

# **Q&A: Study reveals importance of action plans to protect environmental refuges for escaping the summer heat**

April 29 2024, by Lisa Potter

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On April 30, the Salt Lake County Health Department's 2024 Climate & Health Symposium will bring together experts, including University of Utah scientists, to talk about how climate change impacts human health. One speaker is Daniel Mendoza, research assistant professor in

atmospheric sciences; adjunct assistant professor in internal medicine; and adjunct assistant professor in City & Metropolitan Planning.

Mendoza presents a case study, titled "Environmental refuges during summertime heat and elevated ozone levels: A preliminary [case study](#) of an urban 'cool zone' building," [in the journal \*Buildings\*](#).

Mendoza and co-authors measured indoor and [outdoor temperature](#) and [ozone levels](#) at the Millcreek library, a building designated as a "cool zone" for the public to escape increasingly hostile environment extremes by [climate change](#).

Mendoza spoke with AtTheU about environmental refuges and how cities can better protect vulnerable individuals.

## **How are heat and health related?**

In Utah, we're very aware of air quality-related health concerns, but we're not as aware of the dangers of extreme heat. As the climate changes we need to pay attention to elevated temperatures, not only during the day, but also the temperature at night.

There's lots of attention when we hit record highs, but they obviously happen during the middle of the day where there are many opportunities to seek refuge in venues with air conditioning. We're generally at work or at school or can go to the store, for example, because these places are open when it's hottest.

High temperatures during the evening are more insidious—you're very vulnerable to your environment while you're sleeping, especially for children, the elderly, or people with chronic health issues. When it's too hot at night, you're not recovering at a cellular level. This can cause chronic health issues that for some, can lead to strokes, among other

negative effects. We always see an uptick in heat-related illness in the ER during heat waves.

## **How will climate change impact our exposure to heat?**

Not only are average temperatures rising, but our cities essentially generate this brick oven effect where there's so much concrete, it absorbs the heat during the day and radiates it back out at night. We're starting to see that there's a disproportionate health impact of heat-related illness, in a similar manner as we've noticed for air quality.

This urban heat effect has more impact on communities in the central downtown area or on the West side, places that are more built up and have less [green space](#). Green space helps mitigate the urban heat effect because trees block sunlight from hitting the paved surface, and vegetated areas work like giant swamp coolers.

Heat waves don't catch us unaware. They are events that we can predict and, given the right policies, we can minimize the impact on [human health](#), particularly in the vulnerable individuals because those are the populations that really suffer the most because of a lack of proper shelter.

## **What is the Cool Zone program in Salt Lake County?**

The Salt Lake County Division of Aging and Adult Services is trying to bring awareness and protection to individuals who are vulnerable to heat-related illnesses during [heat waves](#). Within the county, all the libraries, rec centers and senior centers are designated locations where people can get relief from the heat.

These places weren't necessarily retrofitted to serve this

purpose—they're established community gathering spaces being used as heat relief centers.

In our recent study, we wanted to look closely at the cool zones to assess whether they are useful and accessible and to provide recommendations based on our data. For example, many of these cool zones close around 2 or 3 pm, and those are the hottest times of the day, right? And some aren't even open on weekends. How can we make cool zones, or better yet, environmental refuges, more effective?

## **Your study analyzed how cool zones blocked heat and ozone, a common air pollutant during the summer. Why did you focus on both heat and ozone?**

Climate change exposes us to compounding environmental exposures. For example, rising temperatures and drought are correlated with bigger wildfires. Even if Utah avoids them, smoke from surrounding states funnel into the Wasatch Front. In the study, we asked, "Can cool zones protect individuals from heat and poor air quality?"

For this first paper, we focused on the Mill Creek Library's ability to protect occupants from heat and ozone as the stand-in air pollutant because the campaign took place during the summer, which is when we see the highest levels of ozone. Ozone is dangerous because it basically causes a sunburn in your lungs that impacts respiratory and cardiovascular health.

We found that the Millcreek Library was cooler than outside, obviously because the temperature was regulated, but also reduced the exposure to ozone by almost 80% compared to the outside concentrations. So, being inside the building not only protected you from elevated temperatures, but also from poorer quality.

## **What are some policy recommendations, based on your findings?**

We argue that we should increase the scope of these cool zones and consider them environmental refuges, to protect populations from ozone, wildfires, and dust events, which we're seeing more often.

We should be thinking about how to make these centers more accessible, for example, keeping them open for longer hours to protect people during the hottest parts of the day.

Now, nighttime is a completely different story. We could follow the "code blue" model extreme temperatures during the winter triggers the county to open emergency shelters to keep people from freezing overnight. Because ultimately, and looking at the issue very cynically, you can always bundle up some more and survive the cold, but there's no way to cool off if you don't have some help, such as mechanical air conditioning.

## **What are your next steps for improving environmental refuges?**

We need to quantify refuge usage, and the reason for usage. Are people going there because they would normally go to the library or the senior center activities? Or are people making a conscious decision to protect themselves. A way to quantify this would be an active public health campaign which includes tracking some health statistics. For example, during a heat wave, the health department can run ads in the radio or organize events at the cool zones, to see if these efforts can increase usage of those locations.

To quantify the campaign's impact, we can see if there are fewer cases

of ER visits due to heat related illness during that week because we see an increase in usage.

**More information:** Daniel L. Mendoza et al, Environmental Refuges during Summertime Heat and Elevated Ozone Levels: A Preliminary Case Study of an Urban "Cool Zone" Building, *Buildings* (2024). [DOI: 10.3390/buildings14020523](https://doi.org/10.3390/buildings14020523)

Provided by University of Utah

Citation: Q&A: Study reveals importance of action plans to protect environmental refuges for escaping the summer heat (2024, April 29) retrieved 17 May 2024 from <https://phys.org/news/2024-04-qa-reveals-importance-action-environmental.html>

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