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CDC Health Advisory

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**Melioidosis Locally Endemic in Areas of the Mississippi Gulf Coast after
Burkholderia pseudomallei Isolated in Soil and Water and Linked to Two
Cases – Mississippi, 2020 and 2022**

Summary

The Centers for Disease Control and Prevention (CDC) identified the bacterium *Burkholderia pseudomallei* (*B. pseudomallei*) for the first time in the environment in the continental United States. This bacterium causes a rare and serious disease called melioidosis. *B. pseudomallei* was identified through environmental sampling of soil and water in the Gulf Coast region of southern Mississippi during an investigation of two human melioidosis cases.

It is unclear how long the bacterium has been in the environment prior to 2020 or how widespread the bacterium is in the continental United States; modeling suggests that the environmental conditions found in the Gulf Coast states are conducive to the growth of *B. pseudomallei* [1]. Extensive environmental sampling is needed to answer these questions.

This Health Alert Network (HAN) Health Advisory serves to alert clinicians and public health officials throughout the country to consider melioidosis in patients whose clinical presentation is compatible with signs and symptoms of the disease, regardless of travel history to international disease-endemic regions, as melioidosis is now considered to be locally endemic in areas of the Gulf Coast region of Mississippi.

Background

The two melioidosis patients that led to this discovery were unrelated to each other but lived in close geographical proximity to each other in the Gulf Coast region of southern Mississippi. Both had no recent travel outside of the United States. They were diagnosed with melioidosis two years apart in July 2020 and May 2022. Genomic sequencing data revealed the two patients were infected by the same novel strain from the Western Hemisphere. Both patients were hospitalized with sepsis due to pneumonia and had known risk factors for melioidosis. Blood cultures were positive for *B. pseudomallei*, and both patients recovered following appropriate antibiotic therapy.

With permission from both patients, in June 2022, the Mississippi State Department of Health and CDC collected environmental samples (soil, water, plant matter) from the patients' properties and nearby areas they frequented and household products. Three of the samples taken from soil and water from the property of the 2020 patient tested positive at CDC for *B. pseudomallei* by polymerase chain reaction (PCR) and culture. *B. pseudomallei* isolates from both patients and the environmental samples were all genetically similar and were distinct from previous known isolates, indicating bacteria from the

environment was the likely source of infection for both patients and has been present in the area since at least 2020.

Burkholderia pseudomallei is a gram-negative bacterium and [Tier 1 Select Agent](#) that typically lives in soil and water in regions with tropical and subtropical climates around the world, such as South and Southeast Asia, northern Australia, parts of Central and South America, the U.S. Virgin Islands, and Puerto Rico. It can infect both animals and humans through direct contact with non-intact skin (such as cuts or wounds) or mucous membranes, inhalation, or ingestion. *B. pseudomallei* is not considered to be transmissible via respiratory droplets in non-laboratory settings. The risk of spread from person to person is considered extremely low as there are few documented cases of person-to-person transmission; contact between damaged (non-intact) skin and contaminated soil or water is the most frequent route for natural infection. For the majority of cases, symptoms occur 1-21 days from exposure, with an average of 7 days; with a high inoculum, symptoms can develop in a few hours. In about 5% of cases, symptoms can develop from latent-activated infections well past this 21-day window, months to years later [2].

Among the average of 12 melioidosis cases reported to CDC each year, most have occurred in people with recent travel to a country where *B. pseudomallei* is known to be endemic. In the United States, a few cases of melioidosis may have been due to contact with contaminated commercial products imported from disease-endemic countries. This occurred in 2021 when a cluster of four cases in four states were linked to an imported contaminated [aromatherapy spray](#) [3].

Melioidosis may present as a localized infection, pneumonia, bacteremia, or disseminated infection and can infect any organ, including the brain. Melioidosis symptoms are nonspecific and vary depending on the type and site of infection. [Symptoms](#) may include fever, localized pain or swelling, ulceration, abscess, cough, chest pain, respiratory distress, weight loss, abdominal discomfort, muscle or joint pain, disorientation, headache, and seizures. Patients generally present with acute illness, but about 9% present with chronic infection, with symptoms lasting over two months. Chronic melioidosis cases often mimic tuberculosis clinically [4].

In regions where melioidosis is highly endemic, such as Thailand and Northern Australia, most healthy people who come into contact with *B. pseudomallei* never develop melioidosis [5-6]. People with certain conditions are at higher risk of disease when they are exposed to the bacteria. The most common underlying conditions that make a person more likely to become sick with or die from melioidosis include diabetes, excessive alcohol use, chronic lung disease, chronic kidney disease, and immunosuppressive conditions. Worldwide, 10-50% of melioidosis cases result in death [7].

Prompt diagnosis and treatment are critical. Melioidosis is confirmed by culture. Testing must be conducted by trained personnel because some automated identification methods in clinical laboratories may misidentify *B. pseudomallei* as a different bacterium (see recommendations for laboratorians). Treatment of melioidosis requires long-term antibiotic therapy (acute phase followed by eradication phase). Healthcare personnel are generally not at risk if they follow [standard precautions](#). However, laboratory personnel are at increased risk because some lab procedures may aerosolize particles and release *B. pseudomallei* into the air.

Once well-established in the soil, *B. pseudomallei* cannot feasibly be removed from the soil. Public health efforts should focus primarily on improving identification of cases so that appropriate treatment can be administered. Melioidosis is now a Nationally Notifiable Disease following a favorable vote at the 2022 CSTE conference which should enhance domestic surveillance and public health response.

Recommendations

Recommendations for Clinicians

- Learn about melioidosis and be aware of the potential for more cases as CDC and state partners continue investigating the potential geographic spread of *B. pseudomallei*.
- Consider melioidosis in patients with a [compatible illness](#) who reside in or have traveled to the Gulf Coast region of the southern United States or areas where *B. pseudomallei* has historically been endemic, especially in patients who:
 - have risk factors, such as diabetes, excessive alcohol use, chronic lung disease, or immunosuppressive conditions
 - report any occupational or recreational activities involving the handling of soil, like gardening, agriculture, or construction work
 - have had recent contact with fresh water, such as swimming or fishing in lakes, ponds, or rivers.
- Report melioidosis cases to state and local health departments.
- When ordering specimen cultures to diagnose melioidosis, advise the laboratory that cultures may grow *B. pseudomallei* and that the laboratory personnel should follow all [laboratory safety precautions](#).
- Collect specimens for culture, guided by clinical syndrome from all relevant sites of infection. Culture of *B. pseudomallei* from any clinical specimen is considered diagnostic for melioidosis. Depending on the site(s) of suspected infection, recommended specimens for collection might include blood, sputum, urine, purulent exudate (from skin or internal abscesses), synovial fluid, peritoneal fluid, pericardial fluid, or cerebrospinal fluid. Throat and rectal swabs can also be collected.
- Consultation with infectious disease specialists is strongly recommended. [Treat](#) melioidosis with IV antibiotics (e.g., ceftazidime, meropenem) for at least two weeks. Depending on the response to therapy, IV treatment may be extended for up to eight weeks. Intravenous treatment is followed by oral trimethoprim-sulfamethoxazole (TMP/SMX) for three to six months to prevent relapse. Amoxicillin/clavulanic acid can be used in individuals who are unable to receive TMP/SMX [8-10].
- For clinicians with clinical inquiries, contact your state health department if you have any questions or suspect a patient may be infected with *B. pseudomallei*.

Recommendations for Laboratorians

- Laboratory automated identification algorithms (e.g., MALDI-TOF, 16s, VITEK-2) may misidentify *B. pseudomallei* as another bacterium. Consider re-evaluating patients with isolates identified on automated systems as Burkholderia spp. (specifically *B. cepacia* and *B. thailandensis*), *Chromobacterium violaceum*, *Ochrobactrum anthropic*, and, possibly, *Pseudomonas spp.*, *Acinetobacter spp.*, and *Aeromonas spp.*
- If *B. pseudomallei* is identified or an organism is suspicious for *B. pseudomallei*, contact your state or local public health department immediately. The health department should facilitate forwarding the isolate for confirmation to the closest state laboratory or a Laboratory Response Network (LRN) laboratory. State lab/LRN can facilitate sending presumptive positives to CDC for confirmation as needed.
- If an isolate is confirmed as *B. pseudomallei*, the state lab/LRN should forward the isolate to CDC for whole genome sequencing. Once isolates have been confirmed as *B. pseudomallei*, select agent regulations will apply.

- Laboratory personnel can reduce their risk of exposure by following good laboratory practices. Laboratory staff who may have been exposed to *B. pseudomallei* should refer to CDC guidance.
- For laboratorians with clinical inquiries, contact your state health department if you have any questions or suspect a patient may be infected with *B. pseudomallei*

For More Information

- General information on [melioidosis](#)
- For urgent or technical clinical questions, contact CDC's Bacterial Special Pathogens Branch at bspb@cdc.gov or 404-639-1711 or call the CDC 24/7 Emergency Operations Center at 770-488- 7100
- [How to submit samples to CDC for melioidosis testing](#)

References

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8. Sullivan, R.P. et al. 2020 Review and revision of the 2015 Darwin melioidosis treatment guideline; paradigm drift not shift. PLoS Negl Trop Dis 14,9 e0008659. 28 Sep. 2020,
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10. Lipsitz, R., et al. Workshop on treatment of and postexposure prophylaxis for Burkholderia pseudomallei and B. mallei infection, 2010. Emerg Infectious Dis 18,12 (2012): e2.

DHEC contact information for reportable diseases and reporting requirements

Reporting of **Melioidosis** is consistent with South Carolina Law requiring the reporting of diseases and conditions to your state or local public health department. (State Law # 44-29-10 and Regulation # 61-20) as per the DHEC 2022 List of Reportable Conditions available at:

<https://www.scdhec.gov/sites/default/files/Library/CR-009025.pdf>

Federal HIPAA legislation allows disclosure of protected health information, without consent of the individual, to public health authorities to collect and receive such information for the purpose of preventing or controlling disease. (HIPAA 45 CFR §164.512).

Regional Public Health Offices – 2022			
Mail or call reports to the Epidemiology Office in each Public Health Region			
MAIL TO:			
Lowcountry 4050 Bridge View Drive, Suite 600 N. Charleston, SC 29405 Fax: (843) 953-0051	Midlands 2000 Hampton Street Columbia, SC 29204 Fax: (803) 576-2993	Pee Dee 1931 Industrial Park Road Conway, SC 29526 Fax: (843) 915-6506	Upstate 352 Halton Road Greenville, SC 29607 Fax: (864) 282-4373
CALL TO:			
Lowcountry Allendale, Bamberg, Beaufort, Berkeley, Calhoun, Charleston, Colleton, Dorchester, Hampton, Jasper, Orangeburg Office: (843) 441-1091 Nights/Weekends: (843) 441-1091	Midlands Aiken, Barnwell, Chester, Edgefield, Fairfield, Kershaw, Lancaster, Lexington, Newberry, Richland, Saluda, York Office: (888) 801-1046 Nights/Weekends: (888) 801-1046	Pee Dee Clarendon, Chesterfield, Darlington, Dillon, Florence, Georgetown, Horry, Lee, Marion, Marlboro, Sumter, Williamsburg Office: (843) 915-8886 Nights/Weekends: (843) 409-0695	Upstate Abbeville, Anderson, Cherokee, Greenville, Greenwood, Laurens, McCormick, Oconee, Pickens, Spartanburg, Union Office: (864) 372-3133 Nights/Weekends: (864) 423-6648
For information on reportable conditions, see https://www.scdhec.gov/ReportableConditions		DHEC Bureau of Communicable Disease Prevention & Control Division of Acute Disease Epidemiology 2100 Bull St • Columbia, SC 29201 Phone: (803) 898-0861 • Fax: (803) 898-0897 Nights / Weekends: 1-888-847-0902	

Categories of Health Alert messages:

Health Alert	Conveys the highest level of importance; warrants immediate action or attention.
Health Advisory	Provides important information for a specific incident or situation; may not require immediate action.
Health Update	Provides updated information regarding an incident or situation; unlikely to require immediate action.
Info Service	Provides general information that is not necessarily considered to be of an emergent nature.