Open Forum Infectious Diseases

EDITORIAL COMMENTARY

What's in Your Community?—Rethinking "CAP"

George R. Thompson III[1,2] **and Arash Heidari**[3]

[1]Division of Infectious Diseases, Department of Internal Medicine, University of California-Davis Medical Center, Sacramento, California, USA, [2]Department of Medical Microbiology and Immunology, University of California-Davis Medical Center, Sacramento, California, USA, and [3]Division of Infectious Diseases, Department of Internal Medicine, Kern Medical-UCLA, Bakersfield, California, USA

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Coccidioidomycosis is an invasive fungal disease caused by *Coccidioides immitis* and *C. posadasii* that is prevalent throughout parts of Arizona, California, and other regions within the Western hemisphere. Infection is acquired via inhalation of soil-dwelling arthroconidia (spores), with resultant respiratory symptoms being common. Presenting manifestations of infection include fever, chills, night sweats, weight loss, cough, fatigue, and joint pain (eg, "Valley Fever"). These nonspecific symptoms are similar to other respiratory illnesses and may be easily mistaken as viral or bacterial etiologies.

Coccidioidomycosis is frequently misdiagnosed as a viral or bacterial respiratory illness despite the availability of accurate diagnostic testing for this disease. However, testing is not frequently ordered, or this diagnosis considered during the initial evaluation of these patients due primarily to gaps in provider and patient education on the epidemiology, the most frequent presenting symptoms, and which diagnostics are indicated.

In this issue of *Open Forum Infectious Diseases*, Pu et al. report the results of educational initiatives within Phoenix and Tucson, Arizona, urgent care centers. These centers are staffed by nurse practitioners (49%), physician assistants (39%), and physicians (13%). The implementation included providing information on coccidioidomycosis clinical practice to newly hired clinicians and a quarterly refresher to new hires and was optional to established urgent care providers. Reminder emails were also sent to all providers. This educational strategy resulted in a significant increase in the overall number of ordered coccidioidal diagnostic tests (a ~3-fold increase in testing) and an increase in testing for coccidioidomycosis on a patient's first visit for associated symptoms. Those with International Classification of Diseases–10th Revision codes for pneumonia and/or erythema nodosum were most frequently associated with positive coccidioidomycosis test results. Overall, coccidioidomycosis accounted for 17.3%–26% of all pneumonia cases during the observed period.

This data are encouraging and illustrate the importance of education in the recognition of coccidioidomycosis as the preceding knowledge gaps are likely broad and multifactorial. Curricula in medical schools and physician assistant and nurse practitioner programs are stretched and already overwhelmed by the breadth of diagnoses encountered during clinical practice. The approach to the education of these pathogens also may play a role in clinicians' retention of these diagnoses as they are frequently taught as rare, obscure, and unlikely to be encountered. These unconscious views of endemic mycoses thus result in underdiagnoses, impacting patient care and epidemiologic attempts to fully understand the scope of this disease. For example, current data trends have shown a progressive increase in coccidioidomycosis cases over the last 20 years, yet only 20 003 cases were reported to the Centers for Disease Control and Prevention in 2019 [1]. However, the true incidence is thought to be ~650 000 cases/year in the United States, illustrating significant shortfalls in both diagnosis and reporting [2]. This suggests that awareness of the disease remains the primary roadblock, in addition to a lack of concerted efforts by state health departments to report endemic mycoses.

Broadened educational efforts are needed to aid in the recognition of coccidioidomycosis cases. As curricula are often driven by national guidelines, these should be an obvious area to focus improvement efforts. Widespread familiarity with current American Thoracic Society/Infectious Diseases Society of America (ATS/IDSA) Community-Acquired Pneumonia Guidelines prompts many practitioners to prescribe antibiotic therapy for those

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Correspondence: G. R. Thompson, MD, FIDSA, Department of Medicine, Division of Infectious Diseases, Department of Medical Microbiology and Immunology, UC-Davis Medical Center, 4150 V Street; Suite G500, Sacramento, CA 95817 (grthompson@ucdavis.edu).

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with a compatible respiratory illness. These guidelines are a significant educational and practical resource, yet they still neglect the endemic mycoses despite their acquisition in the community setting and the presence of one of the endemic mycoses within most regions of the United States [3]. Within highly endemic regions, coccidioidomycosis accounts for 17%–29% of all cases of community-onset pneumonia, yet these US-focused guidelines are silent on the necessity of obtaining a travel history or testing and treatment of the endemic mycoses, missing a crucial opportunity to provide education, guidance, and recommendations to the broad clinical workforce.

Focused recommendations for those with high-risk features, such as residence or history of travel to a highly endemic region or suggestive clinical, examination, or laboratory findings (eg, erythema nodosum and/or eosinophilia in cases of acute pulmonary coccidioidomycosis), would help avoid diagnostic and treatment delays, thus decreasing the costs of clinical care and inappropriate antibiotic use. Further recommendations for patients diagnosed with community-acquired pneumonia who fail to improve after an initial course of antibiotics would also be a valuable addition to current guidelines and may potentially reduce the time to diagnosis and avoid inappropriate second or even third courses of antibiotics.

While we await needed updates to national guidelines, we must strive to continue educational efforts. We need to keep in mind that the frequent travel and movement of patients across the country compound the number of potential pathogen exposures. This emphasizes the need for reflection before uniformly applying community-acquired pneumonia guidelines to all patients. Those traveling from or residing within a region endemic for fungal infections should be tested and treated accordingly—reminding us "what's in our community."

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