

A Matter of Climate Justice: Heat and Air Pollution Combine to Worsen Effects of Homelessness

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As urban temperatures rise, air pollution concurrently worsens—especially ground-level ozone¹ and particulates^{2,3}—because heat alters both atmospheric chemistry cycles and air circulation patterns.^{4,5} One population that is among the most vulnerable to the twin threats of heat exposure and air pollution is also chronically understudied and plagued by stigma: people experiencing homelessness.

A novel Commentary published in *Environmental Health Perspectives*⁶ by a team from Arizona State University synthesizes research on this subject, which becomes ever more urgent as the effects of climate change become more apparent. The team found only a few studies—all of them small—examining how urban heat and air pollution specifically affect people who are unhoused.

Doctoral student and first author Zachary Van Tol says that in the realm of climate research, the focus remains on housed populations at the neighborhood or community scales, often neglecting the individual level. “Researchers and policy makers need to approach the housing and climate crises not as isolated problems,

but as interconnected challenges,” Van Tol says, noting that his work is informed not just by his academic expertise in climate science but also by his experience living in urban areas that lack adequate affordable housing.

“There is insufficient research to understand the magnitude and pattern of risks, and [there are] insufficient evidence-based interventions; both deficits call for urgent investments in research and implementation,” says Kristie Ebi, a professor of global health and environmental and occupational health sciences at the University of Washington who was not affiliated with the study. “Such information will be relevant for developing policies to protect the health and well-being of the unhoused.”

“Stigma undeniably plays a role in the lack of research and funding for studies involving individuals experiencing homelessness,” says Van Tol. “Securing financial support and cooperation from local governments for research within marginalized communities often hinges on obtaining social and political capital, such



Van Tol and his fellow researchers draw attention to the dearth of research about combined effects of urban heat and air pollution on people who are unhoused, such as this man in Phoenix, near the Arizona Canal (drained for cleaning at the time of this photo). Image: © iStock.com/Gregory Clifford.

as access to policy-setting groups or private financing, which is predominantly concentrated in privileged populations.”

Certain adverse health conditions experienced by unhoused individuals—e.g., cardiovascular,⁷ respiratory,⁸ and mental health⁹ disorders—may be exacerbated by heat and pollution exposures.¹⁰ The severity of physiological responses to concurrent air pollution and high heat are directly related to the intensity and duration of exposure,¹¹ the authors wrote, noting that people without shelter are often unable to mediate such exposures by staying in air-conditioned spaces.

“This article raises the profile of the extremely important issue of climate justice—the understanding that the impacts of climate change are not experienced equally across society,” says Jane Currie, a professor and nurse practitioner in the School of Nursing at Queensland University of Technology who was not affiliated with the Commentary. Those experiencing the greatest disadvantage, who have probably contributed the least to climate change, will endure the most significant consequences of climate change, she says, adding, “This [disadvantage] appears to be true of all major weather events, such as flood, fire, heat, and pollution.”

To better study how individuals are affected, the researchers suggest a multipronged methodology:

- Hyperlocal data, to enable researchers to better pinpoint exposures of unhoused individuals who spend time near particular locations. Such data might come from increased use of personal air monitors by volunteers or research subjects, as well as placement of more low-cost monitors.¹²
- Targeted surveying, to understand the health conditions unhoused people may be experiencing, in addition to providing information about where they spend their time to complement remotely sensed data. However, the authors acknowledge it is difficult to survey members of a transient population.
- Local knowledge maps to facilitate on-the-ground measurements without the need for research subjects to carry Global Positioning System (GPS) devices. These maps mark frequented paths, primary locations of activity, and service access points that unhoused people often travel.

“While such data are potentially boutique [not generalizable beyond the study context], they could be tested by implementing these local intervention strategies in different locations and contexts to identify their generalizability,” Currie notes. “Another suggestion would be to strengthen international collaboration, thereby ensuring that countries share data and solutions and learn from each other, to address what is a global issue.”

The authors note that research is complicated by this population’s heterogeneous exposures—they may live in tents or cars, have intermittent housing, or be completely unsheltered, and may move about widely during a single day, not to mention longer periods. The team suggests ways researchers, city planners, social workers, and health professionals should guide future activities related to concurrent high heat and air pollution research:

- Understand the implications of ongoing heat exposure for mental health and well-being.
- Review hospital intake methods to increase collection of data on housing status.
- Improve accounting for deaths related to either heat or pollution.
- Investigate how housing policies and programs mitigate or exacerbate exposure to heat and pollution.

But research cannot stop at merely understanding how the unhoused are affected by heat and pollution, says Commentary

co-author Kristin Ferguson, a professor of social work at Arizona State University. Rather, researchers and policy makers must also commit to preventing homelessness in the first place. “Research cannot be separated from ‘getting people off the street,’ but rather should be viewed as an essential part of successfully supporting people in exiting homelessness,” she says.

There is a role for urban planners to play as well, says Van Tol, that not only lessens exposure risks for people who are unsheltered but also benefits the housed; namely, designing cities to create less heat and pollution, improving local conditions while reducing their contributions to climate change. “Computer modeling, often consulted by city decision makers, aids in understanding unique climatic situations,” he says. “Strategies such as cooling centers, greenspaces, water bodies, clean transit, and thoughtful street orientation serve as effective mitigations.” He notes that these outcomes would also reduce the burden on local health care providers to treat heat- and pollution-related ailments, which are preventable. “The key advice is to prioritize local climate considerations in city design and work to minimize environmental risks and vulnerabilities.”

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