EPIDEMIOLOGIC SUMMARY OF VALLEY FEVER (COCCIDIOIDOMYCOSIS) IN CALIFORNIA, 2019

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An accessible Excel data file of the 2019 Epidemiologic Summary of Valley Fever (Coccidioidomycosis) in California is available for download

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Epidemiologic Summary of Valley Fever (Coccidioidomycosis) in California, 2019

Key Findings

Valley fever (also known as coccidioidomycosis or "cocci") is a disease caused by a fungus that grows in the soil and dirt in some areas of California and the southwestern United States. People and animals can get sick when they breathe in dust that contains the Valley fever fungus. Valley fever can be serious and even fatal. Each year in California, there are around 80 deaths from Valley fever and more than 1,000 people are hospitalized with it.

Valley Fever in California in 2019

Total Cases: A total of 9,004 new Valley fever cases were reported in 2019. This is the highest number of cases reported in a given year in California since individual cases became reportable in 1995.

Rate: The rate of Valley fever in 2019 was about 23 cases per 100,000 people, which is 18% higher than in 2018, when the rate was 19 cases per 100,000 people.

- **By County**: The number of new Valley fever cases was highest in Kern County, with a total of 3,371 cases, or a rate of 368 cases per 100,000 people. Counties with the next highest rates of Valley fever in 2019 included Kings, San Luis Obispo, Tulare, Fresno, Ventura, and Madera. Overall, most cases of Valley fever in California are reported in people who live in the Central Valley and Central Coast regions, which include the counties listed above.
- **By Sex**: Like in previous years, the rate of Valley fever in 2019 was higher in males (27 cases per 100,000 males) than in females (18 cases per 100,000 females).
- **By Age Group**: The rate of Valley fever in 2019 was highest in people aged 60 to 79 years (33 cases per 100,000 people) than in any other age group. The lowest rates of Valley fever in 2019 were reported in children.
- **By Race/Ethnicity**: For cases where race and ethnicity information was available, there was a higher percentage of Valley fever cases in people who reported Hispanic ethnicity (47%) and Black, non-Hispanic race (8%) than compared to the percentage of those groups living in California.
- **By Month**: Like in previous years, more people in 2019 were diagnosed with Valley fever in the month of October (987 cases) than in any other month of the year.

To decrease the risk of Valley fever, people who live, work, or travel in areas where Valley fever has been reported should try to avoid spending time outside in dusty areas as much as possible. Avoiding outdoor dust can help reduce the risk of breathing in the Valley fever fungus from dust in the air. On windy and dusty days, people should stay inside and keep windows and doors closed, especially if they live in the Central Valley or Central Coast of California where Valley fever is more common.

For more information about Valley fever, please visit www.CouldBeValleyFever.org. To view an interactive summary of the data in this report, please view the 2019 Valley fever data dashboard.

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. Coccidioidomycosis is not transmitted directly from person to person. The fungus *Coccidioides* spp. grows throughout much of the southwestern United States (U.S.), and, in California, most cases of Valley fever are reported among people residing in counties of the southern Central Valley and Central Coast.

Following an incubation period of 1 to 3 weeks, clinical manifestations occur in 40 percent of persons infected with coccidioidomycosis and range from a relatively mild illness with symptoms such as cough, fever, or difficulty breathing, 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 persons who are Black or Filipino, pregnant women, adults of older age groups, and people with weakened immune systems[1].

We describe the epidemiology of reported coccidioidomycosis in California in 2019 and present surveillance data for years 2001 through 2019 and demographic data for years 2013 through 2019. Because some persons with coccidioidomycosis experience chronic infection and may be reported more than once, we include only the first report of coccidioidomycosis per person using a probabilistic de-duplication method spanning multiple surveillance reporting years. For a complete discussion of the definitions, methods, and limitations associated with this report, please refer to the Technical Notes at the end of this report.

California Reporting Requirements and Surveillance Case Definition

California Code of Regulations (CCR), Title 17, Section 2500 requires health care providers to report suspected cases of coccidioidomycosis to their local health department (LHD) 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[2].

California regulations require local health officers to report cases of coccidioidomycosis to the CDPH. During this surveillance period, the CDPH defined a confirmed coccidioidomycosis case per the Council of State and Territorial Epidemiologists (CSTE) as a person with clinically compatible illness and at least one of the following: culture, histopathologic, or molecular evidence of *Coccidioides* species; positive serologic test for coccidioidal antibodies in serum, cerebrospinal fluid, or other body fluids by detection of coccidioidal immunoglobulin M (IgM) by immunodiffusion, enzyme immunoassay (EIA), latex agglutination, or tube precipitin; 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. Clinically compatible illness includes 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[3]. Since January 2019, confirmed cases only need laboratory evidence to be reported. Cases included in this report were confirmed by LHDs by either meeting the clinical and laboratory criteria of the CSTE case definition or just the laboratory criteria if clinical confirmation was not feasible; CDPH accepts all cases confirmed by LHDs.

Epidemiology of Coccidioidomycosis in California

Incidence of coccidioidomycosis in 2019 was 22.5 per 100,000 population (9,004 case-patients), which is an 18 percent increase in incidence from 2018 (19.1 per 100,000; 7,625 case-patients) (Table 1 and Figure 1). More case-patients had estimated illness onset in the month of October (987 case-patients) than in any other month (Table 2).

In 2019, incidence among males was 26.7 per 100,000 population (5,303 case-patients) and is higher than incidence among females of 18.4 per 100,000 (3,688 case-patients) (Table 3). By age group, the incidence was highest among persons 60 to 79 years of age (32.6 per 100,000; 2,232 case-patients) (Table 4 and Figure 2). Incidence was 5.8 per 100,000 (524 case-patients) among children ages 17 years and younger and 27.4 per 100,000 (8,467 case-patients) among adults ages 18 years and older.

Statewide in 2019, the incidence was highest in Kern County (367.5 per 100,000; 3,371 case-patients). Other counties with high incidence included Kings (140.5 per 100,000; 217 case-patients), San Luis Obispo (95.0 per 100,000; 265 case-patients), Tulare (86.9 per 100,000; 417 case-patients), Fresno (60.8 per 100,000; 621 case-patients), Ventura (42.6 per 100,000; 364 case-patients), and Madera (40.9 per 100,000; 65 case-patients) (Figure 3). Approximately 59.1 percent of all California case-patients in 2019 resided in these counties at the time of illness onset.

Incidence by race/ethnicity was not calculated due to missing race/ethnicity data for 34.5% of reported cases in 2013 through 2019. However, for cases with complete race/ethnicity data, a higher percentage of cases reported Hispanic ethnicity (46.5%) and Black non-Hispanic race (7.9%) than would be expected based on the overall demographic profile of California (38.5% Hispanic, 6.0% Black non-Hispanic) (Table 5 and Figure 4).

Comments

In 2019, incidence of coccidioidomycosis was 22.5 per 100,000 population, which is the highest annual incidence reported in California since coccidioidomycosis became individually reportable in 1995. Incidence of coccidioidomycosis in California has increased 159 percent from 2013 (8.7 per 100,000; 3,327) to 2019 (22.5 per 100,000; 9,004). Some additional cases for 2019 may be reported after May 1, 2020 due to delays in diagnosis and reporting; future reports will have updated case numbers and incidence.

Age group, race/ethnicity, gender, and county epidemiologic profiles of incident cases with estimated illness onset dates in 2019 are similar to those reported in coccidioidomycosis epidemiologic summaries from earlier years as described previously[4].

The causes of the increase of coccidioidomycosis in recent years are not well understood but contributing factors may include climatic and environmental factors favorable to *Coccidioides* proliferation and airborne release, increase in endemic areas of susceptible residents, and increase in disease recognition, testing, and reporting. In particular, reporting completeness likely improved following the initiation of automatic electronic laboratory reporting in 2014.

Coccidioidomycosis is most often reported among residents of the counties of the southern Central Valley and Central Coast of California and remains an important public health problem in

the state. There is currently no vaccine to prevent coccidioidomycosis, but antifungal medications are available for treatment, particularly for severe disease. To decrease the risk of infection, persons living, working, or traveling in areas where coccidioidomycosis is common, especially those at increased risk for disseminated disease, should limit their exposure to outdoor dust as much as possible, including by staying inside and keeping windows and doors closed when it is windy and the air is dusty. Employers should inform outdoor workers about symptoms of coccidioidomycosis and take steps to limit workers' exposure to dust, such as watering down the soil before digging. It is important that health care providers be alert for coccidioidomycosis among patients who live in or have traveled to areas where the *Coccidioides* fungus may be present, especially those who work or participated in activities where soil is disturbed[1, 5].

For more information on coccidioidomycosis, including education materials and data from previous years, please visit the CDPH Coccidioidomycosis webpage (https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/Coccidioidomycosis.aspx).

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Coccidioidomycosis

Table 1. Coccidioidomycosis, Cases and Incidence Rates by Health Jurisdiction, California, 2013-2019

	YEAR OF ESTIMATED ILLNESS ONSET													
	2013		2014		2015		2016		2017		2018		2019	
JURISDICTION	CASES	RATE	CASES	RATE	CASES	RATE	CASES	RATE	CASES	RATE	CASES	RATE	CASES	RATE
CALIFORNIA TOTAL	3,327	8.7	2,326	6.0	3,184	8.2	5,567	14.2	7,689	19.4	7,625	19.1	9,004	22.5
ALAMEDA COUNTY TOTAL	29	1.8	24	1.5	39	2.4	48	2.9	66	4.0	76	4.6	97	5.8
ALAMEDA	28	1.9	24	1.6	38	2.5	48	3.2	66	4.3	75	4.9	96	6.2
BERKELEY	1	0.9*	0	-	1	0.8*	0	-	0	-	1	0.8*	1	0.8*
ALPINE	0	-	0	-	0	-	0	-	0	-	0	-	0	-
AMADOR	0	-	0	-	4	11.0*	0	-	1	2.7*	7	18.4*	5	13.1*
BUTTE	4	1.8*	1	0.4*	0	-	3	1.3*	4	1.8*	1	0.4*	6	2.8*
CALAVERAS	3	6.6*	1	2.2*	1	2.2*	1	2.2*	0	-	1	2.2*	3	6.8*
COLUSA	0	-	0	-	1	4.6*	1	4.5*	0	-	2	9.0*	3	13.3*
CONTRA COSTA	39	3.6	29	2.6	50	4.5	67	5.9	89	7.8	109	9.5	134	11.6
DEL NORTE	0	-	0	-	0	-	1	3.7*	0	-	0	-	0	-
EL DORADO	1	0.5*	2	1.1*	1	0.5*	2	1.1*	5	2.7*	2	1.1*	5	2.6*
FRESNO	313	32.6	161	16.6	278	28.4	613	62.0	828	82.8	640	63.3	621	60.8
GLENN	0	-	0	-	0	-	0	-	2	7.0*	0	-	2	6.9*
HUMBOLDT	0	-	0	-	1	0.7*	0	-	2	1.5*	0	-	2	1.5*
IMPERIAL	5	2.8*	2	1.1*	2	1.1*	11	5.9*	15	8.0*	19	10.1	17	8.9*
INYO	0	-	1	5.4*	0	-	0	-	0	-	0	-	0	-
KERN	1,659	190.8	932	106.3	1,083	122.6	2,256	254.2	2,789	310.8	2,949	325.1	3,371	367.5
KINGS	108	71.8	78	52.2	104	69.4	235	157.4	273	180.9	173	112.8	217	140.5
LAKE	0	-	0	-	0	-	2	3.1*	2	3.1*	1	1.5*	2	3.1*
LASSEN	0	-	0	-	9	29.1*	6	19.7*	0	-	1	3.3*	0	-
LOS ANGELES COUNTY TOTAL	345	3.4	403	4.0	558	5.5	730	7.1	932	9.1	1,013	9.9	1,156	11.3
LOS ANGELES	336	3.6	383	4.0	521	5.5	713	7.5	904	9.4	996	10.3	1,095	11.4
LONG BEACH	8	1.7*	19	4.0	36	7.6	15	3.2*	19	4.0	12	2.5*	57	12.0
PASADENA	1	0.7*	1	0.7*	1	0.7*	2	1.4*	9	6.2*	5	3.4*	4	2.7*
MADERA	46	30.2	35	22.7	55	35.6	49	31.6	64	40.8	58	36.6	65	40.9
MARIN	6	2.3*	1	0.4*	1	0.4*	2	0.8*	4	1.5*	5	1.9*	5	1.9*
MARIPOSA	0	-	0	-	2	11.1*	3	16.6*	3	16.7*	1	5.6*	2	11.2*
MENDOCINO	1	1.1*	0	-	1	1.1*	0	-	1	1.1*	0	-	3	3.4*
MERCED	54	20.4	51	19.1	91	33.8	78	28.7	105	38.0	137	49.0	105	37.0
MODOC	0	-	0	-	0	-	0	-	0	-	0	-	0	-
MONO	0	-	0	-	0	-	0	-	0	-	1	7.2*	0	-
MONTEREY	69	16.1	24	5.6	38	8.7	79	18.0	191	43.2	238	53.6	164	36.7
NAPA	0	-	0	-	0	-	2	1.4*	1	0.7*	1	0.7*	5	3.6*
NEVADA	0	-	0	-	0	-	0	-	0	-	1	1.0*	0	-
ORANGE	72	2.3	77	2.5	172	5.4	109	3.4	231	7.2	195	6.1	287	8.9
PLACER	3	0.8*	0	-	5	1.3*	3	0.8*	2	0.5*	3	0.8*	11	2.8*
PLUMAS	2	10.5*	1	5.3*	0	-	0	-	0	-	2	10.7*	0	-
RIVERSIDE	34	1.5	38	1.6	59	2.5	65	2.8	134	5.6	139	5.7	255	10.4
SACRAMENTO	9	0.6*	18	1.2*	23	1.5	27	1.8	40	2.6	43	2.8	103	6.6
SAN BENITO	1	1.7*	1	1.7*	0	-	3	5.0*	4	6.6*	3	4.9*	5	8.0*
SAN BERNARDINO	49	2.3	33	1.6	29	1.4	39	1.8	88	4.1	97	4.5	229	10.4
SAN DIEGO	93	2.9	88	2.7	113	3.5	132	4.0	274	8.3	276	8.3	417	12.4
SAN FRANCISCO	18	2.1*	4	0.5*	13	1.5*	7	0.8*	14	1.6*	12	1.4*	25	2.8
SAN JOAQUIN	51	7.2	61	8.5	97	13.3	191	25.9	203	27.1	240	31.6	281	36.4
SAN LUIS OBISPO	53	19.4	27	9.8	65	23.5	258	92.8	436	156.6	344	123.2	265	95.0
SAN MATEO	10	1.3*	3	0.4*	5	0.7*	4	0.5*	18	2.3*	16	2.1*	26	3.3
SANTA BARBARA	23	5.3	15	3.4*	25	5.6	62	13.9	116	25.8	107	23.6	75	16.5
SANTA CLARA	17	0.9*	12	0.6*	17	0.9*	39	2.0	39	2.0	76	3.9	78	4.0
SANTA CRUZ	5	1.8*	3	1.1*	1	0.4*	9	3.3*	8	2.9*	14	5.1*	21	7.6
SHASTA	0	-	1	0.6*	0	-	2	1.1*	0	-	0	-	0	-
SIERRA	0	-	0	-	0	-	0	-	0	-	0	-	0	-
SISKIYOU	1	2.2*	0	-	0	-	2	4.5*	2	4.5*	0	-	1	2.3*
SOLANO	6	1.4*	5	1.2*	19	4.4	16	3.7*	18	4.1*	17	3.9*	34	7.7
SONOMA	1	0.2*	5	1.0*	1	0.2*	2	0.4*	3	0.6*	3	0.6*	12	2.4*
STANISLAUS	39	7.4	36	6.8	49	9.1	81	14.9	122	22.2	76	13.7	80	14.3
SUTTER	1	1.0*	0	-	0	-	1	1.0*	3	3.0*	0	-	4	3.9*
TEHAMA	1	1.6*	1	1.6*	0	-	1	1.6*	0	-	1	1.5*	2	3.1*
TRINITY	0	-	0	-	0	-	0	-	0	-	1	7.5*	0	-
TULARE	116	25.4	107	23.3	119	25.6	248	53.0	290	61.4	286	60.1	417	86.9
TUOLUMNE	0	-	0	-	1	1.9*	6	11.3*	6	11.4*	2	3.8*	1	1.9*
VENTURA	39	4.6	42	5.0	48	5.6	65	7.6	254	29.7	231	27.0	364	42.6
YOLO	0	-	3	1.4*	4	1.9*	6	2.8*	4	1.8*	3	1.4*	16	7.2*
YUBA	1	1.4*	0	-	0	-	0	-	3	3.9*	2	2.6*	5	6.4*

Rates are expressed as cases per 100,000 population per year.
***Potentially unreliable rate: relative standard error 23 percent or more.**
For inclusion/exclusion criteria, please refer to the Technical Notes.

Coccidioidomycosis

Table 2. Coccidioidomycosis, Cases by Month of Estimated Illness Onset, California, 2013-2019

	YEAR OF ESTIMATED ILLNESS ONSET						
MONTH	2013	2014	2015	2016	2017	2018	2019
TOTAL	3,327	2,326	3,184	5,567	7,689	7,625	9,004
JANUARY	267	256	218	290	371	1,033	754
FEBRUARY	235	226	183	276	286	620	683
MARCH	218	159	202	235	304	567	788
APRIL	268	179	232	276	280	485	656
MAY	366	192	174	211	337	545	693
JUNE	285	170	214	308	453	491	597
JULY	286	200	295	388	502	594	631
AUGUST	285	169	259	616	743	636	752
SEPTEMBER	233	193	329	732	837	585	742
OCTOBER	293	192	407	957	1,221	707	987
NOVEMBER	323	185	351	732	1,240	723	942
DECEMBER	268	205	320	546	1,115	639	779

For inclusion/exclusion criteria, please refer to the Technical Notes.

Table 3. Coccidioidomycosis, Cases and Incidence Rates by Sex, California, 2013-2019

	YEAR OF ESTIMATED ILLNESS ONSET													
	2013		2014		2015		2016		2017		2018		2019	
SEX	CASES	RATE	CASES	RATE	CASES	RATE	CASES	RATE	CASES	RATE	CASES	RATE	CASES	RATE
TOTAL	3,327	8.7	2,326	6.0	3,184	8.2	5,567	14.2	7,689	19.4	7,625	19.1	9,004	22.5
FEMALE	1,180	6.1	864	4.4	1,172	6.0	2,062	10.4	2,738	13.8	2,931	14.6	3,688	18.4
MALE	2,132	11.2	1,460	7.6	2,009	10.3	3,501	17.9	4,942	25.1	4,688	23.7	5,303	26.7
UNKNOWN	15	-	2	-	3	-	4	-	9	-	6	-	13	-

Rates are expressed as cases per 100,000 population per year.
For inclusion/exclusion criteria, please refer to the Technical Notes.

Table 4. Coccidioidomycosis, Cases and Incidence Rates by Age Group, California, 2013-2019

	YEAR OF ESTIMATED ILLNESS ONSET													
	2013		2014		2015		2016		2017		2018		2019	
AGE GROUP	CASES	RATE	CASES	RATE	CASES	RATE	CASES	RATE	CASES	RATE	CASES	RATE	CASES	RATE
TOTAL	3,327	8.7	2,326	6.0	3,184	8.2	5,567	14.2	7,689	19.4	7,625	19.1	9,004	22.5
0-4	22	0.9	9	0.4*	18	0.7*	32	1.3	60	2.4	58	2.4	47	2.0
5-19	290	3.6	164	2.1	235	3.0	566	7.1	761	9.6	650	8.2	629	7.9
20-39	1,012	9.3	639	5.8	863	7.8	1,673	15.0	2,255	20.1	2,237	19.9	2,550	22.7
40-59	1,260	12.3	876	8.6	1,210	11.8	2,005	19.7	2,775	27.4	2,678	26.5	3,147	31.3
60-79	629	11.4	542	9.4	715	12.0	1,094	17.6	1,580	24.6	1,707	25.7	2,232	32.6
80+	96	7.4	86	6.4	131	9.6	190	13.6	254	17.8	286	19.6	386	25.7
UNKNOWN	18	-	10	-	12	-	7	-	4	-	9	-	13	-

Rates are expressed as cases per 100,000 population per year.
For inclusion/exclusion criteria, please refer to the Technical Notes.
*Potentially unreliable rate: relative standard error 23 percent or more.

Table 5. Coccidioidomycosis, Cases by Race/Ethnicity, California, 2013-2019

	YEAR OF ESTIMATED ILLNESS ONSET						
RACE/ETHNICITY	2013	2014	2015	2016	2017	2018	2019
TOTAL	3,327	2,326	3,184	5,567	7,689	7,625	9,004
WHITE, NON-HISPANIC	728	578	799	1,247	1,728	1,709	1,706
HISPANIC	1,000	748	871	1,747	2,238	2,215	1,972
ASIAN/PACIFIC ISLANDER	132	112	159	273	399	384	358
BLACK, NON-HISPANIC	176	122	200	273	352	384	336
AMERICAN INDIAN/ALASKA NATIVE	18	13	12	17	38	17	47
MULTIPLE RACE	5	8	5	21	16	8	12
OTHER	45	35	105	166	568	505	752
UNKNOWN	1,223	710	1,033	1,823	2,350	2,403	3,821

For inclusion/exclusion criteria, please refer to the Technical Notes.

Coccidioidomycosis

Figure 1. Coccidioidomycosis Cases and Incidence Rates by Year of Estimated Illness Onset, California, 2001-2019

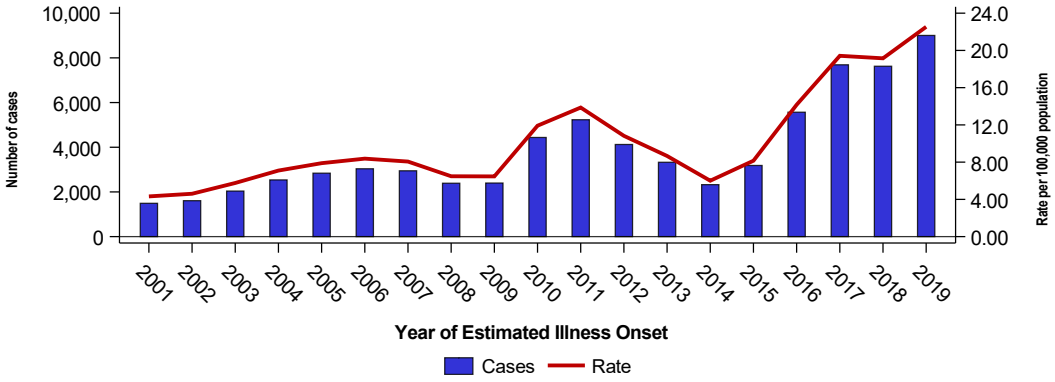


Figure 2. Coccidioidomycosis Incidence Rates by Age Group and Year of Estimated Illness Onset, California, 2013-2019

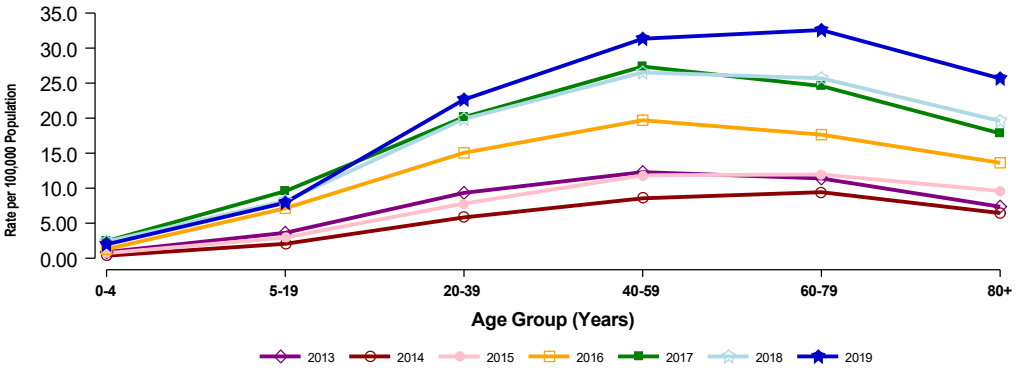


Figure 3. Coccidioidomycosis, Annual Incidence Rate by County, California, 2013-2019

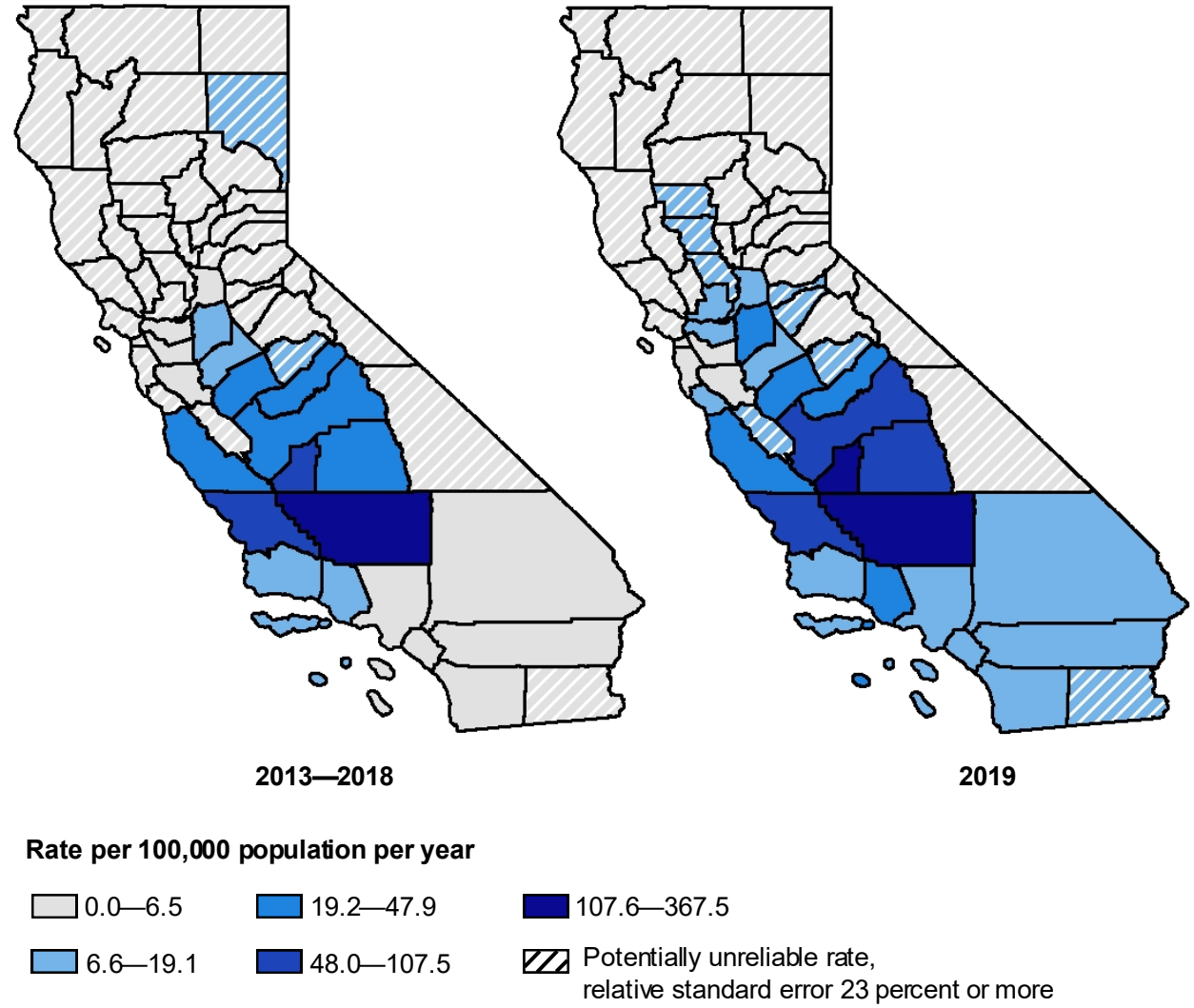
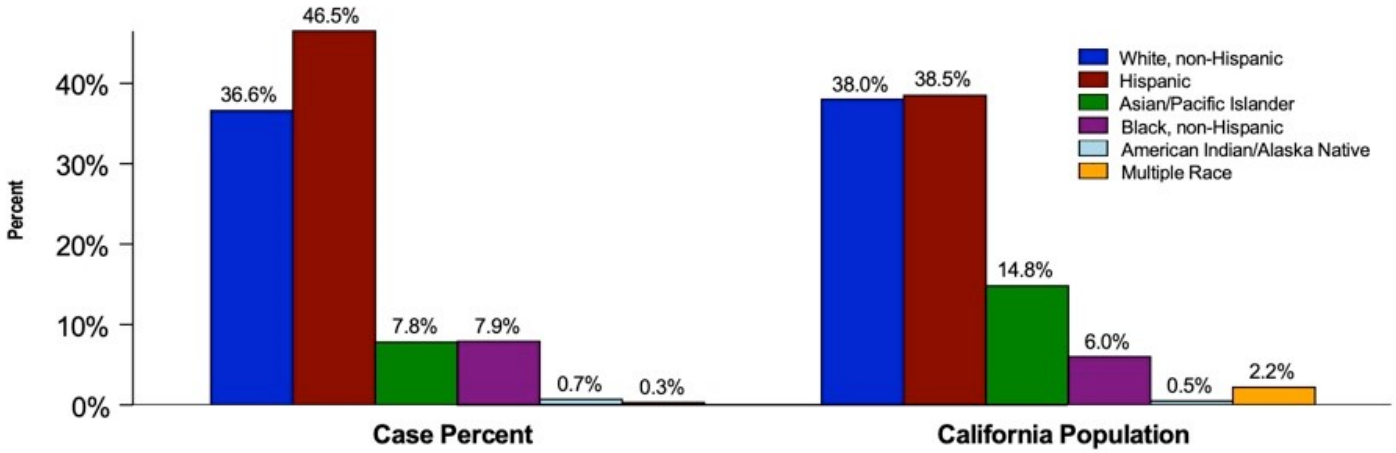


Figure 4. Coccidioidomycosis, Cases and Population by Race/Ethnicity, California, 2013-2019



34.5% (n=13363) of reported incidents of Coccidioidomycosis did not identify race/ethnicity and 5.6% (n=2176) of reported incidents identified as 'Other' race/ethnicity and are not included in the Case Percent calculation. Information presented with a large percentage of missing data should be interpreted with caution.

Technical Notes

Background

The California Department of Public Health (CDPH) Infectious Diseases Branch maintains a passive reporting system for a list of communicable disease cases and outbreaks, including coccidioidomycosis, mandated by state law and regulation[2]. Healthcare providers and laboratories are required to report known or suspected cases of these communicable diseases to their local health department (LHD). LHDs in turn report these cases to CDPH.

The collection and distribution of information on the health of the community is a core function and essential service of public health. The data in this epidemiologic summary provide important health information on the magnitude and burden of coccidioidomycosis in California. Bearing in mind their limitations, these surveillance data can contribute to the identification of risk groups to whom intervention strategies and actions can be targeted, and aid in assessing the effectiveness of these control and prevention measures.

Materials and methods

Case data sources and inclusion criteria

Included in this document-- Epidemiologic Summary of Coccidioidomycosis in California, 2019-- are incident cases of coccidioidomycosis with estimated illness onset dates from January 1, 2001 through December 31, 2019, and detailed demographic data of coccidioidomycosis cases with estimated illness onset dates from January 1, 2013 through December 31, 2019. These data were extracted from California Confidential Morbidity Reports that LHDs submitted to CDPH by May 1, 2020. The Council of State and Territorial Epidemiologists (CSTE) surveillance case definition, requires both clinical and laboratory criteria, for reporting cases as confirmed[3]. However, some LHDs used laboratory results only due to resource constraints; CDPH accepts all cases closed by LHDs as confirmed. Due to delays in provider reporting and time required for LHDs to complete clinical, laboratory, and epidemiologic investigation of reported cases, LHDs may continue to add and rescind cases with eligible illness onset dates after the closeout date of this summary. Data used in this report were quality checked and duplicate records were removed based on a data matching algorithm. Because coccidioidomycosis may occur as a chronic condition and be reported more than once, we included only the first report of coccidioidomycosis per person based on estimated illness onset using a probabilistic de-duplication method spanning multiple surveillance reporting years.

Population data source

For the 2019 Epidemiologic Summary of Coccidioidomycosis in California, we used State of California, Department of Finance projections and estimations population data[6, 7, 8].

Definitions

A case-patient was defined as a person who had laboratory and/or clinical evidence of infection that satisfied the most recent surveillance case definition published by the CSTE. Coccidioidomycosis cases included in the report were closed by the LHDs either after having met case definition criteria for a confirmed case or using laboratory results only; CDPH accepts all cases closed by LHDs as confirmed.

Estimated date of illness onset was defined as the date closest to the time when symptoms first appeared. For cases for which an illness onset date was not explicitly reported, estimated date of illness onset was selected as the earliest of: date of diagnosis, date the case was reported to or received by CDPH, date of laboratory specimen collection, or date of patient death. Because illness onset of coccidioidomycosis is often insidious, estimated illness onset was frequently drawn from the diagnosis date.

Cases were classified to local health jurisdiction according to the case-patient's county of residence. This classification may not correspond to the county where the case-patient was exposed, sought medical care, or was diagnosed.

Sex categories were defined as follows: Female (including Female to Male transgender) and Male (including Male to Female transgender). Cases that did not report a sex were listed as Unknown. We defined mutually exclusive race/ethnicity categories as follows: Hispanic (of any, including unknown race); White, non-Hispanic; Black, non-Hispanic; Asian/Pacific Islander; American Indian/Alaska Native; Multiple Race; and Other. Cases for which race and ethnicity were not reported were categorized as Unknown.

Data analyses

Within this epidemiologic summary, we use incidence rates (or the number of cases per 100,000 people per year) to convey how common a disease is in a place (such as a county) or a group (such as sex, age, or racial/ethnic group) compared to the number of people in that place or group (the population). Different places and groups have different population sizes, and the number of new cases in those places or groups can mean different things based on the size of the population. To understand which place or group has a higher risk of disease, it is better to compare their incidence rates than the number of cases.

We reported case totals and incidence rates per 100,000 population stratified by local health jurisdiction, year of estimated illness onset, sex, and age group.

Incidence rate (IR) = (Number of cases in specified year(s)/population) x 100,000

Standard error (SE) = IR/$\sqrt{}$number of cases

Relative standard error = SE/IR x 100

We defined an incidence estimate as unreliable if the relative standard error was 23 percent or more (a threshold recommended by the National Center for Health Statistics)[9]. A substantial portion of race/ethnicity data were missing, thus incidence rates by race/ethnicity were not calculated. However, for comparison we depicted case totals and California population totals by race/ethnicity.

Tables and figures

The following tables and figures are included in this report; please note that the tables and figures may be altered or suppressed to minimize depiction of unreliable incidence rates:

Tables:

1. *Coccidioidomycosis, Cases and Incidence Rates by Health Jurisdiction, California, 2013-2019*
2. *Coccidioidomycosis, Cases by Month of Estimated Illness Onset, California, 2013-2019*
3. *Coccidioidomycosis, Cases and Incidence Rates by Sex, California, 2013-2019*
4. *Coccidioidomycosis, Cases and Incidence Rates by Age Group, California, 2013-2019*
5. *Coccidioidomycosis, Cases by Race/Ethnicity, California, 2013-2019*

Figures:

1. *Coccidioidomycosis, Cases and Incidence Rates by Year of Estimated Illness Onset, California, 2001-2019*
2. *Coccidioidomycosis, Incidence Rates by Age Group and Year of Estimated Illness Onset, California, 2013-2019*
3. *Coccidioidomycosis, Annual Incidence Rate by County, California, 2013-2019*
4. *Coccidioidomycosis, Cases and Population by Race/Ethnicity, California, 2013-2019*

Limitations

Completeness of reporting

The number of reported cases of coccidioidomycosis summarized in this report are likely to underestimate the true magnitude of the disease. Factors that may contribute to under-reporting include ill persons not seeking health care, misdiagnoses, not ordering diagnostic tests, and limited reporting by clinicians and laboratories. Factors that may enhance disease reporting include increased exposure and disease severity, recent media or public attention, and active surveillance activities.

Because race/ethnicity information was missing or incomplete for 34.5 percent of all 2013-2019 cases included in this report, incidence rates by race/ethnicity were not calculated. However, the proportion of cases representing race/ethnicity categories are presented alongside statewide averages for these categories during the seven-year surveillance period. Nonetheless, race/ethnicity information based on a high percentage of missing data should be interpreted with caution.

Data presented in this report may differ from previously published data due to delays inherent to case reporting, laboratory reporting, and epidemiologic investigation.

Small numbers and rate variability

All incidence rates are subject to random variation. Random variation may be substantial when

the number of cases is small (e.g., less than 20) and can obscure distinguishing random statistical fluctuations from true changes in the incidence of disease. Rates and proportions based on small numbers of cases should be interpreted with caution.

Rate comparisons

Incidence rate comparisons between local health jurisdictions and surveillance years should be done with caution.

References

[1] Brown J, Benedict K, Park BJ, Thompson GR 3rd. Coccidioidomycosis: epidemiology. Clinical Epidemiology 2013:5; 185-197.

[2] California Code of Regulations, Title 17, Sections 2500. https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH%20Document%20Library/ReportableDiseases.pdf

[3] Council of State and Territorial Epidemiologists. Coccidioidomycosis (Valley fever) (*Coccidioides* spp.) position statement 10-ID-04, 2011 [cited 29 Jun 2020]. https://wwwn.cdc.gov/nndss/conditions/coccidioidomycosis/case-definition/2011/

[4] State of California, Department of Public Health. Epidemiological Summaries of Selected General Communicable Diseases in California, 2001-2008 & 2009-2012. Sacramento, California, November 2009; January 2014. https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH%20Document%20Library/CocciEpiSummary09-12.pdf. https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH%20Document%20Library/EpiSummariesofSelectedCommDiseasesinCA2001-2008.pdf#page=17

[5] Preventing Work-Related Valley Fever (Coccidioidomycosis). California Department of Public Health. https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/OHB/Pages/Cocci.aspx

[6] State of California, Department of Finance. P-3 State and County Total Population Projections by Race/Ethnicity and Detailed Age, 2010–2060. Sacramento, California, January 2020.

[7] State of California, Department of Finance, E-4 Population Estimates for Cities, Counties, and the State, 2011–2018, with 2010 Benchmark. Sacramento, California, May 2020.

[8] State of California, Department of Finance, Race/Hispanics Population with Age and Gender Detail, 2000–2010. Sacramento, California, March 2013.

[9] Xu JQ, Murphy SL, Kochanek KD, Bastian B, Arias E. Deaths: Final data for 2016. National Vital Statistics Reports; vol 67 no 5. Hyattsville, MD: National Center for Health Statistics. 2018.

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