

Breathing Valley Fever Fungus

[Announcer] This program is presented by the Centers for Disease Control and Prevention.

[Stephen Monroe] Hello, I'm Dr. Stephen Monroe, and today I'm talking with Dr. Duc Vugia, chief of the Infectious Diseases Branch at the California Department of Public Health. Our conversation is based on his study about Valley Fever, which appears in CDC's journal, *Emerging Infectious Diseases*. Welcome, Dr. Vugia.

[Duc Vugia] Thank you, Dr. Monroe.

[Stephen Monroe] EID has done some other articles about coccidioidomycosis but I think it's still an infection most people don't know anything about. Tell us what it is and how you get it.

[Duc Vugia] Coccidioidomycosis, also known as Valley Fever, is an infectious disease caused by a fungus called *Coccidioides*. This fungus lives naturally in the soil in parts of the southwestern United States, Mexico, and Central and South America. People get infected from breathing in the fungal spores, which are seed forms too small to be seen, probably when they're outdoors in an endemic area, meaning an area where this fungus is often found. Most of the time, this illness is mild and gets better on its own. On rare occasion, however, it can be severe and even fatal.

[Stephen Monroe] How is Valley fever different from other fungal infections, such as the one people got from the cortisone spine injections and from yeast infections?

[Duc Vugia] Well, like bacteria and viruses, there are many different types of fungi that are in the environment and even some that we carry on our bodies. Yeast infections are usually caused by *Candida albicans*, a fungus that many of us carry harmlessly on our skin and mucous membranes. If a person's immune system changes or is weakened, this yeast can overgrow and cause a yeast infection. And when a fungus gets into our body through a wound or through an injection, such as with the recent unfortunate outbreak from injecting contaminated steroids, then a person can become very sick with a fungal infection. Valley Fever, however, is different from those two settings in that the spores of this fungus sometimes get into the air when the soil in an endemic area is disturbed by wind or activities like digging and then people nearby get infected from breathing in the dust and these spores.

[Stephen Monroe] People seem to be aware that mold is bad for them but think fungus is something like mushrooms.

[Duc Vugia] Molds, yeasts, and mushrooms are all types of fungi. They may differ in size, shape, and other ways, but there are some molds, yeasts, and mushrooms that can make people sick.

[Stephen Monroe] Dr. Vugia, tell us how Valley Fever affects a person.

[Duc Vugia] About 60 percent of people infected with Valley Fever have little or no noticeable symptoms. The people who do get sick usually develop a flu-like illness 1 to 3 weeks after exposure to the fungus. Common symptoms include cough, fever, chest pain, headache, muscle aches, fatigue, and a rash. What is notable is that these symptoms can last a month or more; the fatigue can last several months. Then most sickened people usually recover and are protected from being infected again by developing immunity to the fungus.

In some people, the infection becomes more severe, and can spread outside the lungs to the brain, joints, bone, skin, or other organs. When the infection spreads outside the lungs, this is called disseminated Valley Fever. This form of the disease is rare but can be very serious and could be fatal.

[Stephen Monroe] In what regions of the country are people most likely to get Valley Fever?

[Duc Vugia] In the U. S., the southwestern region, including the states of Arizona, California, Nevada, New Mexico, and Utah have reported increased cases of infection with Valley Fever since 1998. Of the total number of cases reported to the Centers for Disease Control and Prevention during this time, 66 percent were from Arizona and 31 percent were from California. In California, most of the endemic counties are in the California Central Valley, and by the way, that's where Valley Fever got its name.

[Stephen Monroe] Is there treatment for Valley Fever? I know it can be hard to treat.

[Duc Vugia] Yes, there are antifungal medications to treat Valley Fever, but some people with mild infections may get better without medication. The severe or disseminated infections can be difficult to treat but antifungal medications can be effective. For some people with Valley Fever meningitis or brain infection, they may need to take these medications for the rest of their life. It's important for patients to follow up and work with their doctor to make sure that their Valley Fever infection is treated appropriately.

[Stephen Monroe] Are some people more likely to get Valley Fever?

[Duc Vugia] Anyone can get Valley Fever after breathing in this fungus. For people living, working, or traveling in areas where the fungus is in the soil the risk of infection is present. In these areas, activities that disturb the soil and bring up dust would put people nearby at higher risk of infection.

Some people are at higher risk for severe or disseminated disease after they get infected. These "at risk" groups include people of certain racial or ethnic backgrounds, including African Americans, Filipinos, or Hispanics; older adults, aged 60 and older; pregnant women; people with diabetes; and people with weakened immune system, such as those with cancer or HIV/AIDS.

[Stephen Monroe] Your study looked at Valley Fever-associated hospitalizations. What did you find? How many of these people died?

[Duc Vugia] We looked at California hospitalization data from 2000 through 2011. We found over 15,000 patients have been hospitalized with a diagnosis of Valley Fever during this time. Some were hospitalized more than once for a total of over 25,000 hospitalizations. The rates of patient hospitalization per year increased approximately two-fold between 2000 and 2011. And the total charges for hospitalizations during this time were over 2 billion dollars. Eight percent of the patients died during their hospitalizations.

[Stephen Monroe] Why did the number of hospitalizations increase since 2000? Is the problem of Valley Fever getting worse?

[Duc Vugia] We don't know why the numbers of reported infections and hospitalizations with Valley Fever have increased since 2000. We have seen an epidemic increase before in the California Central Valley between 1991 and 1994 and we didn't know why at that time either. But the number of infections came down to a baseline by 1995, and we're hoping that the recently increased number of Valley Fever cases will also decrease.

There are some factors that might have contributed to the increase, including climate or rainfall factors, increasing activities disturbing the soil in the endemic areas, increasing number of people moving into these areas, and increasing number of people at risk for severe disease. It's just not yet clear why the numbers of infections and hospitalizations with Valley Fever have increased in this recent time.

[Stephen Monroe] Are people immune after infection? Can people get Valley Fever again and again?

[Duc Vugia] After a person is infected with the Valley Fever fungus, whether with or without noticeable symptoms, that person develops some immunity to Valley Fever. This immunity is usually lifelong, meaning that people who have been infected with Valley Fever don't usually get it again a second time. In rare instances where a person's immunity is weakened, such as in some older adults or with some underlying medical conditions, a person can have Valley Fever again. Overall however, people are protected from Valley Fever once they have been infected and recovered.

[Stephen Monroe] Is there a way people can tell if they've had it or not and if they're immune?

[Duc Vugia] There is a skin test that can show if a person has had Valley Fever in the past. This skin test may be commercially available soon.

[Stephen Monroe] Dr. Vugia, according to your paper, options for prevention are limited. Is a vaccine one of the few options?

[Duc Vugia] Options for preventing Valley Fever are indeed limited because the fungus exists widely in the soil in large areas and it is not possible to get rid of it in the soil. And there is no vaccine available yet. Some scientists have been working toward developing a Valley Fever vaccine. When a safe and effective vaccine is available, it would be a good option for preventing Valley Fever.

[Stephen Monroe] So without a vaccine are there any other strategies for prevention?

[Duc Vugia] Yes, the main precaution is to try to avoid breathing in dusty air in areas where Valley Fever is endemic. People living, working, or traveling in endemic areas can take some common sense precautions to decrease their risk of infection. For example, when it is windy outside and the air is dusty, stay indoors and keep windows and doors closed, or if driving, keep the car windows shut and use “recirculating” air conditioning. Before digging up dirt, wet the soil first to keep dust down.

In dusty situations, one can also consider wearing an N95 mask, that’s the letter N and the number 95. The N95 mask is also known as an N95 respirator. These masks can be bought in most hardware stores. However, they must be worn correctly to keep out dust; information on how to correctly use an N95 mask is available online.

[Stephen Monroe] Is there anything else that can be done to address the Valley Fever problem?

[Duc Vugia] Yes there is. The public should be more aware of Valley Fever, especially if they live, work, or travel in an endemic area. For people who think that they may have Valley Fever symptoms after being in an endemic area, they should see their doctors.

Doctors in and outside the endemic areas should also be more aware of this fungal disease and consider it in patients with compatible symptoms. Early diagnosis and appropriate clinical management are important for patients with Valley Fever. There are still many features about this infection that we don’t fully understand. We would like to know more so that we can address the Valley Fever problem better, so more research is needed.

[Stephen Monroe] Thank you, Dr. Vugia. I’ve been talking with Dr. Duc Vugia about his study, Coccidioidomycosis-associated Hospitalizations, California, USA, 2000-2011, which appears in the October 2013 issue of CDC’s journal, *Emerging Infectious Diseases*. The article is available at cdc.gov/eid.

If you’d like to comment on this podcast, send an email to eideditor@cdc.gov. I’m Dr. Stephen Monroe, for *Emerging Infectious Diseases*.

[Announcer] For the most accurate health information, visit www.cdc.gov or call 1-800-CDC-INFO.