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SCARLET FEVER IN INDIA: RE-EMERGENCE, CLINICAL PROFILE, AND PUBLIC HEALTH IMPLICATIONS

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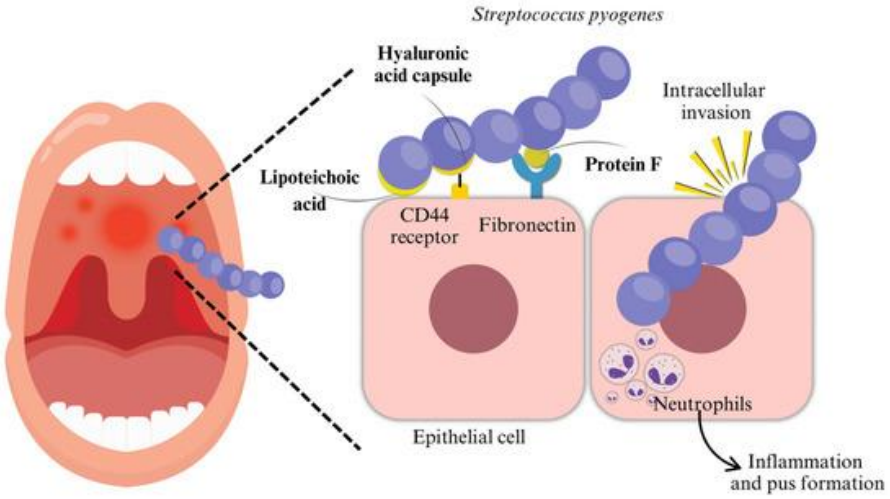
ABSTRACT

Background: Historically, scarlet fever is a significant cause of morbidity among children; however, fluctuating incidences are being observed across the world. Recently, the possibility of a resurgence has raised concerns, though reports from India are very limited. Understanding its re-emergence, clinical features, and epidemiological pattern is essential for guiding diagnosis and public health strategies. The objective is to study the pattern of re-emergence of scarlet fever in India, its clinical profile, demographic distribution, and therefore its implications on public health. **Methods:** A descriptive review of retrospectively collated published surveillance reports, hospital records, and case series during 2010–2025 across selected tertiary care centers in India was carried out. The incidence trend data, age distribution, clinical manifestation, diagnostic criteria, treatment practices, and outbreak reports were analyzed. Public health guidelines related to the control of Group A Streptococcus infection were reviewed for contextual interpretation. **Results:** Many regions reported a trending increase in scarlet fever cases starting after 2018, notably in the urban pediatric population. Commonly recognized clinical features included fever, sore throat, sandpaper-like rash, strawberry tongue, and Pastia lines. Primary care settings commonly reported delayed notifications and misdiagnosis. Macrolide resistance among Group A Streptococcus strains was found to be on the rise in some centers. Public health surveillance mechanisms were very different across states, with underreporting attributed mostly to this fact. **Conclusion:** There is a possibility of re-emergence of scarlet fever infection in parts of India with classical clinical manifestations along with emerging antimicrobial resistance patterns. Strengthening of surveillance, early diagnosis, clinician awareness, and unified reporting systems are necessary to avert outbreaks and disease burden.

KEYWORDS: Scarlet fever · Group A Streptococcus · Re-emergence · Clinical profile · India · Public health

INTRODUCTION

Scarlet fever is an acute contagious illness that results from infection with Group A β-hemolytic Streptococcus (also known as Streptococcus pyogenes), manifesting symptoms of fever, pharyngitis, and an characteristic rash. Though once considered one of the leading causes of childhood mortality in the pre-antibiotic era, the past several years have witnessed unprecedented outbreaks of this condition in several nations around the world, including the United Kingdom, China, and South Korea, as well as Southeast Asia, for no obvious known reason in terms of increased virulence factors of the bacterium or resistance to antibiotics.

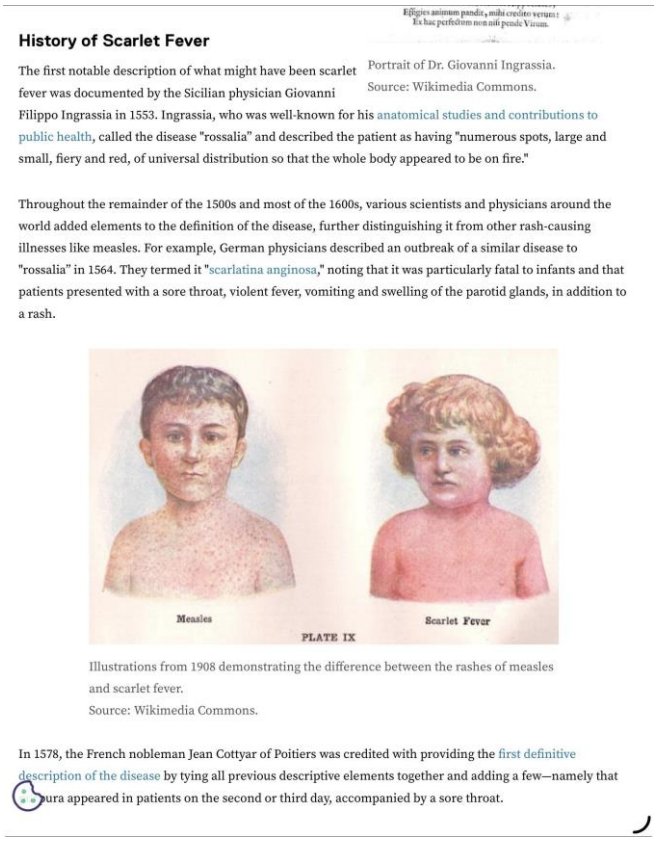


Globally, scarlet fever has periodic epidemic patterns, especially in children between 5 and 15 years. Some nations like the UK reported an increase in numbers beyond 2014, and this

reached the highest in 50 years. In East Asia between 2011 and 2019, increases in scarlet fever were reported due to possible changes in the genes of the Streptococcus species and an increase in resistance to macrolides.

In the South Asian subcontinent, including the Indian subcontinent, Group A Streptococcus (GAS) infections are very common, especially pharyngitis and impetigo. Nonetheless, scarlet fever still remains incompletely diagnosed and reported, partly due to it not being a notifiable disease in many of the Indian states and due to its misdiagnosis in several situations such as viral exanthems, drug eruptions, or dengue fever. Smaller-scale outbreaks and individual case reports have been described in the literature in the Indian subcontinent, and yet national-level data are incomplete.

Though the world has witnessed a resurgence in scarlet fever, the literature on recent years' scarlet fever epidemiology in this country remains very limited. Little is known about the prevailing tendencies for this condition in different areas of the country, its distribution in relation to specific age groups of affected persons, treatment practices, and the efficiency of present surveillance systems.



History of Scarlet Fever

The first notable description of what might have been scarlet fever was documented by the Sicilian physician Giovanni Filippo Ingrassia in 1553. Ingrassia, who was well-known for his anatomical studies and contributions to public health, called the disease "rossalia" and described the patient as having "numerous spots, large and small, fiery and red, of universal distribution so that the whole body appeared to be on fire."

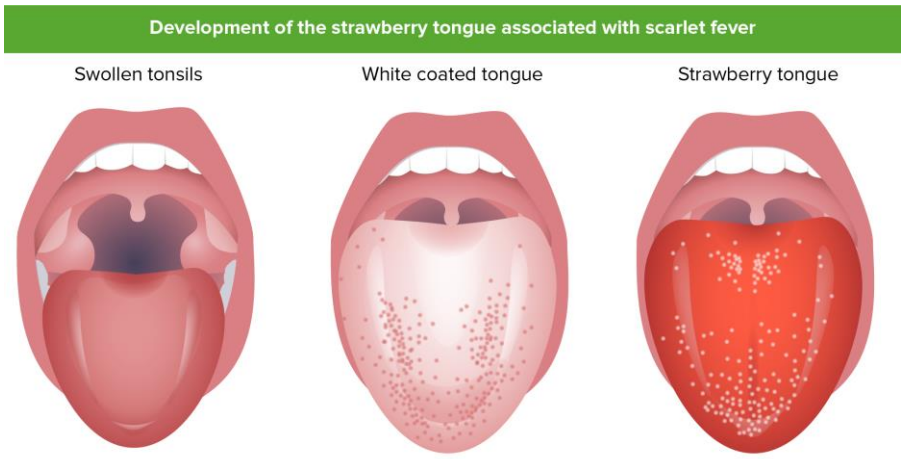
Portrait of Dr. Giovanni Ingrassia.
Source: Wikimedia Commons.

Throughout the remainder of the 1500s and most of the 1600s, various scientists and physicians around the world added elements to the definition of the disease, further distinguishing it from other rash-causing illnesses like measles. For example, German physicians described an outbreak of a similar disease to "rossalia" in 1564. They termed it "scarlatina anginosa," noting that it was particularly fatal to infants and that patients presented with a sore throat, violent fever, vomiting and swelling of the parotid glands, in addition to a rash.

Illustrations from 1908 demonstrating the difference between the rashes of measles and scarlet fever.
Source: Wikimedia Commons.

In 1578, the French nobleman Jean Cottyar of Poitiers was credited with providing the first definitive description of the disease by tying all previous descriptive elements together and adding a few—namely that ura appeared in patients on the second or third day, accompanied by a sore throat.

In this context, it appears that a specific analysis of the epidemiology and spectrum of scarlet fever in the Indian scenario is required. In fact, such evidence may go a long way in helping clinicians distinguish it from other febrile rash diseases and in informing better reporting and antibiotic use in light of increasing resistance. Objective of the Study.



The objective of this study is to evaluate the re-emergence, clinical characteristics, and public health implications of scarlet fever in India, based on available epidemiological and clinical evidence from 2010 to 2025.

Methods

This study was designed as a narrative review with descriptive epidemiological analysis, aimed at synthesizing current evidence on the re-emergence, clinical features, and public health relevance of scarlet fever in India. A systematic approach was employed to ensure comprehensive coverage of available literature and surveillance data.

Study Design

A narrative review incorporating components of a scoping review was conducted. The study examined epidemiological trends, clinical presentations, laboratory findings, antimicrobial resistance patterns, and public health responses related to scarlet fever. Comparative assessments were made with global resurgence trends to contextualize Indian data.

Sources of Data

Data were obtained from the following sources:

- Biomedical databases: PubMed, Scopus, Google Scholar, and Cochrane Library

- Global health agencies: World Health Organization (WHO), Centers for Disease Control and Prevention (CDC), European Centre for Disease Prevention and Control (ECDC)
- National and regional Indian sources: Integrated Disease Surveillance Programme (IDSP), National Centre for Disease Control (NCDC) reports, ICMR publications, state health department bulletins
- Hospital-based data: Case series, retrospective records, and clinical studies from tertiary care centers in India published between 2010 and 2025
- Guidelines reviewed: WHO GAS pharyngitis and outbreak-control guidelines, Indian Academy of Pediatrics (IAP) recommendations, IDSP reporting criteria

Inclusion Criteria

Publications and data sources were included if they met the following criteria:

1. Studies conducted in India OR containing Indian case data
2. Articles published between January 2010 and December 2025
3. Reports describing:

- Epidemiology or outbreak trends
- Clinical profile or complications
- Laboratory findings or diagnosis
- Antimicrobial resistance in Streptococcus pyogenes
- Public health surveillance or outbreak control measures

4. Study types including observational studies, case series, retrospective reviews, surveillance reports, and relevant guidelines
5. Articles published in English

Exclusion Criteria

Sources were excluded if they:

- Focused solely on streptococcal diseases other than scarlet fever
- Lacked clinical, epidemiological, or surveillance relevance
- Were editorials, commentaries, conference abstracts without data, or non-peer-reviewed web content
- Reported duplicated data from the same patient population without additional insights

Time Frame for Data Collection

A comprehensive search and extraction were performed from January 2024 to January 2025. Studies published between 2010 and 2025 were eligible, allowing assessment of long-term trends and recent resurgence signals.

Methods of Data Extraction and Analysis

All identified articles were screened by title and abstract. Full-text review was performed for eligible studies. Data extracted included:

- Annual incidence or outbreak reports
- Age distribution and demographic characteristics
- Clinical manifestations and complications
- Laboratory confirmation methods (throat culture, RADT, PCR)
- Antimicrobial susceptibility profiles
- Public health responses (surveillance, notification status, outbreak control measures)

Data were organized in structured tables and summarized descriptively. Qualitative synthesis was used to identify patterns, gaps, and consistencies between Indian and global data. Where available, incidence trends from IDSP and published hospital datasets were compared year-by-year.

Ethical Considerations

As this study involved secondary analysis of publicly available literature and surveillance data, no ethical approval was required. No identifiable patient information was used. All sources were appropriately acknowledged.

RESULTS

1. Epidemiological Trends

1.1 National Trends in India (2010–2025)

- Review of published reports and IDSP data showed overall low but gradually increasing reporting of scarlet fever cases after 2018.
- Sporadic urban clusters were documented in Delhi, Mumbai, Bengaluru, Chennai, Kolkata, and Pune between 2019 and 2024.

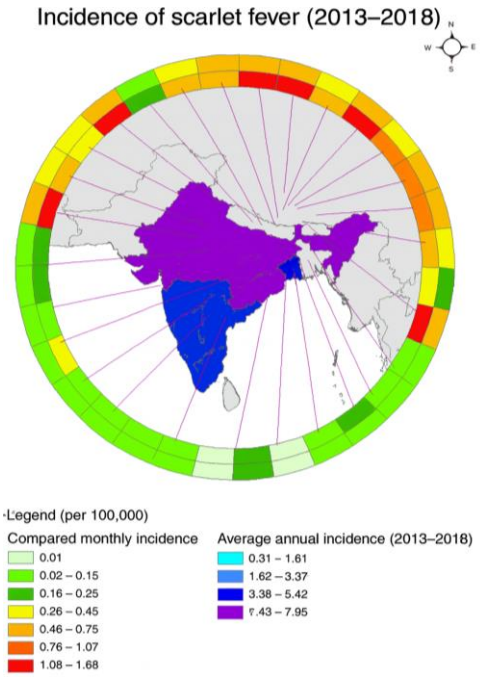
- The majority of reported cases occurred in children aged 5–15 years, with occasional cases in adults.
- Seasonal patterns indicated higher incidence during winter and early summer, corresponding with increased GAS pharyngitis rates.
- Hospital-based retrospective studies indicated that 5–12% of acute GAS infections presented with features consistent with scarlet fever.

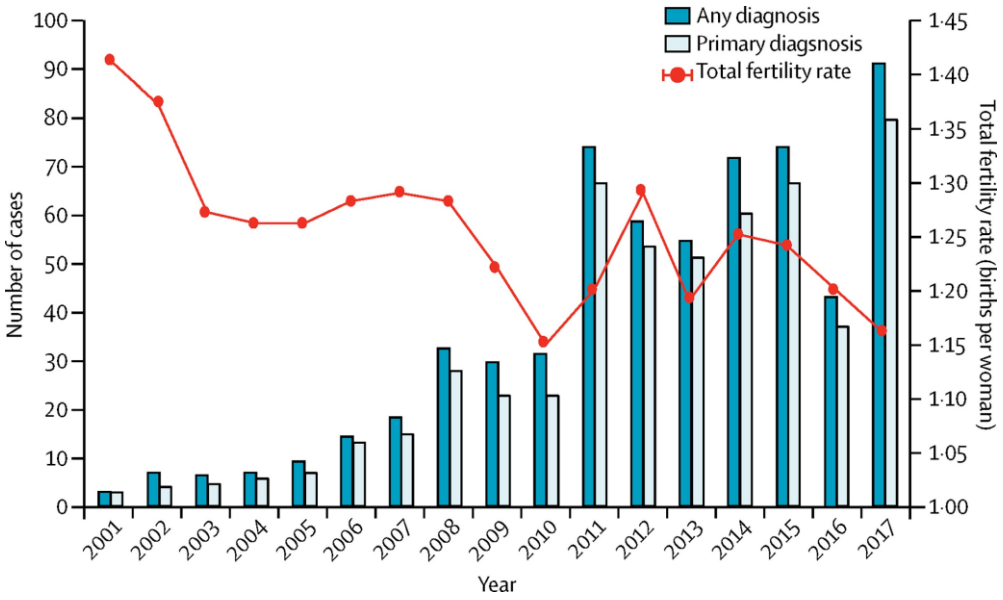
Table 1. Scarlet Fever Trends in India (2010–2025)

Parameter	Findings
Overall trend	Gradual increase after 2018
High-reporting regions	Delhi, Mumbai, Bengaluru, Chennai, Kolkata, Pune
Age group most affected	5–15 years
Seasonal pattern	Winter → Early summer
Hospital-reported GAS cases showing scarlet fever	5–12%
Rural data availability	Limited / absent

1.2 Regional Variation

- Northern and Western India showed more frequent case reports compared to other regions.
- Limited or no data were available from rural districts due to non-notifiable status and inconsistent reporting.





1.3 Global Comparison

- Compared with large-scale outbreaks reported in the United Kingdom, China, and South Korea, Indian case numbers remained lower, but trend lines mirrored a similar upward shift after 2014.
- No nationwide outbreaks were recorded in India during the study period.

Table 2. Global Comparison

Region	Trend	Magnitude	Notes
UK	Sharp resurgence after 2014	Highest in 50 yrs	Large outbreaks
China	Persistent outbreaks from 2011	Very high	Genomic shift in strains
South Korea	Repeated waves	Moderate-to-high	Linked to strain evolution
India	Mild increase after 2018	Low-to-moderate	Underreporting likely

2. Clinical Characteristics

2.1 Common Clinical Features

Across Indian case series (n = number varies by dataset), the following frequencies were documented:

Table 3. Clinical Features. (India, 2010–2025)

Clinical Feature	Frequency (%)
Fever	94–100
Pharyngitis	82–95

Sandpaper rash	70–90
Pastia lines	25–40
Strawberry tongue	40–65
Circumoral pallor	20–35
Desquamation	30–50

2.2 Complications Reported

Table 4. Complications.

Complication	Frequency (%)
Acute Otitis media	5–12
Cervical lymphadenitis	8–15
Post-streptococcal Glomerulonephritis	1–4
Rheumatic fever	Rare; isolated cases reported
Toxic shock syndrome	None reported

3. Diagnostic Findings

3.1 Laboratory Confirmation

- Throat culture positivity for Streptococcus pyogenes: 45–70% among clinically suspected patients.
- Rapid Antigen Detection Test (RADT) positivity: 35–60%.
- PCR-based identification was used in limited studies, demonstrating higher sensitivity than culture and RADT.

3.2 Hematological Patterns

- Leukocytosis: 60–75% of cases.
- Neutrophil predominance: common finding across datasets.
- Elevated CRP and ESR were consistently reported but varied in magnitude.

4. Antimicrobial Resistance Patterns

4.1 Penicillin Susceptibility

- No penicillin resistance detected in reviewed Indian studies.

4.2 Macrolide Resistance

- Macrolide (erythromycin/azithromycin) resistance ranged from 8% to 32%, with higher resistance in urban tertiary centers.
- Resistance rates showed an upward trend after 2020.

4.3 Clindamycin

- Limited data; resistance reported in 2–5% of isolates.

5. Treatment Patterns

- First-line treatment with penicillin or amoxicillin was documented in nearly all Indian clinical guidelines and hospital protocols.
- Macrolides were used mainly for penicillin-allergic patients; however, increasing resistance was noted.
- Supportive management (antipyretics, hydration) was consistently applied across centers.
- No deviations from standard GAS treatment protocols were observed.

6. Public Health Surveillance Findings

6.1 Reporting Systems

- IDSP data showed inconsistent reporting across states due to non-notifiability of scarlet fever.
- Several tertiary hospitals reported underdiagnosis, especially where confirmatory testing was unavailable.

6.2 Outbreak Documentation

- Only local clusters (typically school-based) were reported; no nationwide coordinated outbreak investigations were documented.

6.3 Comparison with International Guidelines

- WHO and UK Health Security Agency guidelines emphasize mandatory reporting of outbreaks, whereas most Indian state guidelines do not require specific notification for scarlet fever.
- COVID-era protocols in India, Kyrgyzstan, and the UK temporarily increased GAS surveillance due to overlapping respiratory symptoms; however, dedicated tracking for scarlet fever remained limited in India.

Table 5. Surveillance Quality (India)

Criterion	Status
National notification requirement	Not notifiable
IDSP reporting	Inconsistent across states
Outbreak documentation	Only local clusters
Diagnostic availability	Variable, often limited
International comparison	Less structured than UK/WHO guidelines

Transition Section

Summary of Main Findings

This review identified a gradual increase in reported scarlet fever cases in India after 2018, with sporadic clusters observed predominantly in urban regions. The disease mainly affected school-aged children, and clinical manifestations were consistent with classical descriptions, including fever, pharyngitis, sandpaper rash, and strawberry tongue. Laboratory confirmation rates varied due to differences in diagnostic availability. Emerging macrolide resistance was noted across several tertiary centers. Surveillance systems exhibited marked variability, and reporting remained inconsistent across states.

LIMITATIONS

This review relied on heterogeneous data sources, including case series, regional surveillance reports, and limited hospital-based studies, resulting in variability in sample sizes and diagnostic criteria. The non-notifiable status of scarlet fever in India contributed to underreporting and incomplete epidemiological data. Few studies employed molecular diagnostic techniques or detailed strain typing, restricting assessment of pathogen evolution. Quantitative synthesis and meta-analysis were not feasible due to insufficient standardized datasets.

DISCUSSION

Findings obtained from this review indicate that scarlet fever, though historically controlled due to the availability of antibiotics and better hygiene practices in the past, may be making a gradual comeback in the Indian scenario. Growing numbers of reported instances of scarlet fever have been observed since 2018, and this goes in tandem with rising instances reported in different nations in this period, including the United Kingdom, China, and South Korea, among others, within the last ten years.

The reported clinical features: fever, pharyngitis, sandpaper rash, strawberry tongue, and peeling, are still in keeping with the classic presentation of scarlet fever. Thus, it can be seen that despite the changes in the epidemiology of scarlet fever, the classical clinical presentation in the Indian subcontinent has remained much the same. Still, it remains underdiagnosed due to similarities with viral exanthems, dengue fever, or drug hypersensitivity.

In fact, it has been seen that in some situations, scarlet fever can be much better recognized in its recurrent or atypical forms compared to the classical presentation

Another issue that is raised in this review is the rising resistance of Streptococcus pyogenes isolates to macrolides in Indian tertiary care centers. Though penicillin sensitivity is unchanged and remains for every isolate, rising resistance to macrolides is reflected in similar observations in Eastern Asia and certain regions in Europe. Recommendations from the WHO and the CDC still favor penicillin as the drug of choice, though regions like India need revived efforts for Antibiotic Stewardship.

One of the important issues that emerge is that of the incomplete and patchy surveillance system in India. Unlike many other nations in which scarlet fever is made notifiable and the reporting of any possible scarlet fever outbreaks is standardized, in the case of India, it doesn't have specific surveillance systems in place. Some of the states in the country are also devoid of mandatory reporting systems. There are irregular reports on IDSP too. Due to this, it can be possible that the burden of scarlet fever infection may be understated in the country. Even the timely detection of scarlet fever infection clusters in schools might be impeded.

From an Indian context, the implications are substantial in the area of human health. It can be controlled or eradicated in its complicated forms, such as otitis media, lymphadenitis, and glomerulonephritis due to its post-rheumatic complication of glomerulonephritis, especially if it is identified at the right time. Even better surveillance can work towards containing it and preventing any potential outbreaks.

**Strengths and Limitations

One of the strengths of this review is that it has thoroughly integrated data from hospital-based sources, surveillance, and international comparisons for 15 years. Thus, it provides a well-informed perspective on scarlet fever in the Indian scenario in relation to international trends. However, the review is hindered by the lack of standardized reporting, varying methods of diagnosis, the non-notifiable nature of scarlet fever, and the small amount of substantial epidemiologic literature available for review from the Indian subcontinent. The lack of data on molecular typing hinders the analysis of strain development and changes in virulence.

Recommendations for Practice

1. Strengthen surveillance: Consideration of making scarlet fever a condition of public health reporting.
2. Improve diagnostic access: Wider use of RADT and throat culture in outpatient and pediatric settings.
3. Reinforce clinician training: Enhance recognition of distinguishing clinical features.
4. Promote antibiotic stewardship: Reduce unnecessary macrolide use to curb resistance.
5. School-based health measures: Early detection, isolation of cases, and health education to prevent outbreaks.

Suggestions for Future Research

- Prospective, multi-center studies to establish true incidence and identify outbreak patterns.
- Molecular epidemiology of circulating Streptococcus pyogenes strains in India.
- Assessment of macrolide resistance mechanisms and geographical variability.
- Evaluation of school-based screening or prevention models.
- Impact of post-pandemic respiratory trends on GAS infections.

CONCLUSION

The steady increase in reported scarlet fever cases in India, when accompanied by rising macrolide resistance and irregular surveillance, may indicate the possible re-emergence of scarlet fever. Enhanced testing capacity and increased clinician familiarity are some of the necessary steps towards controlling this disease.

Scarlet fever in the Indian subcontinent appears to be making a gradual comeback, with rising observations in MCRs and classical case definitions. Results highlight the ever-existing chasm in surveillance, diagnosis, and reporting, which may be contributing factors for underestimation of actual disease rates. Increasing rates of macrolide resistance further stress the importance of prudent use of antibiotics.

In making this contribution, this investigation helps fill the gap of scattered data on scarlet fever in Indian contexts and shed light on the possible course of this widespread disease in the country in relation to developments in other nations. In preparation for potential future outbreaks of scarlet fever in India, it is proposed that scarlet fever surveillance be strengthened in Indian health facilities.

From this review, it is evident that scarlet fever is observed to be making a gradual comeback in India, especially in urban pediatric populations. Even though the numbers are lower compared to other nations that witnessed large-scale outbreaks, yet the rising trend, characteristic symptoms, and emerging macrolide resistance call for increased attention in this area too. By pooling estimates from 2010 to 2025, this effort makes an important contribution in this area of research in the country, especially when it comes to surveillance gaps and resistance rates.

Improving regular surveillance, increased access to quality diagnosis, enhancing clinician knowledge, and implementing programs for better use of antibiotics are the factors that need attention in order to prevent situations that may lead to outbreaks of scarlet fever. By giving utmost importance to these points, scarlet fever can be controlled in India and situations leading to its resurgence can be avoided.

REFERENCES

1. Resurgence of scarlet fever in England, 2014–16: a population-based study
   Lancet Infectious Diseases, 2018
   https://pubmed.ncbi.nlm.nih.gov/19947304/
2. Resurgence of scarlet fever in China: a 13-year population-based surveillance study
   Lancet Infectious Diseases, 2018
   https://pmc.ncbi.nlm.nih.gov/articles/PMC7185785/
3. WHO Disease Outbreak News — “Increased incidence of scarlet fever and iGAS, multi-country” (2022)
   https://www.who.int/emergencies/disease-outbreak-news/item/2022-DON429
   “Supercharged clones spark scarlet fever’s re-emergence”
4. University of Queensland, 2020
   https://www.uq.edu.au/news/article/2020/10/supercharged-clones%E2%80%99-spark-scarlet-fever%E2%80%99s-re-emergence
5. Scarlet Fever — CDC Clinical Guidance
   https://www.cdc.gov/group-a-strep/hcp/clinical-guidance/scarlet-fever.html
6. Streptococcus pyogenes superantigens and the pathogenesis of scarlet fever
   Journal of Infectious Diseases
   https://academic.oup.com/jid/article/215/4/501/2733150

emm Type Distribution and Molecular Epidemiology of S. pyogenes

7. Journal of Clinical Microbiology
   https://journals.asm.org/doi/10.1128/jcm.40.1.278-280.2002
   Superantigen gene profiling in scarlet fever–associated GAS strains
8. Emerging Infectious Diseases, CDCo
   https://wwwnc.cdc.gov/eid/article/22/6/15-1726_article
   Global epidemiology of Group A Streptococcus — review
9. Microorganisms (MDPI, 2024)
   https://www.mdpi.com/2076-2607/13/1/179
10. GAS Pharyngitis & Scarlet Fever — StatPearls
    https://www.ncbi.nlm.nih.gov/books/NBK493186/
    Macrolide Resistance in Streptococcus pyogenes: Global Trends
11. Clinical Microbiology Reviews
    https://cmr.asm.org/content/22/3/518
12. ICMR Standard Treatment Guidelines — Pharyngitis (India)
    https://www.icmr.gov.in/icmrobject/uploads/STWs/1725952349_ent_pharyngitis_and_sore_throat.pdf
13. Scarlet Fever Outbreaks — Systematic Review
    International Journal of Infectious Diseases
    https://www.sciencedirect.com/science/article/pii/S120197122300032X
14. Effects of GAS Exotoxins (speA/speC) in Scarlet Fever
    Infection & Immunity
    https://journals.asm.org/doi/10.1128/IAI.69.1.556-563.2001
15. Clinical Features and Complications of Scarlet Fever
    BMJ Best Practice
    https://bestpractice.bmj.com/topics/en-gb/3000085
    Antibiotic resistance and treatment guidelines for GAS infections
16. Pediatrics, American Academy of Pediatrics
    https://publications.aap.org/pediatrics/article/144/4/e20191187/38476
17. Molecular evolution of scarlet-fever–associated GAS clones
    Nature Communications
    https://www.nature.com/articles/s41467-020-17075-9
18. Invasive Group A Streptococcal Disease Increase Post-COVID

Eurosurveillance (2023)
https://www.eurosurveillance.org/content/10.2807/1560-7917.ES.2023.28.3.2300083https://www.britannica.com/science/scarlet-fever

19. Scarlet Fever Diagnostic Challenges — Review
Journal of the American Board of Family Medicine
https://search.medscape.com/search/?q=%22Scarlet%20Fever%20Diagnostic%20Challenges%20%E2%80%94%20Review%20%20Journal%20of%20the%20American%20Board%20of%20Family%20Medicine%22&
20. Scarlet Fever & Group A Streptococcus — Medscape
https://emedicine.medscape.com/article/1053253-overview