

Is Climate Influencing *Cryptococcus gattii* on Vancouver Island?

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

[Sarah Gregory] Vancouver Island, Canada, reports the world's highest incidence of *Cryptococcus gattii* infection among humans and animals. Today, I'm talking with Dr. Christopher Uejio about his research on why this is occurring. Dr. Uejio is an assistant professor in the department of Geography and Program in Public Health at Florida State University. Welcome, Dr. Uejio.

[Chris Uejio] It's a pleasure to be here.

[Sarah Gregory] So tell me, what is *Cryptococcus gattii*?

[Christopher Uejio] *Cryptococcus gattii* is a fungus that can cause illness in humans and animals. Previously, the fungus was only found in the soil and on trees in specific tropical and sub-tropical areas of the world, but more recently it has emerged in temperate regions, such as British Columbia and the U.S. Pacific Northwest. In British Columbia, the fungus causes approximately 25 human illnesses and 4 deaths per year.

[Sarah Gregory] How do people get it? Can people get it from animals and vice versa?

[Christopher Uejio] People and animals living in areas with *Cryptococcus gattii* breathe in the microscopic fungus. People cannot contract the disease from infected people or animals.

[Sarah Gregory] What are the signs and symptoms of infection?

[Christopher Uejio] *C. gattii* usually infects the lungs or the central nervous system (the brain and the spinal cord), causing diseases like pneumonia and meningitis, but it can also affect other parts of the body. Infected people may experience symptoms like headaches, nausea, cough, weight loss, and difficulty breathing. People who are older, smoke, take medications that suppress the immune system, or have pre-existing health problems are more vulnerable to disease from *C. gattii*. The time between *C. gattii* exposure and experiencing symptoms can vary from as short as 1 month to as long as 3 years, which can make it difficult to correctly diagnose the infection. The diagnosis can be made by a laboratory testing for the cryptococcal antigen, X-ray of the lung, or examination of spinal fluid.

[Sarah Gregory] Why did you decide to do this study?

[Christopher Uejio] Vancouver Island reports the highest rates of new human and animal *C. gattii* cases in the world, so the goal of our study was to determine how climate influences the presence of the *C. gattii* in the environment. Some have suspected that international trade and travel inadvertently introduced a more potent type of *C. gattii* to the island, but genomic analysis to date has not supported this hypothesis. In fact, it appears that *C. gattii* has been present in the

Pacific Northwest for quite some time. Some researchers speculate that changing climate could have allowed *C. gattii* already present in the environment to emerge and expand. However, we don't know enough about *C. gattii* to hypothesize how it could be affected by climate change. The CDC's Climate and Health Program, led by Dr. George Luber, took the first step to build the appropriate evidence. We partnered with Dr. Karen Bartlett at the University of British Columbia, Sunny Mak at the British Columbia CDC, and the British Columbia Cryptococcal Working Group to study how weather systematically influenced *C. gattii* populations. These local experts compiled thousands of *C. gattii* samples from the soil, air, and on trees over multiple years.

[Sarah Gregory] So, please tell us about the study.

[Christopher Uejio] Sure. Our study produced fascinating results. Weather conditions influenced *C. gattii* concentrations differently in the soil compared to the air and on trees. In the soil, warmer temperatures decreased *C. gattii* populations. Wind may be a key process that transferred *C. gattii* from the soil into the air and onto trees. Air and tree samples contained higher *C. gattii* levels on sunny, compared to cloudy, periods.

Our study suggests that concentrations of *C. gattii* in the air are greatest on sunny days with moderately windy conditions during August through October. The greatest concentrations and risk for exposure to *C. gattii* in the soil is during relatively cool June and July summer days.

[Sarah Gregory] Why is Vancouver Island such a hotspot for it?

[Christopher Uejio] *C. gattii* prefers to live in specific ecological areas, and the climate and geography of Vancouver Island may provide just the right conditions for *C. gattii* to thrive. Specifically, it flourishes in the island's southeastern portion, which is in the rain shadow, that is, the downwind side, of the Vancouver Island Mountain Range. This "goldilocks" temperature zone for *C. gattii* is not too cold, with winter temperatures that remain above freezing, and not too hot, with mild summer temperatures.

[Sarah Gregory] How can people protect themselves from getting infected?

[Christopher Uejio] There are no formal recommendations to prevent *C. gattii* infections, since the organism can be found in soil and air. However, it is important to know that the disease from *C. gattii* infection is rare, and that most people breathe in small amounts of many fungi every day, but do not develop symptoms of infection. *C. gattii* infections can be treated with antifungal medications. Clinicians evaluating patients with suspected pneumonia or meningitis might consider asking about whether they lived in or have visited Southeastern Vancouver Island, particularly during August through October, when concentrations of *C. gattii* in air are highest. Clinicians should be aware that *C. gattii* is present in parts of Washington, Oregon, and California.

Thank you, Dr. Uejio, for joining me today. I've been talking with Dr. Christopher Uejio about his November 2015 article, Climatic Influences on *Cryptococcus gattii* Populations, Vancouver Island, Canada, 2002–2004. You can read the entire article online at cdc.gov/eid.

I'm Sarah Gregory for *Emerging Infectious Diseases*.

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