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## Epidemiology of tinea capitis causative species: An analysis of fungal culture results from a major United States national commercial laboratory

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### Keywords

culture; dermatophyte; epidemiology; laboratories; tinea capitis; United States

### To the Editor:

Tinea capitis (TC), a scalp and hair dermatophytosis, is a common childhood infection.<sup>1</sup> US data on the species causing TC are geographically limited or outdated.<sup>1–4</sup> We aimed to describe TC testing practices and causative organisms to improve clinical management.

We analyzed Labcorp (a major US commercial laboratory) data sent to Centers for Disease Control and Prevention's National Syndromic Surveillance Program, a collaborative electronic health data sharing effort among Centers for Disease Control and Prevention, health departments, and academic and private sector partners. We identified fungal culture results ordered during March 1, 2019 to October 31, 2022 using Logical Observation Identifiers Names and Codes codes and patients with suspected TC using International Classification of Diseases, 10th Revision code B35.0. We examined patient demographic characteristics, ordering clinical specialty, species, and order month.

Among 20,259 fungal culture results, most patients were children (median age: 8.0 years, interquartile range: 5.0–14.0), male (53.5%), and Southern US-based (65.3%) (Table I). The most common ordering specialties were dermatology (43.3%) and pediatrics (35.6%).

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Conflicts of interest

Dr Lipner has served as a consultant for BelleTorus Corporation, Ortho-dermatologics, Moberg Pharmaceuticals, and Hoth Therapeutics. Dr Gold, Author Benedict, and Dr Lockhart have no conflicts of interest to declare.

IRB approval status: Not applicable.

Disclaimer: The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

This activity was reviewed by CDC and was conducted consistent with applicable federal law and CDC policy (eg, 45 C.F.R. part 46, 21 C.F.R. part 56; 42 U.S.C. §241(d); 5 U.S.C. §552a; 44 U.S.C. §3501 et seq).

Overall, 7046 (34.8%) results were positive for fungus; of these, 69.0% were dermatophytes, 11.4% nondermatophyte molds, 10.8% yeasts, and 8.7% unspecified fungus. Among dermatophytes, 89.1% were *Trichophyton* (89.5% *T. tonsurans* [among those identified to species level]), 10.6% *Microsporum* (92.3% *M. canus*), and 0.2% *Epidermophyton*.

Overall, fungal culture results from children aged 3 to 12 years, males, Midwesterners, and specimens ordered by nondermatologists had the highest percent positivity and, among positives, highest frequency of dermatophytes (Table II). Fewer dermatology results were from 3- to 12-year-olds (46.5%) versus other specialties (range: 64.2%–72.3%). The monthly number of culture results declined 48.1% from March 2020 to April 2020, remaining generally lower thereafter, with relatively consistent percent positivity (Supplementary Material, available via Mendeley at <https://doi.org/10.17632/rxzzct2g56.1>).

Our analysis found a higher combined percentage of yeasts and nondermatophyte molds (>20%) compared with data from a 1990s to 2000s US multicenter survey (<5.5%).<sup>4</sup> These organisms likely represent scalp or hair colonization or contamination and, unlike TC, rarely require systemic antifungal treatment. Consistent with other US studies, *T. tonsurans* was the most common dermatophyte.<sup>1</sup> *Microsporum* prevalence was relatively high compared with previous studies (10.6% vs 0%–10.3%).<sup>1,3,4</sup> Notably, terbinafine, often chosen for TC therapy because of its shorter duration, is less effective than griseofulvin against *Microsporum*.<sup>5</sup> The lower percent positivity among specimens from dermatologists might reflect more comprehensive testing, including in age groups with lower TC prevalence. Decreased in-person school attendance and care-seeking during the COVID-19 pandemic might explain the decline in fungal cultures after March 2020. The low percent positivity (34.8%) in this study is similar to results from Foster et al<sup>4</sup> (range: 33.1%–52.3%). This might reflect the insensitivity of fungal cultures for dermatophytosis or other conditions (eg, seborrheic dermatitis, psoriasis) that clinically resemble TC.

Limitations include that the dataset is not nationally representative and lacked information on underlying conditions, race/ethnicity, and testing besides cultures (eg, antifungal susceptibility). Also, because International Classification of Diseases, 10th Revision code B35 can represent TC or tinea barbae, some specimens from older patients might not represent suspected TC.

In sum, our study provides updated TC epidemiologic data and highlights the importance of laboratory testing to confirm suspected TC and ensure correct diagnosis and treatment.

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**Table I.**

Fungal culture results from persons with suspected tinea capitis in a large national commercial laboratory dataset—United States, March 1, 2019 to October 31, 2022\*

Feature	n = 20,259	%
Median age in years (IQR) (n = 20,209)	8.0	(5.0–14.0)
Sex (n = 20,001)		
Female	9304	46.5
Male	10,697	53.5
US census region (n = 20,253)		
Midwest	938	4.6
Northeast	4779	23.6
South	13,218	65.3
West	1318	6.5
Provider type (n = 17,060)		
Dermatology	7393	43.3
Pediatrics	6074	35.6
Family, general practice, internal medicine	2238	13.1
Other	1355	7.9
Fungal culture result		
Negative/no fungal growth	13,213	65.2
Positive for fungus <sup>†</sup>	7046	34.8
Dermatophytes	4864	69.0
<i>Trichophyton</i>	4336	89.1
<i>T. tonsurans</i>	2914	67.2
<i>T. violaceum</i>	135	3.1
<i>T. rubrum</i>	98	2.3
<i>T. mentagrophytes</i>	68	1.6
<i>T. soudanense</i>	30	0.7
Other <i>Trichophyton</i> species <sup>‡</sup>	10	0.2
Unspecified <i>Trichophyton</i> species	1081	24.9
Other dermatophytes	528	10.9
<i>Microsporum</i>	517	97.9
<i>M. canus</i>	477	92.3
<i>M. gypseum</i>	24	4.6
<i>M. audouinii</i>	16	3.1
<i>Epidermophyton</i>	11	2.1
Nondermatophyte molds	804	11.4
Dematiaceous molds	476	59.2
<i>Aspergillus</i> species	83	10.3
<i>Fusarium</i> species	47	5.8
Other	198	24.6

Feature	<i>n</i> = 20,259	%
Yeasts	763	10.8
<i>Candida</i> species	342	44.8
Unspecified yeast	270	35.4
<i>Rhodotorula</i> species	108	14.2
<i>Trichosporon</i> species <sup>§</sup>	10	1.3
Other	33	4.3
Unspecified fungus	615	8.7

\* This period represents the widest range of available data. We used the following Logical Observation Identifiers Names and Codes codes to identify fungal cultures: 17947–3, 17948–1, 17949–9, 18482–0, 42804–5, 42805–2, and 51723–5.

<sup>†</sup> Approximately 4.3% of fungal culture results had >1 species identified; however, data on combinations of species could not be obtained at the time of analysis.

<sup>‡</sup> Other *Trichophyton* species included *T. verrucosum* and *T. interdigitale*.

<sup>§</sup> *Trichosporon* species included *T. asahii*, *T. inkin*, and *T. mucoides*.

**Table II.** Fungal culture results from persons with suspected tinea capitis in a large national commercial laboratory dataset, by result—United States, March 1, 2019 to October 31, 2022.\*

Feature	All results		No. (%), among positive results			
	No. positive/No. tested (%)		Dermatophytes	Nondermatophyte molds	Yeasts	Unspecified fungus
Age group, years (n = 20,209)						
0–2	686/2051 (33.4)	474 (69.1)	88 (12.8)	80 (11.7)	44 (6.4)	
3–12	5285/12,188 (43.4)	3992 (75.5)	456 (8.6)	423 (8.0)	414 (7.8)	
13–21	428/2437 (17.6)	201 (47.0)	73 (17.1)	107 (25)	47 (11.0)	
>21	638/3533 (18.1)	193 (30.3)	187 (29.3)	149 (23.4)	109 (17.1)	
Sex (n = 20,001)						
Male	4273/10,697 (39.9)	3098 (72.5)	446 (10.4)	412 (9.6)	317 (7.4)	
Female	2694/9304 (29.0)	1718 (63.8)	345 (12.8)	338 (12.5)	293 (10.9)	
US census region (n = 20,253)						
South	4548/13,218 (34.4)	3026 (66.5)	573 (12.6)	473 (10.4)	476 (10.5)	
Northeast	1693/4779 (35.4)	1250 (73.8)	148 (8.7)	221 (13.1)	74 (4.4)	
West	413/1318 (31.3)	289 (70.0)	45 (10.9)	45 (10.9)	34 (8.2)	
Midwest	389/938 (41.5)	297 (76.3)	38 (9.8)	24 (6.2)	30 (7.7)	
Provider type (n = 17,060)						
Dermatology	2147/7393 (29.0)	1272 (59.2)	351 (16.3)	297 (13.8)	227 (10.6)	
Pediatrics	2341/6074 (38.5)	1735 (74.1)	223 (9.5)	242 (10.3)	141 (6)	
Family, general practice, internal medicine	880/2238 (39.3)	620 (70.5)	92 (10.5)	74 (8.4)	94 (10.7)	
Other	553/1355 (40.8)	414 (74.9)	48 (8.7)	48 (8.7)	43 (7.8)	
Total	7046/20,259 (34.8)	4864 (69.0)	804 (11.4)	763 (10.8)	615 (8.7)	

\* This period represents the widest range of available data.