Valley fever on the rise after years of decline in the USA

The recent huge increase of reported cases of coccidioidomycosis might still fail to reflect the true scale. Roxanne Nelson reports.

After several years of decline, there has been an upswing in cases of coccidioidomycosis in the USA, for reasons that remain unclear. According to the US Centers for Disease Control and Prevention (CDC), the number of reported cases jumped nearly 75% from 2014 (8233 cases) to 2017 (14 364) with most occurring in the states of Arizona and California.

Also known as Valley fever, the disease is caused by *Coccidioides* spp, a fungus found in soil, particularly in warm and arid regions. That said, although more than 95% of cases are reported in Arizona and California, cases have been identified in 26 states and the District of Columbia. However, most of the cases reported from other states are typically travel associated.

From 2011 to 2017, 95 371 coccidioidomycosis cases were reported to the CDC, with 61 480 (64·5%) occurring in Arizona and 30 979 (32·5%) in California. This number markedly decreased from 22 634 in 2011 to 8232 in 2014 but has subsequently climbed back closer to the 2011 level.

"Cases of Valley fever have risen substantially since becoming a nationally notifiable disease in 1995, and much of the early increase is likely related to improved diagnosing and reporting of cases to public health", said Orion McCotter (CDC Mycotics Diseases Branch). "Some of the reasons for recent changes in the number of reported Valley fever cases are not entirely known but could be due to several factors."

He noted that these reasons would include changes in environmental factors such as temperature and rainfall, which can affect the growth of the fungus and how much of it is circulating; the number of susceptible people exposed to the fungus because of travel or relocation to endemic areas; and the way that cases are detected and reported around the country.

"During periods of drought and especially with fires, more spores are likely to be airborne, and we had a lot of fires last year", said George Thompson (Valley Fever Center, University of California, Davis). "The fungus lives in the soil, so during periods of rainfall it multiples. And then it forms spores during periods of drought." "The worst situation is a very heavy rainfall year followed by a high drought year. You get a really high concentration in the soil and then a lot of spores," he said.

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California had record rainfall in the winter of 2016–17, after several years of intense drought. This was followed by a hot and dry winter in 2018.

What is problematic is that only about 40% of coccidioidomycosis infections are symptomatic, and the true number of cases could be as much as 6–14 times greater than reported to public health agencies. "It is hard to track any cases that are not reported and these are estimates from other sources such as hospitalizations, deaths, and population changes", said McCotter.

The geographical distribution of *Coccidioides* spp includes southwestern USA, parts of Mexico, and central and South America, but it has recently been discovered in south-central Washington state, up in the Pacific Northwest. This suggests it may exist in a much larger area than previously recognised. Since 2010, 16 cases have been identified in Washington, and current scientific evidence points to wind, water, mammalian host, and human movement as possible mechanisms for dispersal, according to Hanna Oltean, an epidemiologist with the Washington State Department of Health.

"The exact mechanism and timing for the dispersal in Washington is unknown, but the pathogen likely spread here from California at least several decades ago—possibly hundreds of years ago—and went undetected until recently", she said.

However, the locally acquired cases in the state have higher rates of hospitalisation and death compared with states with high rates of infection. "Because most people infected with coccidioides do not have symptoms or have only mild illness, we believe only the most severe cases of coccidioidomycosis with exposure in Washington are being identified and reported to public health authorities", said Oltean.

Unfortunately, there is no known way to prevent infection with *Coccidioides* spp, because it is very difficult to avoid inhaling spores in areas where it is common in the environment and no known way of eliminating spores in the soil. The CDC recommends that people who live in these regions try to avoid spending time in dusty places as much as possible. As for long-term solutions, right now the focus is concentrated on secondary prevention, aimed at improving outcomes for patients infected with the fungus. Improving primary prevention requires more research on the epidemiology of the infection, which will increase understanding of human exposure and individual susceptibility to disease.

Roxanne Nelson

For more on **coccidioidomycosis surveillance in the USA** see https://www.cdc.gov/mmwr/volumes/68/ss/ss6807a1.htm

For **CDC advice on avoiding coccidioidomycosis** see https://www.cdc.gov/fungal/diseases/coccidioidomycosis/risk-prevention.html