UK Health Security Agency

The global epidemiology of sporotrichosis

A rapid review

Contents

Main messages

1. This rapid review (search up to 17 March 2023) identified and summarised review level evidence on the global epidemiology of sporotrichosis (5 systematic reviews) (1-5).

2. The majority of identified human sporotrichosis cases across the reviews were reported in South America, where Sporothrix (S.) brasiliensis was the most commonly identified species (1,2,5). In North America, Central America, and the Caribbean, almost all reported cases of sporotrichosis were caused by S. schenckii (2).

3. There were a similar number of male and female cases of sporotrichosis reported globally. The reported age range of cases varied considerably, with cases identified as young as 2 days, and as old as 92 years, though infections typically occurred in individuals between the ages of 30 and 50 years (2). Where occupation was reported, a slight majority of cases were farm workers, with some cases in veterinarians, pet shop workers, and other occupations (5).

4. Where co-morbidities were reported, high blood pressure and cardiovascular disease were the most common (5). While demographics of cases were reported, no statistical analyses were performed looking for associations between any risk factor and incidence or prevalence of sporotrichosis.

5. Zoonotic transmission primarily occurred from bites, scratches, or direct contact with the lesions of infected cats (4, 5). However, many cases were also infected through contact with soil (5).

6. Across reviews, the most commonly reported form of sporotrichosis was lymphocutaneous followed by fixed cutaneous, with other forms being relatively rare (1,2). Outcome data was only reported by one review, which found that across all cases, 85.8% were cured, 3.4% died, and 1.7% experienced spontaneous regression (5).

7. Three reviews looked at animal cases of sporotrichosis, with the majority of identified cases reported in cats, some cases reported in dogs, and a small number in a variety of other animals (5). In cases of cat sporotrichosis, S. brasiliensis was the most commonly identified species, with some cases of S. schenckii also reported (5).

8. All reviews were assessed as having critically low confidence in the results of the review using the AMSTAR-2 checklist (6). This was primarily because none of the reviews had accessible protocols, reported comprehensive search strategies, or assessed risks of bias in the included studies. Nonetheless, these reviews may still provide useful information on the global epidemiology of cat sporotrichosis.

Purpose

The purpose of this rapid review is to identify and summarise evidence relating to the global epidemiology of sporotrichosis, searching specifically for sporotrichosis transmission from cats. However, transmission of any sporotrichosis species, infection in any animal, and transmission from any animal were all reported, where this information was available.

Global epidemiology included geographical distribution and demographics of cases, transmission, clinical presentation, and risk factors for sporotrichosis infection.

Methods

There was one review question:

1. What is the global epidemiology of cat-transmitted sporotrichosis?

A search was conducted to identify existing reviews (systematic or rapid), evidence summaries and protocols for reviews related to the review question. The databases searched were Ovid Medline, Ovid Embase, Google Scholar for reviews, Cochrane Library Database of systematic reviews, Prospero, and Epistemonikos up to 17 March 2023.

Title and abstract screening was undertaken by one reviewer, with potentially relevant titles and abstracts then screened by a second reviewer. Screening on full text was undertaken by one reviewer. Six systematic reviews were identified that were potentially relevant to the review question, although one review was subsequently excluded as it only included studies which were not relevant to the outcomes of interest (7), leaving 5 reviews included in this rapid review (1-5).

Critical appraisal of these reviews was conducted in duplicate by 2 reviewers using the quality assessment tool AMSTAR-2, which is a critical appraisal tool for systematic reviews that include randomised or non-randomised studies of healthcare interventions, or both (6).

Data extraction and narrative summaries for each review were completed by one reviewer and checked by a second.

Full details on the methodology are provided in Annexe A. The only deviations from the protocol were to use 5 instead of 6 reviews in the evidence summary (discussed above), and to report on sporotrichosis transmitted from any source.

Evidence

In total, 106 studies were screened, and 5 systematic reviews (all rated as critically low confidence using the AMSTAR-2 checklist, see Annexe B for the full appraisals) were identified that provided evidence to answer the review question (see Annexe C):

1. Alvarez and others looked at sporotrichosis in Brazil, including 135 studies from between 1971 and 2022 (1)
2. Hernández-Castro and others looked at human cases of sporotrichosis in the Americas, including 124 studies between 2012 and 2022 (2)
3. Morgado and others looked at the global distribution of animal sporotrichosis cases, including 33 studies from between 2007 and 2021, of which 31 were published after 2011 (3)
4. Queiroz-Telles and others looked at sporotrichosis in children, including 20 studies between 2016 and 2021 (4)
5. Rabello and others looked at sporotrichosis in Brazil, including 230 studies published between 1907 and 2020, with 49 studies published between 2001 and 2010 and 218 studies published between 2011 and 2020 (5)

All reviews reported the results narratively. Two reviews combined the number of cases across studies (2,5), 2 reviews selectively reported individual studies (1, 4) and one review combined the number of samples taken from animal cases (3).

It is likely that individual cases of sporotrichosis appeared in multiple reviews, especially for reviews looking at the same geographic area (particularly Brazil) over the same time period.

Geographic distribution of sporothrix species

Hernández-Castro and others included studies with a total of 539 sporotrichosis cases in humans with identified sporothrix species in South America, identifying S. brasiliensis (n=251, 46.6%), S. schenckii (n=136, 25.2%), S. globosa plus S. schenkii (n=91, 16.9%), S. globosa (n=57, 10.6%), S. mexicana (n=3, 0.6%), and S. pallida (n=1, 0.2%) (2). Similar results were reported in the other reviews including human cases (1, 5).

For North America, Hernández-Castro and others included studies with a total of 219 sporotrichosis cases in humans with identified sporothrix species, identifying S. schenckii (n=210, 95.9%), S. globosa (n=8, 3.7%), and S. mexicana (n=1, 0.5%) (2). Results were similar for Central America and the Caribbean, identifying S. schenckii (n=54, 96.4%) and S. brasiliensis (n=2, 3.6%) in humans (2).

Queiroz-Telles and others reported that S. globosa accounted for 99.3% of paediatric sporotrichosis cases in Asia, and S. schenckii accounted for 94% of paediatric sporotrichosis cases in Australia and South Africa (4).

Demographics

Of the reviews reporting on the sex of human sporotrichosis cases, the proportion of male and female cases was roughly similar in South America (1) and globally (2), though there may have been more male than female cases in some regions, including North America, Central America, and the Caribbean (2).

The age of identified human cases was highly variable, with cases reported between 2 days old and 92 years old, but the highest incidence was in those aged between 30 and 50 years (2). Queiroz-Telles and others reported results of one included study showing that 26% of cases in a 2019 study of sporotrichosis cases endemic to Jalisco in Mexico were in those under 15 years of age. This was in agreement with results from 3 other studies conducted between 2011 to 2016 that were included in the review (4). Alvarez and others reported that children, the elderly, and women with low socioeconomic status were the groups most affected by sporotrichosis (1).

Rabello and others reported that, of 1,522 cases with employment information, a high proportion of cases were farm workers (n=784, 51.5%), whilst 68 cases (4.5%) were veterinarians or pet shop workers, 61 cases (4.0%) were mine workers, and the remaining cases had a variety of jobs (5).

Rabello and others also reported that, of 922 cases with information about co-morbidities, 312 cases (33.8%) had high blood pressure and cardiovascular disease, 156 cases (16.9%) had HIV, 31 cases (3.4%) had other immunosuppressive conditions (solid organ transplant amongst others), 124 cases (13.4%) had diabetes, 56 cases (6.1%) had alcoholism, and 30 cases (3.3%) were pregnant (5). However, no association analysis was performed between co-morbidities and sporotrichosis outcomes, and background rates of co-morbidities in the general public were not reported.

Transmission

Rabello and others reported that, of 5,996 cases with reported mode of transmission in Brazil, 3,516 cases (79.8%) were a consequence of zoonotic transmission, mostly from bites, scratches, or contact with infected cats, and 884 cases (20.1%) were infected from the soil (5). Similar transmission modes were reported by Queiroz-Telles and others (4).

Clinical presentation

Across the reviews, most clinical presentations of sporotrichosis globally were the lymphocutaneous form (over 50% in all reviews), followed by fixed cutaneous (about 20%

across reviews with some variability) (1, 2). Other forms (including disseminated or systemic, mucosal, and immunoreactive) were relatively rarer (1, 2). Rarer forms included disseminated or systemic, mucosal, and immunoreactive sporotrichosis (1, 2).

Alvarez and others reported that, compared with other species, the clinical presentation of S. brasiliensis is more often associated with both atypical disease and severe symptoms, such as hypersensitive reactions, nervous system tropism, and ocular infections, although the primary study reporting this information only had 50 cases in total, 45 of which were due to S. brasiliensis (1).

Rabello and others reported outcome data for 3,078 cases from Brazil, of which 85.8% of cases were cured, 3.4% of cases died, 1.7% of cases had spontaneous regression, 7.5% of cases abandoned treatment, and for 0.5% of cases treatment became ineffective (5).

Queiroz-Telles and others reported that the majority of paediatric sporotrichosis cases had symptoms that affected the face or limbs (93% of children had facial lesions in one study), and the average duration of disease was one to 2 months, but this varied by region, Sporothrix species, age, and immune status (4).

Animal cases

Rabello and others reported identification of 8,538 animal cases of sporotrichosis from Brazil, of which 7,750 cases (90.8%) were cats, 676 cases (7.9%) were dogs, and the remainder of cases were bovines rats, equines and other wild animals (5). Of 521 isolates from cats, 99.6% were S. brasiliensis and 0.4% were S. schenckii.

Additionally, Morgado and others reported 266 isolates from animal cases of sporotrichosis globally, of which 191 isolates (71.8%) were identified in cats, 52 isolates (19.9%) were identified in dogs, and 22 isolates (8.3%) were identified in other animals (ant, beetle, horse, mouse, weevil, termite, mite, and tiger-quoll) (3). Of 191 isolates from cats, 154 (80.6%) were S. brasiliensis, 29 (15.2%) were S. schenckii, 3 (1.6%) were S. globosa, and 1 (0.5%) was S. humicola (this was the only identified isolate in the UK). Of 52 isolates from dogs, 49 (94.2%) were S. brasiliensis, 2 (3.8%) were S. schenckii. Alvarez and others also reported that isolates from dogs were predominantly S. brasiliensis (1).

Alvarez and others also reported that in cats, sporotrichosis was most common in intact free roaming males (1).

Prevention of sporotrichosis

Recommendations for prevention of sporotrichosis infection were beyond the direct scope of this review but were reported by three reviews (1, 4, 5). These recommendations were in line with standard infection prevention practice (such as use of personal protective equipment,

disinfection of contaminated environment), in addition to cremating the bodies of deceased infected animals rather than burial to avoid contaminating the soil.

Inequalities

Limited evidence was available to explore inequalities through variations across populations and subgroups, for example cultural variations or differences between ethnic, social, or vulnerable groups. Notably, the vast majority of included studies in each of the reviews were case studies or case series in South America, describing clinical cases of sporotrichosis rather than estimating associations between different groups.

However, Alvarez and others (1) included one study looking at the causal effect of social vulnerability on sporotrichosis transmission in Brazil (8). This study reported that a higher social vulnerability index (primarily lack of access to basic sanitation, medical or veterinary services, and living in a high density population) increased likelihood of sporotrichosis transmission.

Limitations

All reviews were assessed as having critically low confidence in the results of the review using the AMSTAR-2 checklist, see Annexe B and Annexe C for individual assessments. This was primarily because none of the reviews had accessible protocols, reported comprehensive search strategies, or assessed risks of bias in the included studies. However, the AMSTAR-2 checklist was developed as a tool to assess the quality of systematic reviews of interventional studies, and the reviews reported in this rapid review included primary studies which mainly described case incidences, not the effect of interventions. Despite this, these reviews still provide useful information on the global epidemiology of cat sporotrichosis.

The search strategy used to identify reviews for this rapid review (available in the protocol in Annexe A), only used search terms pertaining to cat transmitted sporotrichosis. Several of the reviews reported transmission of sporotrichosis from other animals and from the environment, which was nonetheless reported. However, as the search strategy did not comprehensively search for transmission of sporotrichosis from animals other than cats or the environment, relevant reviews may have been missed.

The source of evidence in this rapid review was limited to systematic reviews. As with all reviews, the primary studies that were identified may be subject to publication bias, where null or negative results are less likely to have been published by the authors, though descriptive studies may be less susceptible to publication bias than other study types.

This rapid review was conducted at pace following streamlined methodology. Quality of the individual studies included in each review was not assessed and only the main characteristics of

the reviews were extracted. Data extraction was conducted in duplicate by 2 reviewers, and narrative summaries were completed by one reviewer and checked by a second.

Evidence gaps

The vast majority of identified sporotrichosis cases occurred in Brazil and other countries in South America. The clinical characteristics and transmission may be different in other countries and settings, though there have been relatively few cases in these areas. This rapid review did not identify any other relevant evidence gaps.

Conclusion

In total, 5 systematic reviews provided evidence on the global epidemiology of sporotrichosis.

Most human cases identified were S. brasiliensis in South America, with smaller numbers of S. schenckii reported in North America as well as Central America and the Caribbean. Roughly similar numbers of cases were reported in males and females. The age of cases was wide ranging, with most cases typically presenting in individuals between the ages of 30 and 50 years, though cases as young as 2 days and as old as 92 years were identified.

The majority of zoonotic transmission occurred in Brazil from cat bites and scratches, or direct contact with their infected lesions. Zoonotic transmission from dogs and other wild animals were reported, but less frequently than from cats, and transmission from soil also occurred.

With regards to clinical presentation, most cases had the lymphocutaneous form, followed by fixed cutaneous. Where outcome data was available, the vast majority of cases were reportedly cured (85.8%), though some cases died (3.4%). Most animal cases occurred in cats, followed by dogs and other animals such as cows, horses and other wild animals. Only one identified case of sporotrichosis (S. humicola) was identified in the UK.

Overall, the evidence suggests that sporotrichosis cases remain largely confined to South America and is transmitted by contact with infected cats, but cases have been reported in multiple other countries worldwide.

Acknowledgment

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Disclaimer

UKHSA's evidence summaries aim to provide the best available evidence to decision makers in a timely and accessible way, based on published peer-reviewed scientific papers, unpublished reports, and papers on preprint servers. Please note that the evidence summaries:

i) use accelerated methods and may not be representative of the whole body of evidence publicly available
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References

1. Alvarez CM and others. 'Sporotrichosis: A Review of a Neglected Disease in the Last 50 Years in Brazil'. Microorganisms 2022: volume 10, issue 11, pages 30

2. Hernandez-Castro R and others. 'Epidemiology of Clinical Sporotrichosis in the Americas in the Last Ten Years'. Journal of Fungi 2022: volume 8, issue 6, pages 30

3. Morgado DS and others. 'Global distribution of animal sporotrichosis: A systematic review of Sporothrix sp. identified using molecular tools'. Current Research in Microbial Sciences 2022: volume 3, pages 100140

4. Queiroz-Telles F and others. 'Sporotrichosis in Children: Case series and Narrative Review'. Current Fungal Infection Reports 2022: volume 16, issue 2, pages 33-46

5. Rabello VBS and others. 'The Historical Burden of Sporotrichosis in Brazil: a Systematic Review of Cases Reported from 1907 to 2020'. Brazilian Journal of Microbiology 2022: volume 53, issue 1, pages 231-44

6. Shea BJ and others. 'AMSTAR-2: a critical appraisal tool for systematic reviews that include randomised or non-randomised studies of healthcare interventions, or both'. BMJ 2017: volume 358, pages j4008

7. Ramirez-Soto MC and others. 'Ecological Determinants of Sporotrichosis Etiological Agents'. Journal of Fungi 2018: volume 4, issue 3, pages 12

8. Scuarcialupi L and others. 'Feline sporotrichosis: social vulnerability and prioritization of geographic areas in Guarulhos, SP, Brazil'. Brazilian Journal of Veterinary Research and Animal Science 2021: volume 58, pages e188291

Annexe A: Protocol

Review question

The review question for this evidence summary is:

1. What is the global epidemiology of cat transmitted sporotrichosis?

The evidence summary will include systematic reviews that discuss cat sporotrichosis transmission and symptom severity.

Eligibility criteria

	Included	Excluded
Population	Cats, humans	Other animals
Settings	Any	
Context	Any	
Intervention or exposure	Sporotrichosis infection	Other infections
Outcomes	Any outcomes related to Sporotrichosis incidence, risk of transmission, or clinical severity	Other outcomes
Language	English	
Date of publication	Studies published before 17 March 2023	
Study design	• systematic or rapid reviews • protocols for reviews • evidence summaries	• primary studies • non-systematic literature reviews • guidelines • opinion pieces
Publication type	Published and preprint	

Identification of reviews from scoping search

The databases searched were Ovid Medline, Ovid Embase, Google Scholar for reviews, Cochrane Library Database of systematic reviews, Prospero, and Epistemonikos to identify any existing reviews (systematic or rapid), evidence summaries and protocols for reviews related to the review question, published prior to 17 March 2023. See search strategy.

Title and abstract screening was undertaken by one reviewer, with potentially relevant studies screened by a second reviewer. Screening on full text was undertaken by one reviewer.

Critical appraisal of reviews was conducted using the quality assessment tool AMSTAR-2: a critical appraisal tool for systematic reviews that include randomised or non-randomised studies of healthcare interventions, or both (6).

In total, 6 systematic reviews were identified with evidence relevant to the review question.

Synthesis of evidence

The 6 reviews identified from the scoping search will be summarised, including key component such as the methods used, evidence identified, a summary of findings, the limitations of the review and the AMSTAR-2 critical assessment rating. Data extraction, critical appraisal, and review summaries will be performed by one reviewer and checked by a second.

Variations across populations and subgroups, for example cultural variations or differences between ethnic or social groups will be considered, where evidence is available.

Search strategy

Database: Ovid MEDLINE(R) ALL (1946 to 17 March 2023)
Search Strategy:

1 (Cat or cats).tw,kf. (161597)
2 feline*.tw,kf. (22120)
3 Cat Diseases/ (24385)
4 Cats/ (139999)
5 or/1-4 (212714)
6 Sporothrix.tw,kf. (1495)
7 Sporotrichos#s.tw,kf. (2049)
8 exp Sporothrix/ (1379)
9 exp Sporotrichosis/ (1962)
10 or/6-9 (3152)
11 5 and 10 (343)
12 S* brasiliensis.tw,kf. (458)
13 11 or 12 (680)
14 limit 13 to "reviews (best balance of sensitivity and specificity)" (79)

Database: Embase (1974 to 17 March 2023)
Search Strategy:
1 (Cat or cats).tw,kf. (174704)
2 feline*.tw,kf. (25028)
3 cat disease/ (13663)
4 exp felidae/ (124403)
5 or/1-4 (213619)
6 Sporothrix.tw,kf. (1825)
7 Sporotrichos#s.tw,kf. (2153)
8 Sporothrix/ (815)
9 sporotrichosis/ (2573)
10 or/6-9 (3611)
11 5 and 10 (444)
12 S* brasiliensis.tw,kf. (552)
13 sporothrix brasiliensis/ (222)
14 12 or 13 (593)
15 11 or 14 (875)
16 limit 15 to "reviews (best balance of sensitivity and specificity)" (92)

Annexe B: AMSTAR-2 quality appraisal of reviews

Table B1: AMSTAR-2 quality appraisal of reviews
Acronyms: NA = not applicable, typically due to a meta-analysis not being conducted in the review
A list of AMSTAR-2 questions is provided below the table.

Reference	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Overall Rating
Alvarez and others, 2022 (1)	No	No	No	No	No	No	No	No	No	No	NA	NA	No	Yes	NA	Yes	Critically low
Hernández-Castro and others (2)	No	No	No	No	No	No	No	Yes	No	No	NA	NA	No	Yes	NA	Yes	Critically low
Morgado and others, 2022 (3)	Yes	No	Yes	No	Yes	Yes	No	Yes	No	No	NA	NA	No	Yes	NA	Yes	Critically low
Queiroz-Telles and others, 2022 (4)	Yes	No	Yes	No	No	No	No	No	No	No	NA	NA	No	Yes	NA	Yes	Critically low
Rabello and others 2022 (5)	Yes	No	Yes	No	Yes	No	No	No	No	No	NA	NA	No	Yes	NA	Yes	Critically low

List of AMSTAR-2 questions:

1. Did the research questions and inclusion criteria for the review include the components of Population Intervention Comparator Outcome (PICO)?
2. Did the report of the review contain an explicit statement that the review methods were established prior to the conduct of the review and did the report justify any significant deviations from the protocol?
3. Did the review authors explain their selection of the study designs for inclusion in the review?
4. Did the review authors use a comprehensive literature search strategy?
5. Did the review authors perform study selection in duplicate?
6. Did the review authors perform data extraction in duplicate?
7. Did the review authors provide a list of excluded studies and justify the exclusions?
8. Did the review authors describe the included studies in adequate detail?
9. Did the review authors use a satisfactory technique for assessing the risk of bias (RoB) in individual studies that were included in the review?
10. Did the review authors report on the sources of funding for the studies included in the review?
11. If meta-analysis was performed did the review authors use appropriate methods for statistical combination of results?
12. If meta-analysis was performed, did the review authors assess the potential impact of RoB in individual studies on the results of the meta-analysis or other evidence synthesis?
13. Did the review authors account for RoB in individual studies when interpreting/ discussing the results of the review?
14. Did the review authors provide a satisfactory explanation for, and discussion of, any heterogeneity observed in the results of the review?
15. If they performed quantitative synthesis did the review authors carry out an adequate investigation of publication bias (small study bias) and discuss its likely impact on the results of the review?
16. Did the review authors report any potential sources of conflict of interest, including any funding they received for conducting the review?

Annexe C: Data extraction table

Table C1: Review characteristics

Reference	Methods	Summary of findings	Critical appraisal
Alvarez and others, 2022 (1) 'Sporotrichosis: A Review of a Neglected Disease in the Last 50 Years in Brazil.'	**Search dates:** Searches conducted between February 2022 and June 2022 **Data sources:** Medline, The Latin American Caribbean Health Sciences Literature (LILAC), Virtual Health Library (VHL), ScienceDirect, and Scopus **Inclusion criteria:** • narrative and systematic reviews • original articles • cross-sectional or longitudinal studies • studies written in English, Spanish or Portuguese • studies from developed and developing countries. **Exclusion criteria:** • editorials • opinion papers • thesis or dissertation • meeting summary • book chapters **Screening and data extraction:** No evidence of independent screening or data extraction **Meta-analysis:** No **Risk of bias assessment:** No RoB assessment reported	**Number of studies included:** 135 studies included from 1971 to 2022. **Geographic distribution:** S. brasiliensis isolates have been identified in predominantly in Brazil but also in Argentina and Peru, with 5,113 feline cases of S. brasiliensis identified between 1998 and 2018 and approximately 5,000 human cases from 1998 to 2020. **Demographics:** Children, the elderly, and women with low socioeconomic status were reported to be most affected. **Transmission**: S. brasiliensis is one of the main sporotrichosis species associated zoonotic transmission, as well as S. schenckii. It is transmitted by biting, scratching, or contact with cat skin lesions. **Clinical presentation:** The most frequent clinical presentation was reported to be the lymphocutaneous form, followed by the localised cutaneous form (mainly affecting the upper limbs). Compared with other species, the clinical presentation of S. brasiliensis is more often associated with both atypical disease and severe symptoms, such as hypersensitive reactions, nervous system tropism, and ocular infections. **Animal cases:** S. brasiliensis transmission has been identified between cats to cats, cats to dogs and cats to humans. In cats, sporotrichosis was reported to be most common in intact free-roaming males. In dogs, S. brasiliensis was the most common isolate. **Recommendations for practice:** Variety of recommendations provided: • veterinarians should consider wearing personal protective equipment, such as N95 masks • disinfect the environment with 1% sodium hypochlorite solution or 70% alcohol • dispose of contaminated bedding • limit animal exposure in high risk environments • quarantine infected animals • prevent transmission by neutering street animals, treating sick cats, education about responsible animal ownership, and increase sporotrichosis awareness in areas with high prevalence • deceased infected animals should be cremated, not buried, to prevent soil transmission	**AMSTAR-2 rating:** • no protocol available • search strategy reported, but not comprehensive • list of excluded studies and justifications for excluding not provided • unclear if risk of bias assessment performed (no results presented if conducted) **Overall rating**: Critically low

Hernández-Castro and others (2) 'Epidemiology of Clinical Sporotrichosis in the Americas in the Last Ten Years'	**Search dates:** Between 2012 and 2022 **Data sources:** MEDLINE, Scientific Electronic Library Online (SciELO), Cochrane database **Inclusion criteria:** Papers which report clinical sporotrichosis cases in the past year years in North or South America **Exclusion criteria:** Non-human studies **Screening and data extraction:** Not stated if duplicate screening and data extraction were performed	**Included studies:** 124 studies were included, all published between 2012 and 2022: • 68 studies for South America • 48 studies for North America • 8 studies for Central America and the Caribbean **Geographic distribution:** 11,050 cases were identified in South America: • 10,511 cases (95.1%) had Sporothrix spp. (not characterised further), 251 cases (2.27%) had S. brasiliensis, 136 cases (1.23%) had S. schenckii, 91 cases (0.82%) had S. globosa plus S. Schenkii, 57 cases (0.52%) had S. globosa, 3 cases (0.03%) had S. mexicana, and 1 case (0.01%) had S. pallida • 5,546 cases (50.2%) were identified in Brazil • 4,792 cases (43.4%) were identified in Peru • 452 cases (4.3%) were reported in Venezuela • remainder of cases were identified in Uruguay, Colombia, Argentina, Paraguay, and Chile 1,460 cases were identified in North America: • 1,241 cases (85.0%) had Sporothrix spp. (not characterised further), 210 cases (14.4%) had S. schenckii, 8 cases (0.5%) had S. globosa, and 1 case (0.07%) had S. mexicana • 1,431 cases (98.0%) were identified in Mexico • 27 cases (1.8%) were identified in the US • 2 cases were (0.1%) were identified in Canada 126 cases were identified in Central America and the Caribbean: • 70 cases (55.6%) had Sporothrix spp. (not characterised further), 54 cases (42.9%) had S. schenckii, and 2 cases (1.59%) had S. brasiliensis • 65 cases (51.6%) were reported in Guatemala • 57 cases (45.2%) were reported in Costa Rica • cases were also identified in the Caribbean, Cuba, Honduras and Panama **Demographics:** Across studies in South America: • the reported age of cases ranged from 2 and 79 years, with an average age typically between 30 and 50 years • there were a similar number of reported male and female cases Across studies in North America: • the reported age of cases ranged from 33 months to 87 years, with insufficient information to estimate an average age • there were slightly more male than female cases reported Across studies in Central America and the Caribbean: • the reported age of cases ranged from 14 and 67 years, with an average age typically between 40 and 50 years old • there were slightly more male than female cases reported **Transmission**: Not reported in this review.	**AMSTAR-2 rating:** • no protocol available • search strategy reported, but not comprehensive • inclusion and exclusion criteria not clearly stated • list of excluded studies and justifications for excluding not provided • unclear if risk of bias assessment performed (no results presented if conducted) **Overall rating**: Critically low

		Clinical presentation: In South America, the identified forms of sporotrichosis were: • 3,293 lymphocutaneous (29.5%) • 1,947 fixed cutaneous (17.4%) • 34 disseminated cutaneous (0.3%) • 18 systemic (0.2%) • 177 other forms (1.6%) • 5,702 not determined forms (51.0%) In North America, the identified forms of sporotrichosis were: • 956 lymphocutaneous (65.5%) • 388 fixed cutaneous (26.6%) • 83 disseminated (5.7%) • 16 disseminated cutaneous (1.1%) • 17 other forms (1.2%) In Central America and the Caribbean, the identified forms of sporotrichosis were: • 39 lymphocutaneous (31.0%) • 26 fixed cutaneous (20.6%) • 2 disseminated (1.6%) • 1 chancre (0.8%) • 58 not determined forms (46.0%) **Animal cases:** Not reported in this review **Recommendations for practice:** Not reported in this review	

Morgado and others, 2022 (3)
 	
'Global distribution of animal sporotrichosis: A systematic review of Sporothrix sp. identified using molecular tools'.
	Search dates:
	Between 2007 and 2021
	
	Data sources:
	Latin American and Caribbean Literature in Health Sciences (LILACS), MEDLINE, PubMed, Scopus, and Web of Science.
	
	Inclusion criteria:
	English language studies providing information about the global distribution of various animal sporotrichosis species.
		Included studies:
		There were 33 studies included, 2 were published between 2007 and 2010 and 31 were published after 2011.
		
		Geographic distribution:
		In total 266 sporotrichosis species isolates were identified globally.
		• 12 isolates (4.5%) were reported in Europe:
		  • 1 isolate (S. humicola, from a cat) reported in the UK
		  • 6 isolates (S. pallida) reported in Germany
		  • 3 isolates (1 S. cantabriensis, 1 S. euskadiensis and 1 S. nebularis) in Spain
		  • 1 isolate (S. mexicana, from a dog) in Italy
		  • 1 isolate (Ophiostoma stenoceras) in Sweden
		• 2 isolates (0.8%) were reported in the US (S. brunneovilacea and S. rossii)
		• 216 isolates (81.2%) were reported in South America (S. brasiliensis and S. schenckii) in Brazil (n=210, 97.2%) and Argentina (n=6, 2.8%)
		• isolates were also identified in Asia (n=28), South Africa (n=6), Mexico (n=1), and Tasmania (n=1)
			AMSTAR-2 rating:
			• no protocol available
			• search strategy not reported
			• unclear if risk of bias assessment performed (no results presented if conducted)
			
			Overall rating: Critically low

	Exclusion criteria: • papers written in languages other than English • studies without sporotrichosis strain identification • theses, dissertations, monographs • human and environmental sporotrichosis isolate studies • experimental models • studies with unavailable full texts **Screening and data extraction:** Title and abstract screening was completed by 2 reviewers independently. Duplication of full text screening was not reported. Data extraction was completed by 2 independent reviewers. **Meta-analysis:** No **Risk of bias assessment:** No risk of bias assessment reported	**Demographics:** Non-human studies only **Transmission**: Not reported in review **Clinical presentation:** Of the 266 isolates identified from 27 different Sporothrix species identified, 241 (90.6%) were pathogenic clinical clade species (S. brasiliensis, S. schenkii, S. globosa, or S. humicola) and 25 (9.4%) were non-pathogenic environmental clade species. The Sporothrix species described as pathogenic were: • S. brasiliensis (n=203 isolates, 84.2%) • S. schenckii isolates (n=33 isolates, 13.7%) • S. globosa isolates (n=3 isolates, 1.2%) • S. humicola isolates (n=2 isolates, 0.8%) **Animal cases:** Of the pooled sporotrichosis species (n=266 total): • 191 isolates (71.8%) were identified in cats • 52 isolates (19.9%) were identified in dogs • 22 isolates (8.3%) were identified in other animals (ant, beetle, horse, mouse, weevil, termite, mite or tiger-quoll). Of the pathogenic Sporothrix isolates (n=241), 187 were identified in cats (77.6%), 51 in dogs (21.2%), and 3 in other animals (1.2%): • 154 (63.4%) of S. brasiliensis isolates were identified in cats, and 49 (20.2%) in dogs • 29 (11.9%) of S. schenckii isolates were identified in cats, 2 were identified in dogs (0.8%), and 2 (0.8%) were identified in other animals • 3 (1.2%) of S. globosa isolates were identified in cats • 1 (0.4%) of S. humicola isolates was identified in cats, and 1 (0.4%) was identified in other animals **Recommendations for practice:** Not reported in this review	
Queiroz-Telles and others, 2022 (4) ‘Sporotrichosis in Children: Case series and Narrative Review’	**Search dates:** Between January 2016 and May 2021 **Data sources:** Cochrane, Google Scholar, Latin American and Caribbean Literature in Health Sciences (LILACS), MEDLINE, OviD,	**Included studies:** There were 20 studies of paediatric cases included, 7 of which were reviews. **Geographic distribution:** • S. globosa was reported to account for 99.3% of paediatric sporotrichosis cases in Asia • S. brasiliensis was reported to account for 88% of human and animal sporotrichosis cases in the south-eastern regions of South America • S. schenckii was reported to account for 94% of paediatric sporotrichosis cases in Australia and South Africa, and 89% of cases in North America and parts of South America	**AMSTAR-2 rating:** • no protocol available • search strategy not reported • list of excluded studies and justifications for excluding not provided

	PubMed, Scopus, Springer Link, and Web of Science. Reference lists of included studies were searched. **Inclusion criteria:** • studies providing information about paediatric sporotrichosis cases • randomised clinical trials (RCTs), meta-analyses, systematic reviews, national guidelines, observational studies, book chapters, and case reports • study population was required to be more than 50% paediatric for inclusion **Exclusion criteria:** • papers written in languages other than English, Spanish, German, and Chinese • not paediatric sporotrichosis • non-human studies **Screening and data extraction:** Unclear if duplicate screening or data extraction was performed. Reference lists of included studies checked for further eligible studies. **Meta-analysis:** No **Risk of bias assessment:** No risk of bias assessment reported	**Demographics:** The most frequently reported affected age group with sporotrichosis was up to 15 years of age, comprising 25.8% of all cases in a 2019 study of sporotrichosis cases endemic to Jalisco, Mexico (n=1,134 cases between 1960 and 2017). This study was reported to be in agreement with a further 3 studies conducted between 2011 to 2016. A 2 day old case was reported, who had been bitten in the face by a mouse. **Transmission**: Transmission was reported to occur directly by the yeast-like form by traumatic inoculation (for example, bites and scratches), from direct contact with infected secretions from feline cutaneous and mucosal lesions, and from direct contact with soil and decomposing organic matter (reportedly much less common than zoonotic transmission). **Clinical presentation:** • paediatric cases of sporotrichosis were more likely to have lymphocutaneous or fixed forms • the majority of paediatric sporotrichosis symptoms were reported to affect faces or limbs (one sporotrichosis study reported 93% of children had facial lesions), in particular ocular lesions (a different study reported 59% of ocular lesions occurred in children) • the average duration of disease was reported to be 1 to 2 months in children, but varies by region, Sporothrix species, age, and immune status **Animal cases:** Non-human studies not included. **Recommendations for practice:** • wear personal protective equipment • limit animal exposure in high-risk environments • reduce transmission by neutering street animals, treating sick cats, education about responsible animal ownership and increase sporotrichosis awareness in hyperendemic areas • cremate, rather than bury, deceased infected animals to prevent soil transmission	• no risk of bias assessment **Overall rating**: Critically low
Rabello and others 2022 (5)	**Search dates:** Between 1907 and December 2020	**Included studies:** 230 studies published between 1907 and 2020, with 49 studies published between 2001 and 2010 and 128 studies published between 2011 and 2020.	**AMSTAR-2 rating:** • protocol listed, but unable to find on

‘The Historical Burden of Sporotrichosis in Brazil: a Systematic Review of Cases Reported from 1907 to 2020’	**Data sources:**
	MEDLINE, Scientific Electronic Library Online (SciELO), Web of Science, and Latin American and Caribbean Literature in Health Sciences (LILACS).
	
	Reference lists of included studies were searched.
	
	Inclusion criteria:
	Studies providing information about the clinical presentation of sporotrichosis in Brazil.
	
	Exclusion criteria:
	• studies without Brazilian cases
	• papers written in languages other than English, Spanish or Portuguese
	• review papers
	• studies without sufficient information
	• non-human studies (although some animals studies were reported)
	
	Screening and data extraction:
	Screening of titles and abstracts, and full texts, were likely performed in duplicate. Unclear if data extraction was performed in duplicate.
	
	Data extraction was completed for case demographics, clinical presentation, and possible transmission route.
	
	Meta-analysis:
	No
	
	Risk of bias assessment:
		Geographic distribution:
		In total, 10,400 human sporotrichosis cases were identified in Brazil. Most human cases (n=187) were S. brasiliensis (75.4%), followed by S. schenckii (20.32%), S. globosa and S. chilensis (2.14% each).
		
		Demographics:
		• 56% of cases were female
		• Case age ranged from 5 months to 92 years, with greatest incidence in cases between 30 and 50 years old
		• 784 of 1,522 cases (51.5%) with occupational information were farmers, 570 (37.5%) were unemployed, 68 (4.5%) were veterinarians or pet shop workers, 61 (4.0%) were mine workers, and the remaining cases had a variety of jobs
		• 922 of 10,400 cases (8.5%) had information on co-morbidities, and of those:
		  • 312 cases (33.8%) had high blood pressure or cardiovascular disease
		  • 156 cases (16.9%) had HIV
		  • 31 cases (3.4%) had other immunosuppressive conditions (solid organ transplant amongst others)
		  • 124 cases (13.4%) had diabetes
		  • 56 cases (6.1%) had alcoholism
		  • 30 cases (3.3%) were pregnant
		  • 21 cases (2.3%) smoked
		
		Transmission:
		• Zoonotic transmission occurred in 3,516 of 4,404 cases (79.8%) where mode of transmission was reported, mostly from bites, scratches, or contact with infected cats
		• 3,492 of the 3,516 cases (99.3%) with zoonotic transmission were from cats
		• Transmission from soil occurred in 884 cases (20.1%)
		
		Clinical presentation:
		• 3,069 of 5,467 cases (56.1%) had a lymphocutaneous form of sporotrichosis, 1,482 cases (27.1%) had a fixed cutaneous form, 249 cases (4.6%) had immunoreactive forms, 87 cases (1.6%) had a mucosal form
		• 784 cases (14.3%) had systemic involvement, of which 249 cases (31.8%) had cutaneous disseminated and 233 cases (29.7%) had pulmonary forms
		• 3,078 cases had outcome data:
		  • cure rate: 85.8%
		  • abandoned treatment: 7.5%
		  • mortality rate: 3.4%
		  • spontaneous regression: 1.7%
		  • sequalae (usually ocular): 0.7%
		  • treatment became ineffective: 0.5%
		  • bone complications: 0.1%
		
		Animal cases:
		• 8,538 animal cases were identified:
		  • 7,750 cases (90.8%) were cats
		  • 676 cases (7.9%) were dogs
		  • 40 cases (0.5%) were bovines
		  • 40 cases (0.5%) were rats
		  • 2 cases (0.02%) were equines
			PROSPERO with number provided
			• search strategy reported, but not comprehensive
			• no risk of bias assessment
			
			Overall rating: Critically low

	No risk of bias assessment reported	• 30 cases (0.4%) were other wild animals • of 521 isolates from cats, 99.6% were S. brasiliensis and 0.4% were S. schenckii **Recommendations for practice:** The review identified 53 studies with recommendations for practice, reported in the supplement to the main paper.	

About the UK Health Security Agency

UKHSA is responsible for protecting every member of every community from the impact of infectious diseases, chemical, biological, radiological and nuclear incidents and other health threats. We provide intellectual, scientific and operational leadership at national and local level, as well as on the global stage, to make the nation health secure.

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Prepared by: Katie Kerr, Serena Carville, Sean Harrison, Jennifer Hill
For queries relating to this document, please contact: enquiries@ukhsa.gov.uk

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