

Epidemiology, Clinical Features, and Outcomes of Coccidioidomycosis, Utah, 2006–2015

Appendix

Appendix Table 1. Demographic and clinical data of pulmonary vs. nonpulmonary disease patients from coccidioidomycosis cases identified in the Intermountain Healthcare System database, 2006–2015 (N = 366)*

Characteristic	Pulmonary disease	Nonpulmonary disease	P value
	n (%)	n (%)	
Total cases	323 (88.7)	41 (11.3)	NA
Age	61 (44–71)†	60 (40–74)†	0.94
Pediatric	12 (3.7)	1 (2.4)	1.00
Male	178 (55.1)	23 (56.1)	1.00
Race			
American Indian	3 (0.9)	2 (4.9)	0.014
Asian	2 (0.6)	0 (0.0)	
Black	0	1 (2.4)	
Hispanic	18 (5.6)	2 (4.9)	
Pacific Islander	7 (2.2)	2 (4.9)	
Unknown	5 (1.5)	2 (4.9)	
White	288 (89.2)	32 (78.0)	
All nonwhite	35 (10.8)	9 (22.0)	0.046
White	288 (89.2)	32 (78.0)	
Charlson comorbidity score	2 (0–3)†	2 (0–5)†	0.32
Additional medical factors			
Diabetes mellitus	70 (21.7)	11 (26.8)	0.58
Hepatic disease	53 (16.4)	8 (19.5)	0.78
Chronic pulmonary disease	130 (40.2)	14 (34.1)	0.56
Connective tissue disease	22 (6.8)	5 (12.2)	0.34
Congestive heart failure	45 (13.9)	8 (19.5)	0.47
Neurological disease	42 (13.0)	10 (24.4)	0.08
Renal disease	37 (11.5)	8 (19.5)	0.22
History of malignancy	68 (21.1)	8 (19.5)	1.00
Hematopoietic stem cell transplant	2 (0.6)	0 (0.0)	1.00
Solid organ transplant	1 (0.3)	1 (2.4)	0.21
Medication			
Any immunosuppressive medication	21 (6.5)	6 (14.6)	0.06
Corticosteroids	20 (6.2)	5 (12.2)	0.18
Tumor necrosis factor inhibitors	2 (0.6)	1 (2.4)	0.3
Antimetabolite	1 (0.3)	1 (2.4)	0.22
Chemotherapy	3 (0.9)	1 (2.4)	0.38
Lymphopenia, absolute lymphocyte count <500	8 (2.5)	4 (9.8)	0.04
Outcomes			
Coccidioidomycosis-related hospital admission	131 (40.6)	23 (56.1)	0.08
Hospital length of stay	0 (0–4)†	3 (0–10)†	0.023
42-day all-cause mortality	17 (5.3)	3 (7.3)	0.71
1-year all-cause mortality	26 (8.0)	7 (17.1)	0.08
Case classification			
Proven	161 (49.8)	31 (75.6)	0.003
Probable	162 (50.2)	10 (24.4)	0.003

*NA, not applicable

†Median (25%–75% interquartile range), not number (%)

Appendix Table 2. Coccidioidomycosis management of coccidioidomycosis case-patients identified in the Intermountain Healthcare System database, 2006–2015 (N = 366)

Management	n (%)
Treatment options used	
Antifungal alone	209 (57.4)
Antifungal + surgical resection	7 (1.9)
Surgical resection alone	17 (4.7)
No treatment	46 (12.6)
Unknown	85 (23.4)
Initial antifungal used	
Amphotericin B	7 (3.2)
Caspofungin	2 (0.9)
Fluconazole	198 (91.7)
Itraconazole	2 (0.9)
Micafungin	4 (1.9)
Posaconazole	1 (0.5)
Voriconazole	1 (0.5)
Unknown	1 (0.5)
Switched to a different regimen	45 (20.8)
Duration of treatment	
Unknown duration	61 (28.2)
<1 mo	17 (7.9)
1 to <3 mo	5 (2.3)
3 to <6 mo	23 (10.6)
6 to <9 mon	35 (16.2)
9 to <12 mo	19 (8.8)
≥12 mo	44 (20.4)
Lifetime treatment	12 (5.6)
Managing physician	
Primary care provider	30 (8.2)
Pulmonary specialist	122 (33.5)
Infectious disease specialist	83 (22.8)
Other	24 (6.6)
Unknown	107 (29.4)

Appendix Table 3. Generalized linear model for analysis of variation of coccidioidomycosis cases reported to the Utah Department of Health by year, population, temperature, precipitation, and construction*

Variable	Type III sum of squares	DF	Mean square	F value	P value	Partial η^2
Corrected model	2,094.654†	5	418.931	22.913	0.000	0.414
Intercept	19.040	1	19.040	1.041	0.309	0.006
Year	20.508	1	20.508	1.122	0.291	0.007
Mean annual population	214.951	1	214.951	11.756	0.001	0.068
Mean annual temperature	966.697	1	966.697	52.872	<0.001	0.246
Mean annual precipitation	66.264	1	66.264	3.624	0.059	0.022
Mean annual new construction permits/100,000	229.484	1	229.484	12.551	0.001	0.072
Error	2,961.989	162	18.284	NA	NA	NA
Total	5,854.000	168	NA	NA	NA	NA
Corrected total	5,056.643	167	NA	NA	NA	NA

*DF, degrees of freedom; NA, not applicable
 † $R^2 = 0.42$ (adjusted $R^2 = 0.396$).

Appendix Table 4. ANCOVA for estimated adjusted coccidioidomycosis incidence calculated from cases reported to the Utah Department of Health (N = 5,854) with covariates of year, population, temperature, precipitation, construction and county*

Covariate	Type III sum of squares	DF	Mean square	F value	P value	Partial η^2
Corrected model	4,644.421	28	165.872	55.932	0.000	0.918
Intercept	0.576	1	0.576	0.194	0.660	0.001
Year	0.604	1	0.604	0.204	0.652	0.001
Mean annual population	7.485	1	7.485	2.524	0.479	0.018
Mean annual temperature	1.492	1	1.492	0.503	0.903	0.004
Mean annual precipitation	0.044	1	0.044	0.015	0.518	0.000
Mean annual new construction permits/100,000	1.248	1	1.248	0.421	0.114	0.003
County	2,549.767	23	110.859	37.381	0.000	0.861
Error	412.222	139	2.966	NA	NA	NA
Total	5,854.000	168	NA	NA	NA	NA
Corrected total	5,056.643	167	NA	NA	NA	NA

*DF, degrees of freedom; NA, not applicable

Appendix Table 5. Distribution of coccidioidomycosis cases identified in the Intermountain Healthcare System (N = 366) by zip code, and Utah city and county

Zip Code	n (%)	City	County
84790	60 (16.48)	St. George	Washington
84770	53 (14.56)	St. George	Washington
84780	38 (10.44)	Washington	Washington
89027	25 (6.87)	Mesquite	Clark
84737	22 (6.04)	Hurricane	Washington
89024	10 (2.75)	Mesquite	Clark
84765	8 (2.20)	Santa Clara	Washington
84721	8 (2.20)	Cedar City	Iron
84738	6 (1.65)	Ivins	Washington
84720	6 (1.65)	Cedar City	Iron
86432	5 (1.37)	Little Field	Mohave
84121	5 (1.37)	Salt Lake City	Salt Lake
89034	4 (1.10)	Mesquite	Clark
89040	3 (0.82)	Overton	Clark
86021	3 (0.82)	Colorado City	Mohave
84020	3 (0.82)	Draper	Salt Lake
84092	3 (0.82)	Sandy	Salt Lake
84003	3 (0.82)	American Fork	Utah
84651	3 (0.82)	Payson	Utah
84745	2 (0.55)	La Verkin	Washington
84771	2 (0.55)	St. George	Washington
84784	2 (0.55)	Hildale	Washington
84713	2 (0.55)	Beaver	Beaver
84501	2 (0.55)	Price	Carbon
86022	2 (0.55)	Fredonia	Coconino
84014	2 (0.55)	Centerville	Davis
84041	2 (0.55)	Layton	Davis
84761	2 (0.55)	Parowan	Iron
84047	2 (0.55)	Midvale	Salt Lake
84070	2 (0.55)	Sandy	Salt Lake
84093	2 (0.55)	Sandy	Salt Lake
84109	2 (0.55)	Salt Lake City	Salt Lake
84116	2 (0.55)	Salt Lake City	Salt Lake
84118	2 (0.55)	Salt Lake City	Salt Lake
84005	2 (0.55)	Eagle Mountain	Utah
84042	2 (0.55)	Lindon	Utah
84043	2 (0.55)	Lehi	Utah
84097	2 (0.55)	Orem	Utah
84604	2 (0.55)	Provo	Utah
84032	2 (0.55)	Heber	Wasatch
84401	2 (0.55)	Ogden	Weber
84405	2 (0.55)	Ogden	Weber
84722	1 (0.27)	Central	Washington
84757	1 (0.27)	New Harmony	Washington
84774	1 (0.27)	Toquerville	Washington
84779	1 (0.27)	Virgin	Washington
84783	1 (0.27)	Dammeron Valley	Washington
84752	1 (0.27)	Minersville	Beaver
84302	1 (0.27)	Brigham City	Box Elder
89021	1 (0.27)	Logandale	Clark
89042	1 (0.27)	Panaca	Clark
86040	1 (0.27)	Page	Coconino
84010	1 (0.27)	Woods Cross/Bountiful	Davis
84015	1 (0.27)	Clearfield	Davis
84025	1 (0.27)	Farmington	Davis
84037	1 (0.27)	Kaysville	Davis
84075	1 (0.27)	Syracuse	Davis
84089	1 (0.27)	Clearfield	Davis
84726	1 (0.27)	Escalante	Garfield
84759	1 (0.27)	Panguitch	Garfield
84764	1 (0.27)	Bryce	Garfield
84756	1 (0.27)	Newcastle	Iron
86406	1 (0.27)	Lake Havasu City	Mohave
84044	1 (0.27)	Magna	Salt Lake
84054	1 (0.27)	North Salt Lake	Salt Lake
84094	1 (0.27)	Sandy	Salt Lake
84095	1 (0.27)	South Jordan	Salt Lake

Zip Code	n (%)	City	County
84096	1 (0.27)	Herriman	Salt Lake
84106	1 (0.27)	Salt Lake City	Salt Lake
84108	1 (0.27)	Salt Lake City	Salt Lake
84117	1 (0.27)	Salt Lake City	Salt Lake
84119	1 (0.27)	Salt Lake City	Salt Lake
84120	1 (0.27)	Salt Lake City	Salt Lake
84128	1 (0.27)	Salt Lake City	Salt Lake
84129	1 (0.27)	Salt Lake City	Salt Lake
84165	1 (0.27)	Salt Lake City	Salt Lake
84629	1 (0.27)	Fairview	Sanpete
84643	1 (0.27)	Mayfield	Sanpete
84647	1 (0.27)	Mount Pleasant	Sanpete
84754	1 (0.27)	Monroe	Sevier
84060	1 (0.27)	Park City	Summit
84074	1 (0.27)	Tooele	Tooele
84004	1 (0.27)	Alpine	Utah
84057	1 (0.27)	Orem	Utah
84062	1 (0.27)	Pleasant Grove	Utah
84601	1 (0.27)	Provo	Utah
84653	1 (0.27)	Salem	Utah
84655	1 (0.27)	Santaquin	Utah
84715	1 (0.27)	Bicknell	Wayne
84067	1 (0.27)	Roy	Weber
84317	1 (0.27)	Huntsville	Weber
84404	1 (0.27)	Ogden	Weber