Smell reports reveal the need to expand urban air quality monitoring, say researchers

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Ever wondered if your neighborhood odor could be impacting your health? University of British Columbia researchers have uncovered surprising insights into the Vancouver region's "smellscape" using data

from the Smell Vancouver app. Analyzing 549 reports from one year of app data, they discovered that "rotten" and "chemical" odors dominated, making up about 65% of submissions. These unpleasant smells were linked to self-reported health issues like headaches and anxiety, leading some residents to change their behaviors, like closing windows even in stifling-hot weather.

The findings are published in the journal *Environmental Research: Health*.

"The reports illustrate how odors can be more than just a nuisance—they can impact physical and mental health, well-being, and quality of life," said Dr. Amanda Giang, senior study author and assistant professor in UBC's department of mechanical engineering and the Institute for Resources, Environment and Sustainability.

The app identified major sources of urban odors, including waste management and industrial activities. Four municipalities—City of Vancouver, Delta, Burnaby and Richmond—emerged as hotspots, each with its own distinct smell profiles and associated symptoms. Reports from Vancouver overwhelmingly focused on animal processing, while Delta saw higher complaints about garbage and compost, farming and cannabis.

Crowdsourcing science

With more than 3,500 reports logged, the app showcases the power of "crowdsourced science" in offering a more detailed view of urban air quality.

"Traditional air quality measurements are limited by their fixed locations and set sampling intervals, often missing the rapid onsets and impacts of odors," explained Dr. Sahil Bhandari, co-author and former postdoctoral

researcher in UBC's faculty of applied science. "In addition, smell experiences are highly personal—what's unpleasant to some people may be acceptable to others—and often occur in areas where monitors aren't located. All this creates information gaps that traditional systems can't address."

Dr. Bhandari highlighted an instance where the app detected a strong foul odor from a refinery incident ahead of official reports, underscoring its potential for timely public awareness and emergency response.

Broader and more diverse participation

Despite these insights, more public participation is needed—for example, the app mainly attracted white women aged 30 to 49 without chronic health conditions and men from the highest income bracket. The researchers' future studies will aim for more representative reports to provide a fuller picture of urban smells and their impacts.

Dr. Naomi Zimmerman, co-author and assistant professor of mechanical engineering at UBC said, "Integrating crowdsourced data into urban planning and policy can enhance responses to unpleasant smells. The SmellVan project underscores the need for policies that address odor sources, their broader health impacts and the importance of including diverse community demographics and perspectives."

More information: Sahil Bhandari et al, Odor, air quality, and well-being: understanding the urban smellscape using crowd-sourced science, *Environmental Research: Health* (2024). DOI: 10.1088/2752-5309/ad5ded

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