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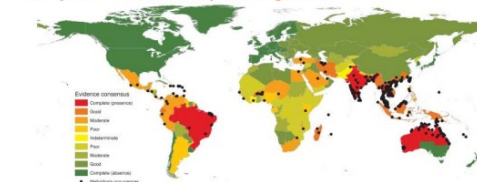
Melioidosis

Melioidosis, also called Whitmore's disease after pathologist Alfred Whitmore, is caused by the gram-negative bacteria *Burkholderia pseudomallei*. Melioidosis is a public health concern due to the potential severity of disease, the need for post-exposure management in healthcare and laboratory personnel, and the potential for use as an agent of bioterrorism.

Background

Melioidosis was first described in 1912 in present-day Myanmar; *Burkholderia pseudomallei* was so named due to its similarity to *B. mallei* – the causative agent of glanders in horses. Both *B. pseudomallei* and *B. mallei* are zoonotic pathogens, although human infection with *B. mallei* is rare. *B. pseudomallei* is an environmental pathogen, living in soil and water in endemic areas – primarily south Asia and northern Australia.

Melioidosis is caused by the environmental gram-negative bacterium *Burkholderia pseudomallei* found in tropical and sub-tropical regions



Global evidence consensus and geographic locations of melioidosis occurrence data from 1910 to 2014
Source: Limmahattakul, C., et al., Predicted global distribution of *Burkholderia pseudomallei* and burden of melioidosis. *Nature Microbiology*, 2016, 1(1): p. 15008.
https://emergency.cdc.gov/coca/ppt/2022/101322_slides.pdf

Melioidosis

Infection in both humans and animals is mainly associated with direct contact with contaminated soil or surface water in endemic areas. Human-to-human transmission occurs rarely; laboratory exposure is a risk. Melioidosis presents in four general clinical forms: localized infection, generally as an ulcer, nodule, or skin abscess, pulmonary infection, bloodstream infection, or disseminated infection. Abscesses in the liver, lung, spleen, and prostate are often observed in patients diagnosed with disseminated infections. Less frequently, brain abscesses may be seen. Latent reactivation infection can occur months to years after primary exposure.

Diabetes is a major risk factor for melioidosis; other underlying medical conditions may also increase the risk of disease.



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Treatment depends on the type of infection (localized, pulmonary, bacteremic, or disseminated.) *Burkholderia* is intrinsically resistant to many antibiotics, so correct choice of treatment regimen is essential. In general, *Burkholderia* is susceptible to beta-lactams, carbapenems, trimethoprim-sulfamethoxazole, and doxycycline. Consultation with infectious disease specialists is strongly recommended. Microbial treatment generally starts with intravenous therapy for 10-14 days (acute phase), followed by 3-6 months of oral therapy (eradication phase). Relapses can occur with incomplete treatment, especially antibiotic treatment for less than 3 months.

If melioidosis is suspected based on clinical and exposure history, confirmatory laboratory testing should be performed. *Burkholderia* can be isolated from blood, urine, sputum, wound swabs, and other tissues or fluids. Infection can also be diagnosed through DNA detection or through paired acute and convalescent serology; however, PCR has low sensitivity. The organism presents a risk to laboratory workers handling specimens or cultures. Appropriate biosafety precautions should be taken to avoid occupational exposure and resulting follow-up.

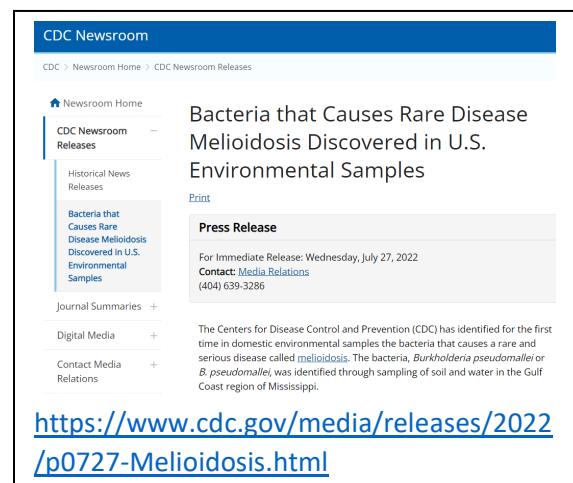
Changing Epidemiology

The majority of cases are reported from south Asia and northern Australia. Although the global burden of melioidosis is underestimated, studies suggest that worldwide, the annual number of deaths from melioidosis is similar to measles. There are >150,000 human cases estimated to occur each year globally of which over half will be fatal due in part to inadequate treatment.

In this country the risk is highest for adventure travelers, ecotourists, military personnel, construction and resource extraction workers, agricultural workers, and other people whose contact with contaminated soil or water may expose them to the bacteria; infections have been reported in people who have spent less than a week in an endemic area. Cases, especially presenting as pneumonias, are often associated with periods of high rainfall such as during typhoons or the monsoon season.

In addition, recent changes in the described epidemiology of melioidosis have led to recognition of new exposure risks. In 2019, a Maryland resident tested positive for *B. pseudomallei* following exposure to a home freshwater aquarium stocked with fish and aquatic plants from South Asia. In 2021, CDC confirmed four linked cases of melioidosis, including two deaths. This multistate outbreak was traced back to aromatherapy spray imported from India. During the investigation, a pet raccoon that died following exposure to the product was also linked to the outbreak. In 2020 and 2022, two patients living in close proximity in the Gulf Coast region of southern Mississippi were diagnosed with melioidosis. Subsequently collected environmental samples documented presence of *B. pseudomallei* endemic in the United States for the first time.

In Washington State, only four cases of melioidosis have been reported in the past decade. Detailed travel histories indicated that these cases had likely exposures in Vietnam, Thailand, Malaysia, and Mexico, consistent with known endemic areas. However, given newly described routes of exposure and locations of exposure, clinicians and public health practitioners should remain vigilant and promptly report suspected or confirmed melioidosis cases to public health.



Resources

Washington State Department of Health guideline

<https://doh.wa.gov/sites/default/files/legacy/Documents/5100/420-216-Guideline-Burkholderia.pdf?uid=63e2c849b7263>

CDC resources

Travel guide (Yellow Book)

<https://wwwnc.cdc.gov/travel/yellowbook/2020/travel-related-infectious-diseases/melioidosis>

Outbreak from a commercial spray

<https://www.cdc.gov/melioidosis/outbreak/2021/index.html>

Animal case from a commercial spray

<https://www.cdc.gov/mmwr/volumes/71/wr/mm7150a5.htm>

Exposure through home aquarium water

https://wwwnc.cdc.gov/eid/article/27/12/21-1756_article

Mississippi environmental sample

<https://www.cdc.gov/media/releases/2022/p0727-Melioidosis.html>

Presentation for clinicians

https://emergency.cdc.gov/coca/calls/2022/callinfo_101322.asp

Mahidol Oxford Tropical Medicine Research Unit (MORU)

<https://www.melioidosis.info/infobox.aspx?pageID=101>

Outbreak from a commercial spray – outbreak report

<https://www.nejm.org/doi/10.1056/NEJMoa2116130>