

Key Findings and Public Health Messages

- The California Department of Public Health (CDPH) received reports of 18,776 cases of coccidioidomycosis with estimated symptom onset dates from 2001 through 2008.
- Annual rates of coccidioidomycosis increased by 91.3 percent from 2001 (4.25 per 100,000) to 2006 (8.13 per 100,000) but decreased by 25.3 percent from 2006 to 2008 (6.07 per 100,000).
- During the surveillance period, 265 (1.4 percent) cases were reported to have died with coccidioidomycosis.
- During the surveillance period, the highest average annual incidence rate occurred among persons 45 to 54 years of age (8.81 per 100,000).
- Average annual incidence rates for the surveillance period were highest in Kern (155.0 per 100,000), Kings (70.6 per 100,000), Tulare (35.0 per 100,000), San Luis Obispo (31.7 per 100,000), Fresno (30.4 per 100,000) and Madera (14.9 per 100,000) Counties.
- During the surveillance period, CDPH received reports of increased cases in at least 1 federal and 2 state correctional institutions in the Central Valley and report of 1 point-source outbreak. In this 2007 outbreak, 10 of 12 civilian construction workers developed symptoms of coccidioidomycosis after excavating soil during an underground pipe installation on a military base in Monterey and San Luis Obispo Counties.
- 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.

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.

Coccidioidomycosis may occur in acute, chronic, and asymptomatic forms. Following an incubation period of 1 to 4 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 disseminated disease include African-Americans and Filipinos, those with immunocompromised conditions, and women in the third trimester of pregnancy. Disseminated or extrapulmonary coccidioidomycosis in an HIV-infected person is an AIDS defining condition.

We describe here the epidemiology of coccidioidomycosis in California from 2001 through 2008. Data for 2008 are provisional and may differ from data in future publications. For a complete discussion of the definitions, methods, and limitations associated with this report, please refer to Technical Notes¹. Because coccidioidomycosis may occur as a chronic condition, 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, 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.

California regulations also require local health officers to report to CDPH cases of coccidioidomycosis. CDPH officially counted cases that satisfied the Centers for Disease Control and Prevention (CDC) surveillance case definition. From 2001 through 2007, CDC defined 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 evidence of coccidioidal antibodies in serum or cerebrospinal fluid by detection of coccidioidal immunoglobulin (Ig) M, or a rising titer of coccidioidal IgG, or coccidioidal skin-test conversion from negative to positive after onset of clinical illness. Clinical illness included one or more of the following: influenza-like signs and symptoms, pneumonia or other pulmonary lesion, erythema nodosum or multiforme rash, involvement of the bones, joints, or skin by dissemination, meningitis, or involvement of viscera or lymph nodes. In 2008, laboratory evidence concerning IgG was revised to detection of IgG alone, with or without evidence of a rising titer.

Epidemiology of coccidioidomycosis in California

CDPH received reports of 18,776 cases of coccidioidomycosis with estimated symptom onset dates from 2001 through 2008. Annual rates of coccidioidomycosis increased by 91.3 percent from 2001 (4.25 per 100,000) to 2006 (8.13 per 100,000) and decreased by 25.3 percent from 2006 to 2008 (6.07 per 100,000). During the surveillance period, 265 (1.4 percent) cases were reported to have died with coccidioidomycosis.

During the surveillance period, the highest average annual incidence rate occurred among persons 45 to 54 years of age (8.81 per 100,000). Incidence rates among persons 1 to 74 years of age increased from the combined years 2001 and 2002 to the combined years 2005 and 2006 and then decreased in the years 2007 and 2008 [Figure 2]. Incidence rates by race/ethnicity were not calculated due to the substantial portion of missing data (35.0 percent). However, cases with complete data reported Hispanic ethnicity and Black, non-Hispanic race/ethnicities more frequently than would be expected based on the overall demographic profile of California [Figure 3]. The ratio of male to female cases was 1.9:1.0.

Average annual incidence rates for the surveillance period were highest in Kern (155.0 per 100,000), Kings (70.6 per 100,000), Tulare (35.0 per 100,000), San Luis Obispo (31.7 per 100,000), Fresno (30.4 per 100,000) and Madera (14.9 per 100,000) Counties which are established *Coccidioides*-endemic areas. Although 76.4 percent of cases resided or were incarcerated in these 6 counties at the time of onset, only 6 California counties reported no cases during the entire surveillance period.

Figure 1. California coccidioidomycosis case counts and incidence rates

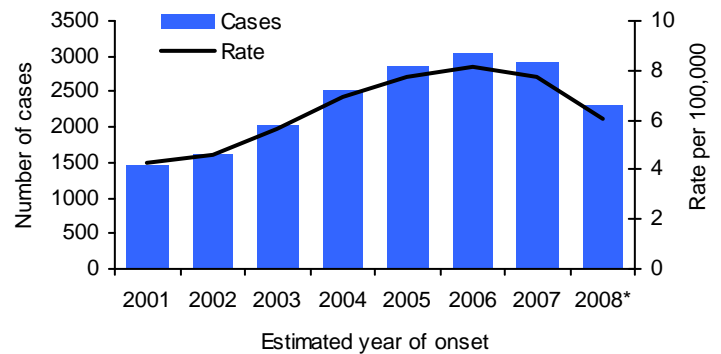


Figure 2. California coccidioidomycosis incidence rates by age and time period

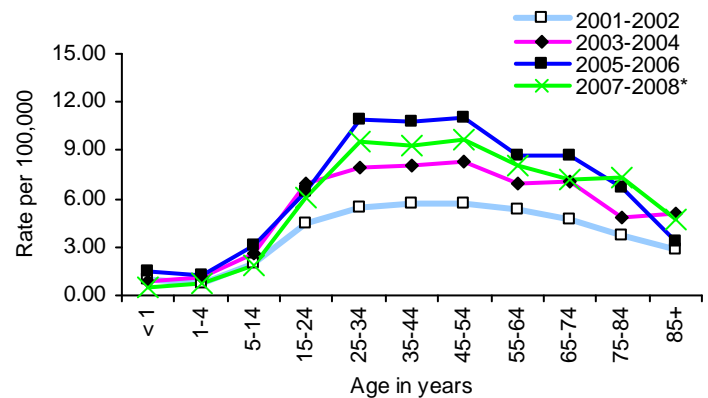
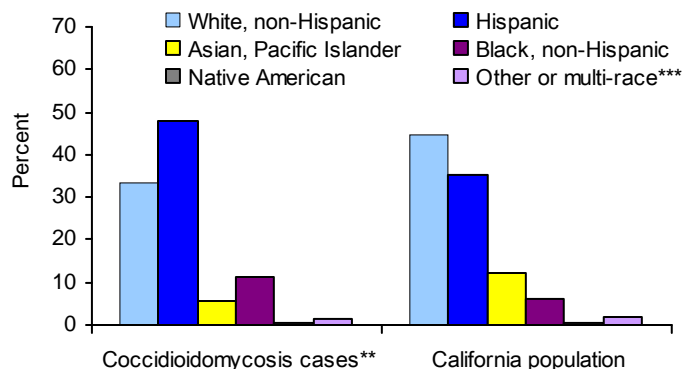


Figure 3. California cryptosporidiosis cases and population by race/ethnicity 2001 - 2008*



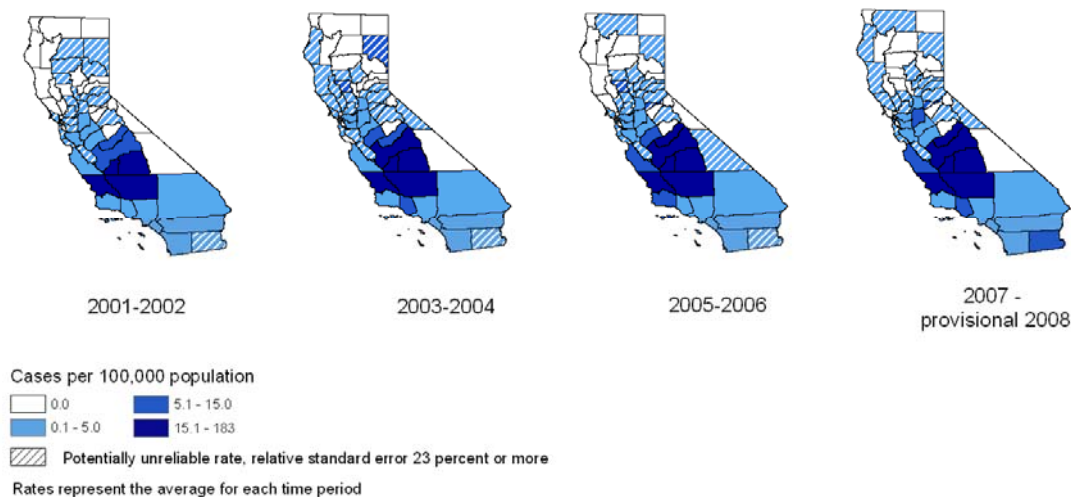
Notes for Figures 1-3

*2008 data 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



During the surveillance period, CDPH received reports of increased cases in at least 1 federal and 2 state correctional institutions in the Central Valley. Taft Correctional Institution, a federal prison in Kern County, Avenal State Prison in Kings County, and Pleasant Valley State Prison in Fresno County reported increased numbers of cases among inmates in 2003, 2004, and 2005, respectively. CDPH also received report of 1 point-source outbreak of coccidioidomycosis in 2007. Ten of 12 civilian construction workers developed symptoms of coccidioidomycosis after excavating soil during an underground pipe installation on a military base in Monterey and San Luis Obispo Counties.² Eight cases had serologically-confirmed disease and 1 developed disseminated disease involving the skin.

Comment

From 2001 to 2006, coccidioidomycosis incidence rates nearly doubled in California – these increases have been described in more depth elsewhere³. Similar increases have been detected in other *Coccidioides* endemic areas such as Arizona. 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. Some of the recent increases in coccidioidomycosis in California may be attributable to increased cases among prison inmates^{3,4}.

Coccidioidomycosis is highly endemic in the San Joaquin Valley but remains an important public health and diagnostic consideration in all California counties. 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 possible³.

References and resources

- ¹Epidemiologic Summaries of Selected General Communicable Diseases in California, 2001-2008: Technical Notes <http://www.cdph.ca.gov/data/statistics/Documents/technicalnotes-episummary-aug2409.pdf>
- ²Cummings KC, McDowell A., Wheeler C, McNary J, Das R, Vugia DJ, Mohle-Boetani JC. Point-source outbreak of coccidioidomycosis in construction workers. *Epidemiol Infect* 2009 (in press).
- ³Centers for Disease Control and Prevention. Increase in coccidioidomycosis -- California, 2000-2007. *MMWR* 2009;58:105-9.
- ⁴Pappagianis D. Coccidioidomycosis in California state correctional institutions. *Ann NY Acad Sci* 2007;1111:1087-9.

Prepared by Kate Cummings, MPH, Amy Karon, DVM, MPH, Charlotte Wheeler, MD, Duc J Vugia MD, MPH, Ying Yang, and Farzaneh Tabnak, MS, PhD, Infectious Diseases Branch

Last updated 11/05/2009