

A bigger footprint? Valley Fever's impact might be expanded by climate change

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FRESNO -- EDITOR'S NOTE: The number of Valley Fever cases has soared so high in recent years that health experts are calling it "The Second Epidemic." In an occasional series that continues today, the Merced Sun-Star and other members of the new Reporting On Health Collaborative will explore the rise of cases, the tricky science of studying the disease, the high costs to patients and taxpayers, the lack of private interest in funding treatments and vaccines, and the long history of inaction by government agencies. Saturday's report painted the big picture, and revealed that there probably are far more cases than are diagnosed. Today's report delves into the role climate change may be playing in spreading the fungus's footprint outside traditional hot spots. Check out the Sun-Star and mercedsunstar.com in coming weeks for more of this important series.

Valley Fever feeds on heat.

And as the average temperature ticks up with each passing decade, experts are concerned that the fungus's footprint and impact are expanding, as evidenced by a rise in cases in areas far outside the hot spots of the Central Valley.



Shelby Mack

Merced Sun-Star - Photo by Shelby Mack / The Californian

Thomas Mace, senior scientific adviser for the nation's space agency, helps Anje Lauer, a microbiologist at California State University, Bakersfield, pour a soil sample in a test tube recently in a field in Bear Valley Springs. Lauer will bring the samples to the university to test for the fungus that causes Valley Fever.

In the soil, the cocci fungus lives on dead organic matter. Less rainfall and higher temperatures reduce overall vegetation, diminishing soil competition for the hardy fungus, scientists say. Cocci spores survive -- even thrive -- when the environment is drier and hotter because other competitors die off.

California State University, Bakersfield, scientists are using satellite images to map areas that could be friendly to the fungus's growth. They're looking for similar vegetation to what is found on Sharktooth Hill, a site for digging up bones from more than 5 million years ago. Because of that digging, researchers often inhaled spores from the soil and came down with Valley Fever.

So when the team at CSU, Bakersfield, finds areas that have vegetation that mirrors Sharktooth Hill, they paint that part of the map yellow.

Their map shows large swaths of Central California bathed in yellow, mostly undeveloped areas such as those along the Interstate 5 and Highway 99 corridors or areas that have been burned by wildfires. Areas of high vegetation or those paved over typically don't harbor the fungus, explained Jorge Talamantes, a CSU, Bakersfield, physics professor.

"California is becoming drier," he said. "We have some climate changes. I think the environment where the fungus grows will expand."

What Talamantes and other scientists are trying to figure out is whether the fungus itself is moving into new areas or whether it has long been there and is simply waiting for the right conditions to flourish.

Their computer mapping shows vegetation conducive to the fungus's growth farther north and east than Valley Fever cases normally occur. In theory, the soil near San Francisco would support the fungus's growth, if it didn't rain so much there. If rainfall or temperature patterns change, the reach of the fungus -- and the illness -- could expand farther, CSU, Bakersfield, microbiologist Antje Lauer said.

Still, confirming these scientific theories would require more research funding and many more people working on the problem, she said.

The fever footprint grows

Paso Robles, a favorite spot among wine enthusiasts, tucked into the hills about 30 minutes from the Central California coast, doesn't look like the typical Valley Fever zone. Bakersfield receives less than 6 inches of rain annually, making it one of the driest parts of the state. Paso Robles averaged 15 inches over the past decade and received more than 20 inches in each of the past two years.

Yet Paso Robles winemaker Todd Schaefer acquired a severe case of cocci in 2003 and has struggled since with health complications, including fungal meningitis. He was running a bulldozer through a vineyard when he breathed in the cocci spores in the dust, he believes. Over the past six months, Schaefer was only able to work two days.

"Doctors can't believe I'm still alive," he said. "They told me flat out, they can't believe it. But somehow I'm able to get by."

San Luis Obispo County, where Paso Robles is located, has seen a rise in cases each year. It reported four cases of the disease in 1990, a year when only seven of 58 counties reported more than 10 cases. But by 2011, San Luis Obispo health officials reported 242 cases. Today, Valley Fever is rising in more than a third of the counties in California. The dramatic increase cannot be explained away as a sign of increasing awareness and better public health monitoring of the disease, health officials say.

Look at a map of Valley Fever cases over the years and it pops up in more states each year over the past decade. In 2001, nearly all cases were in the Southwest. By 2006, though, 13 states reported Valley Fever, including Michigan, Ohio and Minnesota, which reported more cases than New Mexico and nearly as many cases as Nevada. Some of these cases are likely caused by travelers visiting the Southwest, but, as with everything related to Valley Fever, there has been little funding of research into understanding the fungus's reach.

Even space agency concerned

Valley Fever's geographic footprint has even sparked concern from the nation's space agency, which is studying a range of environmental issues near its operations in the Mojave desert to protect the health of the agency's workers.

Senior scientific adviser Thomas Mace is testing a theory about how weather patterns affect the fungus. His research builds on University of Arizona findings and work by Kern County health officials that show that spikes in rainfall foster the fungus's growth -- such as the unusually heavy rains seen in the Central Valley in 2010. When a wet year is followed by a dry spell -- such as the one the Valley saw in 2011 -- grasses and vegetation die off, leaving the more resilient fungus exposed and airborne.

Under that theory, a drier climate with occasional bouts of worsening storm patterns could spur more Valley Fever cases, turning a regional epidemic into a national one.

JUST ONE BREATH

Part 2 of an occasional series about Valley Fever.

ON THE WEB

www.reportingonhealth.org/valleyfever

ABOUT THE SERIES

Why are people still dying from Valley Fever and tens of thousands getting sick? Misdiagnosis. A lack of public awareness. And a long history of inaction by government agencies. In this series, we will explore the startling rise of cases, the science of studying the disease, the high costs to patients and taxpayers, the weak federal and private interest in funding treatments and vaccines, and the public health response.