Filter study dispels common myths about Valley fever

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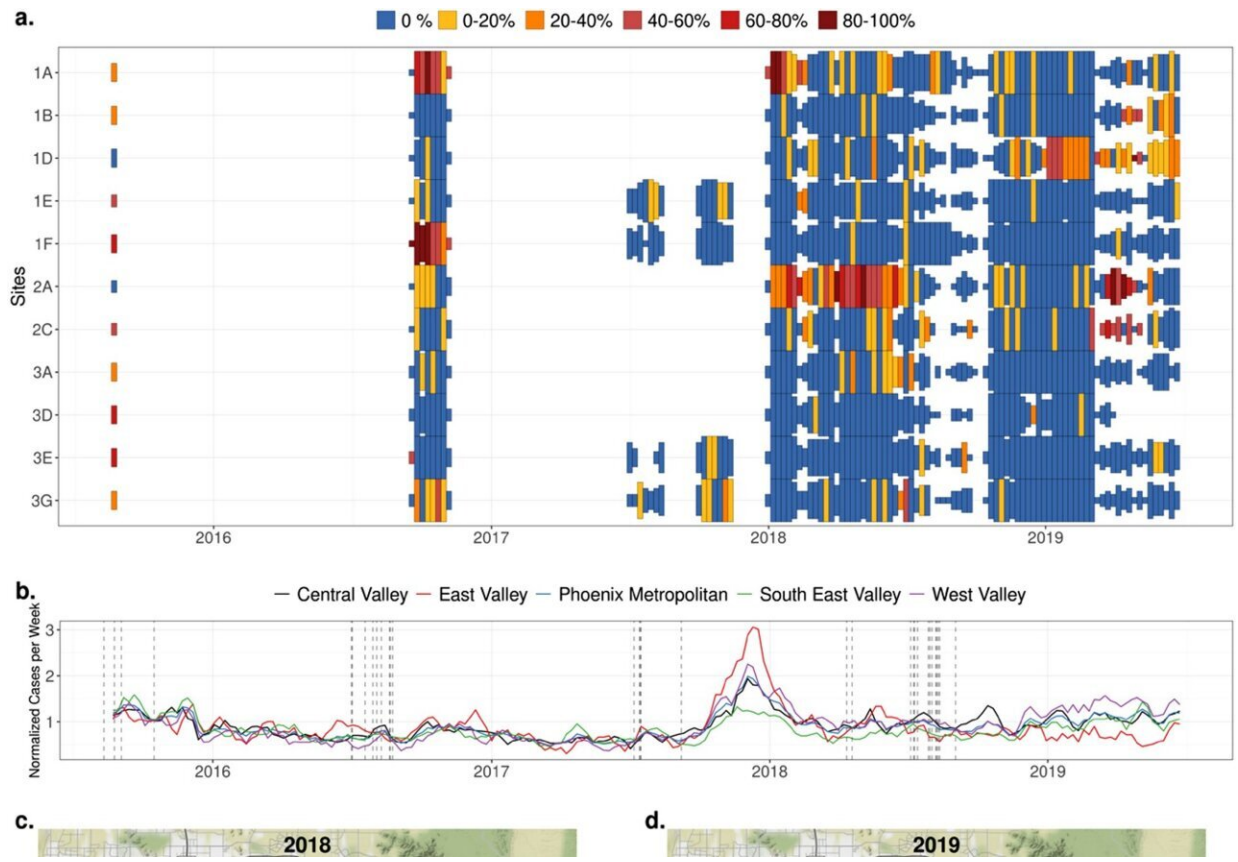

Understanding the exposure risk of aerosolized Coccidioides in a Valley fever endemic metropolis. Credit: *Scientific Reports* (2024). DOI: 10.1038/s41598-024-51407-x

A new study of Valley fever spores collected from air filters around the

Phoenix metro area is helping a research team led by scientists from the Translational Genomics Research Institute (TGen), part of City of Hope, dispel some common myths about exposure to the fungus known as Coccidioides, or 'cocci' for short.

For instance, the risk of airborne exposure to Valley fever spores does not increase significantly after a major dust storm or haboob, as has been the conventional wisdom. The research team also noted that the cocci spores are not ubiquitous throughout the Valley of the Sun.

Instead, the study published in *Scientific Reports* concludes that the presence of the spores, identified through DNA analysis, varied in location and time throughout the study's 18-month collection period. There was also a greater risk of finding cocci on the filters on hotter, more windy days and days with low soil moisture, according to David Engelthaler, Ph.D., director of TGen's Pathogen and Microbiome Division (TGen North) and colleagues.

Public health workers can use these new findings to dispel myths about Valley fever exposure, such as the belief that it's riskier to go outside after a dust storm, Engelthaler said. "That messaging is probably doing little to reduce the risk of people getting exposure to cocci or Valley fever. We are hoping to help provide more precision to such public health warnings."

Valley fever is a disease that mostly affects the lungs and is caused by inhaling Coccidioides spores. The fungus infects hundreds of thousands of people and their pets, causing more than 300,000 cases of Valley fever each year in the American Southwest, mostly in Arizona and California, according to the Centers for Control and Prevention.

The study included 5,243 filters from 11 sites across the greater Phoenix metropolitan area that were tested for Coccidioides DNA from 630 days

during three pilot programs in 2015, 2016 and 2017 and a sustained 18-month surveillance effort between January 2018 and June 2019.

The filters are part of a biodefense monitoring system put in place in Arizona in 2002 after the 9/11 terror attacks. As the state's biodefense coordinator on that project and later as the state epidemiologist, Engelthaler saw the filters as a way to better understand Valley fever exposure. But at the time, "we didn't have the technology to adequately break open the fungal spores and do the genetic testing we can do today," he said.

"This is the very first time that we've looked at this part of the risk, the risk of the fungus in the air, where and when and how that happens," Engelthaler added. "And what the research is starting to tell us is that Valley fever exposure is a really localized thing."

In the Phoenix area, explained Tanner Porter, the study's lead author, researchers had assumed there was "some kind of ongoing omnipresent risk" of Valley fever exposure. But the new findings suggest that the place and time of exposure varies, probably depending on when and where the soil is disturbed by local events such as turning an old agricultural field into a construction site.

Scientists have not discovered a direct link between a warming Southwest caused by global climate change and Valley fever dispersal to new areas, Porter said. But the study did find a greater prevalence of cocci on the filters during warm and dry days. "That probably does mean that the more of those days we have, in a changing climate, the more exposures we're going to see," he said.

The researchers will continue monitoring the filters for cocci, Engelthaler said, using genomic sequencing techniques to identify and quantify different strains of the fungus, "to add more layers to our

understanding of what's driving the cocci spores to get up into the air."

More information: W. Tanner Porter et al, Understanding the exposure risk of aerosolized Coccidioides in a Valley fever endemic metropolis, *Scientific Reports* (2024). DOI: 10.1038/s41598-024-51407-x

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