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NVBDCP

INDIA'S PROGRESS TOWARDS MALARIA ELIMINATION

Technical Report 2025

ICMR-National Institute of Malaria Research (ICMR-NIMR)
National Center for Vector Borne Diseases Control (NCVBDC)

Gates Foundation

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Foreword

Malaria Elimination – Technical Report

Malaria is not only a disease of parasites and vectors, it is a reflection of social vulnerability, environmental conditions, and inequities in access to health services. The burden of malaria continues to fall disproportionately on tribal communities, migrant populations, women, and children living in endemic and hard-to-reach regions. This report offers an important reminder that malaria elimination requires approaches that are both scientifically sound and socially responsive.

The report brings forward perspectives from the field, highlighting the indispensable role of frontline workers, community participation, and gender-responsive strategies in malaria prevention and control. Women often serve as caregivers, health volunteers, and agents of behaviour change, yet their contributions remain under-recognised. Strengthening their capacity and leadership is central to sustaining malaria elimination gains.

The report also underscores the importance of community trust, local ownership, and culturally appropriate communication in improving uptake of vector control measures, surveillance, and treatment adherence. Integrating malaria interventions with broader development initiatives including housing, sanitation, nutrition, and livelihood security emerges as a recurring theme across the findings.

Women's Collective Forum strongly believe that public health programmes are most effective when they prioritise equity, dignity, and inclusion. This report aligns with that vision by placing communities, particularly women, at the centre of malaria elimination strategies.

I congratulate ICMR–NIMR, CII and all contributors to this report for their commitment to evidence-based and inclusive public health action. As India moves steadily towards its malaria elimination goals, the insights and recommendations presented here will support more resilient, community-driven, and equitable interventions ensuring that progress reaches those who need it most.

Mrs Smriti Z. Irani

Founder & Chairperson
The Alliance for Global Good: Gender Equity & Equality
Advisor – Women's Collective Forum

Foreword

I am delighted to present the Technical Review Report of malaria elimination from ICMR-National Institute of Malaria Research (ICMR-NIMR) under the aegis of ICMR (an autonomous body under Department of Health Research, Ministry of Health & Family Welfare, Government of India).

Recently, in close collaboration with the National Centre for Vector Borne Disease Control (NCVBDC), Women's Collective Forum (WCF), and other key partners, ICMR-NIMR convened a series of integrated workshops across different regions of the country. These workshops held in Guwahati, Ahmedabad, and New Delhi to brought together national and state programme managers, public health officials, researchers, entomologists, clinicians, civil society representatives, and international partners. The overall objective was to jointly examine progress, identify emerging operational and technical challenges and align elimination strategies with evolving epidemiological realities and scientific evidence across India.

The deliberations provided valuable insights into the changing nature of malaria transmission in India. While remarkable gains have been achieved, residual transmission persists in specific contexts such as border areas, forested and tribal regions, urban settings and among mobile populations. Issues related to surveillance sensitivity, entomological capacity, private-sector reporting, human mobility, and emerging vector and parasite dynamics were repeatedly highlighted. Importantly, the discussions emphasized the need for adaptive, locally tailored strategies supported by strong surveillance, robust entomological monitoring, operational research and sustained community engagement.

This report presents a structured synthesis of the discussions and insights generated through these consultative sessions. It is intended not as a record of proceedings, but as a practical and policy-relevant technical reference that integrates state-level experiences, common challenges, and prioritized strategic actions for the period 2026-2030. The recommendations outlined aim to support national and state programmes in consolidating gains, addressing residual risks, and accelerating progress toward malaria elimination.

I sincerely acknowledge the valuable contributions of all participating states, technical experts, partner organizations, and international agencies whose engagement and commitment made these consultations meaningful and productive. I also extend my appreciation to the teams at ICMR-NIMR, NCVBDC, WCF and partners for their dedication in organizing the workshops and compiling this report.

I am confident that the insights and recommendations presented herein will contribute to a more adaptive, evidence-informed, and resilient malaria elimination strategy for India, and will support the collective goal of achieving zero indigenous malaria by 2030.

Dr. Anup Anvikar

Director
ICMR-National Institute of Malaria Research
New Delhi, India

Foreword

Malaria Elimination – Technical Report

Malaria elimination remains a critical public health priority for India, particularly in the context of regional heterogeneity, emerging vector resistance, population mobility, and climate-related risks. This report, developed by the ICMR–National Institute of Malaria Research (NIMR) provides a timely and evidence-based assessment of India's malaria response and the strategic directions required to sustain progress towards elimination.

The report highlights India's substantial achievements - expanded surveillance, targeted vector control interventions, use of geospatial tools, improved diagnostics, and a strong national framework aligned with the goal of malaria elimination by 2030. At the same time, it draws attention to persistent operational challenges, including hard-to-reach tribal and forested areas, cross-border transmission, urban malaria, insecticide resistance, and the need for continuous capacity strengthening at the frontline level.

The findings underscore the importance of data-driven microplanning, integration of malaria services within primary healthcare, and convergence with allied sectors such as urban development, environment, and water and sanitation. Strengthening research-to-policy translation and fostering innovation in vector surveillance and control will be essential in addressing evolving transmission dynamics.

The CII Centre for Health recognises the importance of multi-sectoral partnerships in malaria elimination. Industry, research institutions, civil society, and development partners all have a role in supporting innovation, capacity building, and operational efficiency.

I commend ICMR–NIMR and the Women Collective Forum on this report that combines scientific rigour with programmatic relevance. The insights presented here will serve as a valuable guide for policymakers and implementers as India advances decisively towards a malaria-free future.

Dr Randeep Guleria

Chairman, Governing Council, CII Centre for Health
Chairman – Internal Medicine, Respiratory and Sleep Medicine
Medanta – The Medicity

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Table of Contents

Acknowledgements

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We express our deep gratitude to the National Centre for Vector Borne Disease Control (NCVBDC), Ministry of Health & Family Welfare, Government of India, for its strategic direction and close collaboration throughout this initiative. We are particularly thankful to Dr. Tanu Jain, Director, NCVBDC and to Dr. Pranab Jyoti Bhuyan, Dr. C. S. Aggarwal, and Dr. Manpreet Singh for their valuable technical inputs, guidance and active participation in the consultative process.

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We are especially grateful to Dr. Bhupendra Tripathi, Deputy Director, Infectious Diseases and Vaccine Delivery, BMGF India Country Office and Dr. Amol Patil, Senior Program Officer, BMGF Malaria India County Office, for their valuable technical guidance and support.

We also thank the Transport Corporation of India Foundation (TCIF) for its collaboration and support, with special appreciation to Dr. Munish Chander, Director General, TCIF and Dr. Ramesh Dhiman Senior Consultant, for their contributions to this initiative.

We sincerely acknowledge the active participation and valuable inputs from state and district programme officers, public health officials, researchers, entomologists, clinicians, representatives from academic institutions, non-governmental organizations and implementation partners who contributed their field experiences and technical perspectives during the regional and national consultations.

We extend our appreciation to the team at ICMR-NIMR under the strategic guidance of Dr. Anup Anvikar, Director particularly Dr. Sachin Sharma and Dr. Praveen Bharti for

their valuable technical inputs and Dr. Himmat Singh, Dr. Rajendra K. Baharia, Dr. Kuldeep Singh, Dr. Ajeet Kumar Mohanty, Dr. Vineeta Singh, Dr. Waseem Akram Malla, Dr. Praveen Kumar Tripathi and Dr. Madhvi Chahar whose efforts were central to the successful organization of the workshops and the compilation of this report.

Finally, we acknowledge the support extended by the municipal corporations of Delhi, Ahmedabad and Surat, as well as the Division of Epidemiology and Communicable Diseases at ICMR Headquarters, New Delhi for facilitating the successful conduct of the consultative sessions.

The collective contributions of all stakeholders have been invaluable in shaping this report and we remain grateful for their commitment toward achieving a malaria-free India.

Consolidated Technical Commentary

Brainstorming Workshops on the Pre-Malaria Elimination Stage: Progress and Challenges

Dates and Venues

02 April 2025 - Guwahati, Assam

16 April 2025 - Ahmedabad, Gujarat

12 November 2025 - New Delhi, India

Organizers

ICMR-National Institute of Malaria Research (ICMR-NIMR), National Centre for Vector Borne Disease Control (NCVBDC), Women's Collective Forum (WCF) and Transport Corporation of India Foundation (TCIF)

Participants

State and district programme officers, academicians, entomologists, clinicians, international public health partners and other stakeholders

Executive Summary

India has made significant strides toward malaria elimination over the past decade, positioning itself among the global leaders in malaria control and elimination. Between 2015 and 2024, the country achieved an estimated 80-85% reduction in malaria cases and a 78% decline in malaria-related deaths, reflecting sustained investments in surveillance, diagnosis, treatment, and vector control. By 2024, 92% of districts reported an Annual Parasite Incidence (API) below 1, and the country recorded its highest-ever Annual Blood Examination Rate (ABER), underscoring strengthened surveillance reach and diagnostic coverage. These achievements indicate that India has largely transitioned into the pre-elimination phase, with malaria transmission becoming increasingly focal, heterogeneous, and operationally complex.

To consolidate progress and align with the WHO Global Technical Strategy (GTS) 2026-2030, a series of integrated consultative sessions were held across Ahmedabad, Guwahati and Delhi in 2025. These sessions brought together national and state programme managers, entomologists, clinicians, research institutions, NGOs, and international partners to assess progress, identify challenges, and prioritize strategic interventions for the next phase of malaria elimination.

At the national level, substantial progress has been made in strengthening malaria surveillance systems. The rollout of the Integrated Health Information Platform (IHIP) has enabled near real-time, case-based reporting across most states and union territories, improving timeliness of case notification, investigation, and response. Active surveillance has been intensified in tribal, forest areas, border regions, and migratory population settings, where residual transmission risks remain high. Diagnostic and treatment capacity has also improved through universal availability of rapid diagnostic tests (RDTs), deployment of Early Diagnosis and Complete Treatment (EDCT) kits for frontline workers, and growing emphasis on G6PD testing prior to administering primaquine or tafenoquine to ensure safe radical cure for Plasmodium vivax malaria. Vector control interventions have been strengthened through targeted deployment of Long-Lasting Insecticidal Nets (LLINs/ITNs), Indoor Residual Spraying (IRS), larval source management, and enhanced community engagement. However, the consultations highlighted persistent challenges, including insecticide resistance, variable IRS quality, and delays in LLIN replacement cycles, which may compromise the effectiveness of vector control if not systematically addressed. State-level assessments reveal substantial progress in North Eastern and Himalayan states such as Nagaland, Sikkim and Arunachal Pradesh, many of which are nearing elimination. However, high-burden pockets persist in districts of Odisha, Tripura, and Mizoram,

where asymptomatic infections, difficult terrain, and population movement continue to drive transmission. An emerging national concern identified during the consultations is urban malaria, driven largely by the spread of the invasive vector Anopheles stephensi in metropolitan areas such as Delhi. Urban transmission presents unique challenges related to container breeding, construction sites, informal settlements, high population density, and fragmented healthcare delivery, necessitating city-specific vector control and surveillance strategies. Key challenges identified nationwide include inconsistent private-sector reporting, limited entomological capacity, drug and insecticide resistance, operational gaps in remote tribal areas, and sporadic shortages of diagnostics and treatment commodities. Cross-border transmission from Myanmar and Bangladesh continues to affect border districts in the Northeast. Strengthening surveillance systems, enhancing vector monitoring, and improving supply chain reliability emerged as top priorities.

The consultative sessions emphasized that, in the elimination phase, surveillance sensitivity is more critical than surveillance volume. Participants underscored the need for universal case-based surveillance in all API <1 districts, rapid case investigation and foci classification, and sustained vigilance even in areas with very low transmission. Strengthened entomological and molecular surveillance, improved urban vector management, and community engagement were identified as essential pillars for preventing resurgenceRecommendations for 2026-2030 include district-tailored micro-planning, entomological capacity expansion, LLIN replacement planning, cross-border coordination, and annual entomological progress reporting.

Operational research emerged as a key enabler for elimination acceleration. Priority research areas include asymptomatic infections, Anopheles stephensi ecology and control, drug and insecticide resistance, and optimization of treatment regimens for P. vivax. The consultations also highlighted the importance of translating research findings into programmatic action through close collaboration between research institutions, national programmes, and state health systems. Looking ahead to 2026-2030, the report outlines strategic recommendations including district-tailored micro-planning, expansion of entomological capacity, systematic LLIN replacement planning, strengthened cross-border coordination, and annual entomological progress reporting. These actions are intended to support the National Elimination Acceleration Framework and ensure alignment with global malaria elimination targets.

India is well-positioned to achieve zero indigenous malaria by 2030. Achieving this goal will require sustained political commitment, strengthened multisectoral coordination, and data-driven interventions. The outcomes of these consultative sessions provide a clear, actionable roadmap for accelerating malaria elimination, safeguarding recent gains, and advancing toward a malaria-free India.

Introduction

Over the past decade, India has made significant and steady progress in reducing its malaria burden. The number of malaria cases has dropped from 1.17 million in 2015 to around 227,000 in 2024, representing an 80-85% reduction. Similarly, malaria-related deaths have fallen from 384 to approximately 83, a decrease of about 78%. In 2023, the country achieved its highest-ever Annual Blood Examination Rate (ABER) of 25%, reflecting strengthened surveillance and testing efforts. Currently, 92% of districts report an Annual Parasite Incidence (API) is <1, indicating that India has largely entered the pre-elimination phase and is well-positioned for accelerated malaria elimination in the coming years. These gains are underpinned by strengthened surveillance, expanded access to diagnosis and treatment, targeted vector control interventions, and sustained political and programmatic commitment at national and sub-national levels.

As India transitions from malaria control to elimination, the nature of the challenge has fundamentally changed. The current phase is characterized not only by a substantially reduced overall disease burden but also by increasingly heterogeneous, focal, and operationally complex transmission. Malaria is no longer uniformly distributed across large geographic areas; instead, it persists in limited pockets shaped by local ecological conditions, human mobility, occupational exposure, health-system access, and vector dynamics. In several states approaching elimination, remaining cases are often sporadic, imported, or asymptomatic, making detection, investigation, and response more demanding than in earlier phases of higher transmission. Conventional programme review mechanisms, which rely heavily on aggregate case counts and routine indicators, are increasingly insufficient to capture these nuanced epidemiological realities. In low-transmission and pre-elimination settings, residual malaria often persists in forms that are less visible to routine systems, including asymptomatic and submicroscopic infections, infections among mobile and migrant populations, evolving vector behaviour, and reduced community perception of malaria risk. At the same time, declining caseloads can lead to reduced programmatic vigilance, diminished entomological capacity, and competing health priorities within overstretched health systems, all of which increase the risk of resurgence if not proactively addressed.

Recognizing these emerging challenges, and with technical support from the ICMR-NIMR, the NCVBDC, and the WCF, along with financial support from the Bill & Melinda Gates Foundation (BMGF), it was considered essential to move beyond routine programme assessments. Dedicated and interactive platforms were, therefore, envisioned to enable deeper technical reflection, structured dialogue, and collective problem-solving tailored to the realities of malaria elimination across diverse epidemiological and ecological contexts in India.

Following a series of preparatory consultations, it was decided to convene three regional consultative and synthesis workshops at strategically selected geographic locations. The three workshop regions-Ahmadabad, Guwahati, and Delhi, were deliberately chosen to collectively represent and cover all major geographic, epidemiological and programmatic regions of the country, thereby ensuring comprehensive national representation of malaria ecologies and transmission settings. These consultations were organized across three zones:

- **West and South zones-** covering Andhra Pradesh, Telangana, Gujarat, Dadra and Nagar Haveli, Kerala, Lakshadweep, Chhattisgarh, Karnataka, Maharashtra, Goa, Tamil Nadu and Puducherry.
- **North East zones-** covering Assam, Arunachal Pradesh, Meghalaya, Manipur, Mizoram, Nagaland, Tripura, Sikkim, West Bengal, Andaman and Nicobar Islands and Port Blair.
- **Central and North zones-** covering Uttar Pradesh, Punjab, Chandigarh, Odisha, Bihar, Jharkhand, Jammu & Kashmir, Madhya Pradesh, Rajasthan, Uttarakhand, Himachal Pradesh and Haryana.

This regional approach ensured balanced participation from states at varying stages of malaria control and elimination and facilitated context-specific discussions reflecting diverse transmission dynamics, operational constraints, and programmatic priorities.

The consultations were conceptualized as technical and brainstorming forums, bringing together national and state programme managers, public health officials, researchers, entomologists, clinicians, and implementation partners. The objective was to jointly examine emerging challenges, share field-based experiences and align programmatic strategies with evolving technical evidence relevant to the elimination phase.

Specifically, the consultations aimed to:

- Critically examine state-level malaria progress beyond aggregate numerical trends.
- Identify operational and health-system gaps that become increasingly prominent as transmission declines.
- Facilitate cross-learning among states with diverse ecological and epidemiological profiles.
- Link programmatic challenges with research evidence and technical expertise.
- Support forward-looking planning for the next phase of malaria elimination.

Rather than focusing solely on achievements or constraints, discussions emphasized adaptive strategies responsive to local realities. Particular attention was given to determinants increasingly critical for elimination success, including human mobility,

urban malaria, border and forest-associated transmission, diagnostic reliability, entomological capacity and surveillance sensitivity.

This report synthesizes the insights generated through these three regional consultations. It is not intended as a verbatim record of proceedings; instead, it presents a structured technical synthesis integrating state-level experiences, common challenges, and proposed strategic actions. The objective is to provide a practical and policy-relevant reference to inform programme planning and implementation, while supporting sustained progress and minimizing the risk of malaria resurgence.

By consolidating collective learning at this pivotal juncture, the report aims to contribute to a more adaptive, locally responsive, and evidence-informed pathway toward malaria elimination in India.

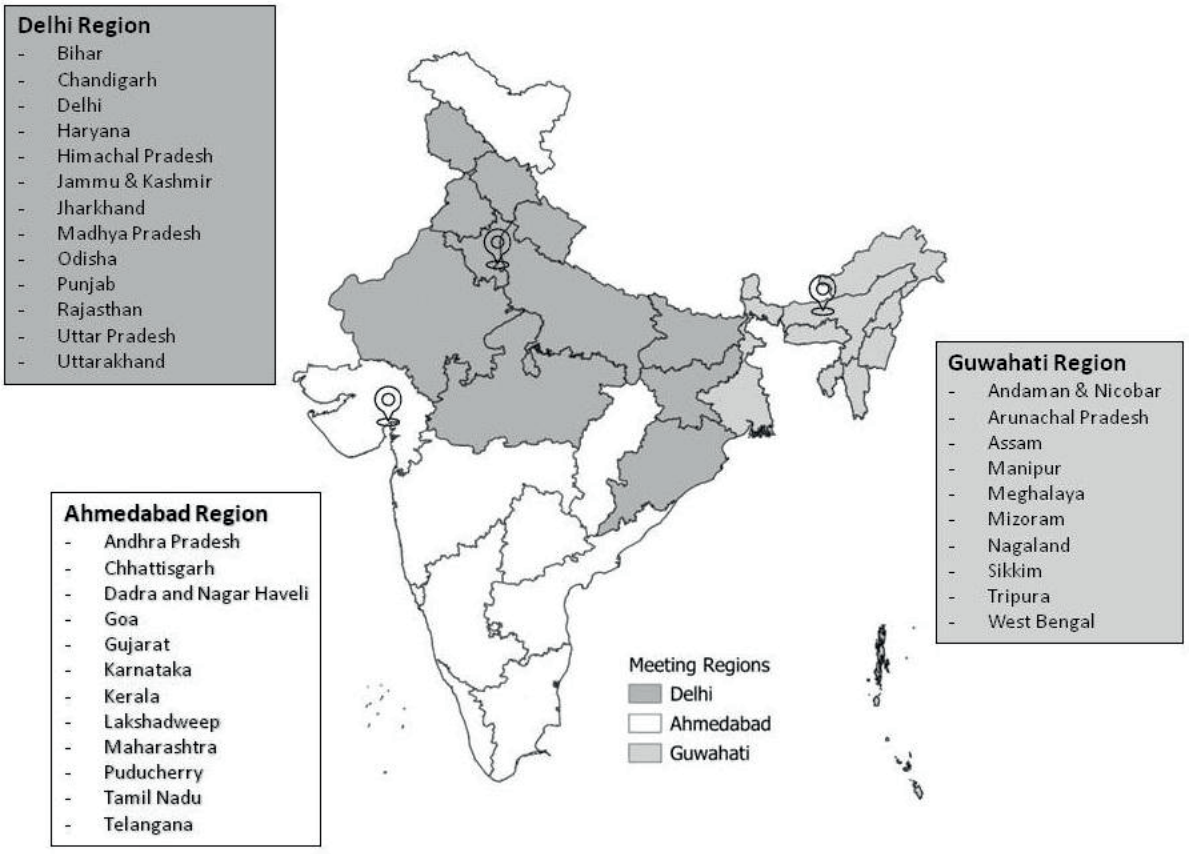

Fig. 1. Locations of the regional workshops conducted under the brainstorming program on the Pre-Malaria Elimination Stage in India.

03 Meeting-Specific Technical Deliberations and Field Insights

3.1 Northeast Zone Technical Workshop held in Guwahati

The Guwahati workshop focused on malaria elimination challenges specific to the north eastern states, where transmission has become increasingly focal and heterogeneous. While most districts have achieved substantial reductions in malaria incidence, persistent transmission continues in border areas, forested and tribal regions, and among highly mobile populations. State-level deliberations highlighted the growing contribution of asymptomatic and low-density infections, which remain largely undetected by routine surveillance yet play a significant role in sustaining residual transmission. Participants critically examined gaps in surveillance sensitivity, diagnostic quality at peripheral health facilities, and constraints in entomological capacity. Operational challenges related to cross border movement, difficult terrain and seasonal inaccessibility were emphasized. The meeting underscored the importance of block and sub district level stratification, strengthened active and reactive surveillance, quality assurance of RDTs and IRS operations, and closer integration of operational research to address insecticide resistance and evolving vector ecology in the north eastern region.

Inaugural session of the Northeastern region workshop

Stakeholders and participants of the Northeastern region workshop

Panel discussion during the Northeastern region workshop

3.2 West and South Zone Consultative Workshop Held in Ahmedabad

The Ahmedabad consultative workshop examined malaria elimination progress in western and central Indian contexts, with particular emphasis on sustaining gains in low transmission and near eliminations districts. Discussions focused on strengthening routine and case based surveillance, addressing diagnostic and treatment adherence gaps, and ensuring programmatic vigilance as malaria incidence declines.

Participants highlighted challenges related to human resource availability, diagnostic delays in peripheral settings and the need for improved integration of private sector reporting. The workshop emphasized district specific micro planning, enhanced use of digital surveillance tools, and continued capacity building of programme staff to prevent re establishment of transmission in settings approaching elimination.

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Inaugural session of the West and South zone consultative workshop

Stakeholders and participants of the West and South zone consultative workshop

Discussion during the West and South zone workshop

3.3. North and Central Zone Technical Review Workshop held at India International Centre (IIC), New Delhi

The national-level workshop held at the IIC, New Delhi provided a comprehensive review of India's malaria elimination trajectory and facilitated strategic alignment with the WHO Global Technical Strategy (GTS) 2026-2030. Deliberations highlighted major achievements, including strengthened surveillance through the Integrated Health Information Platform (IHIP), expanded case based reporting, and improved access to diagnosis and treatment.

At the same time, participants identified emerging risks that could undermine elimination sustainability, including incomplete private sector reporting, urban malaria driven by Anopheles stephensi, evolving drug and insecticide resistance and reduced programmatic visibility in API <1 districts. The synthesis discussions translated regional insights into evidence informed priorities for the elimination acceleration phase, emphasizing universal case based surveillance, entomological and molecular monitoring and district tailored interventions.

Dr. Anup Anvikar, Director, ICMR-NIMR, addressing the participants in New Delhi Workshop

Dr. Tanu Jain, Director, NCVBDC, highlighted key challenges and proposed required actions at the workshop held in New Delhi Workshop

Brainstorming session with all stakeholders and state partners during the workshop in New Delhi Workshop

Stakeholders and participants of North and Central zones, New Delhi Workshop

04 Goals of the Integrated Consultative Sessions

A. Review national and state progress toward malaria elimination (2015-2025).

B. Identify operational, technical and programmatic challenges.

C. Share best practices and innovative interventions.

D. Discuss research priorities and technological support.

E. Strengthen research, surveillance, entomological monitoring, and vector control.

F. Strengthen coordination among national programs, research institutes, NGOs and international partners.

G. Consolidate actionable recommendations aligned with the WHO Global Technical Strategy (GTS) 2026-2030.

05 National Level Progress and Strategic Updates

5.1 Surveillance and Reporting

India has continued to strengthen its malaria surveillance systems through the rollout of the IHIP, which now supports near real-time, paperless reporting across 28 of the 36 States and Union Territories. Case-based reporting has also expanded to more than 200 districts, helping ensure that each malaria case is promptly documented, investigated and followed up.

Active surveillance has been further reinforced, with particular attention to P. vivax relapse monitoring, tracking of mobile and migrant populations, and improving coverage in high-risk tribal and hard-to-reach areas. Together, these efforts enable timely identification of hotspots, quicker response to emerging clusters, and more locally tailored interventions. This strengthened surveillance backbone continues to play a vital role in advancing India's malaria elimination agenda.

Challenges

- **Private sector reporting gaps:** Many malaria cases detected in private clinics and laboratories are not consistently reported, creating gaps in national surveillance data.
- **Data inconsistencies:** Variations in data collection and reporting practices across regions can lead to incomplete or inaccurate information, making it harder to track malaria trends.
- **Limited access in remote areas:** Poor internet and mobile network access in tribal, forest areas and hard-to-reach regions slows timely reporting and follow-up, affecting overall surveillance efficiency.

Actions proposed

- **Integrating private reporting into IHIP:** Ensure that malaria cases diagnosed in private clinics and laboratories are captured in the IHIP to create a complete national database.
- **Mobile based reporting tools for field workers:** ASHAs, MPWs, and other frontline health workers will use mobile applications to record and submit malaria cases promptly and reliably.
- **Digital dashboards:** Use real-time dashboards to visualize case trends, track outbreaks, and support decision making at district, state and national levels.
- **Patient held malaria treatment cards:** Provide patients with personal treatment cards to track their diagnosis and treatment, helping ensure proper follow-up and improving monitoring and adherence.

5.2 Diagnosis and Treatment

- **Universal access to RDTs and microscopy:** High-risk areas are being supplied with RDTs and microscopy services to ensure fast and reliable malaria detection at the community level.
- **EDCT kits for frontline workers:** EDCT kits are being provided to frontline health workers, including ASHAs, so they can test and treat patients promptly during field visits.
- **G6PD testing before Primaquine/Tafenoquine:** Screening for G6PD deficiency is recommended before giving Primaquine or Tafenoquine to ensure safe treatment and prevent adverse reactions.

Actions proposed

- **Prescription audits:** Regularly reviewing prescriptions to ensure that malaria medicines are being used correctly and according to national guidelines.
- **Digital adherence tracking:** Using simple digital tools or apps to monitor whether patients complete their full course of malaria treatment, helping improve cure rates.
- **Operational research on dosing strategies:** Conducting studies to compare new and existing treatment options such as single-dose Tafenoquine versus the 14-day Primaquine regimen to identify safer, easier and more effective approaches for patients.

5.3 Vector Control and Entomology

- **LLINs, ITNs and IRS in high-risk areas:** LLINs, ITNs and IRS are being applied in a targeted manner in districts with higher malaria transmission (API >1) to decrease human mosquito contact and control malaria transmission.
- **Strengthening integrated vector management:** Vector control efforts now include larval source management, use of biological methods such as larvivorous fish and active community participation to reduce mosquito breeding and support long-term control.

Challenges

- **Insecticide resistance:** Mosquitoes in some areas are developing resistance to commonly used insecticides, reducing the effectiveness of current control measures.
- **Variable IRS quality:** The quality and coverage of IRS differ across districts, leading to uneven protection and reduced impact.
- **Delays in LLIN replacement:** Late replacement of LLIN lowers their ability to protect people, as older nets provide less insecticidal action.

Actions proposed

- **Pre dispatch insecticide quality testing:** Ensure that insecticides are tested before distribution so only high-quality, effective products are used in malaria control activities.
- **Regular entomological surveys:** Conduct routine mosquito monitoring to track species, breeding sites and resistance patterns, helping guide targeted interventions.
- **Drone assisted habitat mapping:** Use drones to identify mosquito breeding habitats, especially in hard-to-reach areas, to support timely and precise vector control.
- **Strengthening IRM:** Improve insecticide resistance management by rotating insecticides and using evidence-based strategies to slow the spread of resistance.
- **Community participation:** Encourage local communities to take part in mosquito control activities, such as eliminating stagnant water and supporting larval source reduction.

5.4 Capacity Building, Research and Innovation

- **Expanded training programs:** Training for health workers, entomologists, field staff and district teams has been increased to strengthen skills in diagnosis, surveillance and vector control, improving overall programme performance.
- **Priority research areas:** Key focus areas include monitoring drug and insecticide resistance, studying asymptomatic carriers, strengthening molecular surveillance, identifying transmission hotspots and conducting KAP studies in tribal and urban communities to guide targeted interventions.

Actions proposed

- Collaboration with ICMR-Vector Control Research Centre (ICMR-VCRC), NGOs, WHO, national research institutes, technical agencies, and civil society organizations to support operational research, develops evidence-based strategies and implements targeted interventions in high-risk areas.

06 State Level Progress and Strategic Updates

State	Progress	Annual Parasite Incidence (API)	Key Challenges	Actions proposed
Nagaland	Malaria cases reduced to 5 in 2024; near elimination	<0.1	Migrant population, monitoring travelers, school awareness	Tracking moving populations, supporting ASHA workers, working with schools and churches and making detailed local plans
Assam	Malaria cases Decline in most districts; border districts remain high-risk	0.1-0.5 (in BTAR)	RDT quality, *Anopheles culicifacies* emergence, migrant cases	Area-wise planning, working together locally, checking RDT quality, giving out mosquito nets and sharing learning with neighbouring regions
Manipur	Increase due to internal migration; generally low endemic	0.2-0.3	Lack of entomologists, procurement delays	Adherence to central guidelines, local plan execution and capacity building
Tripura	Cases declined from 22,000 (2023) to 10,000 (2024)	0.5-1.2 (in Dhallai/South Tripura)	Poor connectivity, Jhum cultivation, *P. falciparum* rise	Running health camps, off-season monitoring, malaria card based tracking, sharing LLINs, and conducting AAM awareness campaigns
Meghalaya	Significant reduction; API from 20 (2015) to 0.17 (2024)	0.17	Hard to reach villages in the rainy season and migrant workforce	Full LLINs coverage, marking breeding spots, improving mosquito studies, use of drones and IEC/BCC enhancement
Sikkim	Organic state; malaria controlled via non-insecticidal measures	<0.1	Migrant malaria cases	Pre-monsoon cleaning, intersectoral collaboration, community participation and training of traditional healers
Kolkata (Urban)	30/33 wards malaria-free	<0.1	High migrant influx, making tracking and treatment difficult	Detailed local plans, microscopy based diagnosis and involvement of NGO volunteers

Odisha	7 districts API >1; DAMAN program extended to 24 districts	1-3 (in high-risk districts)	High number of asymptomatic cases and remote areas	Routine surveillance, special health camps, entomological surveys and SHG awareness programs
Mizoram	Steady improvement; PV increasing, PF declining	0.5-1.5 (in endemic pockets)	Lack of staff, language barriers, and hard to reach areas	Using Deltamethrin spraying, NGO manpower deployment and research on drug/insecticide resistance
Arunachal Pradesh	Maintained malaria free status in 16 districts	<0.1	Myanmar border cases and travel related infections	Screening travellers, testing during fairs and festivals, and spreading local awareness
Uttarakhand	95.7% decline; 41 cases in 2025	<0.1	Dengue co-epidemics and low risk plain districts	Strengthening hospital readiness, reducing breeding sources, and enhancing awareness efforts
Delhi	All wards in elimination phase	<0.1	Gaps in reporting from private clinics and limited G6PD testing	Teams to prevent outbreaks, targeted mosquito control, patient cards for better follow-up and digital tools to prevent new cases
Punjab, Haryana, Rajasthan, Jharkhand & Madhya Pradesh	Improved reporting via digital platforms	0.1-0.5 (in high-risk districts)	Human resources shortages, diagnostic delays	Using GIS maps, awareness activities in schools, checking net use, using the MARUDHAR App and district consultants deployment for prevention

07 Interpretation of State-Level Achievements, Challenges, and Response Strategies

Discussions during the brainstorming program indicate that India's malaria elimination programme has entered a transitional phase, where major national achievements coexist with localized and context-specific risks. While most states have successfully reduced malaria incidence to an API below 1, transmission continues to persist in limited geographic pockets. These residual foci are influenced by factors such as human mobility, ecological diversity, occupational exposure, and differences in health-system capacity.

At this stage, malaria is no longer uniformly distributed but is concentrated in specific populations and locations, making elimination increasingly complex. Low transmission levels have reduced overall disease burden; however, they have also increased the risk of undetected cases, delayed diagnosis, and re-introduction, particularly in settings with frequent population movement or limited access to services.

This section presents a state-wise synthesis of progress, key challenges, and strategic responses, based on the summary table and state deliberations. By examining individual state experiences within the broader national framework, it highlights the need for precision-focused surveillance, targeted interventions and sustained programmatic vigilance to support India's progress toward malaria elimination.

7.1 States Approaching or Sustaining Near-Elimination

States such as Nagaland, Sikkim, Arunachal Pradesh, Uttarakhand, Delhi and urban settings like Kolkata have reached a phase where malaria occurrence is rare, sporadic, and largely non-indigenous. In these settings, transmission is no longer sustained within communities and detected cases are mainly linked to population movement across districts or state borders.

Epidemiological interpretation

- Local transmission chains have been largely interrupted.
- Remaining infections are predominantly associated with migrant workers, travelers and mobile occupational groups.
- Reduced case numbers have lowered perceived risk at community level, increasing reliance on health system driven detection rather than self-reporting.

Key programmatic challenges

- Identifying and following mobile and transient populations in real time.
- Maintaining high quality surveillance in settings with very low case load.
- Ensuring treatment adherence and follow-up among individuals who frequently move across locations.

Strategic actions emphasized

- Rapid investigation, classification and response for every detected infection.
- Strengthening frontline worker engagement for post-treatment follow-up.
- Sustained awareness activities through schools, religious institutions, NGOs and community leaders.
- Development and regular updating of village and ward level elimination plans.

These states demonstrate that success in elimination depends on vigilance that is equal to or greater than during the control phase, despite minimal transmission.

7.2 States with Localized Residual Transmission

States including Assam, Manipur and selected districts in Punjab, Haryana, Rajasthan, Jharkhand, and Madhya Pradesh exhibit heterogeneous malaria transmission, where overall reductions coexist with persistent local hotspots.

Epidemiological interpretation

- Transmission is increasingly focal, clustered and context-specific.
- High-risk areas are often associated with border regions, forested landscapes or occupational exposure.
- Migration contributes to periodic re-introduction, leading to localized transmission events.

Operational Challenges

- Inconsistent diagnostic performance at peripheral health facilities.
- Shortage of trained technical staff, particularly in entomology and surveillance.
- Procurement and logistical delays affecting timely intervention.

Programmatic response priorities

- Sub-district stratification to identify and prioritize residual transmission zones.
- Strengthening diagnostic quality assurance and supervisory systems.
- Expanded use of GIS-based mapping and digital surveillance tools.
- Deployment of district-level technical consultants to support elimination planning.

These settings highlight the importance of precision public health, where interventions are tailored to micro-epidemiological contexts rather than applied uniformly.

7.3 States Requiring Sustained Intensification

States such as Tripura, Odisha and Mizoram continue to report ongoing malaria transmission, shaped by ecological complexity and social vulnerability, even as overall trends improve.

Contextual factors sustaining transmission

- Difficult terrain and limited physical connectivity affecting service delivery.
- Livelihood practices that increase exposure to vectors.
- High prevalence of low-density or asymptomatic infections sustaining silent transmission.
- Species-specific challenges, including changing parasite composition.

Key operational needs

- Outreach services extending beyond routine health facility coverage.
- Seasonally adjusted surveillance and intervention strategies.
- Strong community engagement to support early detection and treatment completion..

Priority actions

- Regular outreach health camps and off-season surveillance activities.
- Structured patient tracking systems to ensure complete treatment.
- Strengthened entomological surveillance to guide targeted vector control.
- Active involvement of SHGs, NGOs, and community volunteers.

These states illustrate that the final phase of elimination is resource intensive and operationally demanding, requiring sustained commitment and uninterrupted intensity.

7.4 Urban and Metropolitan Contexts

Urban centers such as Delhi and Kolkata face distinct malaria transmission dynamics, influenced by population density, informal settlements and frequent population turnover.

Key challenges

- Fragmented healthcare delivery with incomplete integration of private providers.
- Difficulty ensuring continuity of care among mobile urban populations.
- Presence of vectors adapted to urban habitats.

Strategic approaches

- Ward and neighborhood level micro-planning.

- Emphasis on laboratory confirmed diagnosis and case verification.
- Partnerships with civil society organizations for follow-up and awareness.
- Use of digital tools for real-time case tracking and outbreak prevention.

Urban experiences underscore the need for city specific elimination strategies aligned with municipal governance systems.

7.5 Border-Adjacent and Mobility-Sensitive Areas

States located along international borders or major transit corridors face a continued risk of malaria re-introduction, even after achieving local control.

Risk drivers

- Cross-border movement for employment, trade and social activities.
- Seasonal population surges during festivals, fairs and mass gatherings.

Mitigation strategies

- Screening and testing during high mobility periods.
- Focused awareness campaigns in border and transit communities.
- Strengthened coordination with neighboring states and countries.

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7.6 Cross-Cutting Programmatic Themes

Across states, several consistent themes emerged:

- Surveillance sensitivity is now more critical than surveillance volume.
- Human mobility increasingly drives transmission patterns.
- Entomological capacity must be preserved despite declining caseloads.
- Community engagement remains central to sustaining elimination gains.

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08 Implications for the Elimination Acceleration Phase (2026-2030)

Collectively, state experiences indicate that malaria elimination in India will depend on:

- Maintaining high alertness in low-burden and malaria-free settings.
- Preventing resurgence through rapid detection, investigation and response.
- Targeting imported, asymptomatic and low-density infections.
- Using fine scale epidemiological and spatial data to guide resource allocation.

These findings reinforce the need for an adaptive, locally responsive and evidence driven elimination strategy, capable of addressing state-level heterogeneity while sustaining national momentum toward zero indigenous malaria.

09 National Challenges

- Under-reporting and gaps in surveillance from private sectors and remote areas, creating gaps in the national malaria data.
- Limited entomological capacity and inconsistent monitoring of mosquito patterns, breeding sites and resistance levels.
- Cross-border malaria cases from Myanmar and Bangladesh increase malaria risk in India's border districts.
- Insecticide and drug resistance evolving in some regions.
- LLINs are sometimes misused, and many households refuse IRS because of smell, stains or safety concerns.
- Urban expansion of Anopheles stephensi, is driving higher malaria risk in cities.
- Population in remote tribal and forest areas often struggle to access malaria testing and treatment.
- Intermittent shortages of diagnostic kits, medicines and nets disrupt smooth programme operations.

10 Key Thematic Insights from the Integrated Consultative Sessions

10.1 Surveillance Strengthening

- Universal Case-Based Surveillance (CBS) for all API <1 districts to ensure every malaria case is detected, reported and followed up individually.
- Timely notification, investigation and foci classification within 24-48 hours to stop further transmission and quickly respond to new cases.
- Stronger private-sector integration so cases from private clinics, hospitals and labs are reported promptly and included in routine surveillance.
- Use of mobile applications for ASHAs and MPWs to support real-time reporting, faster data entry and quicker field response.

10.2 High Burden North East States

- Block-level mapping is essential for Mizoram, Tripura, Meghalaya, Nagaland and Arunachal Pradesh to target interventions where transmission is highest.
- Increase IRS and LLIN coverage during high-risk seasons to provide stronger protection when malaria cases usually rise.
- Detailed block-level planning is essential for Mizoram, Tripura, Meghalaya, Nagaland and Arunachal Pradesh to target interventions where transmission is highest.
- Use trained volunteers in border villages to help report cases early and monitor population movement that may influence transmission.
- WHO supported cross-border technical exchanges to share best practices, coordinate strategies and strengthen joint action to improve regional malaria control.

10.3 Tribal and Forest Areas

- Remote locations and hidden malaria cases remain major challenges, as people in these areas have limited access to testing and treatment and asymptomatic infections continue to fuel transmission.
- Effective solutions include setting up mobile diagnostic camps to reach isolated communities, training and involving local tribal volunteers in surveillance and using sensitive RDTs to detect low-level infections early.

10.4 Urban Malaria and Anopheles stephensi

- Rising concern about the spread of Anopheles stephensi in urban areas require key actions; container mapping, construction site regulations, joint dengue-malaria vector control and city-level mosquito monitoring.

10.5 Vector Control Enhancement

- **IRS quality assurance and monitoring:** IRS is done effectively and consistently, with regular checks to confirm proper coverage and spray quality.
- **Insecticide rotation according to IRM guidelines:** Rotate insecticides as per the IRM strategy to prevent mosquitoes from developing resistance and maintain the effectiveness of vector control.
- **LLIN replacement cycle (2026-2028):** Plan and implement the scheduled replacement of LLINs to ensure communities remain protected over time.

11 Final Recommendations (2026-2030)

- **Strengthen universal case-based surveillance by 2026:** Efforts may continue to ensure that every malaria case is promptly detected, reported, and followed up, enabling timely action at both community and facility levels.
- **Adopt district-specific, area-based planning with tailored strategies:** Each district may be supported to develop focused malaria control and elimination plans based on its unique epidemiological profile and operational needs.
- **Intensify support to North-East states with higher burden:** High-transmission pockets in the North-East may receive enhanced operational assistance to accelerate reduction in malaria cases while respecting local contexts and challenges.
- **Strengthen urban malaria response across 40 major cities:** Cities including Delhi, Mumbai, Kolkata, Chennai and Bengaluru may prioritize targeted actions for urban malaria, particularly focusing on managing Anopheles stephensi breeding sites and improving urban vector control practices.
- **Institutionalize annual entomological monitoring and IRM practices:** Regular entomological assessments may guide evidence-based vector control, while systematic insecticide rotation will help delay and manage resistance.
- **Promote integrated vector management through municipal health collaboration:** Stronger coordination between municipal bodies and health departments may help streamline environmental management, vector control activities, and community participation.
- **Enhance cross-border coordination mechanisms:** Partnerships with neighbouring countries may be strengthened to jointly manage malaria risks in border districts and promote exchange of knowledge, surveillance data and best practices.
- **Introduce quarterly Roll Back Malaria (RBM) style monitoring in high-risk states:** Regular review workshops modelled on the RBM framework which will help to track progress, identify operational gaps and guide timely corrective actions.
- **Advance operational research on asymptomatic infections and Anopheles stephensi:** Research efforts may focus on identifying hidden reservoirs of malaria and better understanding An. stephensi dynamics to support more effective interventions, especially in urban and peri-urban settings.
- **Roll out the National Elimination Acceleration Framework (NEAF) 2026-2030:** A coordinated and phased implementation of NEAF may guide national, state and district-level actions, ensuring a unified approach toward achieving malaria elimination by 2030.

12 Conclusion

The Integrated Consultative Sessions have reiterated that India remains strongly positioned to achieve zero indigenous malaria by 2030. Sustained emphasis on high-quality and sensitive surveillance, locally tailored and evidence-driven operational planning, strengthened entomological capacity, and meaningful community engagement will be essential in the elimination acceleration phase. Continued collaboration among national programmes, state health systems, research institutions, and international partners will support steady progress toward elimination. The recommendations outlined provide a clear and practical pathway to accelerate efforts from 2026 to 2030, safeguard the gains made thus far and advance India's contribution to the WHO South-East Asia Region's malaria elimination goals.

List of Presenters at Regional Workshops

Delhi Workshop - Presenters	
Name	**Region**
Dr. Tanu Jain	Delhi
Dr. Pranab Jyoti Bhuyan	Delhi
Dr. Naveen Rai Tuli	Delhi
Dr. Badri Thapa	Delhi
Dr. Ravinder Ahlawat	Haryana
Dr. D J Raina	Jammu & Kashmir
Dr. Birendra Kumar Singh	Jharkhand
Dr. Manisha Juneja	Madhya Pradesh
Dr. Pravakar Sahoo	Odisha
Dr. Nazatinder Singh	Punjab
Dr. Nirmla Sharma	Rajasthan
Dr. Vikas Singhal	Uttar Pradesh
Dr. Sourabh Singh	Uttarakhand
Dr. Abhishekh Kapoor	Himachal Pradesh
Dr. Suchitra Sasmal	Odisha

Guwahati Workshop - Presenters	
Name	**Region**
Dr. Subrata Roy Chowdhury	Kolkata
Dr. Ipsita Paul Bhowmick	Dibrugarh
Dr. K. Vanlalhruaia	Manipur
Dr. Ramesh Dhiman	Delhi
Dr. Aswani Kumar	Chennai
Dr. Siraj Ahmed Khan	Dibrugarh
Dr. DC Sharma	Sikkim
Dr. S. Priyokumar Singh	Manipur
Dr. Sankha Subhra Debnath	Tripura
Dr. L.A. Singh	Manipur
Dr. Tinurenla Anichari	Nagaland
Dr. Praveen Bharti	Delhi

Ahmedabad Workshop - Presenters	
Name	**Region**
Dr. Vineeta Singh	Delhi
Dr. Ajeet Mohanty	Goa
Dr. R VasanthaKumari	Tamil Nadu
Dr. Nirmal Joe	Tamil Nadu
Dr. Harikumar S	Kerala
Dr. M Senthil Kumar	Tamil Nadu
Dr. Vikram Khan	Dadra and Nagar Haveli & Daman & Diu
Dr. P Manorama	Andhra Pradesh
Dr. Rajendra Baharia	Gujarat
Dr. Dhwani Patel	Gujarat
Dr. Raj Sharma	Gujarat
Dr. Vani H C	Karnataka
Dr. Alex Eapen	Tamil Nadu
Dr. Himmat Singh	Delhi

Notes

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The ICMR-National Institute of Malaria Research (ICMR–NIMR) is India's premier research institution dedicated to understanding and combating malaria and other vector-borne diseases. Established in 1977 as the Malaria Research Centre and renamed in 2005 as the National Institute of Malaria Research, NIMR functions under the Indian Council of Medical Research (ICMR), Department of Health Research, Ministry of Health & Family Welfare, Government of India. The institute provides national scientific leadership and technical support to guide evidence-based malaria control and elimination strategies.

The mandate of the institute is to identify research needs aligned with national malaria strategies, convert research finding into actionable strategies and creating evidence-based policies for malaria elimination. The institute conducts basic, translational, and operational research on multiple facets of malaria and vector-borne diseases, including parasite biology, vector ecology, epidemiology, diagnostics, drug and insecticide resistance, surveillance systems, and intervention effectiveness. A defining feature of ICMR-NIMR is the integration of laboratory science with field research.

In addition to malaria, NIMR conducts research and surveillance on other vector-borne diseases, including dengue, chikungunya, and Zika. Studies on insecticide resistance have identified multiple knockdown resistance mutations, including novel variants strongly associated with pyrethroid resistance, informing national vector control strategies.

In parallel with its research mandate, NIMR plays a critical role in capacity building and technical support, offering training, workshops and collaborative partnerships with national and state health programmes, academic institutions, and international agencies. NIMR continues to strengthen its infrastructure to support high-quality research and training.

Aligned with India's goal of achieving zero indigenous malaria by 2030, NIMR continues to adapt its research, operational and capacity-building functions to meet the evolving challenges of malaria pre-elimination and elimination phases. Through a combination of scientific excellence, operational research, surveillance innovation, infrastructure development and stakeholder engagement, ICMR-NIMR remains a cornerstone institution in India's fight against malaria and other vector borne diseases.

WOMEN'S
COLLECTIVE FORUM

About The Women's Collective Forum (WCF)

The Women's Collective Forum (WCF) is a pan-sectoral platform focused on equity-led systems transformation through scalable, institutionally grounded models.

Its enterprise initiative, SPARK – The 100K Collective, addresses the "missing middle" of women-led businesses—enterprises that are already established but remain excluded from formal finance, markets, digital systems, and regulatory frameworks. Through bootcamps in 300 locations, SPARK will work with 100,000 women entrepreneurs to strengthen their capacity to engage with capital, platforms, and institutions, ensuring that systems become navigable for those already building.

Beyond enterprise, WCF collaborates with leading health, technology, and management institutions to advance maternal health protocols, disease elimination, and the integration of new health technologies. In law and governance, WCF supports implementation of India's evolving criminal law frameworks with a focus on survivor-centricity and institutional accountability.

WCF also convenes cross-sectoral dialogues to highlight India's leadership in frugal innovation and systems change, engaging with global leaders and national platforms to translate research into policy and practice.

Across all these areas, WCF's model is consistent: build partnerships that connect evidence to institutions, and design approaches that can scale to strengthen systems for equity.

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MALARIA ELIMINATION

Technical Report 2025

ICMR-National Institute of Malaria Research (ICMR-NIMR)
National Center for Vector Borne Diseases Control (NCVBDC)