

COCCIDIOIDOMYCOSIS (VALLEY FEVER)

I. DESCRIPTION AND EPIDEMIOLOGY

A. Overview

Coccidioidomycosis, also known as Valley fever, is caused by the fungus *Coccidioides* spp. This fungus is typically found in the soil of hot, dry regions where weather conditions and soil composition promote its growth. It is endemic to parts of Mexico, Central and South America, and the southwestern United States, particularly Arizona and California. There are two species of *Coccidioides* that cause human disease: *Coccidioides immitis* is typically found in California while *Coccidioides posadasii* is found outside of California, especially in Arizona. Coccidioidomycosis most commonly presents as a self-limited influenza-like illness or pneumonia. More severe or disseminated disease is rare but can be fatal. There is no vaccine but antifungal medicines are available.

B. Coccidioidomycosis in California

From 1995, when coccidioidomycosis became an individually reportable disease in California, to 2009, annual incidence rates ranged from 1.9 to 8.4 per 100,000 population, followed by a substantial increase to 11.9 per 100,000 in 2010 and a peak of 13.8 per 100,000 in 2011. Annual rates decreased during 2012–2014, but increased three-fold from 2014 (6.0 per 100,000) to 2017 (18.8 per 100,000). A total of 7,466 cases were reported in 2017, the highest annual number of cases in California recorded to date. Although cases have been reported statewide, the highest incidence rates of coccidioidomycosis have consistently been reported in the southern Central Valley, particularly in the counties of Fresno, Kern, Kings, Madera, Tulare, and the coastal counties of San Luis Obispo and Monterey. Most coccidioidomycosis cases appear to be sporadic rather than outbreak-related. Outbreaks that have been reported in California have largely occurred among groups with high dust and dirt exposure including construction workers, wildland firefighters, archeological workers, and military trainees.

C. Symptoms

Approximately 60% of those infected with *Coccidioides* have no symptoms. Patients who are symptomatic will most likely present with a self-limited influenza-like illness or pneumonia and may complain of fever, cough, chest discomfort, malaise, and fatigue. The respiratory illness may be complicated by diffuse or progressive pneumonia, mediastinitis, or pulmonary nodules or cavities. In addition, approximately 1% of symptomatic persons will develop disseminated disease which most often presents as skin lesions, osteomyelitis, or meningitis. African Americans, Filipinos, persons aged 65 and older, pregnant women, and persons with diabetes or other immunocompromising conditions are at increased risk of severe pulmonary or disseminated disease when infected.

Although most infections lead to immunity against future infection, relapse can occur if a patient becomes immunocompromised.

D. Transmission

When soil in endemic areas is disturbed by winds or by activities such as construction, farming, or digging, *Coccidioides* spores can become airborne and may be inhaled along with dust particles. It is also possible, albeit rare, for infection to occur when spores enter through cuts or abrasions in the skin. *Coccidioides* is not transmitted from person to person, animal to animal, or between people and animals.

E. Incubation Period

The incubation period for primary pulmonary illness typically ranges from 7 to 21 days. Disseminated disease or relapses in pulmonary illness can occur months to years after the initial infection especially if a patient becomes immunocompromised.

F. Clinical Management

Clinical management decisions should be made by the patient's primary care physician or infectious diseases specialist. If needed, treatment with antifungal medication is available.

G. Diagnostics

Diagnosis of coccidioidomycosis is primarily made by the identification of antibodies in a clinical specimen, most commonly serum. Serologic testing is typically done at a clinical or public health laboratory and may include an enzyme immunoassay (EIA), immunodiffusion (ID), or complement fixation (CF) test to confirm the diagnosis of coccidioidomycosis. CF tests are quantitative and will often be reported with an associated titer. CF titers can be used to monitor a patient over time, therefore, there may be multiple reports with CF results for a given patient.

Culture or histopathology may also be used on specimens such as respiratory secretions, tissue biopsies, or normally sterile body fluid samples (i.e., pleural, peritoneal, cerebrospinal fluid, blood, abscess material). These tests can be diagnostic for coccidioidomycosis if the *Coccidioides* spherule was detected in tissue samples by histopathology or septate hyphae with barrel-shaped arthroconidia were observed by microscopic examination. Because cultures of *Coccidioides* present an infection risk, they must be handled with great caution (ie, in a biosafety level 3 facility).

II. CDPH CASE DEFINITION

A. CDPH Case Definition

Beginning in January 2019, the CDPH coccidioidomycosis case definition requires only laboratory confirmation of coccidioidomycosis. 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
- Positive serologic test for coccidioidal antibodies in serum, cerebrospinal fluid, or other body fluids including by detection of immunoglobulin M (IgM), immunoglobulin (IgG), or complete antibody via any of the following tests:
 - Immunodiffusion (may be abbreviated as ID, IMD, IMDF, IDTP, IDCF)
 - Complement fixation (CF)
 - Enzyme immunoassay (may be abbreviated as EIA or ELISA)
 - Latex agglutination
 - Tube precipitin
 - Lateral flow assay

Case Classification

Confirmed: A case that is laboratory confirmed.

B. Case Definition Change, 2019

Prior to January 1, 2019, CDPH used the [Council of State and Territorial Epidemiologists \(CSTE\) case definition for coccidioidomycosis](http://www.cdc.gov/NNDSS/script/casedef.aspx?CondYrID=643&DatePub=1/1/2011%2012:00:00%20AM) which required clinical and laboratory confirmation of disease (<http://www.cdc.gov/NNDSS/script/casedef.aspx?CondYrID=643&DatePub=1/1/2011%2012:00:00%20AM>). Clinical criteria was defined as follows:

Infection may be asymptomatic or may produce an acute or chronic disease. Although the disease initially resembles an influenza-like or pneumonia-like febrile illness primarily involving the bronchopulmonary system, dissemination can occur to multiple organ systems. An illness is typically characterized by one or more of the following:

- Influenza-like signs and symptoms (e.g., fever, chest pain, cough, myalgia, arthralgia, and headache)
- Pneumonia or other pulmonary lesion, diagnosed by chest radiograph
- Erythema nodosum or erythema multiforme rash
- Involvement of bones, joints, or skin by dissemination
- Meningitis
- Involvement of viscera and lymph nodes

Clinical confirmation of disease typically required medical record request and review by local health jurisdiction (LHJ) staff which was resource and time intensive. Many LHJs were

unable to consistently confirm clinical illness and were, therefore, reporting confirmed cases based only on laboratory reports when resources were limited. Alternatively, some LHJs may have been omitting cases when they were unable to verify clinical illness. As such, coccidioidomycosis reporting and methods for confirmation were not standardized throughout the state impeding efforts to accurately track and assess trends.

As of January 1, 2019, clinical confirmation of disease is no longer required. Per this change, the presence or absence of symptoms should not affect whether a case is reported as confirmed. This change will allow for more consistent and less resource intensive reporting statewide.

C. Reporting Guidelines

Acceptable laboratory tests include those listed below. Available laboratory results, including electronic laboratory reporting (ELR) messages, should be reviewed to determine if a case is confirmed. If detailed laboratory results (e.g. titer) are not readily available in the provider or laboratory report, LHJs are not required to follow-up to obtain these results and should assume the result is positive.

- Immunodiffusion (ID, IMD, IMDF, IDTP, IDCF)
- Complement Fixation (CF)
- Enzyme immunoassay (EIA/ELISA)
- Latex agglutination
- Tube precipitin
- Lateral flow assay
- DNA probe/PCR
- Culture or pathology

Confirmed Cases

Cases would be defined by a single positive laboratory result and would be reported as confirmed even if the case had:

- Other coccidioidomycosis laboratory results that were negative
- Only the one or more of the following positive coccidioidomycosis laboratory results:
 - A quantitative immunodiffusion of any titer from any type of specimen (i.e. CSF, serum, unknown)
 - A complement fixation positive with any titer from a CSF specimen
 - A complement fixation with a 1:2 titer from a serum or unknown specimen
 - A weak immunodiffusion result
 - An enzyme immunoassay (EIA)
- Onset in an earlier year and had never been previously reported
 - Please report these cases via CalREDIE and record the appropriate estimated illness onset date

Results including the following words would be considered positive:

- Reactive
- Positive

- Above normal
- Weakly reactive
- F band present
- *Coccidioides* identified (*C. immitis* or *C. posadasii*)
- Confirmed by DNA probe
- *Coccidioides* isolated (*C. immitis* or *C. posadasii*)
- *Coccidioides* species undifferentiated

Not a Case

Cases should not be reported as confirmed if it is known that their only reported coccidioidomycosis laboratory tests had the following results:

- Complement fixation with a result of:
 - Anti-complimentary
 - Titer <1:2 from a serum or unknown specimen
- Culture or histopathology where *Coccidioides* is not specifically identified
- Any coccidioidomycosis test with a result of
 - Equivocal
 - Indeterminate
 - Unclear/not specified
 - Negative
 - Nonreactive
 - Quantity Not Sufficient (QNS)/Insufficient volume
 - Gray zone

“Gram negative cocci” or “gram positive cocci” are not acceptable lab results for coccidioidomycosis (the disease we sometimes refer to as “cocci”). These results refer to Gram staining of bacteria, some of which may cause other reportable diseases.

D. Additional guidelines

Cases should be reported only once to CDPH. If LHJs wish to collect detailed clinical, laboratory, or epidemiological information for a reported case, such as the development of disseminated disease, this information may be added in CalREDIE or to the case report form (CRF).

III. CASE INVESTIGATION AND REPORTING

A. Purpose of Reporting and Surveillance

- To better understand the epidemiology of coccidioidomycosis in California and to use this information to develop targeted interventions to decrease rates of illness
- To identify outbreaks and potential sources of ongoing transmission
- To educate people about how to reduce their risk of infection

B. Local Health Jurisdiction (LHJ) General Case Investigation Guidelines

- As of January 2019, the CDPH surveillance case definition for coccidioidomycosis requires only laboratory confirmation of disease. As such, review of medical records is only necessary if clarification of coccidioidomycosis laboratory results is needed.
 - Cases that meet the laboratory criteria should be reported regardless of the presence or absence of symptoms.
- Coccidioidomycosis reporting does not require filling out a CRF. However, a CDPH CRF for coccidioidomycosis investigation is available for voluntary use. Using the coccidioidomycosis CRF may allow for the identification of local clusters or outbreaks, for the consistent collection of additional information for analysis of local risk factors, and for comparison of risk factors across jurisdictions.
 - If LHJs would like to collect additional clinical, laboratory, or epidemiologic information on cases, we encourage use of the standardized coccidioidomycosis CRF as this would allow for the consistent collection of risk exposures and rapid comparison if needed.
- Most coccidioidomycosis cases are sporadic. However, outbreaks of coccidioidomycosis have occurred in California. Most clusters are identified in occupational settings with high dirt and dust exposure. If the patient appears to be part of a point-source outbreak, follow your protocol for outbreak investigations. This should include notifying CDPH about the outbreak (see below). This information can be helpful to others in the same workplace that may have been exposed and experience illness but are not yet diagnosed.
- If you need assistance with your investigation of a coccidioidomycosis outbreak, call the Disease Investigations Section (DIS) at 510-620-3434.

C. Local Health Jurisdiction Reporting

Coccidioidomycosis is reportable in California by clinicians and laboratories.

Coccidioidomycosis cases that meet the laboratory criteria of the CDPH case definition should be reported to CDPH.

Instructions for CalREDIE-participating jurisdictions:

- Enter the patient information into CalREDIE upon notification of the case by the clinical laboratory or health care provider. Select “Coccidioidomycosis” as “Disease Being Reported”.
- Coccidioidomycosis is not a CRF required condition. Therefore, completion of the Clinical, Laboratory, and Epidemiological Information Sections is not required but, if these data are collected, use of this form is encouraged, as this would allow for the consistent collection of risk exposures and rapid comparison if needed.
- Do not create a new incident for previously reported cases.

- New clinical, laboratory, or epidemiological information for a reported case, such as the development of disseminated disease, may be added to previously submitted CRFs.
- If a historical case has never been previously reported, please report the case via CalREDIE and record the appropriate Date of Onset. If exact Date of Onset is unknown, provide either an estimated onset date or record the earliest date associated with initial diagnosis such as the Date of Diagnosis or the Lab Specimen Collection Date or Lab Specimen Result Date associated with the earliest positive test result.

If only a month and year is known for an estimated date, report date as the 15th of the given month. If only the year is known, report date as June 1st of that given year.

- Coccidioidomycosis meningitis should be reported only under “Coccidioidomycosis” and should not be reported under “Meningitis – Fungal (other than Coccidioidomycosis)”.

Instructions for CalREDIE NON-participating jurisdictions:

- Report line listed data electronically to CDPH and include all available data elements from the standard [Confidential Morbidity Report form \(CDPH 110a\)](https://www.cdph.ca.gov/CDPH%20Document%20Library/ControlledForms/cdph110a.pdf) (<https://www.cdph.ca.gov/CDPH%20Document%20Library/ControlledForms/cdph110a.pdf>).
- Coccidioidomycosis is not a CRF required condition. However, the use of the state [Coccidioidomycosis Case Report form \(CDPH 8280\)](https://www.cdph.ca.gov/CDPH%20Document%20Library/ControlledForms/cdph8280.pdf) is encouraged, as this would allow for the consistent collection of risk exposures and rapid comparison if needed (<https://www.cdph.ca.gov/CDPH%20Document%20Library/ControlledForms/cdph8280.pdf>).
 - Non-participating jurisdictions that are interested in a fillable PDF version of the CRF should contact the Disease Investigations Section at 510-620-3434.
 - The fillable PDF is set up with the capacity to export completed fields to a standardized line listed dataset.

Reporting Outbreaks and Clusters

Suspected coccidioidomycosis outbreaks, including point-source outbreaks within your jurisdiction, should be reported within 24 hours to CDPH.

- *CalREDIE-participating jurisdictions*: Create a new outbreak in CalREDIE. From the dropdown list for “Disease”, select “Respiratory, non TB”.

Microbial Diseases Laboratory (MDL) Resources

The CDPH Microbial Diseases Laboratory (MDL) will confirm suspected *Coccidioides* cultures and differentiate the two species: *Coccidioides immitis* and *Coccidioides posadasii* for local public health laboratories (PHL) upon request. Clinical laboratories which require assistance in the identification of suspected *Coccidioides* isolates should contact their local PHL to obtain this service.

IV. CASE MANAGEMENT AND PUBLIC HEALTH CONTROL MEASURES

Coccidioidomycosis is not transmitted from person to person. There is no vaccine but there are antifungal medications.

The best way to reduce risk of getting Valley Fever is to avoid breathing in dirt or dust in areas where Valley Fever is common. More details on ways to reduce risk of Valley Fever are outlined in the [CDPH Valley Fever fact sheet](https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH%20Document%20Library/ValleyFeverFactSheet.pdf) (<https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH%20Document%20Library/ValleyFeverFactSheet.pdf>).

Persons performing dirt-disturbing work, such as construction, in areas endemic for Valley Fever are at particular risk of infection. Additional guidance for preventing work-related Valley Fever can found on the [CDPH Occupational Health Branch's Valley Fever webpage](https://www.cdph.ca.gov/Programs/CCDHP/DEODC/OHB/Pages/Cocci.aspx#) (<https://www.cdph.ca.gov/Programs/CCDHP/DEODC/OHB/Pages/Cocci.aspx#>).

Data and statistics on coccidioidomycosis in California as well as additional educational materials for the public and healthcare providers are available on the [CDPH coccidioidomycosis webpage](https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/Coccidioidomycosis.aspx) (<https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/Coccidioidomycosis.aspx>).

V. APPLICABLE STATE STATUTES AND REGULATIONS

A. California Code of Regulations, Title 17, Public Health, [Sections 2500, 2505](#)

(<http://ccr.oal.ca.gov/linkedslice/default.asp?SP=CCR-1000&Action=Welcome>)

2500: Health care providers shall submit reports for coccidioidomycosis to the local health officer for the jurisdiction where the patient resides by mailing a written report, telephoning, or electronically transmitting a report within seven calendar days of the time of identification.

2505: Coccidioidomycosis shall be reported by laboratories within one working day after the health care provider or other person authorized to receive the report has been notified. Laboratories shall transmit these reports to the local health officer by courier, mail, electronic facsimile or electronic mail.

B. Assembly Bill No. 1787: [Reporting: Valley Fever](#)

(https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180AB1787)

AB 1787 requires the State Department of Public Health to do the following:

- When it receives a report of a case of coccidioidomycosis after the department's reporting deadline for a specified year, to include the case in its data collection for the next year and attribute it to the year of diagnosis in future data reporting.
- Collect data on coccidioidomycosis cases by April 15 of each year, as specified.
- If it collects data on coccidioidomycosis cases and removes discrepant data from its internal dataset, to timely report sufficient information about its removal of the discrepant

data to a local health officer and the local health officer may remove the discrepant data from the county's dataset.

- If it publishes provisional data on coccidioidomycosis cases, to publish an explanation of data changes likely to occur and of discrepancies between data reported by a local health officer and data reported by the department.
- Publish the date range of a dataset and the date on which the dataset was updated if the department publishes data on coccidioidomycosis cases.

C. Assembly Bill No. 1788: [Public health: Valley Fever](#)

(https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180AB1788)

AB 1788 would, until January 1, 2024, authorize the State Department of Public Health, for the purpose of reports confirming a case of Valley Fever, to use laboratory criteria for diagnosis, with or without clinical criteria.

VI. ADDITIONAL RESOURCES

A. General Information/ Patient Education

- [CDPH coccidioidomycosis webpage](#):
<https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/Coccidioidomycosis.aspx>
- [CDC coccidioidomycosis webpage](#):
<https://www.cdc.gov/fungal/diseases/coccidioidomycosis/index.html>

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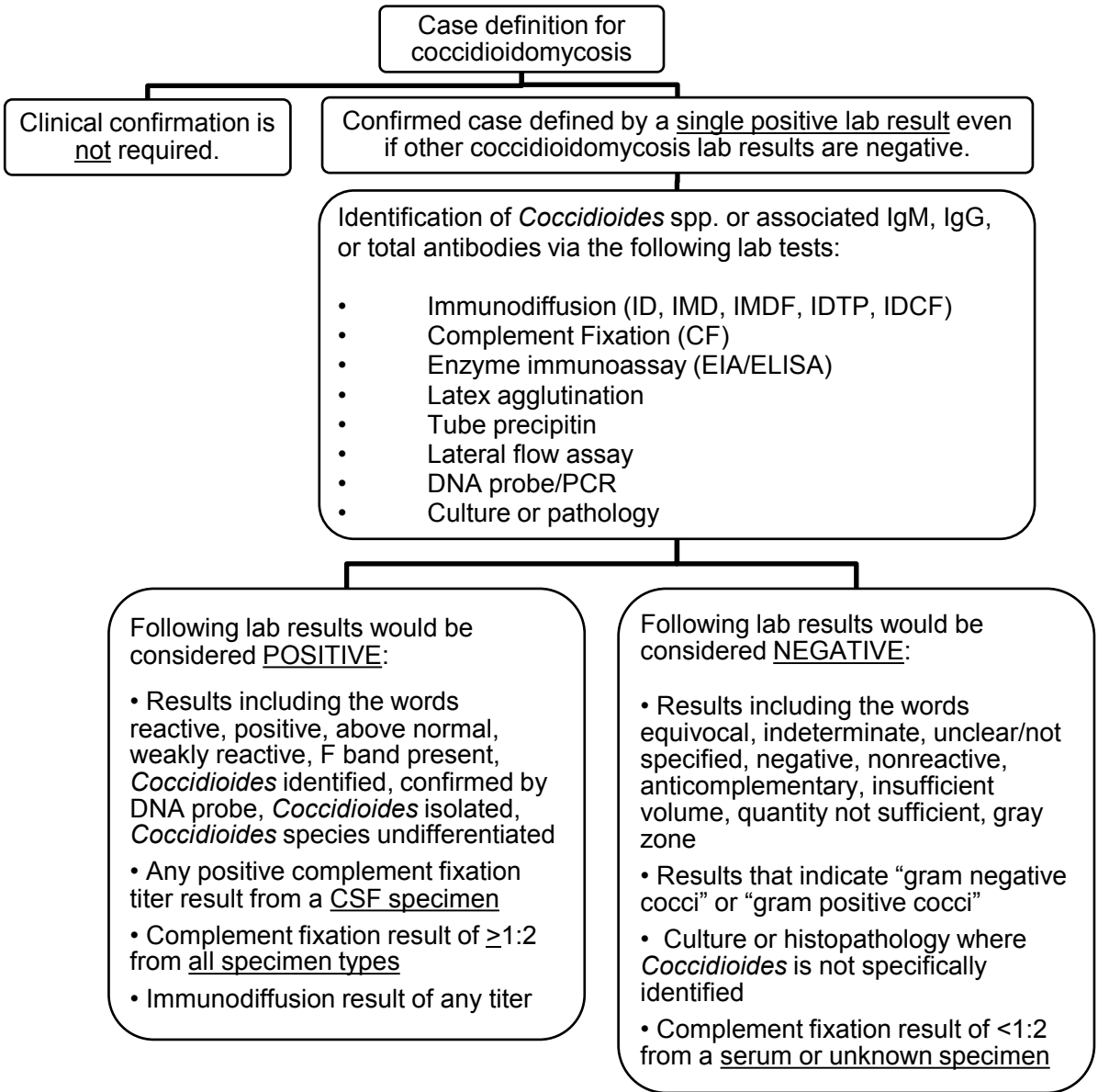
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VII. UPDATES

Original version finalized and completed September 2014.

Updated December 2018.

VIII. Case Definition Guidance: COCCIDIOIDOMYCOSIS (VALLEY FEVER)



Available laboratory results, including electronic laboratory reporting messages, should be reviewed to determine if a case is confirmed. If detailed laboratory results (e.g. titer) are not readily available in the provider or laboratory report, LHJs are not required to follow-up to obtain these results and should assume the result is positive.

Report historical cases who were never previously reported (i.e. cases with onset in earlier years) with appropriate estimated illness onset date, when available, or report the earliest available date associated with initial diagnosis (e.g. Diagnosis Date, Lab Specimen Collection or Result Date).

If you require assistance with your investigation of coccidioidomycosis, call DIS at 510-620-3434