

DATE: Dec. 30, 2024

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Marshfield Clinic Research Institute led lab testing for investigation into the largest known U.S. blastomycosis outbreak at Michigan paper mill

2022-23 outbreak at Escanaba mill sickened 162 people, led to one death

MARSHFIELD, WI – Marshfield Clinic Research Institute tested nearly 500 environmental samples during the multi-state, multi-agency investigation into the largest known blastomycosis outbreak in the United States, which sickened workers at an Escanaba, Michigan paper mill and resulted in one death.

In March 2023, a cluster of atypical pneumonia cases, many of which were attributed to mill workers at the Billerud paper mill in Escanaba, was reported to the local health department. Investigators from the Centers for Disease Control and Prevention’s (CDC) National Institute for Occupational Safety and Health (NIOSH), working with public health partners, facilitated blastomycosis case-finding through a medical survey and conducted an environmental assessment. A survey of 645 mill workers showed that 162 people (25%) were identified with blastomycosis between Nov. 1, 2022, and May 15, 2023, according to a study [published online Dec. 30 in the CDC's weekly Morbidity and Mortality Weekly Report](#). Overall, an estimated 20% of workers at the paper mill in Michigan tested positive for blastomycosis.

Blastomycosis is a rare infectious disease caused by inhalation of *Blastomyces* fungal spores from the environment. *Blastomyces* is found in moist soil or decaying wood and leaves, often near rivers and lakes. Blastomycosis incubates over a two-week to three-month period and pulmonary illness is most common, ranging from mild, respiratory symptoms to severe, potentially fatal pneumonia.

Blastomycosis is an endemic and reportable disease in Michigan with 186 cases reported between 2007-2017. Blastomycosis does not spread from person to person.

Jennifer Meece, Ph.D., is the executive director of Marshfield Clinic Research Institute and has researched blastomycosis for more than 20 years, investigating outbreaks throughout the Midwest. She said it’s critical to launch a comprehensive investigation as soon as possible when clusters of potential blastomycosis cases are reported.

“Blastomycosis is difficult to diagnose because its symptoms often mimic other respiratory illnesses, like pneumonia, making it hard to distinguish clinically,” Meece said. “Diagnosis

requires seeing the fungus in tissue samples through a culture or microscope. It's important for patients to begin treatment with antifungal medication as soon as possible, and to attempt to find the source of the exposure to prevent others from inhaling the spores."

Digging into the cause of the outbreak

In addition to being the largest blastomycosis outbreak ever reported in the U.S., this was the first associated with a paper mill or other industrial worksite. The mill's location along a riverway in a wooded environment is consistent with *Blastomyces* habitat. *Blastomyces* typically does not propagate indoors; the spores potentially entered the building through unfiltered ventilation systems, open doors, and caused the exposure over several months.

Meece and her team of researchers were asked to join the Escanaba outbreak investigation based on their past experience researching public health outbreaks. Their previous blastomycosis work included looking at people who [have certain racial and ethnic backgrounds and may need more aggressive treatment and closer monitoring](#).

Marshfield Clinic Research Institute and the Wisconsin State Laboratory of Hygiene analyzed environmental samples for *Blastomyces* by polymerase chain reaction (PCR) and culture for identification. Environmental samples collected included soil, wood chips, indoor surface dust, and water, dust, duct lining and filters from HVAC systems. Among 533 indoor and outdoor samples analyzed, no *Blastomyces* was detected and the specific environmental factors in or around the mill that led to this outbreak remain unknown.

"This was not an unexpected outcome as *Blastomyces* is an elusive organism," Meece said. "It is rare, if not unheard of, that the exact source of a blastomycosis outbreak has ever been detected in the environment."

More education can lead to quicker public health response

While many people who recreate in areas where blastomycosis is endemic are aware of the disease, this first-time outbreak at an industrial business opens new potential risks for exposure. Health care providers and public health authorities should consider work-related exposure to *Blastomyces* to detect future outbreaks and implement public health interventions quickly. Industries with workers who routinely work outdoors in the midwestern and southeastern United States should consider providing worker training and education to enhance awareness of *Blastomyces*.

For more information on fungal diseases, visit <https://www.cdc.gov/fungal/index.html>.

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