MONTANA STATE UNIVERSITY

COLUMBIA | MAILMAN SCHOOL OF PUBLIC HEALTH
ENVIRONMENTAL HEALTH SCIENCES

December 19, 2023

Dr. Monica Contestabile,
Chief Editor, *Nature Sustainability*

Dear Dr. Contestabile:

Please find enclosed our revised manuscript entitled "Trends and disparities of hazardous heat exposure among incarcerated people in the United States" (NATSUSTAIN-23093333-T). We have revised the text according to the comments and suggestions of the Editors and Reviewers, in the original submission, as outlined in our responses.

The main text, including abstract and figure legends, is 1700 words. The abstract is 92 words. The legends for Figures 1 and 2 are 52 and 109 words, respectively. The methods section is 289 words. There are 20 references for the main text. The submission contains two figures, with additional information in the Supplementary Information. We have tried our utmost to respond to the suggestions from editors and reviewers. We are mindful, however, that this is a Brief Communication with a strict word limit of 1,700 words, and we have therefore attempted to balance the two priorities.

Unbearable and dangerous temperatures were common throughout the United States during the summer of 2023, with over 100 million people exposed to hazardous heat. Among the 2 million people currently incarcerated in the United States, concerning reports surfaced of heat-related illness and death over the last several summers. This is hardly surprising – incarcerated people in the United States are at high risk for heat-related morbidity and mortality in large part because they are physically confined, socially isolated, and have high rates of chronic mental and physical illnesses. Unlike most of the population in the United States, many incarcerated people are living without air conditioning.

While a nascent body of research has begun to explore how dangerous heat is impacting incarnated people, this has largely been through case studies. Researchers and policymakers are yet to address the critical knowledge gap of understanding exposure to dangerous heat at carceral facilities at across the country over multiple decades. As the effect of climate change accelerates in the United States, identifying where incarcerated people are exposed to dangerous heat is imperative to advancing environmental justice for one of the most marginalized groups in the country.

In the accompanying manuscript, titled "*Trends and disparities of dangerous humid heat exposure among incarcerated people in the United States*", we fill this critical knowledge gap. We map daily maximum wet bulb global temperatures to 4,078 federal, state, and local carceral facility across the US to measure the trends in the number of dangerous humid heat days per year during 1982 – 2020. We (1) characterize dangerous humid heat at each carceral facility location and by facility type and state; (2) measure how exposure to dangerous humid heat at carceral facility locations compares with the rest of the population nationally and by state; and (3) calculate how the trends over of dangerous humid heat at carceral facilities has changed over time.

Our results reveal new and pressing insights about the dipartites incarcerated people in the United States face when contending with dangerous humid heat. We find:

- During 2016 – 2020, on average annually, there were 41.25 million person-days of exposure at US carceral facilities, with the greatest contribution from state prisons (61%);
- There was a consistent disparity during 1982 - 2020, with carceral facilities exposed to an average of 5.5 more dangerous humid heat days than the rest of the US annually;
- An estimated 915,627 people (45% of total) are incarcerated in 1,739 facilities that experienced an annual increase in the number of dangerous humid heat days per year during 1982 – 2020; and
- Southern US facilities exhibited the most rapid warming, though many of these states do not mandate access to air conditioning for incarcerated people.

By identifying where incarcerated people are exposed to dangerous heat conditions, our work highlights how incarcerated people in the United States are systematically exposed to greater levels of dangerous humid heat than the rest of the United States population, with the greatest exposure and rates of increase concentrated in state-run institutions. We expect our work can aid federal, state, and local decisionmakers in efforts to mandate safe temperature ranges, enhance social and physical infrastructure, and implement health system interventions to mitigate the effect of dangerous heat on this marginalized group. To this end, all data and code supporting this analysis will be made publicly available upon publication, including the entire historical daily maximum wet bulb globe temperature record during 1982 – 2020 we construct for each carceral facility in the United States.

Because of the pressing and novel nature of our findings, we are resubmitting this revised manuscript for publication as a Brief Communication to *Nature Sustainability*. None of this material has been published or is under consideration elsewhere.

On behalf of our co-authors, we thank you for your time and consideration.

Sincerely,

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