

## Epidemiologic Summary of Coccidioidomycosis in California, 2009 - 2012

### Key Findings and Public Health Messages

- The California Department of Public Health (CDPH) received reports of 16,108 incident cases of coccidioidomycosis with estimated symptom onset dates from 2009 through 2012. The annual number of incident cases peaked at 5,182 in 2011, the highest annual number since the increasing trend from 2001.
- Annual rates of coccidioidomycosis increased by 67.7 percent from 2009 (2,399 case-patients; 6.5 per 100,000 population) to 2012 (4,094 case-patients; 10.9 per 100,000). During 2001-2012 the highest annual incidence rate was in 2011 with 13.9 per 100,000 population.
- From 2009 through 2012, 213 (1.3 percent) case-patients were reported to have died with coccidioidomycosis.
- The highest average annual incidence rate occurred among persons in age group 45 to 54 years of age (14.8 per 100,000).
- Average annual incidence rates were highest in Kern (205.1 per 100,000), Kings (191.7 per 100,000), Fresno (64.5 per 100,000), San Luis Obispo (47.2 per 100,000), Tulare (39.2 per 100,000) and Madera (20.7 per 100,000) counties.
- During 2009-2012, CDPH received report of one point-source outbreak. In this 2009 outbreak, three organ donor recipients developed symptoms of coccidioidomycosis after receiving organs from a donor in Los Angeles County who was later determined to have coccidioidomycosis on post-mortem specimen testing.
- To decrease the risk of infection, persons living, working, or traveling in coccidioidomycosis endemic areas, especially those at increased risk for disseminated disease, should limit their exposure to outdoor dust as much as possible. It is important that healthcare providers be alert for coccidioidomycosis among patients who live in or have traveled to endemic areas.

### Background

Coccidioidomycosis (also known as Valley Fever) results from directly inhaling spores of the dimorphic fungus *Coccidioides* spp. (*Coccidioides immitis* and *Coccidioides posadasii*) from soil or airborne dust. *Coccidioides* is not transmitted directly from person-to-person. Although *Coccidioides* grows in localized areas of the southwest United States (US), the southern San Joaquin Valley is the major region of endemicity in California.

Of those infected with coccidioidomycosis, approximately 60 percent may be asymptomatic. Following an incubation period of 1 to 3 weeks, clinical manifestations occur in 40 percent of infected persons and range from influenza-like illness to severe pneumonia, and rarely, disseminated disease. Disseminated infection, which can be fatal, most commonly involves skin and soft tissues, bones, and the central nervous system. Persons at increased risk for severe disease include African-Americans, Filipinos, Hispanics, pregnant women, adults 60 years of age and older, and people with weakened immune systems<sup>1,2,3</sup>.

We describe the epidemiology of reported coccidioidomycosis in California from 2009 through 2012. Data for 2012 are provisional and may differ from data in future publications. The epidemiological description of coccidioidomycosis for the 2001-2008 period can be found in the Epidemiologic Summary of Coccidioidomycosis in California, 2001—2008<sup>4</sup>. For a complete discussion of the definitions, methods, and limitations associated with this report, please refer to Technical Notes<sup>5</sup>. We included in this summary only the first report of coccidioidomycosis per person during the surveillance period.

### California reporting requirements and surveillance case definition

California Code of Regulations (CCR), Title 17, requires health care providers to report suspected cases of coccidioidomycosis to their local health department within 7 days or immediately by telephone if an outbreak is suspected. Since 2010, CCR, Title 17, Section 2505 has also mandated laboratories to report to the local health jurisdiction.

California regulations also require local health officers to report to CDPH cases of coccidioidomycosis. CDC defines a confirmed case as one with clinically compatible illness and at least one of the following: culture, histopathologic, or molecular evidence of *Coccidioides* species, or positive serologic test for coccidioidal antibodies in serum, cerebrospinal fluid, or other body fluids by: detection of coccidioidal immunoglobu-

lin 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. Clinical illness includes one or more of the following: influenza-like signs and symptoms, pneumonia or other pulmonary lesion, erythema nodosum or multi-forme rash, involvement of the bones, joints, or skin by dissemination, meningitis, or involvement of viscera or lymph nodes.

### Epidemiology of coccidioidomycosis in California

CDPH received reports of 16,108 incident cases of coccidioidomycosis with estimated symptom onset dates from 2009 through 2012. The annual number of incident cases peaked at 5,182 in 2011, the highest annual number since the increasing trend from 2001 (Figure 1). Annual rates of coccidioidomycosis increased by 67.7 percent from 2009 (2,399 case-patients; 6.5 per 100,000 population) to 2012 (4,094 case-patients; 10.9 per 100,000). During 2001-2012, the highest annual incidence rate was in 2011 with 13.9 per 100,000 population (Figure 1). From 2009 through 2012, 213 (1.3 percent) case-patients were reported to have died with coccidioidomycosis.

The highest average annual incidence rate occurred among persons 45 to 54 years of age (14.8 per 100,000) (Figure 2). Incidence rates by race/ethnicity were not calculated due to the substantial missing data (44.4 percent). However, cases with complete data reported Hispanic ethnicity and Black (non-Hispanic) race more frequently than would be expected based on the overall demographic profile of California (Figure 3). The ratio of male to female case-patients was 2.0:1.0.

Average annual incidence rates from 2009 through 2012 were highest in Kern (205.1 per 100,000), Kings (191.7 per 100,000), Fresno (64.5 per 100,000), San Luis Obispo (47.2 per 100,000), Tulare (39.2 per 100,000) and Madera (20.7 per 100,000) counties (Figure 4) which are established *Coccidioides*-endemic areas. Approximately 73.6 percent of case-patients resided or were incarcerated in these six counties at the time of symptom onset. There were eleven counties that reported no cases during 2009-2012.

Since 2009, CDPH received report of one point-source outbreak; three organ donor recipients developed symptoms of coccidioidomycosis after receiving organs from a donor in Los Angeles County who was later determined to have coccidioidomycosis on post-mortem specimen testing.

Figure 1. California coccidioidomycosis case counts and incidence rates

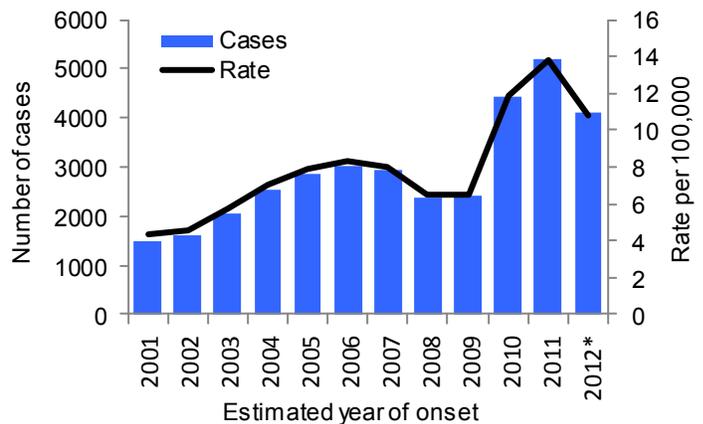


Figure 2. California coccidioidomycosis incidence rates by age and time period

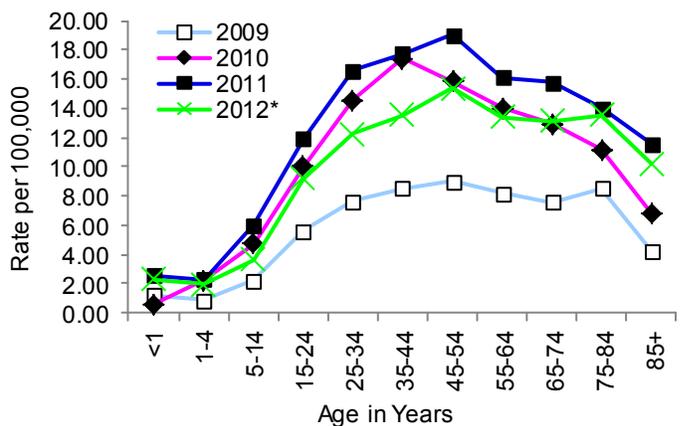
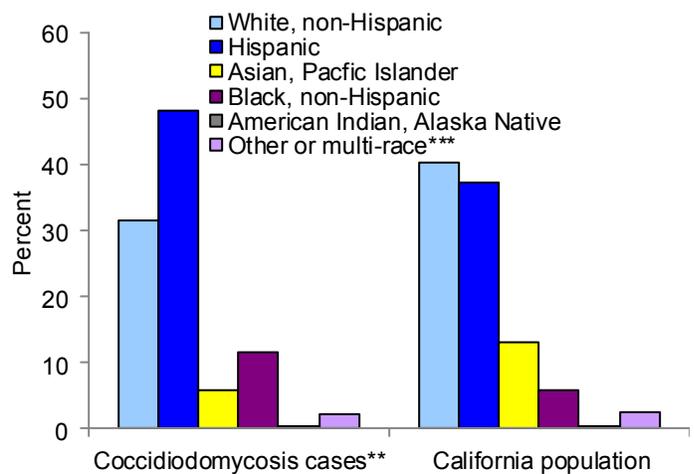


Figure 3. California coccidioidomycosis cases and population by race/ethnicity 2009—2012\*



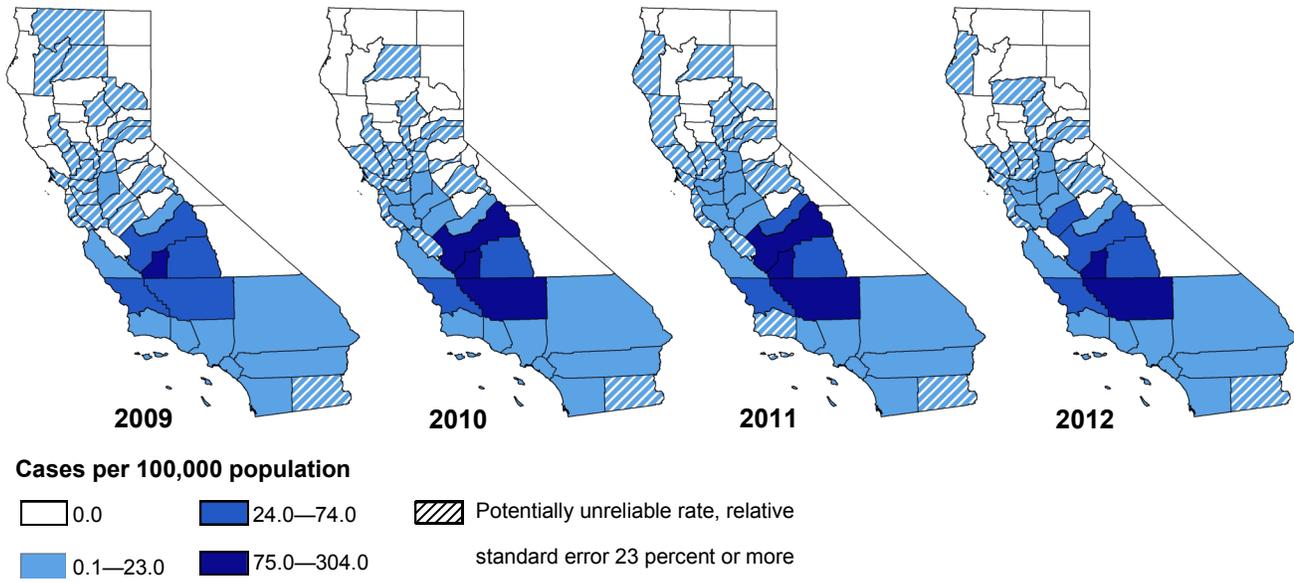
**Notes for Figures 1-3**

\*2012 data reported as of May 4, 2013 and are provisional

\*\*Unknowns were excluded

\*\*\*includes cases who identified 'other' as their race and Californians ('population') who identified more than one race

Figure 4. California county-specific coccidioidomycosis incidence rates



### Comment

Coccidioidomycosis annual incidence rates increased by 67.7 percent from 2009 to 2012. There was a peak in the incidence rate in 2011, which was the highest rate since the increasing trend from 2001. Age group, race/ethnicity, gender, and county epidemiologic profiles of incident cases with estimated onset dates from 2009 through 2012 remained fairly consistent with those with estimated onset dates from 2001 through 2008 as described previously<sup>4</sup>.

The causes of these increases are not well understood but climatic and environmental factors favorable to *Coccidioides* proliferation and airborne release, and increases in non-immune populations in endemic areas may be contributing factors. The initiation of mandated laboratory reporting in 2010 could partly account for the increase in reported cases during 2011. However, some highly endemic counties were already using laboratory-based reporting. Coccidioidomycosis is highly endemic in the San Joaquin Valley and remains an important public health problem in California. There is currently no vaccine; efforts to develop a vaccine are ongoing. To decrease the risk of infection, persons living, working, or traveling in coccidioidomycosis endemic areas, especially those at increased risk for disseminated disease, should limit their exposure to outdoor dust as much as possible. It is important that healthcare providers be alert for coccidioidomycosis among patients who live in or have traveled to endemic areas<sup>1, 2, 3, 6</sup>.

### References and resources

- <sup>1</sup>Recent advances in our understanding of the environmental, epidemiological, immunological, and clinical dimensions of coccidioidomycosis. Nguyen C, Barker BM, Hoover S, et al. *Clin Microbiol Rev.* 2013;26(3):505-25
- <sup>2</sup>Coccidioidomycosis (Valley Fever). California Department of Public Health <http://www.cdph.ca.gov/HealthInfo/discond/Pages/Coccidioidomycosis.aspx>
- <sup>3</sup>Coccidioidomycosis (Valley Fever). Centers for Disease Control and Prevention <http://www.cdc.gov/fungal/coccidioidomycosis/risk-prevention.html>
- <sup>4</sup>Epidemiological Summaries of Selected General Communicable Diseases in California, 2001-2008: Coccidioidomycosis <http://www.cdph.ca.gov/programs/sss/Documents/Epi-Summaries-CA-2001-2008-083111.pdf#page=17>
- <sup>5</sup>Epidemiological Summaries of Selected General Communicable Diseases in California, 2001-2008: Technical Notes <http://www.cdph.ca.gov/data/statistics/Documents/technicalnotes-episummary-aug2409.pdf>
- <sup>6</sup>Preventing Work-Related Valley Fever (Coccidioidomycosis). California Department of Public Health <http://www.cdph.ca.gov/programs/ohb/pages/cocci.aspx>

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