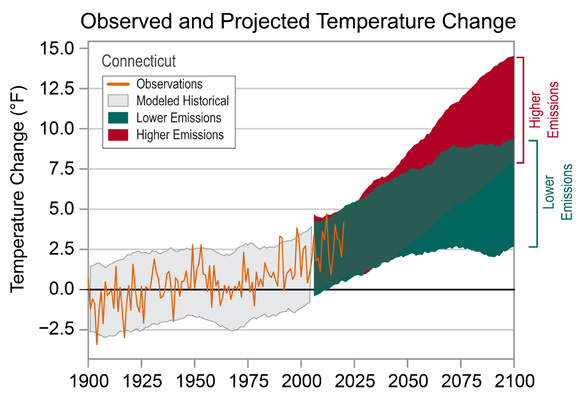
EXTREME HEAT RESPONSE & PLANNING IN CONNECTICUT

Primary Investigators
Joanna Wozniak-Brown, Ph.D.
Laura Bozzi, Ph.D.

In 2022, Connecticut experienced its hottest recorded August, including a record for the weather site in the capital city of Hartford. Just under half of the month (13 days) of August 2022 in Hartford had highs at or above 90˚F.[1] Between 1901 to 2020, Connecticut's average temperature increased 2.81˚F per century.[2]

By 2050, under a high emissions scenario, summer days (>74˚F) will increase by about 35 days, warm spells days by about 44 days, and tropical nights by about 32 days.[3] Increases in temperature in the lower or higher scenarios (RCP4.5 or RCP8.5, respectively) could result in 650 or more excess deaths in the Northeast.[4]



Other significant impacts could include yield losses on key agricultural exports, occupational injuries, and heat-related labor productivity losses. Connecticut already experiences high ground-level ozone pollution, or smog, and its negative health impacts; higher temperatures worsen ozone pollution through the "climate penalty."[5]

There are many populations in Connecticut at risk to the health effects of extreme heat, including: outdoor workers, persons experiencing homelessness, pregnant women, Black persons, children, people over age of 65, residents without access to A/C, and those of lower socio-economic status.[5] Tailored and localized response makes sense given the spatial differentials in temperatures experienced by residents, local adaptive capacity, and demographic and health characteristics of a community.[4] Neither emergency management and health departments have specific remits related to climate change in Connecticut and the structure for responding to the impacts of climate change is in early construction.

METHODS

Conceptual Framework
The purpose is to understand the current extreme heat planning and response activities amongst Connecticut local health departments and local emergency managers, and to identify the barriers and facilitators to these local agencies undertaking a more comprehensive approach to addressing residents' health risks to extreme heat. We also seek to place the issue of extreme heat within the broader context of climate adaptation, therefore we also explore the knowledge, capacity, and prioritization that the local agencies apply to general climate adaptation activities.

Data Collection and Analysis
- Study protocol exempted by the Yale University IRB. We selected interviewees through purposive sampling based on geographic location (inland/coastal, county), population size, governance structure (municipal health department, regional health district), and department type (local health and emergency management). Interviews with tribal health department representatives were requested but none secured.
- The interview guide was informed by other instruments.[6, 7, 8] Questions addressed themes: (1) Current state of local heat response planning; (2) Barriers and innovations to local heat response; (3) Preparedness for climate change impacts to health; (4) Integration across government scales and associated adaptive capacity. Researchers used probing questions for further detail where appropriate.
- 11 semi-structured interviews, August 2021–March 2022 via Zoom, 30-75 minutes, audio transcribed.
- Applied a Rapid Qualitative Analysis,[9] using a template transcript summary document with 5 neutral themes. Each transcript was analyzed independently by two researchers, then combined. All summaries were transferred to a combined matrix (respondent × domain). Lead authors developed summaries of each domain, workshopped the summaries, and created final results.

Limitations
The limited set of interviews with multiple positions cannot indicate the broad experience of each role's experience across the state; however, given the goal of this study to understand the broader effort of extreme heat response, it is appropriate to have a more diffuse set of interviewees, especially when triangulated with other sources. This is further supported by the corollary on broader cross-role experiences and within the roles. Recruitment was difficult given the sampling population's ongoing role in responding to the COVID-19 pandemic.

DRAFT RESULTS

Vulnerable Populations
- Commonly cited vulnerable populations: elderly, homeless populations, people with existing medical conditions (especially lung conditions, mental illness), people without A/C. No respondent identified outdoor workers.
- Some respondents de-emphasized heat as an issue, including because of municipality's above-average income or new and upgraded infrastructure (schools and senior living facilities with A/C or generators). **"People are living in their air conditioned homes or apartments etc., they go out they, you know, we don't seem to have a lot of heat related illness."**
- Some respondents identified categories, but faced barriers locating specific at-risk individuals or lacked regulatory mechanisms to enforce safe conditions. One respondent described how people with physical or mental disabilities may live in homes where the indoor temperature may get very high (**"many windows are not open"**) and could lead to **"severe medical emergencies or deaths,"** but **"there is not a good method, other than, a neighbor reporting, a family member calling, a welfare check"** to identify people at risk.

"in much of the country, certainly in Connecticut, there is no law that requires air conditioning so it's challenge. We have laws that require heating or temperatures have to not fall below 65 but we don't have any laws that require a maximum temperature" … "we know that there is little we can do, because we can't order the owner to install an air conditioner and often folks are on fixed incomes."

Existing heat preparedness and response practices
- Heat Response Plans: Plans were often described as informal and either not written or not specific to heat. Most respondents did not have stand-alone municipal heat response plans, or were unsure. Some explained that heat response is addressed through the Emergency Operations Plan (EOP) generally: **"it's built into the plan, just like general shelter and pet shelter."** In two cases, the municipality's heat response plan was an addendum to the municipal EOP.
- Pre-season activities: Pre-season heat preparedness trainings are rare. One respondent described issuing heat and vector-borne diseases messaging at the start of the season, and another described trainings conducted by CERT and Medical Reserve Corps, though not necessarily on extreme heat.
- Current activities: There lacks a uniform, local-level protocol. Only four respondents identified the CT Division of Emergency Management & Homeland Security (DEMHS) extreme heat protocol, which had been issued in Summer 2021. Some described formal activation criteria (i.e., 3-day forecast of 95˚F heat index, as specified in EOP). Others lack a formal process; e.g., because EOP lacks activation criteria, the emergency management director and chief elected official decide when to open up a cooling center. The most common heat response activity is to open and operate cooling centers, often in partnership with social service and civic partners.
- Communications: Messaging is shared via social media, department or municipal websites, and 211. Some issue press releases and engage social service partners (e.g., senior centers, outreach workers) to reach their clients. Some municipalities have emergency alert systems, with varying subscribership. There is limited use of languages other than English; one respondent explained: **"although it may be nice to do that, I'm not sure that there is an urgent need."**
- State agencies: DEMHS and CT Department of Public Health (DPH) provide limited support capacity. DEMHS distributes external updates to municipalities when the Extreme Weather Protocol is triggered, but local responses are determined and implemented independently. DEHMS, through a common database, coordinates requested supplies and sends cooling center info to the 211 website.

Challenges & Innovations
- COVID made sheltering efforts more difficult, due to reduced density needs and fewer available volunteers.
- Interviewees questioned if heat was a major concern, if the public perceived heat as a concern, and who exactly would be impacted by extreme heat.
- Increasing frequency of extreme heat events strains resources and time. Compounded impact of extreme events (especially loss of electricity) with extreme heat can complicate emergency response.
- Participants were asked to share their ideas to make their community more heat resilient, if funding and capacity weren't an obstacle. Ideas included: misting tents for public events, power inverters for medical equipment use during power outages, improved sheltering amenities including sleeping, increased hours and staffing for public cooling space.

Data Needs
- Data concerns included reliability of the state syndrome surveillance system to interpret impacts from extreme heat, inconsistent applications for an extreme heat event, and the lack of data on the impacts of cooling centers as a response.
- The lack of this data, combined with the interpretation that extreme heat is not currently a concern compared to other climate impacts, may perpetuate some respondents' beliefs that there is adequate response and recovery and additional planning is not necessary. This is also inconsistent with the future of dramatically increased heat exposures predicted by 2050.

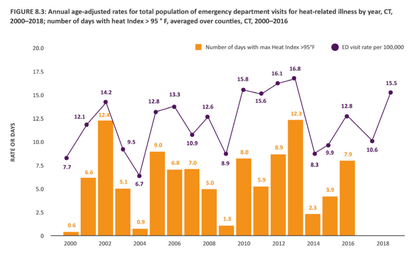


FIGURE 8.3: Annual age-adjusted rates for total population of emergency department visits for heat-related illness by year, CT, 2000–2018; number of days with heat Index > 95 ° F, averaged over counties, CT, 2000–2016

Source: Connecticut Environmental Public Health Tracking Network, Connecticut Emergency Department Visit Dataset. Data analyzed October 10, 2019; Centers for Disease Control and Prevention, National Environmental Public Health Tracking Network. Data analyzed September 30, 2019. Retrieved from www.cdc.gov/nphtracking

Suggested Citation
Bozzi, Laura & Wozniak-Brown, Joanna. Extreme Heat Response & Planning in Connecticut. 2022.

Citations

Graph: Runkle J, Kunkel KE, Champion SM, Easterling DR, Stewart BC, Frankson R, et al. Connecticut State Climate Summary 2022. NOAA Technical Report NESDIS 150-CT. NOAA/NESDIS, Silver Spring, MD; 2022.

1. NOAA Northeast Regional Climate Center, Cornell University. "A Record Hot August Closes Out Summer." retrieved on 10/18/22, https://www.nrcc.cornell.edu/services/blog/2022/09/01/index.html.

2. NOAA NCEI, Climate at a Glance: Statewide Time Series, Average Temperature; published October 2022, retrieved 10/14/22 from https://www.ncdc.noaa.gov/cag/.

3. Seth A, Wang G, Kirchhoff C, Lombardo K, Stephenson S, Anyah R, et al. Connecticut Physical Climate Science Assessment Report (PCSAR): Observed Trends and Projections of Temperature and Precipitation. Connecticut Institute for Resilience and Climate Adaptation; 2019.

4. Dupigny-Giroux LA, Mecray EL, Lemcke-Stampone MD, Hodgkins GA, Lentz EE, Mills KE, et al. Northeast. In: Reidmiller DR, Avery CW, Easterling DR, Kunkel KE, Lewis KLM, Maycock TK, et al., editors. Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II. Washington, DC: US Global Change Research Program; 2018.

5. Bozzi L, Dubrow R. Climate Change and Health in Connecticut: 2020 Report. New Haven, CT, Yale Center on Climate Change and Health; 2020.

6. Austin SE, Ford JD, Berrang-Ford L, Biesbroek R, Ross NA. Enabling local public health adaptation to climate change. Social Science & Medicine. 2019;220:236–244;

7. Hamstead Z, Coseo P, AlKhaled S, Boamah EF, Hondula DM, Middel A, Rajkovich N. Thermally resilient communities: Creating a socio-technical collaborative response to extreme temperatures. Buildings and Cities, 2020;1(1).

8. Houghton ME. Integrated Urban Water Management and Governance Capacity in Boston, Massachusetts: Implications for Building Climate Resilience [M.A., Tufts University]. In ProQuest Dissertations & Theses Global; 2020.

9. Hamilton, AB. Rapid turn-around qualitative research. 17th Annual ResearchTalk Qualitative Research Summer Intensive. 8/7/2020.

10. Elton N Hayes LE, Wozniak-Brown J.Preliminary Results: Emergency Shelter and Cooling Center Practices in Connecticut. Connecticut Department of Public Health and UConn Connecticut Institute for Resilience and Climate Adaptation; 2022.

Acknowledgments
We sincerely appreciate the time our interviewees shared with us, given the ongoing challenges presented by different hazards throughout the interview period. Thank you very much to our research assistants Noelle Serino, Adriana Ballinger, Emily Goddard, and Sophia Ptáček in transcript preparation and data analysis support. Thank you to the Yale Center on Climate Change & Health, University of Connecticut, and the Connecticut Institute for Resilience & Climate Adaptation for resource support.

RECOMMENDATIONS

Establish, evaluate, and update communication protocols for vulnerable populations

This study and another Connecticut study found a dominant reliance on social media for sheltering communications.[10] Both studies found that there was limited translation of the materials into multiple languages. Only two respondents in this study felt comfortable with their efforts to communicate in English and Spanish. Other methods included 211 hotline, reverse messaging systems, mobile phone alert applications, and partner messaging.

"We opened up [cooling centers] and published information on Wednesday afternoon for the current heat wave, and that is just put out into the ether. And, with the hopes that residents would heed it, would find a way to take that information and take advantage of that."

Collect better data and educate community on risks

Since extreme heat is a less recognized health hazard in Connecticut, there is greater need for public education and outreach about risks and important behavioral and structural adaptation. One respondent described how he approaches public communication through combining stories and data to "paint a picture" that can propel personal action. However, to do this effectively about extreme heat requires local climatological and health outcome trend data and projections.

"I tell my staff, public health and epidemiology, you have to paint a picture, you have to, you know, ake a story out of the data, so people can, you know, bring it home and see how it could affect them"

Create holistic solutions to address heat as a systemic issue tied to deeper inequities

"…my concern is…we are not meeting the real need, which is a systemic need, and, you know, it is well beyond just the heat emergency. That population is suffering to begin with, and the heat is just one more way in which their circustances create more suffering. Now… if they make a decision, especially low income, and in particular seniors, if they make a decision about whether to buy food or prescription drugs, they're certainly not turning on the air conditioner and running it 24 hours a day, and they're just suffering through some severe weather and uncomfort."

Given the deep and complex relationships between heat exposure, socio-economic status, medical status, and the built environment, extreme heat planning, response, and recovery require interactions across sectors and across scales. Partners and programs across scale and sectors need to link into a comprehensive heat preparedness and response plan that addresses the multiple drivers of heat risk. Such a structure needs to allow for longer term heat planning and improved coordination before the heat season.

Clarify and establish thresholds

At the time of the interviews, the DEHMS extreme heat protocol had been deployed for the first time. Notably, the protocol remains discretionary to a certain extent without exact thresholds for notification to the governor or for the governor to call for opening of cooling centers. While flexibility to open local support at lower thresholds should remain, given the local population, clarity in when it is advisable or required to do so, should be well-established and communicated. One interviewee noted that there is not the same protections on liability in cooling center operations as there are for other types of emergency shelterings. Clearer protocols and processes may assist in clarification for other operational rules.