Coccidioidomycosis

Investigative Guidelines

December 2015

1. DISEASE REPORTING

1.1 Purpose of Reporting and Surveillance

1. To identify potential outbreaks and to mitigate future transmission.
2. To identify environmental foci of *Coccidioides* spp. in Oregon.
3. To reduce the risk of acquisition of coccidioidomycosis from the environment in Oregon.

1.2 Laboratory and Physician Reporting Requirements

Laboratories and physicians are required to report within one working day of identification or diagnosis. Clinical laboratories are required to forward all *Coccidioides* spp. isolates to the Oregon State Public Health Laboratory (OSPHL). Please see Section 3.3 of this Investigative Guideline for additional specimen submission instructions.

1.3 Local Health Department Reporting and Follow-Up Responsibilities

1. Report all confirmed and presumptive (but not suspect) cases (see definitions below) to the Oregon Public Health Division (OPHD) by the end of the calendar week of initial physician or lab report. See §3 for case definitions.
2. Investigate all reported cases. Report using the coccidioidomycosis case investigation form or Orpheus, the electronic equivalent.
3. For recognized outbreaks, complete the appropriate investigation summary form in consultation with the assigned Acute and Communicable Disease Prevention (ACDP) epidemiologist when the investigation is (reasonably) complete.

2. THE DISEASE AND ITS EPIDEMIOLOGY

2.1 Etiologic Agent

Coccidioidomycosis, also called “valley fever,” was first described by Wernicke and Posadas in 1892 in South America, in an Argentinean soldier with predominantly cutaneous manifestations. In 1894, a patient with disseminated coccidioidomycosis was reported in the San Joaquin valley of California. Coccidioidomycosis is an infection caused by the fungus *Coccidioides*. Two species of *Coccidioides* are recognized: *C. immitis* and *C. posadasii*, both of which can infect humans. *Coccidioides* is a dimorphic fungus endemic to the soil in the southwestern United States. In 2011 it was isolated from the soil in southeastern Washington State. In soil, it grows as a saprophyte with hyphae

and production of spores called arthroconidia. The spores are stable and can survive in dry conditions for many years. When inhaled, the spores lodge in the terminal bronchioles and remodel into spherules, each of which then produce up to 300 endospores. These endospores are released by rupture of the spherule and can go on to create more spherules in the lung and in some cases disseminate to other organs.

2.2 Description of Illness

Approximately 60% of *Coccidioides* infections are asymptomatic. Symptomatic cases typically present 1–3 weeks after exposure with a mild respiratory syndrome characterized by nonproductive cough and dyspnea, as well as systemic symptoms of fatigue, night sweats, myalgias, and occasionally erythema nodosum or erythema multiforme. The typical pulmonary infection is self-limited and clinically indistinguishable from other community-acquired pneumonias. In endemic areas of the American Southwest many cases of pneumonia are likely due to primary pulmonary infection by *Coccidioides*. In 5%–10% of cases, the pulmonary disease results in chronic infection, manifested by nodules or cavitary lesions.

Extrapulmonary dissemination is uncommon in immunocompetent hosts but may be as high as 30%–50% in the immunocompromised — e.g., persons with solid organ transplants, HIV infection, lymphoma, or those receiving immunosuppressive therapy such as high-dose steroids or anti-TNF medications. Pregnant women, blacks and Filipinos are also at elevated risk of dissemination. Disseminated disease can involve any organ but commonly affects the meninges, skin, and bones.

2.3 Sources and Routes of Transmission

Coccidioides is limited to the western hemisphere and is endemic to the soil in the southwestern U.S., as well as parts of Mexico and South America. Within the United States, the most highly endemic areas are the San Joaquin Valley in California, and southern Arizona, though it has recently been detected in soil in the Tri-Cities area of Washington State.

2.4 Modes of Transmission

Transmission is by inhalation of spores circulating in the air after contaminated soil is disturbed by humans, animals, or the weather. Coccidioidomycosis is not transmitted by infected persons. In extremely rare cases, infection can be transmitted through solid organ transplants, fomites, and direct cutaneous inoculation. Well documented causes of outbreaks include construction or excavation and large-scale environmental events such as dust storms and earthquakes.

2.5 Incubation Period

Variable, usually 1–3 weeks.

2.6 Period of Communicability

Coccidioidomycosis is not communicable by the respiratory route. There have been reports of transmission through transplantation of infected organs.

2.7 Treatment

The vast majority of infections will resolve without specific therapy. The Infectious Diseases Society of America (IDSA) recommends that patients be monitored every 3–6 months for up to 2 years to document resolution and to detect extrapulmonary infection early, should it occur.

Patients presenting with immunocompromising conditions or severe pneumonia, or who develop chronic pulmonary or disseminated disease, should be treated with antifungal therapy. In general, initial therapy is with azoles such as fluconazole (400–800 mg/day administered orally or intravenously) or itraconazole (200 mg twice or three times per day administered orally). As there are subtle differences in treatment recommendations based on host or disease factors, we recommend checking the most recent IDSA guidelines (*www.idsociety.org*) or enlisting the help of an infectious disease consultant.

3. CASE DEFINITIONS, DIAGNOSIS AND LABORATORY SERVICES

3.1 Confirmed Case Definition

Isolation or histopathologic identification of *Coccidioides* spp. in a clinical specimen.

3.2 Presumptive Case Definitions

An individual with antibodies against *Coccidioides* as indicated by one of the tests in the table below, and

- Influenza-like signs and symptoms (e.g., chest pain, cough, myalgia, arthralgia, and headache);
- Pneumonia or other pulmonary lesion or any compatible heart and lung condition, diagnosed by chest radiograph;
- Erythema nodosum, erythema multiforme rash or localized skin nodules or any other cutaneous manifestations of the disease;
- Involvement of bones, joints, or skin by dissemination;
- Meningitis; or Involvement of viscera or lymph nodes

Table1. Serologic tests for *Coccidioides* antibodies

A confirmed case must meet at least one of the following laboratory criteria for diagnosis:

Cultural, histopathologic, or molecular evidence of presence of *Coccidioides* species, OR

- a positive serologic test for coccidioidal antibodies in serum, cerebrospinal fluid (CSF), or other body fluids by:
- Detection of coccidioidal immunoglobulin M (IgM)
- by immunodiffusion,
- enzyme immunoassay (EIA),
- latex agglutination,
- or tube precipitin,

  OR

Detection of coccidioidal immunoglobulin G (IgG) by

- immunodiffusion, EIA, or
- complement fixation, OR
- coccidioidal skin-test conversion from negative to positive after onset of clinical signs and symptoms

3.3 Services Available at the Oregon State Public Health Laboratory

Clinical laboratories are required to submit all *Coccidioides* spp. isolates to the OSPHL. Please ship *Coccidioides* spp. isolates to the Oregon State Public Health Lab on a slant in order to comply with leak-proof primary container requirements and to minimize potential lab exposures; do not use plates or petri dishes to ship *Coccidioides* spp. isolates.

The OSPHL will only forward the *Coccidioides* spp. slants to the Centers for Disease Control and Prevention (CDC) for speciation and possibly molecular characterization. Isolates not sent on slants will not be forwarded to the CDC. No testing is performed at the OSPHL at this time.

Confirmed or suspected cultures of *Coccidioides* spp. should be classified and packaged as a Category A infectious substance for transport to the OSPHL, in accordance with DOT and IATA regulations and requirements. Please contact the OSPHL at 503-693-4100 for guidance if needed.

Packaging and shipping guidance, including links to regulations and requirements for DOT and IATA, is available on the OSPHL website at: *http://public.health.oregon.gov/LaboratoryServices/CommunicableDiseaseTesting/SubmittingSamples/Pages/ShippingTransport.aspx*

A list of organisms indicative of Category A substances can be found on table 3.6.D here: *http://www.iata.org/whatwedo/cargo/dgr/Documents/infectious-substance-classification-DGR56-en.pdf*

4. ROUTINE CASE INVESTIGATION

4.1 Identify Source of Infection

All cases should be investigated as a matter of routine. Ask about possible exposures and travel history in the 7–28 days before acute illness and in the preceding 12 months in those patients with chronic lung disease or other respiratory conditions before symptom onset. Specifically, query about

- Any travel to Arizona or California during or prior to the incubation period;
- Exposure to visible dust due to construction activity, soil disturbance, dust storm, etc.;
- Name, diagnosis, and phone number or address of any acquaintances or household member with a similar illness. (N.B.: anyone meeting the presumptive case definition should be reported and investigated in the same manner as a confirmed case; although the disease is not transmitted from person to person, clusters of cases may allow an environmental source to be identified.)

5. CONTROLLING FURTHER SPREAD

5.1 Education

Cases should be educated that coccidioidomycosis is contracted through the inhalation of *Coccidioides* spores in soil, and that they will not spread the infection to others. They should be warned that there is a small risk of long-term complications, so they should discuss follow-up with their doctor regarding any new respiratory symptoms that arise over the next several years.

5.2 Isolation and Work or Day Care Restrictions

There are no restrictions to work, though cases may feel too fatigued or ill to go back to work for two or more weeks.

5.3 Case Follow-up

Not required. The goal is to try to identify sources and to educate.

6. MANAGING SPECIAL SITUATIONS 4

6.1 Case with No Obvious Exposure in Arizona or California

It is important to try to identify any foci of *Coccidioides* in Oregon — as well as in adjacent parts of Washington State or Idaho. Cases who have had no potential exposures in Arizona or California merit additional follow-up to try to ascertain just where they encountered the fungus. This may entail more extensive travel histories, asking about notable exposures to dust storms or other episodes of dust inhalation, and possibly soil testing. Please consult ACDP epidemiologists.

6.2 Suspected Outbreaks

Most cases of valley fever are sporadic. If the number of reported cases in your county or area is higher than usual for the time of year, or you note possible epidemiological connections, consider the possibility of common-source outbreaks. Review the temporal, geographic, and demographic clues that you have.

- Outbreaks have occurred in military trainees, archeological workers, and in people exposed to earthquakes and dust storms. In any event, consult with ACDP epi staff.

UPDATE LOG

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