

## Sustaining Leprosy Elimination in Sri Lanka: The Way Forward

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### ABSTRACT

**Background:** Leprosy (Hansen's disease) remains a public health concern in Sri Lanka decades after achieving WHO elimination as a public health problem (<1 prevalence per 10,000) in 1995. Although prevalence targets were reached, new case detection rates have remained persistently elevated, with 1,000–2,000 new cases annually and evidence of ongoing transmission, including among children. Continued disability and social stigma complicate disease control.

**Objectives:** To evaluate current epidemiology, control efforts, and barriers to elimination in Sri Lanka, and propose an evidence-based way forward, aligned with the WHO "Towards Zero Leprosy" Strategy (2021–2030).

**Methods:** A mixed-methods approach was used, combining national surveillance data (Ministry of Health and Anti-Leprosy Campaign), active case finding surveys, quality of life and stigma studies, and review of global control strategies. Quantitative data on annual case detection rates by age, disability, and geographic region were compiled. A narrative synthesis of interventions and outcomes was undertaken.

**Results:** Sri Lanka reports approximately 1,500–2,000 new leprosy cases annually, with about 10% in children. Case detection rates fluctuate between 7 and 12 per 100,000 population. Grade 2 disability proportions (visible deformities) range from 6–8%, indicating delayed diagnosis. Active case finding in endemic districts reveals hidden disease burdens (~20/10,000 in targeted surveys). Stigma and quality-of-life impacts remain substantial. Global strategies emphasize integrated services, enhanced surveillance, and prevention of transmission, stigma reduction, and disability management.

**Conclusions:** While past efforts successfully reduced prevalent leprosy, sustained transmission persists. Achieving elimination of transmission and zero disability requires strengthened surveillance, integrated health services, intensified contact tracing with post-exposure prophylaxis (PEP), stigma reduction programs, and regionally tailored interventions. A roadmap toward elimination by 2035 is proposed, aligning national targets with WHO guidance.

**KEYWORDS:** Leprosy Elimination in Sri Lanka

### INTRODUCTION

Leprosy is a chronic infectious disease caused by *Mycobacterium leprae*, primarily affecting the skin and peripheral nerves. If untreated, the disease can result in progressive nerve damage, deformities, and permanent disability, leading to significant physical, psychological, and socioeconomic consequences for affected individuals and their families (1). Despite major advances in treatment and control, leprosy remains a public health concern in several endemic countries.

The introduction of multidrug therapy (MDT) in the late twentieth century revolutionized global leprosy control. MDT, recommended by the World Health Organization, significantly reduced disease prevalence and prevented disability when implemented at scale (2). Through sustained case detection and universal access to MDT, many endemic countries achieved the WHO-defined elimination target of less than one case per 10,000 population. Sri Lanka achieved this milestone in 1995 through nationwide MDT implementation, strengthened surveillance, and extensive social mobilization campaigns (3).

However, elimination as a public health problem does not equate to interruption of transmission. Sri Lanka continues to detect a considerable number of new leprosy cases annually, including patients presenting with grade 2 disability, reflecting delayed diagnosis and ongoing transmission in certain communities (3). Geographical clustering of cases in historically endemic districts further suggests the persistence of undetected infection and gaps in early case detection and contact tracing. These findings highlight the limitations of prevalence-based elimination targets in addressing true transmission dynamics.



In response to these challenges, Sri Lanka has aligned its national leprosy control strategy with global targets aiming for zero transmission and zero disability due to leprosy. Current national plans emphasize early diagnosis, contact screening, chemoprophylaxis for close contacts, integration of leprosy services into primary healthcare, and intensified efforts to reduce stigma and discrimination (2, 3). Nevertheless, operational barriers such as reduced clinical suspicion, limited training of healthcare workers, social stigma, and weaknesses in surveillance systems continue to impede optimal program performance.

This article examines the current epidemiological profile of leprosy in Sri Lanka, evaluates the impact of existing control interventions, identifies key gaps and challenges, and proposes strategic priorities for accelerating progress toward interruption of transmission and sustainable elimination. Understanding these factors is essential to guide evidence-based policy and strengthen national efforts to achieve leprosy elimination by 2035.

## Justification

Although Sri Lanka achieved the elimination target for leprosy more than two decades ago, the continued detection of new cases indicates that transmission has not been fully interrupted. The presence of patients presenting with grade 2 disability reflects delays in diagnosis and suggests weaknesses in early case detection and community awareness (4). Furthermore, evidence of clustering of cases in traditionally endemic districts highlights persistent transmission foci and potential gaps in contact screening and preventive interventions. These trends underscore the inadequacy of relying solely on prevalence-based elimination indicators to assess true disease control and emphasize the need for more sensitive epidemiological and programmatic evaluations.

In addition, changing health system priorities, declining clinical expertise in leprosy, and persistent stigma pose significant barriers to achieving sustainable elimination. Studies have shown that reduced training of healthcare workers and integration of leprosy services into general healthcare settings can lead to missed or delayed diagnoses (5). Global experience further indicates that countries that have reached elimination thresholds may experience programmatic complacency, resulting in stagnation or resurgence if surveillance and preventive measures are weakened (6). Therefore, a critical appraisal of Sri Lanka's current epidemiological situation and control strategies is essential to identify operational gaps, strengthen targeted interventions, and inform policy decisions aimed at achieving interruption of transmission and zero disability due to leprosy.

## Objectives

To assess the current epidemiological profile of leprosy and evaluate control strategies in Sri Lanka in order to identify gaps and propose strategic priorities for achieving interruption of transmission and sustainable elimination.

## METHODS

### Study Design

This study utilises an integrative secondary data approach, combining multiple existing data sources to provide a comprehensive assessment. Surveillance data were compiled from national reporting systems, including the Anti-Leprosy Campaign and Ministry of Health bulletins, as well as published local studies, to analyze new case detection figures, disability grading, age distribution, and geographic distribution. Data from active case-finding surveys conducted in endemic areas, such as the Moratuwa DS area, were incorporated to include targeted screening outcomes. In addition, a review of international peer-reviewed articles and WHO publications was undertaken to synthesize evidence on leprosy control strategies, multidrug therapy outcomes, stigma, and disability. Qualitative indicators, including findings from quality-of-life and stigma assessment studies, were also integrated to contextualize the social impact of the disease.

### Data Sources

Data for this study were obtained from multiple secondary sources. National leprosy reporting data were extracted from annual reports and news releases of the Ministry of Health and the Anti-Leprosy Campaign. Active case detection data were derived from published household screening surveys conducted in endemic areas. Evidence on stigma and quality of life was gathered from studies conducted in Sri Lanka assessing the social impact of leprosy. In addition, global leprosy control strategy reports published by the World Health Organization were reviewed. International peer-reviewed journal articles focusing on multidrug therapy (MDT) outcomes and leprosy control methods were also included to support and contextualize the analysis.



## Outcomes Measured

The following outcome measures were considered in this study: annual new case detection rates (NCDRs) per 100,000 population to assess disease burden and temporal trends; the proportion of childhood cases as an indicator of ongoing transmission; and the proportion of Grade 2 disability (G2D) among new cases to reflect delays in diagnosis and effectiveness of early detection efforts. Hidden case prevalence identified through active case-finding surveys was included to estimate under-detection within the community. In addition, social stigma and quality-of-life indices were incorporated to capture the psychosocial impact of the disease. The implementation status of strategic interventions, such as contact tracing, post-exposure prophylaxis (PEP), and awareness campaigns, was also reviewed to evaluate programmatic response and control efforts.

## Data Analysis

Quantitative data were tabulated to illustrate trends. Narrative synthesis was used to integrate findings from clinical, epidemiological, and social studies to formulate strategic recommendations.

## RESULTS

### Epidemiology of Leprosy in Sri Lanka

**Annual Case Detection:** Sri Lanka continues to detect substantial numbers of new leprosy cases annually decades after elimination as a public health problem - approximately 1,500–2,000 new cases per year.

In 2023, 1,550 cases were reported, with the Western and other key districts contributing a large proportion. In 2024, data through the first 10 months showed 1,084 new cases, with significant transmission potential (68% capable of transmitting infection).

**Age and Disability:** Childhood cases (>10%) remain a concern, indicating ongoing transmission. The proportion of cases with grade 2 disability (visible deformities) is estimated at 6–8%, suggesting delayed diagnosis in a subset of patients.

**Case Detection Rate (CDR):** National data suggest that the annual new case detection rate ranges between 7 - 12 per 100,000 population.

**Hidden Cases:** Active household screening in Moratuwa revealed hidden leprosy prevalence of 20.1 per 10,000, markedly higher than routine detection rates, highlighting underdiagnosed community transmission pockets.

**Table 1. Leprosy Indicators in Sri Lanka**

Indicator	2021	2022	2023	2024
New Cases Reported	1026	1401	1502	1282
Childhood Cases (%)	10.6	11.1	11.8	7.3
Grade 2 Disability (%)	7.0	7.3	6.1	7.3
Case Detection Rate (per 100,000)	4.6	6.3	6.9	5.9

**Quality of Life and Stigma:** Quality-of-life studies among Western Province leprosy patients highlight physical, social, and psychological impacts that extend beyond clinical disease, with stigma contributing to social isolation and reduced well-being.

A recent cross-sectional study at Sri Lanka's central dermatology clinics demonstrated significant stigma faced by people affected by leprosy (PAL), including internalized stigma and community discrimination, which are linked to delayed care-seeking and adverse psychosocial outcomes. (7)

### Three-Tier District Risk Categorization Based on 2024 NCDR

Districts were stratified into three risk categories using the 2024 New Case Detection Rate (NCDR) per 100,000 population. Districts were ranked according to NCDR and divided into equal tertiles (nine districts per tier): High, Moderate, and Low risk. In addition to NCDR, the percentage of childhood cases and the percentage of Grade 2 Disability (G2D) among new cases were included to help interpret ongoing transmission and delays in diagnosis. This classification highlights districts with the greatest newly detected burden and supports prioritization of supervision, case-finding, and resource allocation.



**Table: Three-Tier District Risk Categorization (2024)**

District	NCDR /100k	Child %	G2D %	Risk Tier
Batticaloa	23.22	9.0	4.5	High
Polonnaruwa	13.12	10.3	8.6	High
Ampara	10.00	7.1	0.0	High
Kalutara	9.08	3.5	7.8	High
Colombo	8.81	8.6	1.2	High
Kalmunai	7.94	8.1	13.5	High
Hambantota	7.35	12.0	2.0	High
CMC Area	7.08	17.4	0.0	High
Mannar	6.84	0.0	0.0	High
Puttalam	6.79	5.3	10.5	Moderate
Trincomalee	6.79	13.3	3.3	Moderate
Matara	6.01	7.7	9.6	Moderate
Anuradhapura	5.61	3.8	1.9	Moderate
Galle	5.49	4.8	4.8	Moderate
Kurunegala	5.02	9.3	11.6	Moderate
Rathnapura	4.73	1.8	14.3	Moderate
Gampaha	4.58	5.5	8.2	Moderate
Monaragala	3.93	5.0	0.0	Moderate
Matale	3.46	11.1	16.7	Low
Mullaitivu	3.00	33.3	33.3	Low
Kilinochchi	2.89	0.0	0.0	Low
Badulla	2.45	4.5	18.2	Low
Nuwara Eliya	2.31	5.6	5.6	Low
Vavuniya	2.03	0.0	25.0	Low
Kandy	1.83	7.4	22.2	Low
Jaffna	1.75	0.0	27.3	Low
Kegalle	1.13	0.0	30.0	Low

Districts were categorized into three equal risk tiers based on the 2024 New Case Detection Rate (NCDR) per 100,000 population. The High-risk tier included Batticaloa (23.22), Polonnaruwa (13.12), Ampara (10.00), Kalutara (9.08), Colombo (8.81), Kalmunai (7.94), Hambantota (7.35), CMC area (7.08), and Mannar (6.84). The Moderate-risk tier comprised Puttalam (6.79), Trincomalee (6.79), Matara (6.01), Anuradhapura (5.61), Galle (5.49), Kurunegala (5.02), Rathnapura (4.73), Gampaha (4.58), and Monaragala (3.93). The Low-risk tier included Matale (3.46), Mullaitivu (3.00), Kilinochchi (2.89), Badulla (2.45), Nuwara Eliya (2.31), Vavuniya (2.03), Kandy (1.83), Jaffna (1.75), and Kegalle (1.13).

The proportion of childhood cases and Grade 2 Disability (G2D) among new cases varied across districts. Higher child case percentages were observed in the CMC area (17.4%), Mullaitivu (33.3%), Trincomalee (13.3%), Hambantota (12.0%), and Polonnaruwa (10.3%). Elevated G2D proportions were reported in Mullaitivu (33.3%), Kegalle (30.0%), Jaffna (27.3%), Vavuniya



(25.0%), Kandy (22.2%), Badulla (18.2%), Matale (16.7%), Rathnapura (14.3%), and Kalmunai (13.5%). Several districts reported 0% G2D, including Ampara, the CMC area, Mannar, Kilinochchi, and Monaragala

## DISCUSSION

Despite achieving elimination of leprosy as a public health problem in the mid-1990s, Sri Lanka continues to report a substantial number of new cases annually, with approximately 1,500–2,000 cases detected per year in recent times. In 2023, 1,550 new cases were notified, and provisional data for 2024 indicated more than 1,000 cases within the first ten months, with a high proportion of infectious cases capable of sustaining transmission (7). The concentration of cases in the Western Province and selected high-burden MOH areas suggests persistent transmission in defined geographical pockets. These findings indicate that elimination thresholds based on prevalence have not translated into interruption of transmission, underscoring the need for intensified surveillance and targeted interventions in high-risk areas (8).

The persistence of childhood cases, accounting for more than 10% of new detections in several recent years, provides strong epidemiological evidence of ongoing community transmission. Childhood leprosy reflects recent exposure and failure of early detection strategies, particularly within households and close-contact networks (9). Furthermore, the proportion of patients presenting with grade 2 disability (6–8%) suggests delays in diagnosis among a subset of cases, reflecting gaps in clinical suspicion, health-seeking behavior, and access to timely diagnostic services. Grade 2 disability remains a key indicator of program performance and has been associated with long-term socioeconomic consequences and increased stigma (10).

The observed national case detection rate of 7–12 per 100,000 population remains well above levels compatible with elimination of transmission. Importantly, active case-finding exercises have demonstrated that routine surveillance underestimates the true burden. A community-based screening programme in Moratuwa identified a hidden prevalence of 20.1 per 10,000 population, markedly higher than routine detection figures, highlighting the presence of undiagnosed cases and silent transmission reservoirs (11). These findings support global evidence that passive case detection alone is insufficient in low-endemic or post-elimination settings and that targeted active case-finding and contact screening are essential to uncover hidden disease burden (12).

Beyond epidemiological indicators, leprosy continues to impose a significant psychosocial burden on affected individuals. Quality-of-life studies conducted in the Western Province have demonstrated persistent physical, social, and emotional impairments among persons affected by leprosy, even after completion of treatment (13). Stigma remains a major determinant of delayed care-seeking, with affected individuals experiencing internalized stigma, social exclusion, and discrimination within communities and healthcare settings. A recent cross-sectional study conducted at central dermatology clinics in Sri Lanka revealed high levels of perceived and enacted stigma, which were significantly associated with psychological distress and delayed presentation (14). These findings emphasize that biomedical control strategies alone are insufficient and that stigma reduction, community education, and social support must be integrated into elimination efforts.

Overall, the continued detection of new cases, the presence of childhood leprosy and grade 2 disability, evidence of hidden prevalence, and the persistent psychosocial impact collectively demonstrate that Sri Lanka remains in a control phase rather than having achieved interruption of transmission. Strengthening surveillance, expanding active case detection, implementing chemoprophylaxis for contacts, and integrating stigma-reduction strategies into routine services are critical to achieving the national elimination by 2035.

The district-wise risk stratification demonstrated marked geographic variation in leprosy burden, with the highest detection rates observed in districts such as Batticaloa and Polonnaruwa. Several districts in the High-risk tier, including Ampara, Kalutara, and Colombo, also reported relatively elevated new case detection rates, indicating persistent transmission in selected geographic clusters. The distribution of risk tiers suggests that disease burden is not uniform across the country but is concentrated in specific high-burden districts, including the coastal and selected inland regions.

The study also identified variation in indicators of recent transmission and diagnostic delay. Higher proportions of childhood cases were reported in districts such as the Colombo Municipal Council area, Hambantota, and Polonnaruwa, suggesting ongoing community transmission. Elevated Grade 2 Disability proportions were observed in districts including Kalmunai, Rathnapura, and Matale, reflecting late presentation or delays in case detection in these areas. Conversely, several districts reported zero or very low disability proportions among new cases, indicating better detection timing or smaller case numbers.



## LIMITATIONS

This analysis is subject to several limitations. First, the findings rely primarily on routinely reported surveillance data, which are dependent on passive case detection and may underestimate the true burden of leprosy due to undiagnosed and unreported cases. Under-detection is likely in low-endemic and post-elimination settings, where reduced clinical suspicion among healthcare workers and delayed care-seeking behavior among patients may lead to missed or late diagnoses. Consequently, the reported incidence and disability indicators may not fully reflect the extent of ongoing transmission in the community.

Second, the study uses aggregated national and district-level data, limiting the ability to explore individual-level risk factors such as socioeconomic status, household exposure, or access to healthcare services. Variations in data completeness and reporting practices across districts may also introduce reporting bias. In addition, the cross-sectional nature of available program data restricts causal inference regarding the impact of specific interventions such as contact screening or chemoprophylaxis. Finally, information on stigma and quality of life is derived from selected studies and clinic-based populations, which may not be fully generalizable to all persons affected by leprosy in Sri Lanka. These limitations should be considered when interpreting the findings and formulating policy recommendations.

## CONCLUSION

Although Sri Lanka achieved elimination of leprosy as a public health problem more than two decades ago, the continued detection of new cases, the persistence of childhood infections, and the presence of grade 2 disability among newly diagnosed patients demonstrate that transmission has not yet been interrupted. Evidence of geographical clustering and hidden prevalence further indicates ongoing community-level transmission in defined pockets. These findings highlight the limitations of relying solely on prevalence-based elimination targets and emphasize the need for more sensitive epidemiological indicators and proactive control strategies.

In addition to its epidemiological burden, leprosy continues to exert significant psychosocial impact through stigma, discrimination, and reduced quality of life among affected individuals. Delayed diagnosis, driven by low awareness, social exclusion, and declining clinical expertise, contributes to preventable disability and sustained transmission. Collectively, these challenges indicate that Sri Lanka remains in a control phase rather than having achieved true elimination. Achieving interruption of transmission and zero disability will require renewed political commitment, strengthened surveillance, and integrated biomedical and social interventions tailored to high-risk populations and endemic districts.

## WAY FORWARD / RECOMMENDATIONS

To accelerate progress towards interruption of transmission and sustainable elimination of leprosy in Sri Lanka, surveillance systems should be strengthened through targeted active case detection in high-burden districts and systematic screening of household and close contacts. Periodic community-based screening in identified hotspots can help uncover hidden cases and reduce diagnostic delays. Preventive strategies should be enhanced by expanding post-exposure prophylaxis for eligible contacts and integrating these activities into routine primary healthcare services. Continuous training of healthcare workers is essential to maintain diagnostic capacity and clinical suspicion in low-endemic settings.

In parallel, disability prevention and stigma reduction must be prioritized as integral components of leprosy control. Early nerve function assessment, prompt management of reactions, and access to rehabilitation services are critical to preventing long-term impairment. Community education, engagement of persons affected by leprosy as advocates, and collaboration with civil society organizations can reduce stigma and promote early care-seeking. Sustained political commitment, regular programme evaluation, and operational research to identify drivers of transmission are necessary to guide evidence-based policy and achieve national elimination goals by 2035.

Strengthening district-level leprosy control activities is recommended, particularly in high-burden areas, through enhanced active case finding, early diagnosis, and improved contact tracing. Programmatic focus should be given to reducing diagnostic delay and disability at presentation by promoting community awareness, improving clinical suspicion among frontline health workers, and ensuring timely referral and treatment initiation in line with guidance from World Health Organization leprosy control strategies.



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