

Economic costs of coccidioidomycosis

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Methods and results

- Review of literature using PubMed with search terms “Coccidioidomycosis OR Valley Fever NOT Rift” and MeSH term “Economics”
- 12 published articles identified
- 3 are within scope
- Additional report identified in grey literature

Grizzle, Arizona 2019

- Lifetime cost of care analysis based on cases reported in Arizona in 2019
 - Median age 50 years, females 55%
 - Societal perspective
- Total \$736 million for 10 359 cases
 - Total direct medical costs \$671 million
 - Total indirect costs \$65 million
- Cost per average: **\$64 800 per person in direct costs** and \$6 300 for indirect costs
- Costs varied by degree of complication
 - Disseminated disease \$1.26 million direct and \$137 400 indirect costs per person
 - Primary uncomplicated pneumonia with \$23 200 in direct costs and \$1300 in lost wages

Table 3. Estimated Total Direct and Indirect Lifetime Costs for Newly Diagnosed Valley Fever Cases in Arizona in 2019

Costs	Patients (N = 10 359)	Avg Per Person Lifetime Cost	Total Lifetime Cost for Arizona
Direct Costs			
Primary uncomplicated pneumonia	8805	\$23 192	\$204 209 262
Chronic pneumonia	259	\$130 033	\$33 675 245
Disseminated infection	259	\$1 262 414	\$326 933 779
Other pulmonary changes: pulmonary nodules	725	\$100 768	\$73 069 735
Other pulmonary changes: pulmonary cavities	311	\$106 171	\$32 994 839
Indirect Costs			
Primary uncomplicated pneumonia	8805	\$1299	\$11 437 890
Chronic pneumonia	259	\$41 113	\$10 647 198
Disseminated infection	259	\$137 379	\$35 577 694
Other pulmonary changes: pulmonary nodules	725	\$7471	\$5 417 535
Other pulmonary changes: pulmonary cavities	311	\$7 471	\$2 321 801
Total Costs of Valley Fever			
Direct costs			\$670 882 860
Indirect costs			\$65 402 119
Work loss			\$22 876 440
Mortality			\$42 525 679
Total direct + indirect costs		\$71 077	\$736 284 978

Abbreviations: Avg, average.

Wilson, California 2019

- Lifetime cost of care analysis based on cases reported in California in 2017
 - Indirect costs work loss, short- and long-term disability, and mortality costs
 - Societal perspective
- Total \$700 million for 7 466 cases
 - Total direct medical costs \$429 million
 - Total indirect costs \$271 million
- Average cost per case: **\$57 413 per person in direct costs** and \$36 297 for indirect costs
- Costs varied by degree of complication
 - Disseminated disease \$1 023 730 direct and \$562,291 indirect costs per person
 - Primary uncomplicated pneumonia with \$22 039 in direct costs and \$931 in lost wages

Economic burden of coccidioidomycosis varies by county

Table 4. Estimated total direct and indirect lifetime costs, stratified by endemic counties and counties with >100 reported coccidioidomycosis (CM) cases in 2017 in California.

County	Number (<i>n</i> = 7466)	Direct Cost	Indirect Cost	Total Cost
Fresno *	824	\$47,308,662	\$29,928,554	\$77,237,216
Kern *	2748	\$157,772,090	\$99,810,276	\$257,582,366
Kings *	260	\$14,927,490	\$9,443,476	\$24,370,966
Los Angeles County	934	\$53,624,138	\$33,923,871	\$87,548,009
Madera *	65	\$3,731,873	\$2,360,869	\$6,092,742
Monterey	182	\$10,449,243	\$6,610,433	\$17,059,676
San Diego	142	\$8,152,706	\$5,157,591	\$13,310,297
San Luis Obispo *	419	\$24,056,225	\$15,218,525	\$39,274,749
Tulare *	275	\$15,778,692	\$9,988,292	\$25,776,983

* Coccidioidomycosis endemic counties.

Sondermeyer, California 2000-2011

- Analysis restricted to hospitalized patients only
- Abstracted length of stay and hospital charges
- Median length of stay 6 days
- Total charges over 12-year period \$2.23 billion
- Average annual charge \$185 million
- **Average hospital charge per patient \$55 062** (range \$1 000 to >\$6 million)
- Charges increased from \$73 million in 2000 to \$308 in 2011 (inflation adjusted)
- 62% of charges were billed to government payors

Total and average costs for coccidioidomycosis-associated hospitalizations by expected payor, California, 2000-2011

Table 5. Total and average annual charges, by expected source of payment category, for coccidioidomycosis-associated hospitalizations, California, 2000–2011*

Payment category	Total charges, US \$ (%)	Average annual charges, US \$
Private coverage	713,390,109 (32)	59,449,176
Government	1,388,671,670 (62)	115,722,639
Medi-Cal	595,837,721 (27)	49,653,143
Medicare	567,965,499 (25)	47,330,458
Other government	161,878,874 (7)	13,489,906
County indigent programs	62,989,577 (3)	5,249,131
Self-pay	92,892,777 (4)	7,741,065
Workers compensation	18,209,024 (1)	1,517,419
Other payer	11,775,902 (1)	981,325
Other indigent	7,553,126 (<1)	629,427
Invalid/unknown	593,365 (<1)	118,673
Total charges	2,233,085,973 (100)	186,159,724

*Unknown, invalid, and missing charges were excluded from this analysis. Charity care charges coded as \$1 were also excluded. Approximately 8% of hospitalizations were missing total charge data. These charges are not adjusted for inflation.

Conclusions

- Observations of direct medical costs per person are consistent across three studies:
 - Sondermeyer: \$55 062 (hospitalized patients only) California 2000-2011
 - Wilson: \$57 413 California 2017
 - Grizzle: \$64 800 Arizona 2019
- Taking a mid point between Wilson and Grizzle and 18 407 cases reported to CDC in 2019, the lifetime direct medical costs associated with this cohort of cases would be \$1.125 billion