Utah Department of Health & Human Services

Coccidioidomycosis

(San Joaquin Valley fever, Valley fever, Desert fever)

Disease plan

Quick links

Last updated: 6/6/2023, by BreAnne Osborn

Questions about this disease plan?

Contact the Utah Department of Health and Human Services Office of Communicable Diseases: 801-538-6191.

Critical clinician information

Clinical evidence
Signs/symptoms • Common symptoms include cough, joint pain, rash, headache, muscle aches, and fever
Period of communicability • Coccidioidomycosis is not transmissible from person-to-person
Incubation period • 1-3 weeks
Mode of transmission • Inhalation of the fungus, usually from dust and soil
Laboratory testing

Type of lab test/timing of specimen collection
• Serologic antibody testing:
  ○ Immunodiffusion (ID)
  ○ Complement fixation (CF)
  ○ Enzyme immunoassay (EIA)
• Antigen by EIA
• Polymerase chain reaction (PCR)
• Latex agglutination
• Culture
• Spherule detection by histopathology
• Skin test

Type of specimens • Serum • Tissue samples • Cerebrospinal fluid (CSF) • Urine and other body fluids
Treatment recommendations
Type of treatment • Treatment is not necessary in all cases. • Fluconazole and Itraconazole are commonly prescribed antifungal treatments.
Prophylaxis • None
Contact management
Isolation of case • None
Quarantine of contacts • None
Infection control procedures
• None

Why is coccidioidomycosis important to public health?

Coccidioidomycosis, also called Valley fever, is an infection caused by the fungus *Coccidioides*. The fungus is known to live in the soil in the southwestern United States (U.S.), parts of Mexico, and Central and South America. In Utah, the fungus is known to live in the soil in Washington County; it has also previously been found in soil from Dinosaur National Monument in Uintah County.[1,2] Surveillance of coccidioidomycosis infections in Utah is important in order to track the extent of the fungus in the different counties, differentiate between locally acquired and imported cases of coccidioidomycosis, and monitor trends in Utah.

Disease and epidemiology

Clinical description

After infection, a wide spectrum of manifestations is possible; many of those infected do not develop symptoms. When symptoms do occur, *Coccidioides* typically first affects a person's lungs. Most people with symptomatic disease will develop a moderate influenza-like illness or pneumonia-like febrile illness with 1 or more of the following symptoms: chest pain, cough, fever, headache, myalgia (muscle pain), arthralgia (joint pain), or rash (erythema nodosum or erythema multiforme). It is estimated that 5–10% of those with coccidioidomycosis go on to have serious or long-term lung complications.[3] Other symptoms may include fatigue and shortness of breath (dyspnea). Symptoms may last for weeks to months, and the majority of infections will resolve without specific antifungal therapy. A small number of infections result in chronic pulmonary or extrapulmonary infections.[3]

Dissemination of the disease occurs in less than 1% of people with symptomatic coccidioidomycosis.[4] Disseminated disease results in lesion formation within the lungs and abscesses throughout the body. Abscesses tend to form in the subcutaneous tissues, skin, bone, and the central nervous system (the brain and spinal cord), causing infections such as meningitis and bone and joint infections. There is an increased risk of dissemination for immunocompromised individuals, including those who have HIV infection, diabetes, organ transplants, Hodgkin's disease, chronic corticosteroid therapy, and those who are pregnant. Several studies have shown that men and people who are Black or Filipino are also at higher risk.[5,6]

People usually acquire lifelong immunity to coccidioidomycosis after an infection, which prevents them from contracting the illness again. However, *Coccidioides* can remain dormant in some people, and the infection can be reactivated if a person's immune system is suppressed.[6]

Causative agent

Coccidioidomycosis is caused by spores of a fungus, *Coccidioides,* which grow in soil of areas with low rainfall, high summer temperatures, and moderate winter temperatures. There are 2 known species of *Coccidioides* fungus: *Coccidioides immitis* and *Coccidioides posadasii*. The clinical presentation of disease caused by the 2 species of *Coccidioides* fungus are indistinguishable, and laboratories are not routinely able to determine species.

Differential diagnosis

The differential diagnosis for coccidioidomycosis includes other fungal infections, lymphoma, tuberculosis, other granulomatous infections, and meningitis.

Laboratory identification

Multiple methods for diagnosing coccidioidomycosis are available. Most patients are diagnosed using serologic tests, including enzyme immunoassay (EIA), immunodiffusion (ID), polymerase chain reaction (PCR), complement fixation (CF), or fungal culture methods, although skin tests are also available.

Positive serologic antibody test results indicate current or recent infection. Conversely, a positive skin test (spherulin) indicates prior exposure and infection with the fungus. Because reactivity lasts a lifetime, skin tests are not generally helpful in diagnosing current infection, but can help determine whether a person is at risk for infection. A conversion from negative to positive after onset of symptoms is considered laboratory evidence of disease.[7]

Although serologic testing is most common, cerebrospinal fluid (CSF) should be tested in patients with suspected meningitis.[8] Fungal cultures can also be performed on a variety of specimens, including respiratory secretions, normally sterile fluids, and abscesses.

It is generally recommended that EIA tests are ordered initially, as they have high sensitivity for early infections. ID tests are sometimes subsequently ordered to support a positive EIA result, as they are considered to be more specific than EIA tests. An EIA test may also be recommended upon a negative ID result if a coccidioidal infection is strongly suspected. CF tests are generally most useful to manage complicated cases, including measuring the severity and progression of disease.[7]

Fungal cultures are considered the “gold standard” for diagnosis of coccidioidomycosis, however, they can take weeks, and can easily expose lab workers if proper biocontainment precautions aren’t used. Additionally, obtaining specimens for culture can be invasive and extremely difficult outside of a hospital setting.

Approximately 90% of patients develop detectable IgM antibodies within 3 weeks of onset. IgG antibodies generally take longer to develop; it is estimated they are detectable within 3 months of onset for 85–90% of patients.[4,9] In general, antibodies are only detectable for a few months to a year, although they may persist longer in patients with a pulmonary cavity or disseminated disease.

Treatment

Mild cases of coccidioidomycosis usually resolve without treatment. However, treatment may shorten the course of illness, or prevent complications to prevent severe cases. Opinion varies about the most relevant factors to consider when judging the severity of illness and necessity of treatment. Some commonly used indicators of severe illness are[8]:

- greater than 10% loss of body weight
- infiltrates involving more than half of one lung or portions of both lungs
- anti-coccidioidal complement fixing antibody concentrations in excess of 1:16
- symptoms which persist for more than 3 weeks

The most frequently used oral antifungals are fluconazole and itraconazole. Surgical removal of cavities in the lung and draining abscesses in bones or joints is sometimes necessary. The duration of treatment for uncomplicated primary coccidioidal infection generally ranges from 3 to 6 months.

Specific treatment guidance published by the Infectious Diseases Society of America (2016) can be found at https://www.idsociety.org/practice-guideline/coccidioidomycosis/.

Case fatality

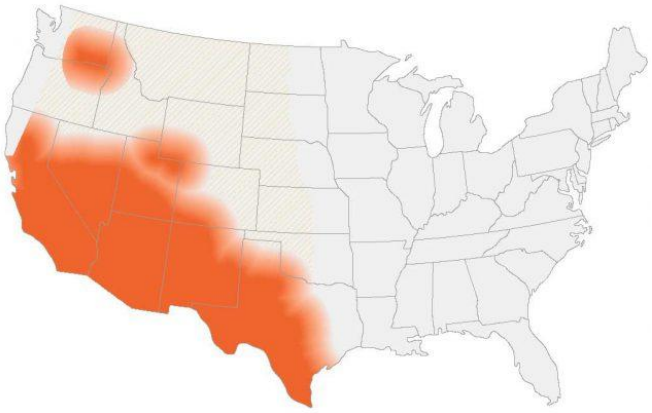
The case fatality rate of coccidioidomycosis is estimated to be very low, although deaths do occur. On average, there were approximately 200 coccidioidomycosis-associated deaths each year (deaths in which coccidioidomycosis was listed as a primary or contributing cause on a death certificate) in the United States during 1999–2019, according to National Multiple Cause of Death data.[10] Disseminated disease increases risk of death; coccidioidal meningitis, the most serious form of disseminated disease, is almost always fatal within 2 years of diagnosis if left untreated.[11]

Reservoir

Coccidioides live in dust and soil in some areas in the southwestern U.S., Mexico, and South America. In the U.S., *Coccidioides* is found in Arizona, California, Nevada, New Mexico, Texas, and Utah.[6] In 2014, the fungus was found in south-central Washington, an area not previously known to have *Coccidioides.*[12]

Figure 1 shows the approximate areas (called endemic areas) where *Coccidioides* is known to live, or is suspected to live, in the U.S. and Mexico. Much of what is known about where the fungus lives in the southwestern U.S. is based on studies performed in the late 1940s and early 1950s.

Figure 1. Areas estimated endemic for coccidioidomycosis



Note. From "Valley Fever Maps" by CDC, 2020, (https://www.cdc.gov/fungal/diseases/coccidioidomycosis/maps.html).

Transmission

Anyone who is around activities which produce dust where soil or other materials contaminated with *Coccidioides* species are located can get coccidioidomycosis if enough spores are inhaled. People can be exposed to *Coccidioides* species spores during recreational or occupational activities including digging, farming, construction work, driving off-road vehicles, riding ATVs, biking, camping, and hiking. Living in, or traveling through, an endemic area can lead to an exposure and illness.

Susceptibility

Anyone can get coccidioidomycosis. Lifelong immunity almost always develops after infection. The infection can come back in some people (a relapse) after they get better the first time, but this is very rare.[6]

Incubation period

Symptoms of disease usually start within 1 to 3 weeks after exposure.[6] Disseminated disease can sometimes develop years after the primary infection (even when the primary infection was so mild the patient does not remember having it).

Period of communicability

The fungus that causes coccidioidomycosis cannot be spread from the lungs between people or animals. However, in extremely rare instances, a wound infection with *Coccidioides* can spread

infection to someone else.[6] The infection may also be spread through transplant of an infected organ.[13]

Epidemiology

Coccidioides species grow in arid and semiarid areas of the Western Hemisphere. In the U.S., this range extends from California to southern Texas, and includes parts of Utah. The soil conditions in southern Utah are well suited for growing *Coccidioides* species. From 2016-2022, an average of 53 cases of coccidioidomycosis were reported to the Utah Department of Health and Human Services each year. Notably, 80 cases were reported in 2017, considerably more than the surrounding years.

Public health control measures

Public health responsibility

- Investigate all reports of coccidioidomycosis and mark appropriate case status; fill out and submit appropriate disease investigation forms.
- Provide education to the general public, clinicians, and first responders about disease transmission, prevention, and diagnosis.
- Identify clusters or outbreaks of this disease and determine the source.
- Identify cases and sources of infection to prevent further transmission.
- Identify and evaluate laboratory personnel who handle a *Coccidioides* culture. If a *Coccidioides* culture was handled outside of a biological safety cabinet, a list of all persons present in the room should be collected.

Prevention

The best way to prevent exposure to *Coccidioides* species is to avoid situations where soil that may be contaminated can be inhaled. People who live in endemic areas can prevent illness through decreasing the amount of dust in their environment; this may be accomplished by installing air conditioning, pouring asphalt, or planting grass. It should be noted these measures will help decrease dust, but will not eliminate *Coccidioides* species from the environment.

Education about the possibility of acquiring infection through exposure to dust or soil, and providing the recommendation to consider avoiding activities that increase the likelihood of dust inhalation (e.g., recreational activities, construction, archaeological digs), is particularly important for individuals who are at high risk of severe infection (e.g., immunocompromised patients, pregnant people, people who are Black or Filipino, those who have diabetes). It is critical to encourage people who may be exposed to *Coccidioides* species to consult a healthcare provider for early diagnosis and treatment if symptoms develop.

Chemoprophylaxis

There are no chemoprophylaxis agents for coccidioidomycosis.

Vaccine

A coccidioidomycosis vaccine is not currently available.

Isolation and quarantine requirements

There is no need for patient isolation or quarantine restrictions.

Case investigation

Reporting (CSTE position statement, 2022)

Note: The following section is copied directly from CSTE position statement 22-ID-07.[14]

A. Narrative: A description of suggested criteria for case ascertainment of a specific condition.

In public health jurisdictions where coccidioidomycosis is classified as a reportable disease, clinicians, laboratories, and healthcare facilities should report to public health authorities based on the below criteria. Reporting should be all-inclusive, ongoing, and routine. Reporting should occur in a timeframe consistent with local jurisdiction rules. Report any suspected coccidioidomycosis outbreaks to public health authorities.

A1. Clinical Criteria for Reporting In the absence of a positive coccidioidal laboratory test (one or more negative *Coccidioides*-specific test result(s) OR no *Coccidioides*-specific testing conducted), clinical criteria, as defined below, must be paired with epidemiologic linkage criteria:

- Acute onset or worsening of at least 2 of the following signs or symptoms:
  - Cough
  - Fever or chills or night sweats
  - Shortness of breath
  - Chest or flank pain
  - Headache
  - Unintentional weight loss
  - Myalgia (muscle pain)
  - Arthralgia (joint pain) or bone pain
  - Fatigue,

OR

- At least one of the following findings:
  - Abnormal lung findings on chest imaging (e.g., pulmonary infiltrates, nodule, or cavitary lesions) or report of pneumonia
  - Single or multiple skin lesions
  - Bone or joint abnormality (e.g., osteomyelitis, pathologic fracture)
  - Meningitis, encephalitis, or focal brain lesion
  - Abscess, granuloma, or lesion in other body system
  - Erythema nodosum or erythema multiforme rash.

A2. Laboratory Criteria for Reporting

- Culture of *Coccidioides* spp. from a clinical specimen, **OR**
- Identification of characteristic *Coccidioides* spp. in tissue or body fluid by histopathology, **OR**
- Identification of characteristic *Coccidioides* spp. in tissue or body fluid by cytopathology, **OR**
- Detection of *Coccidioides*-specific nucleic acid in a clinical specimen using a validated molecular assay (e.g., PCR, DNA Probe), **OR**
- Detection of *Coccidioides*-specific proteins in a clinical specimen or isolate using a validated molecular assay (e.g., MALDI-TOF), **OR**
- Detection of *Coccidioides* spp. antigen in serum, urine, or other body fluid, **OR**
- Detection in serum or other body fluid of antibodies against *Coccidioides* spp. by immunodiffusion (ID), enzyme immunoassay (EIA or ELISA), complement fixation (CF) assay, tube precipitin (TP), latex agglutination (LA), or lateral flow assay (LFA) or combination tests based on these (e.g., IDTP, IDCF).

A3. Epidemiologic Linkage Criteria for Reporting

- In the absence of a positive coccidioidal laboratory test (one or more negative *Coccidioides*-specific test result(s) OR no *Coccidioides*-specific testing conducted), a person meeting the clinical criteria for reporting and a shared environmental exposure with a confirmed case of coccidioidomycosis should be reported to public health.

A4. Vital Records Criteria for Reporting

- Any person whose death certificate lists coccidioidomycosis as a cause of death or a significant condition contributing to death.

A5. Other Records Criteria for Reporting

- Any person whose healthcare record contains a diagnosis of coccidioidomycosis.

CSTE case definition (CSTE Position Statement, 2022)

Note: The following section is copied directly from [CSTE position statement 22-ID-07](#).

A. Narrative: Description of criteria to determine how a case should be classified.

A1. Clinical Criteria

In the absence of a more likely diagnosis of an alternative fungal infection, such as histoplasmosis or blastomycosis, which have similar clinical presentation as coccidioidomycosis, and which can lead to serologic and antigenic false positives for coccidioidomycosis due to cross reactivity:

- Acute onset or worsening of at least two of the following signs or symptoms:
    - Cough
    - Fever or chills or night sweats
    - Shortness of breath
    - Chest or flank pain
    - Headache
    - Unintentional weight loss
    - Myalgia (muscle pain)
    - Arthralgia (joint pain) or bone pain
    - Fatigue,

    OR

- At least one of the following findings:
    - Abnormal lung findings on chest imaging (e.g., pulmonary infiltrates, nodule, or cavitary lesions) or report of pneumonia
    - Single or multiple skin lesions
    - Bone or joint abnormality (e.g., osteomyelitis, pathologic fracture)
    - Meningitis, encephalitis, or focal brain lesion
    - Abscess, granuloma, or lesion in other body system
    - Erythema nodosum or erythema multiforme rash.

A2. Laboratory Criteria

For the purposes of surveillance, laboratory evidence includes:

Confirmatory laboratory evidence:

- Culture of *Coccidioides* spp. from a clinical specimen, **OR**
- Identification of characteristic *Coccidioides* spp. in tissue or body fluid by histopathology, **OR**
- Identification of characteristic *Coccidioides* spp. in tissue or body fluid by cytopathology, **OR**

- Detection of *Coccidioides*-specific nucleic acid in a clinical specimen using a validated molecular assay (e.g., PCR, DNA Probe), **OR**
- Detection of *Coccidioides*-specific proteins in a clinical specimen or isolate using a validated molecular assay (e.g., MALDI-TOF), **OR**
- Detection of coccidioidal antibodies in cerebrospinal fluid (CSF), **OR**
- Detection of coccidioidal antibodies in serum or other body fluids using any of the following diagnostic tests:
    - Immunodiffusion (may be abbreviated as ID, IMD, IMDF, IDTP, IDCF)
    - Complement fixation (CF) with a titer of >1:2
    - Tube precipitin
    - Detection of both IgM and IgG by enzyme immunoassay (may be abbreviated as EIA or ELISA).

Presumptive laboratory evidence:

- Detection of coccidioidal antibodies in serum or other body fluids using any of the following diagnostic tests:
    - Complement fixation (CF) with a titer of 1:2
    - Lateral flow assay (LFA)
    - Latex agglutination
    - Detection of either IgM or IgG by enzyme immunoassay (may be abbreviated as EIA or ELISA), **OR**
- Detection of *Coccidioides* spp. antigen in serum, urine, CSF, or other body fluids.

Supportive laboratory evidence: N/A*

*See Appendix I for more details on laboratory methods for diagnosis of coccidioidomycosis.
Note: The categorical labels used here to stratify laboratory evidence are intended to support the standardization of case classifications for public health surveillance. The categorical labels should not be used to interpret the utility or validity of any laboratory test methodology.

A3. Epidemiologic Linkage

Exposure to a *Coccidioides* spp. endemic area, including via residence, work, or travel, in the 2 months prior to acute symptom onset or positive coccidioidal laboratory result if acute onset date is unknown.

To assess areas of endemicity, investigators can reference CDC's estimated areas with *Coccidioides* spp. (https://www.cdc.gov/fungal/diseases/coccidioidomycosis/maps.html). Current estimates of where *Coccidioides* spp. live are based on public health surveillance

data, outbreak locations, skin testing studies, and detection of *Coccidioides* spp. in the environment.

Of note, it can be challenging and complex to determine the *Coccidioides* spp. endemicity of a specific area, and endemicity is expected to change and likely expand over time, particularly given the influences of climate change. Investigators can work with public health officials in the state where exposure may have occurred to make a determination if epidemiologic linkage criteria are met.

If exposure history is not available, assume the case does not meet the epidemiologic linkage criteria.

A4. Case Classifications
High-incidence jurisdictions are those that have had an average coccidioidomycosis incidence of ≥10 confirmed cases/100,000 population for a period of three consecutive years. Currently (as of July 2022), those jurisdictions are Arizona and California.

Low-incidence jurisdictions are those that have not had an average coccidioidomycosis incidence of ≥10 confirmed cases/100,000 population for a period of three consecutive years. Once ≥10 confirmed cases/100,000 population have been observed in a low-incidence jurisdiction for a period of three consecutive years, they become a high-incidence jurisdiction for the purposes of surveillance and should permanently switch reporting criteria.

For determining incidence for case classification and reporting purposes, calculations should be made at the state or territory level. Case classification for reporting should not be differentially applied at the subdivision level (e.g., county or region within a state).

Some cases of coccidioidomycosis are not identified until months or years after infection (e.g., *Coccidioides* spp. identified from biopsy of lung nodule). If it is believed that exposure or initial onset occurred months or years earlier, cases can be attributed to the estimated time of infection or onset rather than the time of positive test result.

Contact the laboratory for positive coccidioidal laboratory reports that do not specify test type (e.g., "*Coccidioides* spp. antibody positive"). If this is not feasible, consider the report to meet presumptive laboratory evidence. Additionally, if a complement fixation test is reported to be positive, but the specific titer result is absent, then also consider the report to meet presumptive laboratory evidence if contacting the laboratory is not feasible.

High-incidence jurisdictions (as defined above)

*Confirmed**:

- A case that meets confirmatory or presumptive laboratory evidence.

Low-incidence jurisdictions (as defined above)

*Confirmed**:

- A case that meets confirmatory laboratory evidence AND either epidemiologic linkage OR clinical criteria**, **OR**
- A case that meets presumptive laboratory evidence AND epidemiologic linkage AND clinical criteria.

*Probable**:

- A case that meets confirmatory laboratory evidence and does NOT meet epidemiologic linkage criteria AND does NOT meet clinical criteria, **OR**
- A case that meets presumptive laboratory evidence AND either epidemiologic linkage OR clinical criteria**.

*Suspect**:

- A case that meets presumptive laboratory evidence and does NOT meet epidemiologic linkage criteria AND does NOT meet clinical criteria.

**Illness in a person with compelling evidence (e.g., culture, histopathology, seroconversion) of a different fungal infection, such as histoplasmosis or blastomycosis, should not be counted as a case of coccidioidomycosis without evidence of co-infection since other fungal infections can cause false positive (cross-reactive) Coccidioides spp. antigen and antibody test results. Thus, coccidioidomycosis cases should only be classified as such in the absence of a more likely diagnosis.*
***Some jurisdictions have systematically validated laboratory evidence with clinical compatibility for the vast majority of cases. Those jurisdictions may assume that clinical criteria are met for cases with no clinical information available.*
Note: This CSTE case definition is intended solely for public health surveillance purposes and does not recommend diagnostic criteria for clinical partners to utilize in diagnosing patients with potential coccidioidomycosis.

B. Criteria to distinguish a new case of this disease or condition from reports or notifications which should not be enumerated as a new case for surveillance

A new case is a case not known to be previously reported and counted in any public health jurisdiction in the United States.

There is no standardized system to check if a coccidioidomycosis case has been reported in another state; however, if it is known that a case was previously diagnosed or reported out-of-state, that case should not be counted or reported again.

Reactivation of coccidioidomycosis can occur, particularly among patients with previous coccidioidomycosis who are later treated with immunosuppressive medications. Potential cases of

reactivation should not be counted or reported unless they are known to have not been previously diagnosed or reported.

Multiple cases of coccidioidomycosis for the same patient should only be reported if reactivation of a previous infection can be ruled out (i.e., patient was reinfected) by whole genome sequencing (i.e., sequencing data indicate infection from distinct *Coccidioides* spp. lineages/strains).

Case classification table

Criterion	High-incidence jurisdiction	Low-incidence jurisdiction					
Clinical evidence							
	Confirmed	**Confirmed**		**Probable**			**Suspect**
Acute or worsening of at least TWO of the following findings: o Cough o Fever or chills or night sweats o Shortness of breath o Chest or flank pain o Headache o Unintentional weight loss o Myalgia (muscle pain) o Arthralgia (joint pain) or bone pain o Fatigue			O	O			O	
At least ONE of the following findings: o Abnormal lung findings on chest imaging (e.g., pulmonary infiltrates, nodule, or cavitary lesions) or report of pneumonia o Single or multiple skin lesions o Bone or joint abnormality (e.g., osteomyelitis, pathologic fracture) o Meningitis, encephalitis, or focal brain lesion o Abscess, granuloma, or lesion in other body system o Erythema nodosum or erythema multiforme rash			O	O			O	
Absence of a more likely diagnosis of alternative fungal infection, such as histoplasmosis or blastomycosis			N	N			N	
Laboratory evidence								
Culture of *Coccidioides* spp. from a clinical specimen	**S**	**O**	**O**		**S**			
Identification of characteristic *Coccidioides* spp. in tissue or body fluid by histopathology	**S**	**O**	**O**		**S**			
Identification of characteristic *Coccidioides* spp. in	**S**	**O**	**O**		**S**			

tissue or body fluid by cytopathology								
Detection of *Coccidioides*-specific nucleic acid in a clinical specimen using a validated molecular assay (e.g., PCR, DNA Probe)	**S**	**O**	**O**		**S**			
Detection of *Coccidioides*-specific proteins in a clinical specimen or isolate using a validated molecular assay (e.g., MALDI-TOF)	S	O	O		S			
Detection of coccidioidal antibodies in cerebrospinal fluid (CSF)	S	O	O		S			
Detection of coccidioidal antibodies in serum or other body fluids using any of the following diagnostic tests: o Immunodiffusion (ID, IMD, IMDF, IDTP, IDCF) o Complement fixation (CF) with a titer of >1:2 o Tube precipitin o Detection of both IgM and IgG by enzyme immunoassay (EIA or ELISA)	S	O	O		S			
Detection of coccidioidal antibodies in serum or other body fluids using any of the following diagnostic tests: o Complement fixation (CF) with a titer of 1:2 o Lateral flow assay (LFA) o Latex agglutination o Detection of either IgM or IgG by enzyme immunoassay (EIA or ELISA)	S			O		O	O	S
Detection of *Coccidioides* spp. antigen in serum, urine, CSF, or other body fluids	S			O		O	O	S
Epidemiologic linkage								
Exposure to a *Coccidioides* spp. endemic area, including via residence, work, or travel, in the 2 months prior to acute symptom onset or positive coccidioidal laboratory result if acute onset date is unknown		N		N		N		
Criteria to distinguish a new case								
Not previously reported and counted in any public health jurisdiction in the United States	N	N	N	N	N	N	N	N

Notes:

S = This criterion alone is SUFFICIENT to classify a case

N = All "N" criteria in the same column are NECESSARY to classify a case

O = At least one of these "O" (ONE OR MORE) criteria in each category (categories=clinical evidence, laboratory evidence, and epidemiologic evidence) in the same column—in conjunction with all "N" criteria in the same column—is required to classify a case.

Case investigation process

- Complete minimum/required fields in UT-NEDSS/EpiTrax.
- Verify case status.
- Determine whether the case had travel/exposure history consistent with acquisition of disease in Utah or elsewhere.

Outbreaks

Outbreaks due to coccidioidomycosis are not common in Utah, but can occur following dust storms, earthquakes, or soil excavation. An outbreak of coccidioidomycosis would be defined by the occurrence of more than the average, or expected, number of cases in a particular non-endemic area or more than 1 case with a common exposure.

Identifying case contacts

The fungus that causes coccidioidomycosis is not typically spread from person to person. However, in extremely rare instances, a wound infection with *Coccidioides* can spread the infection to someone else,[6] or the infection can be spread through transplant of an infected organ.[13] In the event an organ transplant patient is identified with coccidioidomycosis, it is critical for public health partners to work together to identify other organ recipients.

Case contact management

Exposed laboratory workers should be referred to an infectious disease physician for appropriate antifungal management.

References

1. Petersen, L. R., Marshall, S. L., Barton-Dickson, C., Hajjeh, R. A., Lindsley, M. D., Warnock, D. W., Panackal, A. A., Shaffer, J. B., Haddad, M. B., Fisher, F. S., Dennis, D. T., Morgan, J. (2004). Coccidioidomycosis among workers at an archeological site, northeastern Utah. *Emerging Infectious Dis*eases, *10*(4), 637-42. https://doi.org/10.3201/eid1004.030446

2. Johnson, S. M., Carlson, E. L., Fisher, F. S., Pappagianis, D. (2014). Demonstration of Coccidioides immitis and Coccidioides posadasii DNA in soil samples collected from Dinosaur National Monument, Utah. *Medical Mycology, 52*(6), 610-7. https://doi.org/10.1093/mmy/myu004

3. Thompson, G. R., 3rd. Pulmonary coccidioidomycosis. (2011). *Seminars in Respiratory and Critical Care Medicine*, *32*(6), 754-63. https://doi.org/10.1055/s-0031-1295723.

4. American Public Health Association. (2022). *Control of communicable diseases manual* (D. L. Heymann, Ed; 21st ed.). American Public Health Association.

5. Huang, J. Y., Bristow, B., Shafir, S., & Sorvillo, F. (2012). Coccidioidomycosis-associated deaths, United States, 1990–2008. *Emerging infectious diseases*, *18*(11), 1723. https://doi.org/10.3201%2Feid1811.120752

6. Centers for Disease Control and Prevention. (2020, December 29). *Valley Fever (Coccidioidomycosis)*. https://www.cdc.gov/fungal/diseases/coccidioidomycosis/index.html

7. Valley Fever Center For Excellence. (2021). *Order the Right Tests*. https://vfce.arizona.edu/valley-fever-people/order-right-tests

8. Galgiani, J. N., Ampel, N. M., Blair, J. E., Catanzaro, A., Geertsma, F., Hoover, S. E., Johnson, R. H., Kusne, S., Lisse, J., MacDonald, J. D., Meyerson, S., L., Raskin, P. B., Siever, J., Stevens, D. A., Sunenshine, R., & Theodore, N. (2016). 2016 Infectious Diseases Society of America (IDSA) clinical practice guideline for the treatment of coccidioidomycosis. *Clinical Infectious Diseases*, *63*(6), e112-e146. https://doi.org/10.1093/cid/ciw360

9. Washington State Department of Health. (2017). *Guidelines for public health investigations.* http://doh.wa.gov/sites/default/files/legacy/Documents/5100//420-139-Guideline-Cocci.pdf

10. Centers for Disease Control and Prevention. (2023). *National Multiple Cause of Death Data*. https://wonder.cdc.gov/mcd.html

11. Vincent, T., Galgiani, J. N., Huppert, M., Salkin, D. (1993). The natural history of coccidioidal meningitis: VA-Armed Forces cooperative studies, 1955-1958. *Clinical Infectious Diseases*, *16*(2), 247-54. https://doi.org/10.1093/clind/16.2.247

12. Litvintseva, A. P., Marsden-Haug, N., Hurst, S., Hill, H., Gade, L., Driebe, E. M., Ralston, C., Roe, C., Barker, B. M., Goldoft, M., Keim, P., Wohrle, R., Thompson, G. R., 3rd, Engelthaler, D. M., Brandt, M. E., Chiller, T. (2015). Valley fever: finding new places for an old disease: Coccidioides immitis found in Washington State soil associated with recent human infection. *Clinical Infectious Diseases*, *60*(1), e1-3. https://doi.org/10.1093/cid/ciu681

13. Dierberg, K. L., Marr, K. A., Subramanian, A., Nace, H., Desai, N., Locke, J. E, Zhang, S., Diaz, J., Chamberlain, C., Neofytos, D. (2012). Donor-derived organ transplant transmission of coccidioidomycosis. *Transplant Infectious Disease*, *14*(3), 300-4. https://doi.org/10.1111/j.1399-3062.2011.00696.x

14. Council of State and Territorial Epidemiologists (CSTE). (2022). *Update to the Standardized Surveillance Case Definition and National Notification for Coccidioidomycosis*. https://cdn.ymaws.com/www.cste.org/resource/resmgr/ps/ps2022/22-ID-07_Coccidioidomycosis.pdf

Version control

Updated February 2016: Updated format, links prevention, disease and epidemiology, case investigation, public health control measures, and references sections.

Updated May 2023: Updated links, statistics, laboratory identification section, references, minimum dataset requirements, and ELR processing rules. Updated reporting recommendations and case definition to reflect changes to CSTE position statement. Added ELR processing rules.

2023 CRF changes:

- Signs/symptoms:
    - Removed sputum production, sore throat
    - Added fever, chills/night sweats, shortness of breath, flank pain, myalgia, abnormal lung findings, pneumonia, skin lesions, bone/joint abnormalities, meningitis/encephalitis/focal brain lesion, abscess/granuloma, erythema nodosum/rash
- Other clinical:
    - Removed questions regarding tuberculosis testing
    - Updated questions regarding dissemination, chest/other imaging, transplants, clinical history/comorbidities, previous Valley fever testing
    - Added questions regarding hospitalization, treatment, other fungal infections
- Contacts:
    - Added ill contacts section
- Travel:
    - Updated questions regarding previous residence/travel history to be open-ended
    - Added exposure period for travel
- Recreational exposures:
    - Added exposure period for recreational activities
    - Added hunting and landscaping to recreational activities
    - Added question regarding pets testing positive for *Coccidioides*
- Demographics
    - Updated occupation, race, ethnicity questions

UT-NEDSS/EpiTrax minimum/required fields by tab

Demographic

- First name
- Last name
- Street number
- Street name
- City
- State
- County
- ZIP Code
- Date of birth
- Area code
- Phone number
- Birth sex
- Ethnicity
- Race

Clinical

- Disease
- Onset date
- Does the patient have any of the following symptoms?
  - Chest pain
  - Weight loss
  - Joint aches
  - Rash
  - Fatigue
  - Cough
  - Fever
  - Chills/night sweats
  - Shortness of breath
  - Flank pain
  - Myalgia
  - Abnormal lung findings
  - Pneumonia
  - Skin lesions
  - Bone/joint abnormalities
  - meningitis/encephalitis/focal brain lesion
  - Abscess/granuloma
  - Erythema nodosum/rash
  - Dissemination
- Visit type
  - (if inpatient) Did Coccidioidomycosis cause hospitalization?
- Died
  - (if yes) Date of death
  - (if yes) Did Coccidioidomycosis cause death?

Laboratory

- Lab name
- Lab test date
- Collection date
- Specimen source
- Test type
- Organism
- Test result
- Accession number

Reporting

- Date first reported to public health

Administrative

- State case status
- Outbreak associated
- Outbreak name

Electronic laboratory reporting processing rules

Coccidioidomycosis rules for entering laboratory test results

The following rules describe how laboratory results reported to public health should be added to new or existing events in UT-NEDSS/EpiTrax. These rules have been developed for the automated processing of electronic laboratory reports, although they also apply to manual data entry.

Test-specific rules

Test specific rules describe what test type and test result combinations are allowed to create new morbidity events in UT-NEDSS/EpiTrax, and what test type and test result combinations are allowed to update existing events (morbidity or contact) in UT-NEDSS/EpiTrax.

Test type	Test result	Create a new event	Update an existing event
Culture	Positive	Yes	Yes
	Negative	No	Yes
	Equivocal	No	Yes
	Other	No	Yes
Immunodiffusion (ID)	Positive	Yes	Yes
	Negative	No	Yes
	Equivocal	No	Yes
	Other	No	Yes
Complement fixation (CF)	Positive	Yes	Yes
	Negative	No	Yes
	Equivocal	No	Yes
	Other	No	Yes
PCR/amplification	Positive	Yes	Yes
	Negative	No	Yes
	Equivocal	No	Yes
	Other	No	Yes
Total antibody (by EIA, IFA, TRF, etc.)	Positive	Yes	Yes
	Negative	No	Yes
	Equivocal	No	Yes
	Other	No	Yes

Whitelist rules

Whitelist rules describe how long an existing event can have new laboratory data appended to it. If a laboratory result falls outside the whitelist rules for an existing event, it should not be added to that event, and should be evaluated to determine if a new event (CMR) should be created.

Coccidioidomycosis morbidity whitelist rule: Never a new case

Coccidioidomycosis contact whitelist rule: Never added to contact.

Graylist rule

We often receive laboratory results through ELR that cannot create cases, but can be useful if a case is created in the future. These laboratory results go to the graylist. The graylist rule describes how long an existing event can have an old laboratory result appended to it.

Coccidioidomycosis graylist rule: The laboratory result should always be added to the morbidity event.

Other electronic laboratory processing rules

If an existing event has a state case status of not a case, ELR will never add additional test results to that case. New labs will be evaluated to determine if a new CMR should be created.

Case report form

Demographic information

UT-NEDSS ID _____

Last name _____ First/MI _____

Address _____ City _____ ZIP _____

County _____ State ___ Phone number(s) ❶ _____ ❷ _____ ❸ _____

Date of birth ____ Age ___ Sex □M □F Parent/contact _____

Clinical information

Onset
Date:
Time:

Symptom Resolution
Date:
Time:

☐Ongoing illness

Hospitalized? Y☐ N☐ U☐
Facility:
Admit date:
Discharge date:

Admitted to ICU? Y☐ N☐ U☐
Mechanical ventilation or intubation required? Y☐ N☐ U☐

Treated? Y☐ N☐ U☐
Antibiotic/antifungal:
Start date:
End date:

Symptoms:

Y☐ N☐ U☐ Cough

Y☐ N☐ U☐ Fever
☐Subjective ☐Measured, Temp (°F): ____

Y☐ N☐ U☐ Chills or night sweats

Y☐ N☐ U☐ Shortness of breath

Y☐ N☐ U☐ Chest pain

Y☐ N☐ U☐ Flank pain

Y☐ N☐ U☐ Headache

Y☐ N☐ U☐ Unintentional weight loss

Y☐ N☐ U☐ Myalgia (muscle pain)

Y☐ N☐ U☐ Arthralgia (joint pain) or bone pain

Y☐ N☐ U☐ Fatigue

Other clinical findings:

Y☐ N☐ U☐ Abnormal lung findings on chest imaging (e.g., pulmonary infiltrates, nodule, or cavitary lesions)
Describe: _____
_____
_____

Y☐ N☐ U☐ Pneumonia
☐ Diagnosed by X-ray, CT, MRI, etc.
☐ Diagnosed by provider only

Y☐ N☐ U☐ Single or multiple skin lesions

Y☐ N☐ U☐ Bone or joint abnormality (e.g., osteomyelitis, pathologic fracture)

Y☐ N☐ U☐ Meningitis, encephalitis, or focal brain lesion

Y☐ N☐ U☐ Abscess, granuloma, or lesion in other body system

Y☐ N☐ U☐ Erythema nodosum or erythema multiforme rash

Y☐ N☐ U☐ Disseminated to another site
☐ Bone ☐ Joint ☐ Lymph node ☐ Skin
☐ Other: _____

Clinical history

Are you currently pregnant? Y☐ N☐ U☐ N/A ☐

Do you have any underlying health conditions? Y☐ N☐ U☐

Condition:
☐ HIV/AIDS ☐ Diabetes ☐ Cancer ☐ Previous transplant recipient
☐ Cardiovascular disease ☐ Lung disease (e.g., COPD, emphysema, etc.) ☐ Chronic kidney disease
☐ Other underlying condition(s):
_____

Do you take any immunosuppressive therapies or medications?
Y☐ N☐ U☐

Immunosuppressive therapies
☐ Chemotherapy ☐ Corticosteroids (e.g., prednisone, cortisone, etc.)
☐ TNF-a inhibitors ☐ Other: _____

Have you previously been tested for Valley fever?
Year tested: _____
Place tested: _____

Test result:
☐ Positive ☐ Negative ☐ Unknown

Test type:
☐ Serum ☐ Skin test ☐ Biopsy ☐ Other: _____ ☐ Unknown

Were you being screened for coccidioidomycosis as part of the process to become a living organ donor or to receive an organ transplant? Y☐ N☐ U☐

Specify:
☐ Living donor ☐ Transplant recipient

Organ donation type:
☐ Liver ☐ Kidney ☐ Other: _____

Have you received a diagnosis of another fungal infection (e.g., histoplasmosis, blastomycosis, etc.)?
Y☐ N☐ U☐

Specify:
☐ Histoplasmosis ☐ Blastomycosis ☐ Other:
_____

Ill contacts

Any contacts ill with similar symptoms? Y☐ N☐ U☐ If yes, list below. If no, skip to Prior residence/Travel history

Note: Cocci is not transmitted person-to-person; identify ill contacts who may have had same/similar exposures as patient.

❶ Last name: _____ First / MI: _____

Relationship to case: _____ Onset date: _____

Address: _____

❷ Last name: _____ First / MI: _____

Relationship to case: _____ Onset date: _____

Address: _____

Prior residence/travel history	
Have you ever lived in another county in Utah? Y☐ N☐ U☐ County: _____ City: _____ Years: _____	**Have you ever lived in another US state?** Y☐ N☐ U☐ State: _____ City: _____ Years: _____
Have you ever lived in another country? Y☐ N☐ U☐ Country: _____ City: _____ Years: _____	**Have you ever traveled to Mexico or Central/South America?** Y☐ N☐ U☐ Country: _____ City: _____ Depart date: _____ Return date: _____

Recent travel history (60 days before onset)	
Travel outside USA? Y☐ N☐ U☐	City: _____ Country: _____ Depart date: _____ Return date: _____
Travel outside Utah, but inside USA? Y☐ N☐ U☐	City: _____ State: _____ Depart date: _____ Return date: _____
Travel outside county, but inside Utah? Y☐ N☐ U☐	City: _____ Country: _____ Depart date: _____ Return date: _____

Recreational exposure (21 days before onset)

Did you participate in any of the following activities?
☐Biking ☐4-wheeling/ATVs ☐Digging/excavation ☐Hiking ☐Camping ☐Hunting ☐Landscaping
Location: _____ Date: _____
Other details: _____

Did you participate in any other activities in which you had contact with or may have inhaled dust or soil? Y☐ N☐ U☐
Activity (including details): _____
Location: _____
Date: _____

Do you have any pets that have been diagnosed with coccidioidomycosis? Y☐ N☐ U☐
Type of pet: ☐Dog ☐Cat ☐Other: _____
Date diagnosed: _____
Diagnosed via lab results? Y☐ N☐ U☐

Occupation and race/ethnicity	
Occupation: ☐Agricultural worker ☐Archeological worker ☐Construction worker ☐Geologist ☐Military personnel/trainee ☐Wildland firefighter ☐Mining, gas, or oil extraction worker ☐ Other: _____	**Race:** ☐White ☐Black/African American ☐American Indian/Alaska Native ☐Asian ☐Native Hawaiian/Pacific Islander ☐Filipino ☐Unknown ☐Other: _____

Job duties: _____ **Employer:** _____	**Ethnicity:** ☐ Hispanic or Latino ☐Non-Hispanic or Latino ☐Unknown

Follow-up actions	
Date	**Action**
_____	☐ Provide client education (see disease plan)
_____	☐ Notify DHHS of potential cluster/outbreak
_____	☐ Other follow-up: