Park Zoo, Greenway Conservancy, Mattapan Food and Fitness Coalition, Museum of

Science, and UMass Boston. A Better City members were interested in participating in the heat sensor pilot to better understand how to protect their workers, patients, students, vulnerable communities, businesses, and critical infrastructure from the increasing impacts of extreme heat.

" Extreme heat is already impacting our vulnerable communities and infrastructure alike, so it is critical to measure real impacts and develop actionable resilience solutions with a sense of urgency," said Kate Dineen, President and CEO of A Better City. "This collaborative partnership confirmed our hypothesis that there are instances of unrecognized heat emergency conditions in hotspot communities across the city. As this project suggests, neighborhood-specific and community-informed temperature data should be leveraged as a powerful tool for more effective heat emergency response, preparedness, and equitable resource allocation over time."

Additional Statements from Pilot Project Team Partners

Isabella Gambill, Assistant Director of Climate Energy & Resilience, A Better City

"Temperature sensors are poised to be a powerful community engagement tool in helping local businesses, non-profit organizations, healthcare providers, schools, and community-based organizations better understand how heat might impact the communities that they serve. We are grateful to our countless community partners who made this project possible, and who demonstrated the power to be found in neighborhood-specific and community-driven data, for community-driven solutions."

Dr. M. Patricia Fabián, Associate Professor of Environmental Health and Associate Director of the Institute of Global Sustainability, Boston University School of Public Health

"Cross-sector collaborations like this Boston extreme heat project are the future for advancing climate resilience efforts in cities, and we hope to generate actionable information for different stakeholders, including the city, businesses, community partners and researchers. As a public health researcher, ultimately my goal is to see improved population health and reduced health inequities through collaborative climate projects like this one."

Brian Swett, Chief Climate Officer, City of Boston

"Addressing extreme heat is a top priority for Boston to improve our resilience to the impacts of climate change. This heat sensor pilot project is a crucial step towards understanding and mitigating the disparities in heat exposure across our neighborhoods. By filling critical data gaps, we can develop more equitable heat resilience strategies and better protect our residents. I am thankful to our partners including A Better City, Boston University, and The Boston Foundation, as well as Zoë Davis from the City who has been crucial to Boston's work to equitably respond to extreme heat."

Julia Howard, Senior Program Officer, The Boston Foundation

"The B-COOL data reaffirms that any commitment we make to housing equity needs to include an attention to elements of climate in our neighborhoods," said Julia Howard, Senior Program Officer at the Boston Foundation. "We cannot make progress on climate resilience without addressing the issues this pilot program underscored - that many areas feeling the greatest heat are those that lack the green space and infrastructure to mitigate it."

Additional Statements from Sensor Host Site Partners

Dr. Anna Goldman, Director of Climate and Sustainability, Boston Medical Center; Co-Founder, Clean Power Prescription Program

As the largest essential hospital in Boston, Boston Medical Center is proud to serve as a heat sensor host site for this important project, which will generate much-needed data on urban heat islands in our metropolitan area.

Ben Hires, CEO, Boston Chinatown Neighborhood Center (BCNC)

Partnering with A Better City, C-Heat at BU, the City of Boston, and The Boston Foundation to address the impact of the ever-increasing heat from climate change is exciting. With the fewest trees and green space of any Boston neighborhood, the many residents that live below the poverty line are at much greater risk for the negative impact of heat during the year. BCNC, for example, services children year-round and more during the summer and being outside is part of the program. I hope the information gained from this pilot will inform policy makers about the resources and interventions needed to keep Chinatown and other communities and the most vulnerable members of our communities safe and healthy.

Chris Cook, Executive Director, Rose Kennedy Greenway Conservancy

The Rose Kennedy Greenway Conservancy prioritizes work with our Chinatown partners focused on recreational value and climate resilience, especially from heat. I applaud A Better City for its commitment to understanding how the climate crisis is impacting our Chinatown neighbors so we can collaboratively work on solutions.

Dave Kramer, Director of Green Programs & Partnerships, Boston Green Academy

Boston Green Academy is proud to be part of this pioneering effort. Having a sensor on our small front lawn, at the intersection of two main streets in Brighton, where our students play during recess and pass by on their way to and from school, is an amazing privilege. As a green school, we are on a mission to serve as leaders in involving young people in the civic life of our city as active participants and to understand, firsthand, what it means to deal with the impacts of climate change proactively, analytically, and without despair. With so many of our students commuting from the neighborhoods most impacted by the urban heat island effect, this literally connects their lived experience and educational journey, linking home and school in authentic

ways. We can't wait to learn more and connect with the various participants in this innovative project, putting our students and learning community at the center of this effort.

Dr. David Sittenfeld, Director, Center for the Environment, Museum of Science

Extreme heat is a growing hazard for our communities in and around Boston. Heat is a silent storm that impacts everyone, stressing public health and our engineered infrastructures, but it doesn't affect all communities the same way. Because of the inequitable ways we have constructed our urban environments, marginalized neighborhoods experience temperature differences of up to 15-20 degrees Fahrenheit during extreme heat events, exacerbating other environmental and socioeconomic disparities. This pilot led by A Better City, Boston University, The Boston Foundation, and the City of Boston will provide crucial around-the-clock data that will inform equitable heat resilience planning to support our most vulnerable communities as these extreme heat events become more frequent and intense.

Elizabeth Browne, CEO, Charles River Community Health

Charles River Community Health is pleased to be able to participate in this important project. The impacts of climate change disproportionately impact the health of the patients we serve, and so as a community health center we are excited about the temperature data that will be collected through this project to determine future mitigation efforts that will benefit our patients and the community.

Janna Cohen-Rosenthal, Sustainability & Resiliency Planner, UMass Boston

At UMass Boston, we are working hard to decrease our climate impact and adapt to change, while also conducting vital education and research. Providing accurate localized temperature data and interventions to reduce heat islands is a critical life-saving measure and improves community wellbeing. Our beautiful harborside campus is hosting a sensor to contribute a comparable cool spot to this research. As a community health promoting University, we have opened public access to boating this summer. Partnering with other agencies to improve public transit and build more resilient roadways would increase equitable waterfront access to all Bostonians in a rapidly warming world.

Shavel'le Olivier, Executive Director, Mattapan Food and Fitness Coalition (MFFC)

Mattapan Food and Fitness Coalition (MFFC) is happy to partner with A Better City to collect temperature data in Mattapan. Extreme heat, along with extreme weather challenges, water pollution, reduction of emissions, and the like are important factors to consider when supporting the health of a community. When we are able to combine the work at MFFC of engaging residents in ways to make the neighborhood more environmentally friendly through programming such as our bike rides and food access work, coupled with educational resources, we can work towards a healthy and thriving community.

William (Ned) Friedman, Director, Arnold Arboretum, Harvard University

From its beginnings, the Arnold Arboretum has valued its role in making our landscape accessible to all as a naturalized buffer against the rigors and intensity of urban life for the people of Boston. As a scientific institution, we are excited to participate in the City's temperature sensor pilot to provide real data on how different temperature extremes are experienced in our landscape than in the heat islands that surround it. There is reason to hope that work like this will contribute meaningfully to making Boston and its population more resilient to what lies ahead.

About the Project Team
The team on this project consists of Isabella Gambill, A Better City, Dr. Patricia Fabián, BUSPH/C-HEAT, Jonathan Lee, BUSPH/C-HEAT (grad student lead researcher), Ameera Saba (BUSPH), Yirong Yuan (BUSPH), Zoë Davis, City of Boston Office of Climate Resilience (in partnership with the Mayor's Office of New Urban Mechanics and the Green New Deal Office), and Julia Howard, The Boston Foundation.

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About A Better City
A Better City represents a multi-sector group of nearly 130 business leaders united around a common goal: to enhance the Greater Boston region's economic health, competitiveness, equitable growth, sustainability, and quality of life for all communities. By amplifying the voice of the business community through collaboration and consensus-building, A Better City develops solutions and influences policy in three critical areas: 1. transportation and infrastructure, 2. land use and development, and 3. energy and the environment. A Better City is committed to building an equitable and inclusive future for the region that benefits and uplifts residents, workers, and businesses in Greater Boston. For more information, please visit **http://www.abettercity.org**.

Photo credit: Boston Green Academy; Sticker Credit: Jonathan Lee