

# How air pollution affects homeless populations

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When air quality worsens, either from the smoke and ozone of summer or the inversion of winter, most of us stay indoors. But for individuals experiencing homelessness, that's not always an option. In a new study,

researchers from the University of Utah document the effect of air pollution on people experiencing homelessness, finding that nearly all notice and are impacted by air pollution, whether or not they reside in shelters.

The study, funded by the Interdisciplinary Exchange for Utah Science (NEXUS) at the University of Utah, is published in the *International Journal of Environmental Research and Public Health*.

## **Life lived outdoors**

People experiencing homelessness, particularly those who sleep outdoors at night, are the most vulnerable and exposed population to [environmental hazards](#), says Daniel Mendoza, a research assistant professor in the Department of Atmospheric Sciences and visiting assistant professor in the Department of City & Metropolitan Planning. Mendoza also holds appointments as an adjunct assistant professor in the Pulmonary Division in the School of Medicine and as a senior scientist at NEXUS. "Many individuals sleep near a road or under a bridge," he says, "which leads to exposure to high levels of traffic related emissions. Further compounding the issue is the fact that during sleep, many people breathe through their mouth and breathe more deeply."

This life lived outdoors makes homelessness an environmental justice issue, says Jeff Rose, assistant professor in the Department of Parks, Recreation and Tourism.

"People experiencing unsheltered homelessness often live, eat, sleep, socialize, use the bathroom, and other basic human functions outdoors, with close and regular interaction with the environment," he says. Environmental justice research looks at uneven exposures to [pollution](#) and other environmental risks. "Increasingly, scholars are considering people experiencing unsheltered homelessness as fitting in this

framework."

While other researchers have looked at how people experiencing homelessness experience environmental injustice in the form of access to safe drinking water or parks, the U team says it is among the first to look at how people experiencing homelessness also experience the intermittent poor [air quality](#) of Salt Lake County.

## **Gathering experiences**

To collect people's stories, Angelina DeMarco, a doctoral student in anthropology and Rebecca Hardenbrook, a doctoral student in mathematics, went to several Salt Lake City resource centers to meet with people experiencing sheltered homelessness.

"We sat in the dining hall of each center and invited all residents that came by to interview," DeMarco says. In partnership with the Volunteers of America outreach team, they also interviewed people at the Salt Lake City library, on downtown streets, outside the St. Vincent de Paul dining hall and at local parks. Outdoor interviews took place often during harsh winter conditions, DeMarco says.

They interviewed everyone they encountered, 138 people total, and asked them open-ended questions about when and how they knew the air was polluted, and how air pollution make them feel. With the interviewees' permission, the researchers also examined health records kept by the state Homeless Management Information System.

## **Sheltered and unsheltered**

More than half of the participants reported having physical reactions to air pollution including headaches and difficulty breathing, and more than

a third reported emotional stress associated with air pollution. 89% reported seeking medical treatment for their symptoms.

But the researchers also wanted to look at whether the duration of homelessness or residing within a shelter would affect individuals' experiences with air pollution. Surprisingly, they found no significant differences in heart and lung health outcomes between sheltered and unsheltered individuals, as well as between people experiencing chronic (more than a year) or non-chronic homelessness.

"These results indicate that sheltered and unsheltered, short-term and long-term [homeless](#) populations experience negative health outcomes that are associated with air pollution," DeMarco says. The mental health impacts of air pollution exposure, she says, merit additional study.

The message for governmental leaders, the researchers say, is that shelters and day centers that protect people from the elements may not be shielding them from [air pollution](#) and other environmental impacts, which can have a significant effect on their health. Affordable housing policies and efforts to place people experiencing homelessness in housing, they say, may do much more to protect a vulnerable population from an environmental hazard.

**More information:** Angelina L. DeMarco et al, Air Pollution-Related Health Impacts on Individuals Experiencing Homelessness: Environmental Justice and Health Vulnerability in Salt Lake County, Utah, *International Journal of Environmental Research and Public Health* (2020). [DOI: 10.3390/ijerph17228413](https://doi.org/10.3390/ijerph17228413)

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