Meeting Report

Melioidosis is in the Americas: A Call to Action for Diagnosing and Treating the Disease

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Abstract. Melioidosis, a disease caused by the pathogen *Burkholderia pseudomallei*, is a significant underreported endemic disease found in tropical countries worldwide. Recent studies have demonstrated that human melioidosis cases have been increasingly recognized in the Americas. Therefore, the first Scientific Reunion of Melioidosis in the Americas was organized in Colombia, with the participation of health authorities of 11 Latin American countries and the United States. This report summarizes the topics reviewed during the meeting, including how to identify human infections and properly diagnose them, with the goal of increasing recognition of the disease in the Americas.

Awareness of melioidosis has been enhanced lately through demonstration that the causative agent of the disease, *Burkholderia pseudomallei*, is distributed in tropical areas around the world and by the increasing number of human cases reported worldwide because of better surveillance and reliable diagnosis by trained laboratory personnel.^{1,2} Unfortunately, melioidosis remains a significantly under-recognized and underreported disease, with manifestations ranging from acute sepsis and pneumonia to chronic infection.¹ More than half of all patients present with bacteremia, resulting in clinical manifestations involving virtually any site, and close to a quarter of these patients can also develop septic shock. Even if the disease is diagnosed rapidly, treatment requires initial intravenous antibiotic therapy, followed by eradication via oral treatment of a minimum of 3 months.¹ Failure to adhere to this treatment results in relapse, and in places where antibiotic treatment is not readily available, mortality may be up to 50%.³

In highly endemic areas, such as Southeast Asia and Northern Australia,² awareness of melioidosis and campaigns to prevent infection are underway. However, in other parts of the world where the disease has been shown to be endemic, very little is currently being done. Several countries in the Americas can be included in this category because the sociodemographic, ecological, and environmental conditions are similar to those in areas known to be endemic for melioidosis.² Although melioidosis cases have been diagnosed in Mexico, Central and South America, and the Caribbean Islands,^{4–6} and the disease has been reported to be endemic in Brazil and Puerto Rico,^{7,8} very little is currently being done to increase awareness and to determine the epidemiological impact of the disease in this region.

Recent epidemiological studies in Colombia coordinated by the Centers for Disease Control and Prevention (CDC) and the Training Programs in Epidemiology and Public Health Interventions Network (TEPHINET), in collaboration with the National Institutes of Health-Colombia, Clinic León XIII, Hospital Pablo Tobón Uribe, and University El Bosque, have demonstrated that melioidosis cases are distributed throughout Colombia. Despite its cause of severe community-acquired

pneumonia, cases are underreported (data not shown). Because of this study, and based on conversations with local and international experts, it was decided to organize the first Scientific Reunion of Melioidosis in the Americas in Bogotá, Colombia, from April 13–14, 2018.

The first melioidosis meeting in Latin America included health professionals from Brazil, Colombia, the Dominican Republic, Ecuador, Haiti, Panama, Paraguay, Peru, Puerto Rico, Trinidad and Tobago, the West Indies, and the United States. The goals were to provide information about the disease and identify viable ways to investigate, diagnose, and treat infections in the Americas. The first talk was presented by Dr. Alfredo Torres, from the University of Texas Medical Branch, Galveston, TX, who discussed the history of the disease in the Americas and presented a model that can be used to establish a melioidosis network in the region. The talk was followed by a presentation by Dr. David Blaney (CDC, Atlanta, GA), who described clinical aspects of human melioidosis, including diagnosis. Next, Mindy Elrod (CDC) presented a detailed description of how laboratory personnel can identify *B. pseudomallei*, including tests to confirm the presence of the pathogen in different types of specimens. Subsequently, Carina Hall (Northern Arizona University, Flagstaff, AZ) discussed the methodology used to sample and detect *B. pseudomallei* from the environment, and described the strategy used in Puerto Rico to confirm the presence of the pathogen in soil on the north part of the island. Next, Dr. Jay Gee (CDC) summarized the analysis of *B. pseudomallei* genomes isolated from human cases, animals, and the environment in diverse areas of the Americas, and demonstrated that genomic analysis has the power in many cases to resolve phylogeography of isolates. Dr. David Aucoin (University of Nevada, Reno, NV) discussed the value of using a lateral flow immunoassay to detect *B. pseudomallei* in different clinical specimens, with awareness of different levels of specificity and sensitivity. Finally, Dr. Herbert Schweizer (University of Florida, Gainesville, FL) summarized the best antimicrobial therapies to treat melioidosis and instructed the audience about antibiotic resistance mechanisms.

After the first day of general concepts dealing with history, detection, identification, symptoms, genetic analysis, environmental sampling, antibiotic resistance, and treatment, the second day of the reunion focused on presentations on confirmed melioidosis cases in different Latin American countries.

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The first speaker was Dr. Dionne Rolim (University of Fortaleza, Fortaleza, Brazil) who discussed the strategies that have been taken to confirm multiple cases of melioidosis in the Brazilian state of Ceará, in the Northeast region of Brazil.⁷ The presentation described the epidemiological investigation of the disease and the laboratory confirmation of the first cases, which triggered a change in policies in Ceará to make melioidosis a reportable disease.^{9,10} Further, she described activities to educate the community, medical personnel, and students regarding how to prevent, diagnose, and treat the disease. The second talk was by Dr. Ronnie Gavilan from the National Institutes of Health, Peru, who described the epidemiological investigation associated with the first reported melioidosis case in a resort area in the north of this country; sequence analysis of the isolate indicated that it clustered with other *B. pseudomallei* isolates recovered in the Americas. Next, Dr. Franco Montufar (León XIII Clinic of Antioquia University, Medellín, Colombia) presented a series of melioidosis cases reported in the northern part of Colombia.¹¹ A summary of recent findings from the epidemiological investigation sponsored by CDC indicated that cases are distributed throughout Colombia and that there is a need to train medical personnel to perform accurate diagnosis and identification, particularly in those patients presenting with severe respiratory infections or bacteremia. Finally, Dr. Bernard Christenson (San Pablo Medical Center, Bayamón, Puerto Rico) and Dr. David Blaney (CDC) presented the status of melioidosis in Puerto Rico. Dr. Christenson presented the clinical history of the first case of melioidosis reported on the island.^{12,13} Dr. Blaney summarized the epidemiological study that led to the declaration that melioidosis is an endemic disease in Puerto Rico^{8,14} and presented on efforts to closely monitor the emergence of cases on the island after devastation by hurricane Maria in 2017.

The meeting ended with a panel discussion coordinated by Dr. Blaney and Dr. Torres. Participants expressed concerns regarding the challenges of including melioidosis in their country's panels of reportable diseases, discussed common strategies that can be implemented in the region, and considered establishment of a regional network. Finally, CDC distributed printed material in Spanish that provided a summary of the disease, the predicted distribution within the Americas, and information about identification, diagnosis, and treatment. The success of this regional reunion relied on the ability of TEPHINET and the CDC to bring representatives of multiple countries together and trigger an interest in melioidosis among the participants. The experiences of the participating experts provide a path for other countries to identify and start reporting the disease in their countries, elevating recognition that melioidosis is a global health problem and an under-recognized neglected tropical disease in the Americas.

Received May 16, 2018. Accepted for publication May 24, 2018.

Published online July 16, 2018.

Acknowledgments: The authors are thankful for the support of CDC to organize this meeting and the logistical operation of TEPHINET to contact participants and support all the activities associated with this meeting.

Financial support: This work was supported by UTMB Institute for Human Infections and Immunity seed grant awarded to AGT.

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