



Ministry of Health  
& Family Welfare  
Government of India



# National Strategic Plan: Malaria Elimination

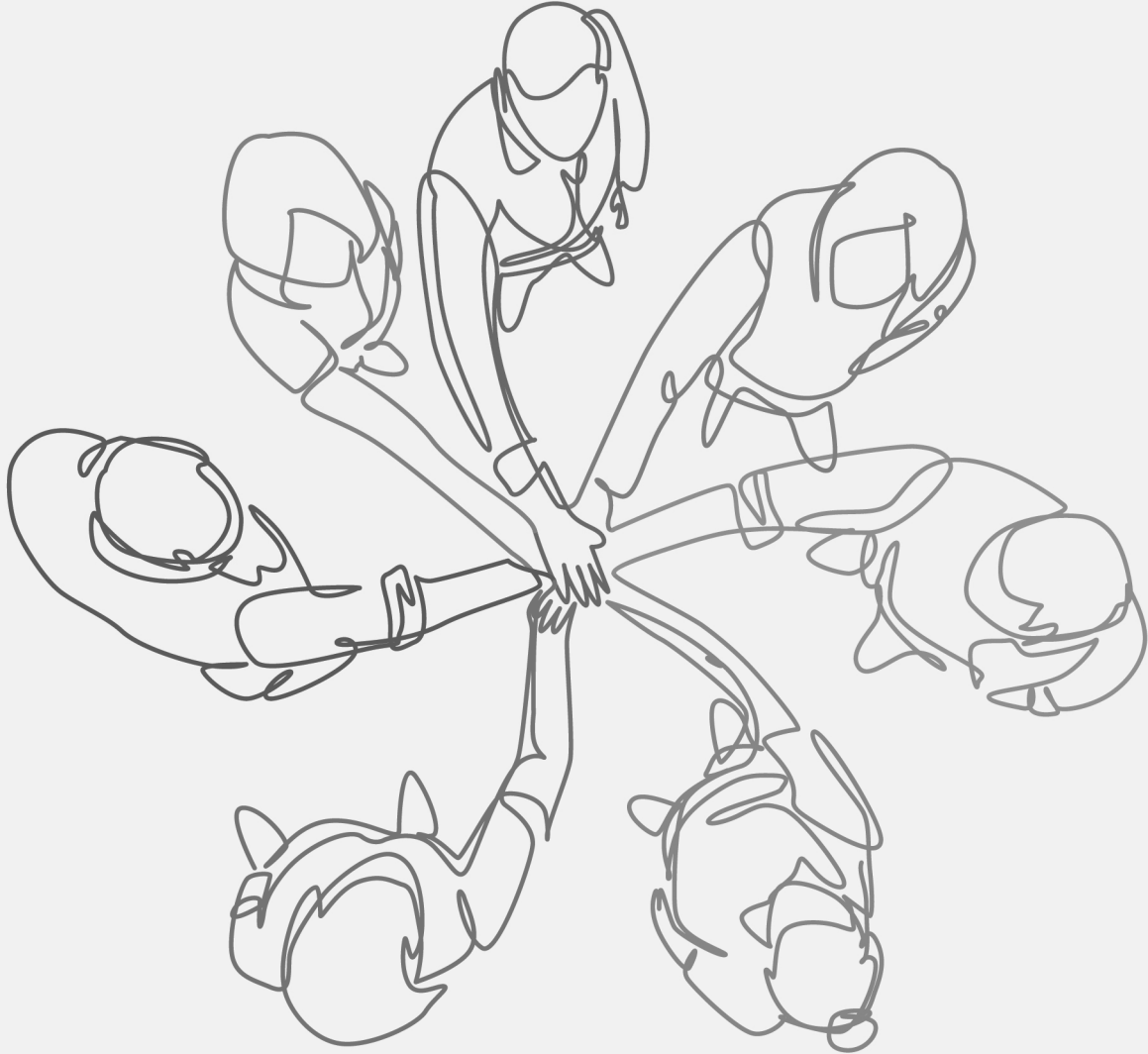
## 2023-27

National Centre for Vector Borne Disease Control  
Dte.GHS, MoH&FW, Government of India  
22, Sham Nath Marg, Delhi – 110054  
[www.nvbdc.gov.in](http://www.nvbdc.gov.in)





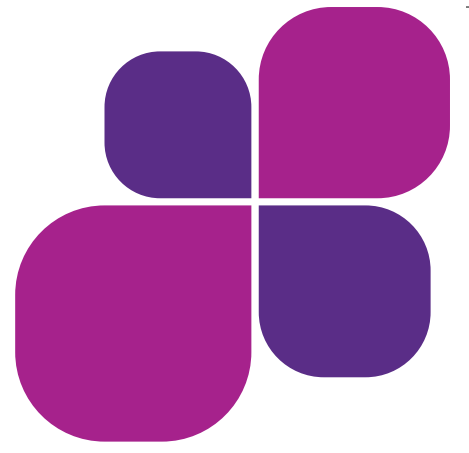
Ministry of Health  
& Family Welfare  
Government of India

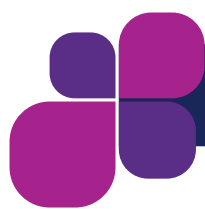


# National Strategic Plan: Malaria Elimination

## 2023-27

National Centre for Vector Borne Disease Control  
Dte.GHS, MoH&FW, Government of India  
22, Sham Nath Marg, Delhi – 110054  
[www.nvbdc.gov.in](http://www.nvbdc.gov.in)

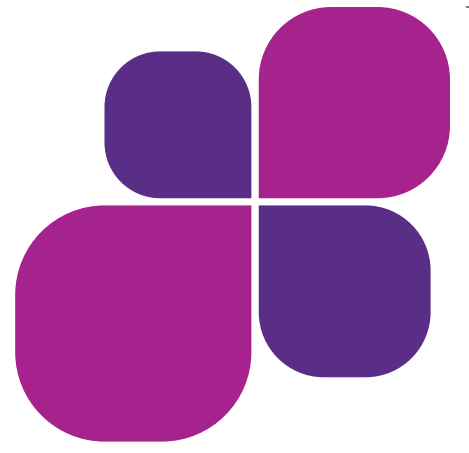




# Contents

Acknowledgements	xvii
Abbreviations	xviii
Executive summary	xxiii
<b>Unit 1: Introduction</b>	<b>1</b>
1.1 Background	1
1.2 History of National Malaria Programme in India	2
1.3 Country profile	2
1.4 Health systems of India	2
1.5 National Health Policy	3
1.6 Systems for implementation of Malaria Programme in India	3
1.7 Gender equity in Policy, Programing and Advocacy for Malaria Elimination	4
<b>Unit 2: Epidemiological determinants in malaria</b>	<b>6</b>
2.1 Epidemiological Triad	6
2.2 Burden of Malaria	7
2.3 Trends of malaria	7
2.4 Progress towards elimination	10
2.5 Paradigms of malaria in India	11
2.6 Key initiatives in India	11
2.7 Key challenges identified during Malaria Programme review	11
2.8 Key recommendations of malaria programme review 2022	12
<b>Unit 3: Strategy development process and policies</b>	<b>14</b>
3.1 Vision, mission, goal, and strategies	14
3.2 Targets	15
3.3 Strategic approaches	16
3.3.1 Transforming malaria surveillance as a core intervention for malaria elimination	16
3.3.2 Ensuring universal access to malaria diagnosis and treatment by enhancing and optimizing case management - “testing, treating and tracking”	22
3.3.3 Ensuring universal access to malaria prevention by enhancing and optimizing vector control	28
3.3.4 Accelerating efforts towards elimination and attainment of malaria-free status	33
3.3.5 Promoting research and innovation for malaria elimination and prevention of re-establishment of malaria transmission	48
<b>Unit 4: Monitoring and evaluation</b>	<b>50</b>
4.1 Output indicators	52
4.2 Outcome indicators	52
4.3 Impact indicators	53











डॉ. मनसुख मांडविया  
DR. MANSUKH MANDAVIYA



मंत्री  
स्वास्थ्य एवं परिवार कल्याण  
व रसायन एवं उर्वरक  
भारत सरकार  
Minister  
Health & Family Welfare  
and Chemicals & Fertilizers  
Government of India

### MESSAGE

The Vision and Mission of new India is to provide leadership to the World through successful campaigns against diseases affecting the globe including Malaria. Under the able leadership of Hon'ble Prime Minister Shri Narendra Modi Ji, India is achieving new heights towards providing accessible and affordable healthcare to the common man. The launch of Ayushman Bharat – Pradhan Mantri Jan Aarogya Yojana (AB-PMJAY) which is the “**world's largest government funded healthcare program**” is targeting more than 50 crore beneficiaries.

India has achieved remarkable progress in bringing down Malaria, as evident from 84.90% decline in cases and 78.38% decline in deaths during 2022, compared to 2015, despite various challenges of complex geographies, heterogeneous population and multiple paradigms of malaria. To reach the last mile of elimination in the coming years, focused interventions on tribal, forested and under-served rural areas etc. will be taken up on priority. Accessible and Affordable Comprehensive Primary Health Care by **Ayushman Arogya Mandir**, an Initiative by Government of India is a step towards achieving Universal Health Coverage and to meet the underlying commitment of Sustainable Development Goals to “**leave no one behind.**”

National Strategic Plan (NSP) 2023-2027 envisages to consolidate on the achievements of previous NSP, and to strengthen the efforts towards the goal of Malaria elimination by 2030, with specific actions for different demographic settings. We are committed to achieve zero cases through collective efforts guided by current NSP which emphasizes core strategies and microplanning for all important facets of the Malaria programme.

I congratulate the National Center for Vector Borne Diseases Control for developing this comprehensive document for the States. I feel that it is a great leap towards strengthening our efforts to achieve malaria elimination by 2030.

(Dr. Mansukh Mandaviya)



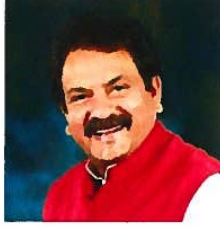
प्रो. एस.पी. सिंह बघेल  
PROF. S.P. SINGH BAGHEL



सत्यमेव जयते



राज्य मंत्री  
स्वास्थ्य एवं परिवार कल्याण  
भारत सरकार  
MINISTER OF STATE FOR  
HEALTH & FAMILY WELFARE  
GOVERNMENT OF INDIA



सन्देश

भारत ने हाल के वर्षों में मलेरिया के मामलों और मृत्यु-दर को कम करने में महत्वपूर्ण प्रगति की है। अभी भी जनजातीय और दुर्गम क्षेत्रों में चुनौतियाँ मौजूद हैं, जहाँ मलेरिया के पचास प्रतिशत से अधिक मामले और मौतें हो रही हैं। भारत सरकार अब तक हासिल की गयी उपलब्धियों को बनाए रखने और विशेष रूप से अधिकतम प्रभावित राज्यों में मलेरिया उन्मूलन की चुनौतियों से निपटने की दिशा में निरंतर प्रयास कर रही है।

नैशनल स्ट्रैटिजिक प्लान (एनएसपी) 2023-27 को राष्ट्रीय वेक्टर जनित रोग नियंत्रण केंद्र द्वारा विशेषज्ञों के परामर्श से तैयार किया गया है, जिसमें कार्यक्रम प्रबंधन को मजबूत करने और अंततः मलेरिया के मामलों और मृत्यु दर को कम करने की रणनीतियों पर ध्यान केंद्रित किया गया है। चूंकि रोकथाम मलेरिया के खिलाफ लड़ाई की कुंजी है, इसलिए वर्ष 2030 तक मलेरिया के मामलों को शून्य तक लाने के लिए अधिकतम बोज़े वाले जिलों और कठिन पहुंच वाले क्षेत्रों पर विशेष ध्यान देने के साथ समुदायों के बीच गहन इनफार्मेशन एजुकेशन एण्ड कम्यूनिकेशन (आईईसी) एवं बिहेवियर चेंज कम्यूनिकेशन (बीसीसी) गतिविधियों की आवश्यकता है।

इस संबंध में नीति निर्माण और योजना के लिए नए दिशानिर्देश महत्वपूर्ण हैं जो सभी स्तरों पर मलेरिया उन्मूलन प्रयासों के प्रभावी कार्यान्वयन के साथ-साथ निगरानी को भी सक्षम बनाएगा। पिछले कुछ वर्षों में भारत में मलेरिया के मामलों और मौतों में काफी कमी आई है, जो वर्ष 2030 तक मलेरिया को खत्म करने के लक्ष्य के अनुरूप है। नई राष्ट्रीय रणनीतिक योजना में पिछले एनएसपी की उपलब्धियों को समेकित करने और आगामी प्रयासों को मजबूत करने की परिकल्पना की गई है।

मुझे विश्वास है कि एनएसपी वर्ष 2023-2027 देश में मलेरिया उन्मूलन में एक नया मील का पत्थर स्थापित करेगा एवं सामूहिक प्रयासों से हम भारत से मलेरिया को समाप्त करने में सफल होंगे।

(प्रो. एस.पी. सिंह बघेल)





डॉ. भारती प्रविण पवार  
Dr. Bharati Pravin Pawar



**MESSAGE**

NO 3639  
स्वास्थ्य एवं परिवार कल्याण राज्य मंत्री  
भारत सरकार

MINISTER OF STATE FOR  
HEALTH & FAMILY WELFARE  
GOVERNMENT OF INDIA

As we all are aware that our Hon'ble Prime Minister Shri Narendra Modi ji was among the global leaders who endorsed the malaria elimination roadmap of Asia-Pacific Leaders Alliance at the East Asia Summit in 2015 which galvanized the region in striving to become malaria free by 2030. And with this inspiration, India is accelerating towards the goal of malaria elimination by 2030. Due to persistent efforts of the Central and State Governments, the incidence of malaria has dropped significantly in the recent years. With one of the oldest malaria elimination programmes in the world, India registered an 85% decline in malaria cases and 78% decline in deaths from 2015 to 2022. This was made possible through strengthening of health systems and effective implementation of globally accepted tools and standards.

The National Health Mission and the National Center for Vector Borne Diseases Control have been at the forefront in the efforts to combat malaria. Under 'Ayushman Bharat', which is the largest health programme of the world, malaria services have been expanded as part of the Ayushman Arogya Mandir.

I am happy to know that the National Center for Vector Borne Diseases Control (NCVBDC) has prepared the National Strategic Plan 2023-2027 which will act as a roadmap for the States/UTs and Districts to move towards the goal of malaria elimination in the country. It is good to note that this document has intermediate milestones to monitor the progress all through this ambitious journey.

Government of India, under the visionary leadership of Hon'ble PM Shri Narendra Modi ji and in the able guidance of Hon'ble Minister, Health & Family Welfare Dr. Mansukh Mandaviya ji, is committed to secure the health of the people of India. I wish this endeavour the very best and hope that through focused and targeted approach, malaria elimination would be a major public health achievement for India. Active collaboration from the Ministries and Departments will help us achieve our target in the last mile of elimination.

सर्वे भवन्तु सुखिनः। सर्वे सन्तु निरामयाः।  
(अर्थात् सभी सुखी हों, सभी रोगमुक्त रहें।)

(Dr. Bharati Pravin Pawar)





सुधांश पंत  
सचिव  
**Sudhansh Pant**  
Secretary



सत्यमेव जयते



आज़ादी का  
अमृत महोत्सव

भारत सरकार  
स्वास्थ्य एवं परिवार कल्याण विभाग  
स्वास्थ्य एवं परिवार कल्याण मंत्रालय  
Government of India  
Department of Health and Family Welfare  
Ministry of Health and Family Welfare



### MESSAGE

The public health challenge posed by Malaria exerts an enormous economic and social burden on individuals, communities and the country. Considering the complex and varied epidemiology of Malaria in India from State to Sub-District levels, it requires tailored strategies and approaches designed for specific contexts and risk groups, vector behavior as well as available infrastructure including health system coverage.

Notable decrease in Malaria incidence across the country, seen in the last few years, indicates the significant progress made towards elimination of Malaria by 2030. The National Strategic Plan (NSP) 2023-2027 envisages to consolidate on the achievements of previous NSP 2017-2022 and strengthens the efforts towards malaria elimination by 2030. In harmony with the National Framework for Malaria Elimination 2016-30 and guided by the Global Technical Strategy (GTS) of WHO, the National Strategic Plan (NSP) for the period 2023-27 has been developed in which the focus is on District-based planning, implementation, and monitoring. The new NSP is evidence-based and incorporates the recommendations of the Malaria Program Review 2022. The NSP 2023-27 delineates the journey of Malaria elimination while ensuring gender equity and human rights.

The Malaria elimination strategy emphasizes surveillance as a core intervention. The Malaria program is moving towards real time web-based reporting in keeping with Ayushman Bharat Digital Mission of the country. Key programme initiatives such as Cross-border collaborations for Malaria elimination, private sector engagement in Malaria case management and reporting, establishing a National Reference Lab at National Centre for Vector Borne Diseases Control (NCVBDC) and expansion of network of WHO certified L1 and L2 Laboratory technicians for strengthening malaria microscopy are appreciable.

I take this opportunity to congratulate Director, NCVBDC and her entire team for their tireless and determined efforts in developing this document. I am confident that NSP 2023-27 will serve as a reference document for the Malaria program managers at the National and State levels, research institutions and other stakeholders working towards malaria elimination in the country.

*Sudhansh Pant*

(Sudhansh Pant)

Date : 30.12.2023  
Place : New Delhi

Room No. 156, A-Wing, Nirman Bhawan, New Delhi-110 011  
Tele : (O) 011-23061863, 23063221, E-mail : secyhwf@nic.in







प्रो.(डॉ.) अतुल गोयल

Prof. (Dr.) ATUL GOEL  
MD (Med.)

स्वास्थ्य सेवा महानिदेशक  
DIRECTOR GENERAL OF HEALTH SERVICES



सत्यमेव जयते

भारत सरकार  
स्वास्थ्य एवं परिवार कल्याण मंत्रालय  
स्वास्थ्य सेवा महानिदेशालय  
Government of India  
Ministry of Health & Family Welfare  
Directorate General of Health Services



### MESSAGE

National Center for Vector Borne Disease Control (NCVBDC) has embarked upon a mission of Malaria Elimination in India by 2030. India like World faced major challenges during Covid-19 pandemic. Despite which, India managed to implement its efforts to prevent, control and eliminate malaria. A clear focus on research and innovation in prevention, diagnostics and treatment through efforts of research institutes has helped it progress towards for Malaria Elimination by 2030.

Diagnostic intervention in the form of Rapid Diagnostic Kits, access to quality microscopy services as well as access to Long Lasting Insecticidal Nets (LLINs) under Integrated Vector Management (IVM) has changed the paradigm for malaria prevention, diagnosis and control. Focused approach in the high burden states have augmented our efforts for elimination of this historic disease of Malaria.

National Strategic Plan (NSP) 2023-2027 is building upon the gains achieved so far in prevention and control of Malaria and clearly aims for attaining a goal of zero indigenous malaria case in India by 2027 in sync with National Framework for Malaria Elimination 2015-30 and Global Technical Strategy 2015-2030. This strategic plan will support and Central & State Governments, research institutes and all stakeholders in formulating policies, planning, implementation, monitoring and conducting research towards Malaria elimination.

I hereby congratulate NCVBDC, WCO Malaria Division and all participating experts for preparing this document at the launch of NSP 2023-27.

(Atul Goel)





एल. एस. चांगसन, भा.प्र.से.  
अपर सचिव एवं मिशन निदेशक ( रा.स्वा.मि. )

**L. S. Changsan, IAS**  
Additional Secretary & Mission Director (NHM)



भारत सरकार  
स्वास्थ्य एवं परिवार कल्याण मंत्रालय  
निर्माण भवन, नई दिल्ली - 110011  
Government of India  
Ministry of Health & Family Welfare  
Nirman Bhawan, New Delhi - 110011



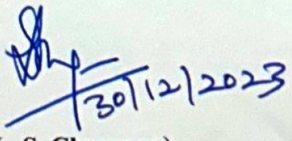
### Message

The National Center for Vector Borne Diseases Control (NCVBDC) has been functioning under the umbrella of National Health Mission (NHM), a flagship program of the Government of India, aimed at providing accessible, affordable and quality healthcare services to all citizens. Under the ambit of NHM, the Program Implementation Plans (PIP) of States/UTs ensure local planning and adequate resources for all the States/UTs.

With the commitment for realizing the vision of malaria elimination in the country, NCVBDC has developed the National Strategic Plan (NSP) 2023-2027. This document outlines comprehensive strategies for surveillance, diagnosis, case management, vector control, capacity building, health system strengthening, community mobilization, research, advocacy and intersectoral coordination as well as other key programmatic areas.

I would like to congratulate VBD Division of the Ministry of Health & Family Welfare, Director of NCVBDC and her team and other stakeholders who have worked tirelessly in formalizing this document. The States/UTs may now take forward the malaria elimination agenda by implementing this plan.

I trust and hope that this plan will pave the path for coordinated and collaborative approach in malaria elimination from India.

  
(L. S. Changsan)





**RAJIV MANJHI**

JOINT SECRETARY

Tele : 23062485

E-mail : rajiv.manjhi@nic.in



सत्यमेव जयते



भारत सरकार  
स्वास्थ्य एवं परिवार कल्याण मंत्रालय  
निर्माण भवन, नई दिल्ली-110011  
Government of India  
Ministry of Health & Family Welfare  
Nirman Bhawan, New Delhi - 110011

Dated: Jan 01, 2024

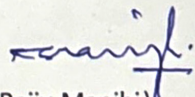


### Message

During the last 7 years (2015-22), India has made significant progress towards malaria elimination as malaria cases and deaths dropped by 84.90% and 78.39% respectively. The National Strategic Plan (NSP) (2023-27) for elimination of malaria in India has been developed by incorporating the lessons learnt from the implementation of previous NSP 2015-22. This NSP (2023-27) aims at accelerating the momentum of malaria elimination and envisages to achieve zero indigenous malaria cases by 2027.

It was my pleasure to be directly associated with the teams that drafted NSP 2023-27 particularly on development of implementation framework. The NSP 2023-2027 defines lucidly 5 strategic approaches focusing on surveillance at its core, early diagnosis and radical treatment, robust program management, integrated vector management and promoting research. Well-defined strategic approaches defined in the document are essential for effective implementation as well as monitoring of the malaria elimination efforts at all levels.

I take the opportunity to applaud Director, NCVBDC and her entire team for tireless and determined efforts in developing this document. The malaria team of WHO India is also appreciated for providing technical support towards framing strategic roadmap for the next five years. I am confident that this document will be beneficial to the policy makers, research organization and other stakeholders working towards malaria elimination in the country. The next five years are critical as we need to achieve zero indigenous malaria cases by 2027 in the country. We need to make this a reality not only upto District level but also upto the village level in the country.

  
(Rajiv Manjhi)



डॉ. तनु जैन  
निदेशक  
DR. TANU JAIN

Director  
MBSB, M.D. (Community Medicine)

Tel.: 011-23921086  
E-mail: dir.ncvbdc@gmail.com  
tanu.jain69@nic.in



सत्यमेव जयते



राष्ट्रीय वैक्टर जनित रोग नियंत्रण केंद्र  
(स्वास्थ्य सेवा महानिदेशालय)

स्वास्थ्य एवं परिवार कल्याण मन्त्रालय, भारत सरकार  
NATIONAL CENTER FOR VECTOR BORNE DISEASES CONTROL  
(Directorate General of Health Services)  
Ministry of Health & Family Welfare, Govt. of India



### Message

As one of the oldest health programmes launched in 1953, Malaria control in India has seen lots of ups and downs during the last 70 years. The country has witnessed a remarkable progress towards malaria elimination in the recent years. A significant decline in Malaria cases by 86% and deaths by 76% in 2021 as compared to 2015 has paved the way for achieving the vision of "Malaria Free India" by 2030.

In sync with National Framework for Malaria Elimination 2016-30, guided by the Global Technical Strategy (GTS) of WHO, and the previous NSP 2017-21, the National Strategic Plan (NSP) for the period 2023-27 has been developed with focus on district-based planning, implementation and monitoring. Intensive efforts have been made for aligning Malaria Elimination with Sustainable Development Goals (SDGs) to ensure "Good Health and well-being" for all.

The National Strategic plan 2023-27 is a comprehensive document based on long standing experience of implementing the programme, and incorporates the recommendations of Malaria Programme Review (2022), conducted in 9 states in collaboration with WHO Country Office. The plan is an outcome of a series of brainstorming sessions with Experts in the field of Malaria and provides an overall guidance to the States for accomplishing the target of Malaria elimination by 2030.

The NSP 2023-27 focuses on 5 core strategies, viz. Surveillance, Diagnosis & Treatment, Integrated Vector Control, adequate Human Resource & Capacity Building and Research & Innovation to achieve elimination and prevent re-establishment of malaria transmission. Also, it leaves flexibility to the States for adapting as per the changing paradigm and epidemiology of Malaria in the coming years. The annual review, which is a critical element of this plan, will provide ample scope for evolution of the plan, policy and strategy.

The current NSP 2023-27 aims for zero indigenous malaria case throughout the country by 2027, and targets the district and sub-district level for achievement of the goals. Special focus has been given to 27 high burden districts. NCVBDC is committed to move forward with all the States and Stakeholders. We hope this document will guide the States in microplanning the activities in their districts and blocks to achieve the elimination goals. The continued efforts of all of us are envisaged to culminate into elimination of Malaria.

  
(Tanu Jain)



Swachh Bharat : An opportunity for Dengue and Malaria Control.

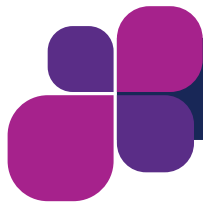
22, शम नाथ मार्ग, दिल्ली-110054/22, SHAM NATH MARG, DELHI-110054

Website : www.ncvbdc.gov.in









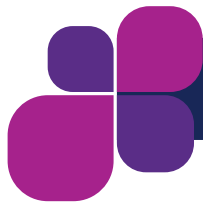
# Acknowledgements

The National Strategic Plan for Malaria Elimination in India (2023-2027) has been developed by National Center for Vector Borne Disease Control (NCVBDC) with support of World Health Organization, Country Office (WCO) through an extensive consultative process including multiple technical workshops and high-level consultation meeting with multidisciplinary group of experts. The purpose of the document is to provide a roadmap for the progress towards malaria elimination aligned with the commitment of the Ministry of Health and Family Welfare, Government of India in achieving the zero indigenous case of malaria in India by 2027.

The National Strategic Plan (NSP) has been developed under the overall guidance of Dr. Tanu Jain, Director, NCVBDC. The technical aspects of NSP document have been coordinated by malaria team, including Dr. C. S. Agarwal (Advisor), Dr. Rinku Sharma, Joint Director & Head of Malaria Division, Dr Vinod Choudhary, Medical officer (CHS) – Malaria, Senior Regional Directors of RoHFW, State Program Officers (VBD) and all the officers and consultants of NCVBDC.

NCVBDC is extremely grateful to Shri Rajesh Bhushan, Secretary (Health), Smt. Roli Singh, Addl. Secretary & MD (NHM) and Dr. Atul Goel, Director General of Health Services, GoI for their constant guidance and encouragement. Special thanks to Shri Rajiv Manjhi, Joint Secretary (VBD), MoH &FW, GoI for his overall directions in developing roadmap during the high-level consultation meeting and aligning the budgetary details and activities for malaria elimination in the country. NCVBDC also acknowledges the contribution of Ms Vinita Srivastava, (Advisor Tribal health – MoTA), Dr Sushil Kumar Vimal (Deputy Commissioner-NUHM), Dr Anup Anvikar, Director NIMR, Dr Manju Rahi, Scientist-'F' / Deputy Director General (SG), NIMR.

NCVBDC acknowledges the contribution of Dr. Roop Kumari, National Professional Officer (Malaria &VBD), WHO Country Office of India and Dr. Po-lin Chan, Team Lead, Communicable Diseases, WCO India, for overall support in the preparation of the NSP 2023-27. NCVBDC also acknowledges the support of Dr Subhash Salunke, Dr K. Ravi Kumar and other independent experts and stakeholders for providing consultation for the preparation of the NSP document.



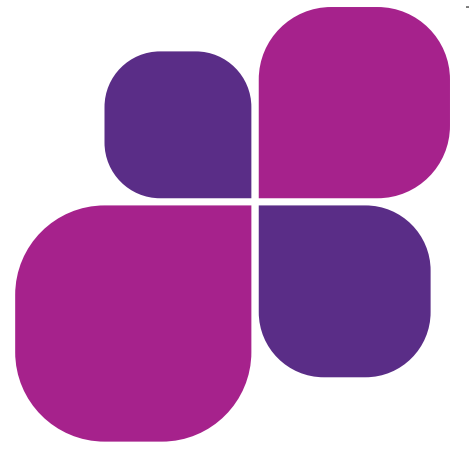
# Abbreviations

<b>ABER</b>	Annual Blood Examination Rate
<b>ACD</b>	Active Case Detection
<b>ACT</b>	Artemisinin Based Combination Therapy
<b>ACT-AL</b>	Artemisinin Based Combination Therapy- Artemether Lumefantrine
<b>ACT-SP</b>	Artemisinin Based Combination Therapy- Sulphadoxine Pyrimethamine
<b>AFI</b>	Annual Falciparum Incidence
<b>AI</b>	Artificial Intelligence
<b>AIDS</b>	Acquired Immunodeficiency Syndrome
<b>An</b>	Anopheles
<b>ANC</b>	Ante Natal Care
<b>ANM</b>	Auxiliary Nurse Midwife
<b>API</b>	Annual Parasite Incidence
<b>APMEN</b>	Asia Pacific Malaria Elimination Network
<b>ASHA</b>	Accredited Social Health Activist
<b>BCC</b>	Behavior Change Communication
<b>BCM</b>	Block Community Mobilizer
<b>BMGF</b>	Bill and Melinda Gates Foundation
<b>BPHU</b>	Block Public Health Units
<b>BSE</b>	Blood Slide Examination
<b>CBR</b>	Crude Birth Rate
<b>CDR</b>	Crude Death Rate
<b>CEO</b>	Chief Executive Officer
<b>CHC</b>	Community Health Centre
<b>CHO</b>	Community Health Officer
<b>CME</b>	Continuing Medical Education
<b>CMSS</b>	Central Medical Services Society
<b>COVID</b>	Corona Virus Disease
<b>CQ</b>	Chloroquine
<b>CSC</b>	Common Service Centre
<b>CSO</b>	Civil Society Organizations
<b>CSR</b>	Corporate Social Responsibility
<b>DCGI</b>	Drug Controller General of India
<b>DDT</b>	Dichlorodiphenyltrichloroethane
<b>DH</b>	District Hospital
<b>DMO</b>	District Malaria Officer
<b>DOT</b>	Directly Observed Treatment
<b>DVBDCO</b>	District Vector Borne Diseases Control Officer
<b>DVS</b>	Dominant Vector Species
<b>ECAMM</b>	External Competency Assessment of Malaria Microscopist
<b>ECoP</b>	Environmental Code of Practices
<b>EDCT</b>	Early Diagnosis and Complete Treatment
<b>EQAS</b>	External Quality Assurance Services
<b>EMCP</b>	Enhanced Malaria Control Project
<b>ESIC</b>	Employees State Insurance Corporation

<b>GFATM</b>	Global Fund to fight AIDS, Tuberculosis and Malaria
<b>GIS</b>	Geographic Information System
<b>GMP</b>	Global Malaria Programme
<b>GMSD</b>	Government Medical Store Depot
<b>GoI</b>	Government of India
<b>G6PD</b>	Glucose-6-Phosphate Dehydrogenase
<b>GTS</b>	Global Technical Strategy
<b>HBHI</b>	High Burden High Impact
<b>HI</b>	Health Inspector
<b>HIV</b>	Human Immunodeficiency Virus
<b>HR</b>	Human Resource
<b>HRH</b>	Human Resources for Health
<b>HSC</b>	Health Sub Centre
<b>HWC</b>	Health and Wellness Centre
<b>IAP</b>	Indian Academy of Pediatrics
<b>IAPSM</b>	Indian Association of Preventive and Social Medicine
<b>ICMR</b>	Indian Council of Medical Research
<b>IDSP</b>	Integrated Disease Surveillance Programme
<b>IEC</b>	Information, Education and Communication
<b>IHIP</b>	Integrated Health Information Platform
<b>IMA</b>	Indian Medical Association
<b>IMCP</b>	Intensified Malaria Control Project
<b>IPC</b>	Interpersonal Communication
<b>IPHA</b>	Indian Public Health Association
<b>IRM</b>	Insecticide Resistance Monitoring
<b>IRS</b>	Indoor Residual Spray
<b>ITN</b>	Insecticide Treated Net
<b>IVM</b>	Integrated Vector Management
<b>IUCN</b>	International Union for Conservation of Nature
<b>KAP</b>	Knowledge Attitude and Practice
<b>LAMP</b>	Loop-Mediated Isothermal Amplification
<b>LLIN</b>	Long Lasting Insecticidal Net
<b>LQAS</b>	Lot Quality Assurance Sampling
<b>LSM</b>	Larval Source Management
<b>LT</b>	Laboratory Technician
<b>M&amp;E</b>	Monitoring and Evaluation
<b>MCH</b>	Maternal and Child Health
<b>MEAT</b>	Malaria Elimination Assessment Tool
<b>MECP</b>	Malaria Elimination Certification Panel
<b>MIS</b>	Malaria Information System
<b>MO</b>	Medical Officer
<b>MoD</b>	Ministry of Defense
<b>MoE</b>	Ministry of Education
<b>MoEFCC</b>	Ministry of Environment Forest and Climate Change
<b>MoFAH&amp;D</b>	Ministry of Fisheries, Animal Husbandry & Dairying
<b>MoHA</b>	Ministry of Home Affairs
<b>MoHFW</b>	Ministry of Health and Family Welfare
<b>MoIB</b>	Ministry of Information and Broadcasting
<b>MoR</b>	Ministry of Railways
<b>MoTA</b>	Ministry of Tribal Affairs
<b>MoYAS</b>	Ministry of Youth Affairs and Sports

<b>MPR</b>	Malaria Programme Review
<b>MPO</b>	Modified Plan of Operation
<b>MPW</b>	Multi-Purpose Worker
<b>MSaT</b>	Mass Screening and Treatment
<b>MTS</b>	Malaria Technical Supervisor
<b>NCAMM</b>	National Competency Assessment of Malaria Microscopist
<b>NCDC</b>	National Centre for Disease Control
<b>NCVBDC</b>	National Center for Vector Borne Diseases Control
<b>NFME</b>	National Framework for Malaria Elimination
<b>NGO</b>	Non-Governmental Organization
<b>NHM</b>	National Health Mission
<b>NHP</b>	National Health Policy
<b>NIMR</b>	National Institute of Malaria Research
<b>NMCP</b>	National Malaria Control Programme
<b>NMEP</b>	National Malaria Eradication Programme
<b>NPSP</b>	National Polio Surveillance Programme
<b>NQMS</b>	National Quality Management System
<b>NRL</b>	National Reference Laboratory
<b>NSP</b>	National Strategic Plan
<b>NTD</b>	Neglected Topical Disease
<b>NUHM</b>	National Urban Health Mission
<b>NVBDCP</b>	National Vector Borne Disease Control Programme
<b>OTSS</b>	Onsite Training and Supportive Supervision
<b>PCD</b>	Passive Case Detection
<b>PCR</b>	Polymerase Chain Reaction
<b>Pf</b>	Plasmodium falciparum
<b>Pf HRP</b>	Plasmodium falciparum Histidine Rich Protein
<b>PHC</b>	Primary Health Centre
<b>PIP</b>	Programme Implementation Plan
<b>Pk</b>	Plasmodium knowlesi
<b>pLDH</b>	Parasite Lactate Dehydrogenase
<b>Pm</b>	Plasmodium malariae
<b>PMHD</b>	Per Man Hour Density
<b>Po</b>	Plasmodium ovale
<b>PoE</b>	Points of Entry
<b>PRI</b>	Panchayati Raj Institutions
<b>PSM</b>	Preventive and Social Medicine
<b>Pv</b>	Plasmodium vivax
<b>QA</b>	Quality Assurance
<b>QC</b>	Quality Control
<b>RACD</b>	Reactive Case Detection
<b>R&amp;D</b>	Research and Development
<b>RD</b>	Regional Director
<b>RDT</b>	Rapid Diagnostic Test
<b>ROHFW</b>	Regional Office of Health and Family Welfare
<b>RRT</b>	Rapid Response Team
<b>SBCC</b>	Social and Behaviour Change Communication
<b>SDG</b>	Sustainable Development Goals
<b>SDH</b>	Sub District Hospital
<b>SFR</b>	Slide Falciparum Rate
<b>SHG</b>	Self Help Group

<b>SOP</b>	Standard Operating Procedures
<b>SPO</b>	State Programme Officer
<b>SPR</b>	Slide Positivity Rate
<b>SRS</b>	Sample Registration System
<b>SVBDCP</b>	State Vector Borne Disease Control Programme
<b>TB</b>	Tuberculosis
<b>TES</b>	Therapeutic Efficacy Study
<b>TMAP</b>	Tribal Malaria Action Plan
<b>ToR</b>	Terms of Reference
<b>TPR</b>	Test Positivity Rate
<b>UMS</b>	Urban Malaria Scheme
<b>UT</b>	Union Territory
<b>VBD</b>	Vector Borne Diseases
<b>VBDCI</b>	Vector Borne Disease Control Inspector
<b>VBDS</b>	Vector Borne Disease Technical Supervisor
<b>VCNA</b>	Vector Control Need Assessment
<b>VHS&amp;NC</b>	Village Health Sanitation and Nutrition Committee
<b>WHO</b>	World Health Organization
<b>WMR</b>	World Malaria Report





# Executive summary

Over the last few years, India has shown a remarkable decrease in the incidence of malaria. Despite various challenges of complex geographies and heterogeneous population, India aims to achieve zero indigenous cases by 2027 and Malaria Elimination certification by 2030. The current NSP envisages to consolidate on the achievements of the previous NSP and strengthen the efforts towards the goal of elimination. In sync with National Framework for Malaria Elimination 2016-30 and guided by the Global Technical Strategy (GTS) of WHO, the National Strategic Plan (NSP) for the period 2023-27 has been developed with focus on district-based planning, implementation and monitoring.

Development of the current NSP 2023-2027 involved a series of high-level consultations and a detailed Malaria Programme Review (MPR) in April 2022. The key recommendations of the MPR were: strengthening of surveillance systems at all levels, implementation of case-based surveillance and foci investigation for interruption of local/indigenous transmission of malaria, real time data reporting through Integrated Health Information Portal (IHIP), monitoring of cases, deaths and outbreaks, intensified malaria control activities, increased focus on training and capacity building and transmission in tribal, forest, urban, cross border and project areas.

The previous National Strategic Plan 2017-2022, adopted various principles and pillars such as (a) Diagnosis and case management (b) Surveillance and epidemic response (c) Prevention-integrated vector management (d) Cross-cutting interventions - advocacy, communication and community mobilization, programme management and coordination, monitoring and evaluation, research & development.

Achievement of NSP 2017-2022 - The country achieved 79% reduction in malaria cases and 57% reduction in malaria deaths in the year 2022 when compared to the year 2017.

The country reported 128 districts with zero indigenous cases and 603 districts with API below 1 in 2022.

**Table 1: Category-wise distribution of districts in 2017 and 2022**

<b>Category</b>	<b>2017</b>	<b>2022</b>	<b>Definition</b>
Category 0 (Prevention of re-establishment)	28	128	Districts having zero indigenous cases
Category 1 (Elimination phase)	574	603	Districts having API <1 per 1000 population
<b>Category 2</b> (Pre-elimination phase)	32	9	Districts having API 1 and above but less than 2 per 1000 population
<b>Category 3</b> (Intensified control phase)	71	18	Districts having API 2 and above per 1000 population

The NSP 2023-2027 delineates the journey of malaria elimination while ensuring gender equity and human rights. The **Vision** is of a “**Malaria Free India**”. **Mission** of the NSP is Malaria elimination in India by 2030 aligned with the Global Technical Strategy 2016-30 and National Framework for Malaria Elimination 2016-30. **Goals** are to interrupt local transmission and achieve zero indigenous case through the country by 2027 and provide an enabling environment to prevent re-establishment of malaria.

NSP 2023-27 defines five strategic approaches as mentioned below:

**Strategic Approach 1: Transforming Malaria surveillance as a core intervention for malaria elimination**

Surveillance is a core strategy of the NSP 2023-27. Near real time web-based reporting through IHIP-malaria will be rolled out in the country. Case based and foci-based surveillance, and entomological surveillance will be strengthened.

Special focus is given to challenging malaria paradigms such as in urban, forest, tribal, project/ and border areas, hard to reach areas and migrant populations.

**Strategic Approach 2: Ensuring universal access to malaria diagnosis and treatment by enhancing and optimizing case management - “testing, treating and tracking”**

This strategy emphasizes on parasitological confirmation of suspected cases of malaria, treatment availability and compliance as per national guidelines, monitoring of relapse, recrudescence, early treatment failures and adverse drug reactions. Quality assurance of all diagnostics and drugs will be ensured both at the center and state levels.

**Strategic Approach 3: Ensuring universal access to malaria prevention by enhancing and optimizing vector control**

Vector surveillance, foci investigations, and response spot checks and Insecticide Resistance Monitoring (IRM) will be conducted regularly. The implementation of the core vector control strategies that are



Indoor Residual Spray (IRS), Long Lasting Insecticidal Nets (LLIN) and Larval Source Management will be strengthened and monitored regularly through IHIP-malaria portal.

#### **Strategic Approach 4: Accelerating efforts towards elimination and attainment of malaria-free status**

Elimination efforts will require strengthening of the program implementations at all levels, that is from village to the center. Other areas that will need strengthening will be seamless flow of data, multisectoral coordination, adequate resource including Human Resource (HR) and drug and diagnostics to sustain malaria elimination and prevent re-introduction. The strategy also envisages providing enabling environment by capacity building of all the cadres of health workers. Elimination and attainment of malaria free status will require cross border collaboration at international, interstate and inter-district borders. High level advocacy will ensure the mobilization of resources at all levels.

Social and Behaviour Change and Communication packages befitting the socio-cultural environment will be made to ensure malaria elimination.

In consultation with various stakeholders the budget has been rationalized and the plan is to make effective and efficient utilization of the available resources. The current estimated budget is INR 6249.80 Crores for the period of 2023-2027.

Implementation of Logistic and Management Information System to track near real time stock availability and to ensure efficient management are key features of the NSP 2023-27.

As the number of malaria cases decrease there will be a need to sustain the momentum of the malaria elimination efforts and this NSP describes this issue very comprehensively.

#### **Strategic Approach 5: Promoting research and innovation for malaria elimination and prevention of re-establishment of malaria transmission**

NSP 2023-27 re-affirms Research and Development as an important and ongoing activity for guiding policy change and improving performance at the National, State, and District level towards malaria elimination. Key focus areas are Operational Research, Therapeutic efficacy studies (TES), Quality assurance of RDTs, Vector control, Drug and Insecticide resistance studies, GIS mapping, etc.

#### **Other important features of the NSP**

The chapter on Monitoring and Evaluation Framework has been drawn up with succinct, output and outcome indicators.

The details of preparation for the certification and sub national verification of malaria elimination as per the WHO criteria for certification are also detailed. Guidelines have been drawn for the dossier preparation/documentation at the national and sub-national level.

MoU has been signed with Ministry of Tribal Affairs for Joint Tribal Action Plan for Malaria Elimination. Private Sector Engagement plan has been drawn up for malaria case reporting and management of cases. In coordination with NUHM Urban Malaria Elimination plan has been drafted.

During the course of 5 years of implementation, any amendments suggested towards strategic approaches by annual and midterm reviews would be incorporated and disseminated to the states/UTs from time to time.

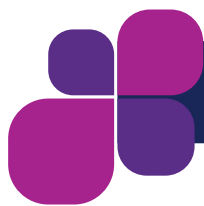
Let's create a "MALARIA FREE FUTURE".

د  
د  
د





# Unit 1



## Introduction

- 1.1 Background
- 1.2 History of National Malaria Programme in India
- 1.3 Country profile
- 1.4 Health systems of India
- 1.5 National Health Policy
- 1.6 Systems for implementation of Malaria Programme in India
- 1.7 Gender equity in Policy, Programing and Advocacy for Malaria Elimination

### 1.1 Background

Malaria has been targeted for elimination from the country by 2030 aligned with goal of World Health Organization (WHO) Global Technical Strategy for Malaria 2016-2030 (GTS). This is further aligned with Sustainable Development Goals (SDGs) which emphasizes accessibility and equity of health services with the targets to end the epidemics of AIDS, TB, Malaria and NTDs by 2030. The Government of India has made a strong commitment to achieving SDGs, including SDG 3: “Good Health and Well-Being”, with specific target 3.3 underscoring “end malaria” by 2030. In addition, the Government of India has committed to malaria elimination by endorsing the WHO GTS for Malaria 2016-2030. India is also a signatory to the Ministerial declaration on accelerating and sustaining Malaria Elimination in the South-East Asia Region, which was signed in New Delhi by Health Ministers of countries of the WHO South-East Asia Region in 2017 and statement of renewed commitment for malaria elimination was endorsed again in 2022. In February 2016, Ministry of Health and Family Welfare (MoHFW), Government of India, launched the National Framework for Malaria Elimination in India (NFME) 2016-2030. In sync with NFME, the National Strategic Plan (NSP) 2017-2022 was developed with the support of WHO Country Office and that was launched by Hon’ble Union Minister of Health & Family Welfare on 12<sup>th</sup> July 2017. It articulates the vision, goals, objectives, and strategies for malaria elimination in the country in phased manner. The interventions for malaria elimination are strategized based on the endemicity of the State/UTs.

India has made significant progress in malaria reduction in recent years which has been appreciated globally as reflected in WHO’s World Malaria Reports (WMR) of 2018, 2019, 2020, 2021, 2022 and 2023. Overall, there has been 79% decline of malaria cases and 57% decline in deaths in 2022 as compared to 2017. However, there are many challenges to achieve target for malaria elimination in the country. Malaria Programme Review (MPR) was conducted in 9 states from 18<sup>th</sup> - 28<sup>th</sup> April 2022 by NCVBDC in collaboration with WHO Country Office. NCVBDC developed NSP 2023-27 with the support of WHO Country Office based on the experiences of the National Program, recommendations of MPR, in alignment with NFME and GTS, focusing on the innovative strategies to overcome major challenges to achieve the zero indigenous cases by 2027 in the country.

## 1.2 History of National Malaria Program in India

In 1947, during India's independence 22% of the country's population was estimated to suffer from Malaria with 75 million cases and 0.8 million deaths annually. To combat devastating effects of Malaria, the National Malaria Control Programme (NMCP) was launched in 1953. Encouraged by the program's success, NMCP was converted to National Malaria Eradication Programme (NMEP) in 1958. By the year 1961, there was significant decline in the number of reported cases to <50,000 and no reported mortality. However, following the massive resurgence of malaria in 1976, the modified plan of operations (MPO) was launched in 1977 with a three-pronged strategy: early diagnosis and prompt treatment, vector control and IEC/BCC with community participation. To combat malaria in high transmission areas of the country, an Enhanced Malaria Control Project (EMCP) was launched with additional support from the World Bank in 1997 and Intensified Malaria Control Project (IMCP) with support of the Global Fund to fight AIDS, Tuberculosis and Malaria (GFATM) in 2005.

The Malaria Control Programme and other Vector Borne Diseases control programs namely Kala-azar, Dengue, Lymphatic Filariasis, Japanese Encephalitis and Chikungunya were integrated under the umbrella program for prevention and control of Vector Borne Diseases. The programme was named as National Vector Borne Disease Control Programme (NVBDCP) and launched in December 2003. Since 2005, NVBDCP has been implemented under the overarching umbrella of the National Rural Health Mission which has now been subsumed under the National Health Mission (NHM), incorporating the National Urban Health Mission (NUHM) as well. The Government of India also has 17 Regional Offices for Health and Family Welfare (ROHFW), located in 17 states covering one or more states under their jurisdiction. These ROHFWs play a critical role in monitoring of NVBDCP activities in the respective states. Every state has a Vector-Borne Diseases Control Unit under its State Department of Health and Family Welfare, headed by the State Programme Officer and at the district level, the vector-borne diseases programme including malaria is managed by the District Vector Borne Disease Control Officer (DVBDCO). Each state has a State Health Society and District Health Societies at the state and district level through which funds are disbursed.

## 1.3 Country profile

India comprises of 28 States and 8 Union Territories. As per Rural Health Statistics 2021-2022, the estimated midyear population 2022 of India is 1,379,750,000 (rural – 898,870,000 & urban- 480,880,000) The birth rate of 19.5, death rate of 6.0 and life expectancy up to 69.7 years at birth for the country have been estimated as per Sample Registration System 2022.. According to National Family Health Survey-5, , the literacy rate amongst women and men is 71.5% and 84.4% respectively in the country. In regard to sex ratio of the total population, at present there are 1020 females per 1000 males and the child sex ratio is 929 females per 1000 males.

## 1.4 Health systems of India

The enormous diversity existing in India poses a challenge to the healthcare delivery system. Indian health system mainly focuses on ensuring universal access to health coverage, increase in recruitment, development, training, and the retention of health care service providers. In India, the rising economic growth with enhanced fiscal capacity of the government, the changing health needs of the population and the growing incidences of significant expenditure due to health care costs have necessitated a policy and programme response to reach everyone in a comprehensive integrated way.

As per Rural Health Statistics 2021-2022, as on 31st March 2022 there are a total of 1,61,829 Sub Centres (SCs) (1,57,935 rural + 3894 urban), 31,053 Primary Health Centres (PHCs) (24,935 rural + 6,118 urban), 6064

Community Health Centres (CHCs) (5,480 rural + 584 urban), 1,275 Sub-divisional Hospitals, 767 District Hospitals which are catering to both rural and urban areas across the country. National Health Policy (NHP) 2017 is a comprehensive document which aims to strengthen and prioritize the role of the government in shaping the health systems in all its dimensions. The policy envisages the highest possible level of health and wellbeing for all at all ages which aligns with the aim of universal health coverage.

## 1.5 National Health Policy

National Health Policy was launched in 2017 by the Central Government. This policy has introduced four significant approaches:

- i. **Changing health priorities:** This policy aims to tackle the increasing non-communicable and infectious diseases in India.
- ii. **Growth of the health care industry:** National Health Policy plans to strengthen the health care industry by introducing newer and more advanced technologies.
- iii. **Lower the expenditure:** This policy also aims to reduce medical expenses and other health-related costs.
- iv. **Economic growth:** It aims to enhance fiscal capacity by boosting economic growth.

The National Health Policy aims to achieve the following goals:

- i. It aims to offer superior health services to every age group and gender.
- ii. The policy focuses on providing universal access to excellent quality health care services at a reasonable cost.
- iii. Promoting health care orientation in every developmental policy.
- iv. Offering access to better treatment, lowering expenses related to health care services and improving quality.
- v. It aims to reduce premature mortality from cancer, cardiovascular diseases, chronic respiratory diseases and diabetes by 25% within 2025.
- vi. This policy recognises the importance of sustainable development and time-bound quantitative goals.
- vii. National Health Policy in India improves overall health status through promotive, palliative, and rehabilitative services.

## 1.6 Systems for Implementation of Malaria Program in India

### Ministry of Health and Family Welfare

Ministry of Health and Family Welfare has two departments, namely, Department of Health & Family Welfare and Department of Health Research, each headed by the Secretary to the Government of India. MoHFW mainly focuses on ensuring availability of quality healthcare on equitable, accessible and affordable basis across regions and communities. It specially focuses on under-served population and marginalized groups, establishing comprehensive primary healthcare delivery system and well-functioning linkages with secondary and tertiary care health delivery system. As a result, reducing Infant Mortality Rate, reducing the burden of non-communicable diseases, focusing on population stabilization in the country, developing the training capacity for providing human resources for health (medical, paramedical and managerial) with adequate skill mix at all levels and regulating health service delivery and promoting rational use of pharmaceuticals in the country.

### National Health Mission

The National Health Mission (NHM) encompasses its two Sub-Missions, The National Rural Health Mission (NRHM) and The National Urban Health Mission (NUHM). The main programmatic components include Health System Strengthening, RMNCHA+, and Communicable and Non-Communicable Diseases. The NHM envisages achievement of universal access to equitable, affordable & quality health care services that are accountable and responsive to people's needs. Under the National Health Mission, the Government of

India has made concerted efforts to engage all relevant sectors and stakeholders to march in the direction of achieving universal health coverage and delivering quality health care services to all at affordable cost.

### **National Centre for Vector borne Disease Control**

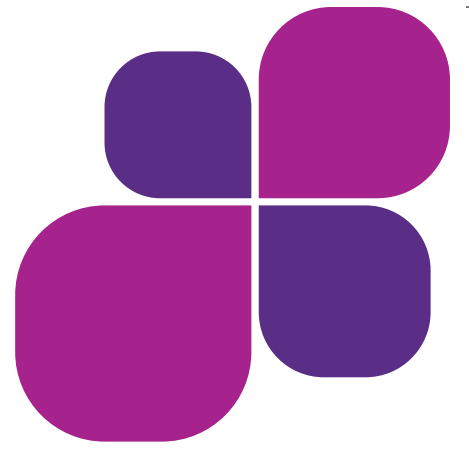
The National Center for Vector Borne Diseases Control (NCVBDC) implements National Vector Borne Disease Control Programme (NVBDCP) for prevention & control of six vector borne diseases i.e., Malaria, Dengue, Chikungunya, Japanese Encephalitis (JE), Kala-azar and Lymphatic filariasis. NCVBDC envisages a self-sustained, well informed, healthy India free from vector borne diseases with equitable access to quality health care services nearest to their residences. The programme aims to make the investments sustainable by developing robust systems and supporting the local capacity. It has planned to ensure that the right diagnostics and treatment are available to all people - especially the poor and disadvantaged and those living in tribal and rural areas.

## **1.7 Gender equity in policy, programing and advocacy for malaria elimination**

It is evident that strengthened gender equality is linked to improved health parameters including improved malaria outcomes. Multiple research findings strongly suggest that gender integration into malaria prevention and treatment, research and development, and advocacy has the potential to accelerate burden reduction and disease elimination. NSP 2023-2027 advocates for both women's economic empowerment initiatives in the maternal and child health sector to achieve high levels of adoption and use of preventive and treatment technologies. Addressing the significant links between gender inequality and malaria vulnerabilities is imperative to improve malaria health outcomes, as well as to make progress toward a more gender-equitable future.

Handwritten notes in purple ink on the right margin.





# Unit 2



## Epidemiological determinants in Malaria

- 2.1 Epidemiological Triad
- 2.2 Burden of Malaria
- 2.3 Trends of malaria
- 2.4 Progress towards elimination
- 2.5 Paradigms of malaria in India
- 2.6 Key initiatives in India
- 2.7 Key challenges identified during Malaria Programme review
- 2.8 Key recommendations of Malaria Programme review

### 2.1 Epidemiological Triad

**Agent factors:** Malaria is caused by plasmodium parasite. There are four species of malaria parasite (*P. falciparum*, *P. vivax*, *P. malariae*, *P. ovale*). In India *falciparum* and *vivax* species are the major contributors. Other species such as *P. malariae* and *P. ovale* have been rarely reported in the country.

**Vector:** Out of 58 species of Anophelines in India, 9 species are proven vectors of malaria. *An. culicifacies*, *An. fluviatilis*, *An. minimus*, *An. baimaii* (*dirus*), *An. Stephensi* and *An. epiroticus* (*sundaicus*) have been considered as primary vectors of malaria whereas three species are secondary vectors viz. *An. annularis*, *An. philippinensis* and *An. varuna* being of local importance in the transmission of the disease. *An. stephensi* is mainly involved in transmission of malaria in urban areas.

**Host factors:** The main variables of the human elements that have an influence on malaria epidemiology include the following: age, sex, socio economic development, housing, population mobility, occupation, human habits, immunity.

**Environmental factors:** Malaria is a seasonal disease and India's geographic position and climatic conditions have been, for long, favorable to its transmission. In most parts of India, maximum incidence of cases is from July to November. Optimum temperature of 20 to 30 °C and relative humidity of 60% is required for the development of malaria parasite. Rain in general provides opportunities for the breeding of mosquitoes. The relationship between rainfall (total and its distribution) and mosquito breeding is of fundamental importance.

## 2.2 Burden of malaria

### Global

As per World Malaria Report (WMR) 2023, there were an estimated 249 million malaria cases in 2022 in 85 malaria endemic countries, increasing from 247 million in 2021. Malaria case incidence reduced from 81 in 2000 to 58 in 2022. The Malaria mortality rate halved from about 29 in 2000 to 14.3 in 2022. Globally, malaria deaths declined from 8,64,000 in 2000 to 6,08,000 in 2022.

### South-East Asia

As per WMR 2023, the South-East Asia Region (SEAR) accounted for about 2% of the estimated burden of malaria cases globally. Malaria cases reduced by 77%, from 22.8 million in 2000 to about 5.2 million in 2022. In this region, malaria deaths were reduced by 77.1%, from about 35,000 in 2,000 to 8,000 in 2022.

### India

As per WMR 2023 India contributed to 65.7% of the estimated Malaria cases in the South-East Asia Region. The reported total malaria cases and deaths in 2022 were 1,76,522 and 83 respectively. The reported Pf cases declined from 11,36,423 in 1995 to 98,306 cases in 2022. Overall, 85% decline in malaria cases and 78.3% decline in deaths were noted in 2022 compared to 2015 as per the Annual Malaria report 2022, NCVBDC) Trends of malaria cases (Pf & Pv) and deaths in India from 2000-2022 is shown in Figure 1.

## 2.3 Trends of malaria

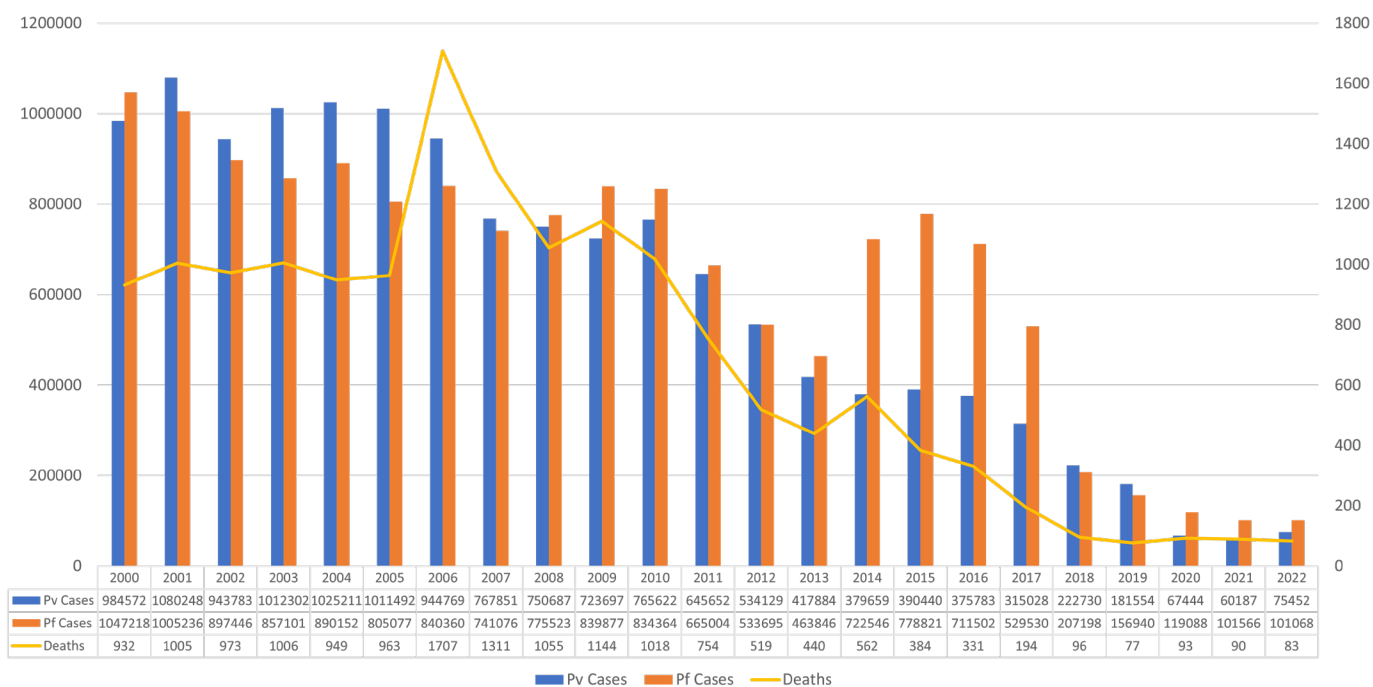


Figure 1: Trends of malaria cases (PF & PV) 2000 to 2022

Malaria epidemiological data from the year 2000 to 2022 is given in the Figure 2. There is drastic reduction of API from 2.09 to 0.13 during the years 2000 to 2022. Death due to malaria also reduced from 932 to 83 over the same period. Annexure 8 shows tabulated epidemiological data from 2000 to 2022. 10% below 5 years, 25% between 5 to 15 years, 65% above 15 years. In 2022, Male : Female ratio of malaria cases was 59:41.

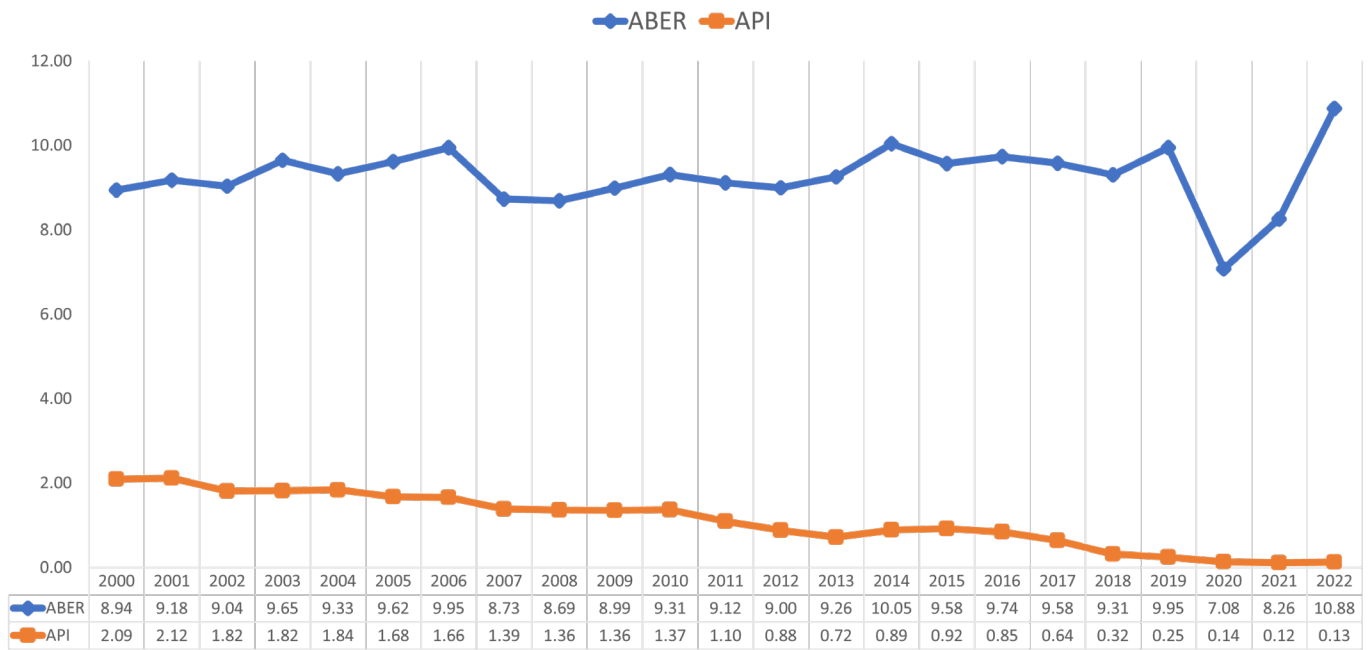


Figure 2: Trends of ABER and API from 2000 to 2022

The below Figure 3 shows the high transmission areas become low transmission area which has led to the shrinking of malaria map.

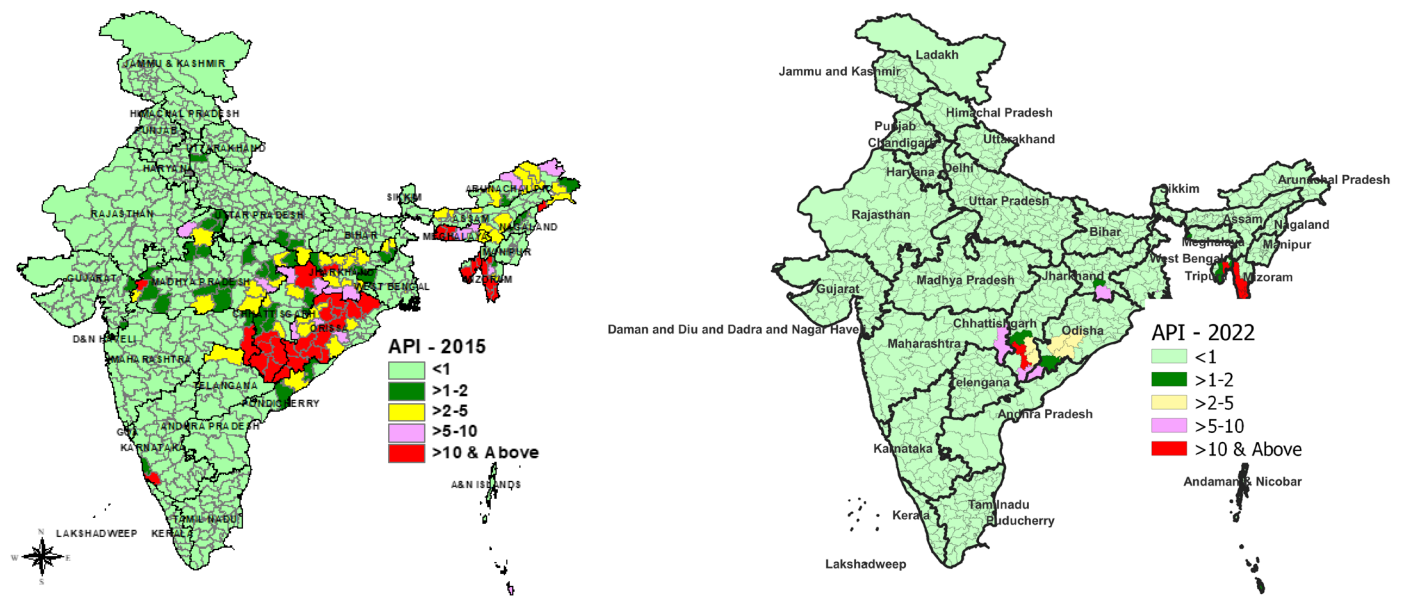


Figure 3: Malaria burden in India and its regional distribution (2015,2018 & 2021)

Distribution of malaria cases in different months of the year since 2015 to 2022 have been shown in Figure 4.

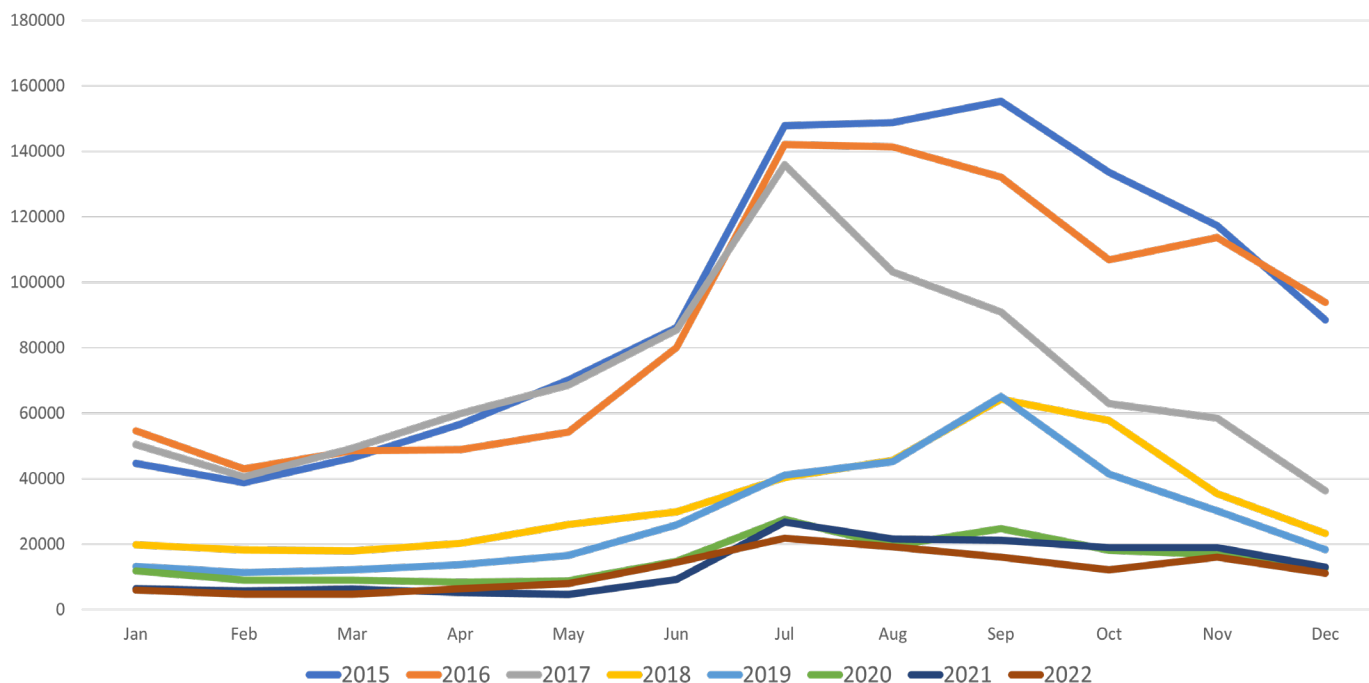


Figure 4: Distribution of malaria cases in different months of the year since 2015 to 2022

Category-wise distribution of States/UTs in year 2015 and 2022 is reflected in Table 1. Mizoram and Tripura are only two states in Category 3 in the year 2022.

Categories	States/UTs status in 2015	States/UTs status in 2022
Category 0 States with Zero Indigenous Cases	Ladakh*	Puducherry and Lakshadweep
Category 1 States with API** <1 case/1000 population in all Districts	Chandigarh, Daman & Diu, Delhi, Goa, Haryana, Himanchal Pradesh, Jammu and Kashmir (including Ladakh), Kerala, Lakshadweep, Manipur, Puducherry, Punjab, Sikkim, Rajasthan, Uttarakhand (15)	Delhi, Himanchal Pradesh, Jammu and Kashmir, Goa, Kerala, Sikkim, Chandigarh, Daman and Diu- Dadra-Nagar Haveli, Haryana, Manipur, Punjab, Rajasthan, Uttarakhand, Andhra Pradesh, Nagaland, Tamil Nadu, Karnataka, Assam, Gujarat, Telangana, Bihar, Arunachal Pradesh, Madhya Pradesh, Uttar Pradesh, Ladakh (25)
Category 2 States with API <1 case/ 1000 population but some districts having API ≥1	Andhra Pradesh, Bihar, Nagaland, Tamil Nadu, Telangana, West Bengal, Assam, Gujarat, Karnataka, Maharashtra, Uttar Pradesh (11)	Maharashtra, Chhattisgarh, Jharkhand, West Bengal, Odisha, Meghalaya, Andaman and Nicobar Islands (7)

Category 3 States with API $\geq 1$ case/ per 1000 population	A & N Islands, Arunachal Pradesh, Madhya Pradesh, Mizoram, Chhattisgarh, Dadra & Nagar Haveli, Jharkhand, Meghalaya, Odisha, Tripura (10)	Mizoram, Tripura (2)
--	---	----------------------

Table 1: Category wise distribution of states in 2022 as compared to 2015

\*Ladakh was a part of Jammu and Kashmir hence in 2015, there was no independent reporting. However, Ladakh has not reported any indigenous malaria case till date.

\*\* Annual Parasite Incidence (API) - The number of confirmed new cases from malaria registered in a specific year, expressed per 1,000 individuals under surveillance, for a given country, territory, or geographic area.

## 2.4 Progress toward elimination

India achieved 78.3% (as per state reported data) reduction in malaria morbidity in 2022 compared to 2015. Against the GTS target of 40% reduction in malaria cases in 2020, India had achieved 85% reduction in malaria cases in the year 2020 compared to 2015. These achievements of the country were sustained even during the period of COVID-19.

Significant achievements have been made towards malaria elimination during the time period of NSP (2017-2022)

- i) 79% reduction in the malaria cases in the year 2022 when compared to the year 2017.
- ii) 57% reduction in the malaria deaths in the year 2022 when compared to the year 2017.
- iii) 34 States/UTs have made Malaria a notifiable disease; only Bihar and Andaman & Nicobar Island are yet to make malaria a notifiable disease.
- iv) Significant improvement has been seen in movement of districts from Category 3 to 2 to 1 to 0 as seen from Table 2. Out of 110 districts reporting API more than 2 in 2015, in 2022 the number have come down to 18.

Category	2015	2016	2017	2018	2019	2020	2021	2022
<b>Category 0:</b> Prevention of re-establishment (Districts units having zero indigenous cases)	30	30	28	36	46	119	126	128
<b>Category 1:</b> Elimination Phase (Districts/units having API <1 per 1000 population)	494	522	574	614	629	577	588	603
<b>Category 2:</b> Pre-elimination Phase (Districts/units having API 1 and above but less than 2 per 1,000 population)	45	42	32	21	10	9	6	9
<b>Category 3:</b> Intensified Control Phase (Districts/units having API 2 and above per 1000 population)	109	90	71	42	32	24	18	18

Table 2: Districts under different categories over the years (2015-2022)

## 2.5 Paradigms of malaria in India

Considering the complex and varied epidemiology of malaria in India from state to sub district levels, it requires tailored strategies/approaches designed for specific contexts and risk groups, vector behavior, as well as available infrastructure including health system coverage. Over the years, malaria transmission has become local and focal in hilly, forested and forest fringe areas, inter-state, international border areas. Malaria transmission is mostly found among indigenous/tribal, mobile and migrant population groups, jhum (shifting) cultivators, forest workers/goers, labour in tea gardens/plantations, and socio-economically disadvantaged groups. Urban areas pose a different set of challenges for malaria elimination. The intensity of malaria transmission in any given area is prone to change as a result of changing ecologies, population movements, various social determinants, etc. The particular strategies being adopted for migrant, urban, forest, tribal, and cross border malaria have been explained in **Annexures 1, 2, 3, 4 and 5** respectively.

## 2.6 Key initiatives in India

- i) Strong political commitment at central and state level has ensured adequate domestic and external funding which has facilitated in improved performance resulting in decline in malaria incidence.
- ii) Data reporting from public sector health facilities are regular through paper-based/electronic systems.
- iii) After successful implementation of near real time data entry through IHIP in Odisha and Himachal Pradesh, it is being rolled out to all States and UTs.
- iv) Well established funding mechanism for carrying out various activities towards elimination.
- v) Strong networking and support system from global funds and development partners in endemic areas.
- vi) Uninterrupted supply of drugs and diagnostics including hard to reach tribal and forest areas.
- vii) National quality management system for quality assurance of microscopy and RDTs has been instituted is being followed in the country.
- viii) Proactive planning and special campaigns are in place in many states for reducing the malaria burden, example-Madhya Pradesh, Odisha & Chhattisgarh.
- ix) WHO-HBHI (High Burden to High Impact) approach has been adopted in five high burden states including Chhattisgarh, West Bengal, Jharkhand, Madhya Pradesh and Odisha.
- x) Malaria has been made a notifiable in 34 States and UTs.
- xi) Village level volunteers namely Accredited Social Health Activist (ASHA) have been provided performance-based incentives for diagnosis and treatment at community level.
- xii) Provision of incentivization of the good-performing districts/states for achieving zero indigenous case status under NHM.
- xiii) National Reference Laboratory was inaugurated by honourable Union Minister of Health & Family Welfare & Chemical & Fertilizers in 2022. It is catering to quality assurance and training needs of various cadres of laboratory technicians.
- xiv) 100% coverage of high-risk populations with appropriate vector control strategies, e.g., LLINs and IRS.

## 2.7 Key challenges identified during malaria program review 2022

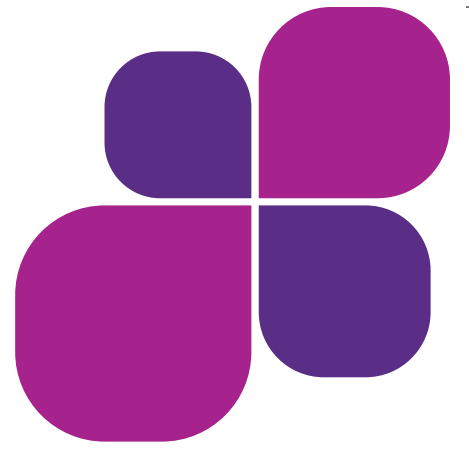
- i) Institutional mechanism for multi-sector coordination to be strengthened. State-specific malaria elimination guidelines aligned with national strategy and operational guidelines has to be operationalized in all the states/UTs.
- ii) Urban malaria issues need greater focus. Coordination between state health services and municipal corporations especially regarding sharing of data as well as reporting has to be strengthened. Private sector reporting of malaria cases needs extensive push and the data thus received will be incorporated within the state malaria information system. Infrastructure in municipalities required

- to be upgraded.
- iii) Overall, vacant post of entomologist to be filled by states and UTs in order to ensure vector surveillance and management for malaria elimination.
- iv) Evidence-based community engagement and BCC activities remain highly variable and needs to be tailored to the local context including the vulnerable populations. SBCC should be comprehended as an important programme component. Availability of dedicated staff at state and block levels for regular planning, implementation, hand holding and reporting of SBCC activities to be ensured. specific capacity building for SBCC for malaria elimination should be strengthened at all the levels.
- v) Need for increased quantum of research regarding development of new diagnostic tools, basic entomological parameters in different eco-epidemiological situations, drug resistance monitoring, vector behavior and changes due to climate change, insecticide resistance monitoring, outdoor transmission control measures and its feasibility studies, usage/durability and bio-efficacy of LLINs and innovative, tools.
- vi) Ensuring compliance of 14 days radical treatment for *P. vivax* cases needs special focus.

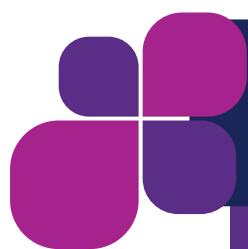
## 2.8 Key Recommendations of Malaria programme review 2022

- i) A better understanding of the micro-epidemiology of malaria in different transmission settings is needed to support evidence-based targeting and accelerating progress.
- ii) Ensure surveillance systems tailored to context and accordingly a national surveillance guideline for malaria elimination should be developed.
- iii) Intensified malaria control activities must be implemented in 24 high burden districts in project mode to ensure reduction in malaria burden.
- iv) Roll out and strengthen case-based surveillance with case and focus characterization, classification, follow-up and appropriate response in states/districts aiming at interrupting local/indigenous transmission and realizing elimination, with standardized forms/registers followed by appropriate public health and vector control responses.
- v) The formats currently used for case investigation and foci investigation need to be reviewed and revised.
- vi) Strengthen capacities at all levels in states/districts on surveillance and response and M&E through continual training/re-trainings, supportive supervision.
- vii) Consider IHIP as the primary data reporting platform and for near real time malaria monitoring, which should be expanded quickly.
- viii) Ensure that malaria workers get information about population movements and occurrences of fever outbreaks, which requires immediate reporting and investigation.
- ix) Impact Assessment for malariogenic potentials for any project coming up in an area should be emphasized. The State health authorities should identify projects, namely, industry, irrigation, mines, power plants, construction etc., as well as those which have separate townships and make necessary recommendations on malaria control activities.
- x) Link between malaria and rainfall should be studied to use the same for early warning of outbreaks.
- xi) Sensitize the public and the local authorities about malaria in native forest populations.
- xii) Compliance of radical cure of *P. vivax* and capturing the pharmacovigilance data for specific population groups.





# Unit 3



## Strategy development process and policies

- 3.1 Vision, mission, goals, and strategies
- 3.2 Targets
- 3.3 Strategic approaches
  - 3.3.1 Transforming malaria surveillance as a core intervention for malaria elimination
  - 3.3.2 Ensuring universal access to malaria diagnosis and treatment by enhancing and optimizing case management - “testing, treating and tracking”
  - 3.3.3 Ensuring universal access to malaria prevention by enhancing and optimizing vector control
  - 3.3.4 Accelerating efforts towards elimination and attainment of malaria-free status
  - 3.3.5 Promoting research and innovation for malaria elimination and prevention of re-establishment of malaria transmission

### 3.1 Vision, Mission, goal, and Strategies of National Strategic Plan 2023-2027

The NSP 2023-2027 is aligned with the GTS 2016-2030, NFME 2016-2030 and builds on the NSP 2017-2022. The NSP 2023-2027 incorporated suggestions from the various cadres of field functionaries involved in the malaria implementation program.

<b>Vision</b> Malaria Free India
<b>Mission</b> Malaria elimination in India by 2030 aligned with the Global Technical Strategy 2016-30 and National Framework for Malaria Elimination 2016-30.
<b>Goals</b> <ul style="list-style-type: none"><li>• Interrupt local transmission and achieve zero indigenous case throughout the country by 2027</li><li>• Provide an enabling environment to prevent re-establishment of malaria</li></ul>

## Strategies

- Transforming malaria surveillance as a core intervention for malaria elimination
- Ensuring universal access to malaria diagnosis and treatment by enhancing and optimizing case management - “testing, treating and tracking”
- Ensuring universal access to malaria prevention by enhancing and optimizing vector control
- Accelerating efforts towards elimination and attainment of malaria- free status
- Promoting research and supporting the generation of strategic information for malaria elimination and prevention of re-establishment of malaria transmission

NSP 2023-2027 consolidates the achievements of the previous NSP 2017-22 and sustains its achievements. It is based on evidence, best practices, national policies, and guidelines, MPR findings and recommendations, and WHO global and regional guidance. The NSP 2023-27 is aligned with the NFME 2016-2030 and guided by Global Technical Strategy (GTS) 2016-2030. The salient points of GTS are mentioned in **Annexure 7**. The NSP development process was rigorous with deliberations with multidisciplinary group of experts. Two technical workshops and one high level consultation meeting was organized for the purpose of development of NSP. The drafts developed were recirculated with the experts for their concurrence.

NSP 2023-2027 aims to be a guiding document to the states and program officers in designing and implementing malaria elimination program in their states to achieve the goal of zero indigenous case throughout the country by 2027. During the course of NSP 2023-27 implementation, any amendments suggested towards strategic approaches by midterm or annual review would be incorporated and disseminated to the states/UTs.

### 3.2 Targets

Building on the significant quantitative achievements after the NSP 2017-2022, the current NSP 2023-2027 has set specific targets to be achieved by 2030.

<b>2024</b>	Category 1 States/UTs (28) should reach Category 0 Category 2 States/UTs (6) should reach Category 1 Category 3 States/UTs (2) should reach Category 2
<b>2025</b>	Category 0 States/UTs (28) maintain the status Category 1 States/UTs (6) will make the efforts to move to Category 0 Category 2 States/UTs (2) will make intensified efforts to move towards Category 1
<b>2026</b>	Category 0 States/UTs (34) maintain the status Category 1 States/UTs (2) will make intensified efforts to move towards Category 0
<b>2027</b>	All the States/UTs should reach Category 0, i.e., zero indigenous cases
<b>2030</b>	The re-establishment of local transmission prevented in areas where malaria has been eliminated The malaria-free status maintained throughout the nation

## Definitions

Category 0 - Transmission of malaria interrupted and Zero Indigenous Cases

Category 1 - States/UTs with API < 1 case/1000 population in all districts

Category 2 - States/UTs with API < 1 case/ 1000 population but some districts having API >1

Category 3 - States/UTs with API >1 case/ 1000 population

## 3.3 Strategic Approaches

### 3.3.1 Transforming malaria surveillance as a core intervention for malaria elimination

The malaria surveillance is the process of ongoing systematic collection, analysis, and interpretation of malaria-specific data for the purpose of planning, decision-making and dissemination of relevant information. Malaria epidemiological surveillance is done at different levels of the health care system (e.g., health facilities, the community), with different detection systems (e.g., case-based: active or passive) and sampling strategies (e.g., sentinel sites, contact /mass surveys). The surveillance system in the elimination phase is to detect all malaria infections, whether symptomatic or suspected, and ensure that they are radically cured very early so that they do not generate secondary cases. An effective surveillance system enables program managers to:

- i) Identify and target the areas and population groups affected by malaria for delivering the necessary interventions.
- i) Regularly assess the impact of interventions and measures the progress.
- ii) Detect and respond to an outbreak in a timely manner.
- iii) Monitor re-establishment of transmission to guide the response.
- iv) Provide relevant information for certification of elimination.

The GTS introduced the concept of a continuum, whereby progress towards malaria elimination is considered to be a continuous process. As transmission decreases, malaria becomes focal and the intensity and frequency of reporting increases.

### Surveillance in different settings

Areas with different magnitudes of transmissions will require a different approach of surveillance as given below:

#### 1. Surveillance in high transmission settings

In high transmission setting, the surveillance through Passive case detection (PCD) and Active case detection (ACD) - proactive ACD will be intensified along with efficient recording and reporting systems. This will provide data for overall analysis of trends and permit stratification and planning of resource allocation. State/Districts has to identify annually the high-risk population by analyzing the information on (i) size, type, and location of high-risk groups. (ii) type and degree of mobility and support of any social organization. (iii) security concerns, connectivity and other operational factors. In addition, the assessment of risks of malaria amongst exposed population, e.g., area of known high risk, military paramilitary troops, non-immune populations etc., will also be considered. In these settings aggregate reporting on monthly basis will be required.

Surveillance systems that function well are the backbone of effective malaria interventions at all levels of transmission intensity. Surveillance systems support planning, budgeting, evaluation and tracking of programme activities and disease trends. The better the surveillance system, the more likely it is that a programme will have an impact for the resources invested

*Malaria surveillance, monitoring & evaluation: a reference manual 2018*

## **2. Surveillance in low transmission settings**

Surveillance in the low transmission setting focusing on the identification, investigation, classification and elimination of continuing transmission will be intensified through ACD, PCD and reactive case detection. In the low transmission/elimination setting, each and every suspected case should be diagnosed, confirmed, notified, investigated, classified and followed up with foci response. This requires weekly aggregate reporting.

## **3. Surveillance in the area with zero indigenous case: prevention of reintroduction (POR)**

Early identification of imported cases to prevent local cases and outbreaks to prevent reestablishment. Immediate notification has to be done.

### **Key activities/methods of malaria surveillance**

1. The surveillance activities to detect malaria cases will be carried out as routine (active, & passive), sentinel-based surveillance, mass surveillance, case and foci-based surveillance. ACD will be carried out by trained community level health care worker (ASHAs/ CHOs/ MPH/ ANM/ CHV) through door-to-door visit. PCD will be done at the facility level including sub center and above. Active surveillance is further divided into proactive and reactive surveillance. Proactive case detection will be undertaken in high-risk groups, not prompted by detection of cases whereas, Reactive Case Detection will be undertaken in a population potentially linked to a confirmed case or cluster of cases.

2. In low transmission settings, the investigating team for “case and foci based” investigation will comprise of DVBD officer/DMO (team leader), a skilled laboratory technician, entomological staff member/consultant and the local health facility personnel.

3. The aim of case investigation is to determine whether an infection was acquired locally with likely location of such infection and to classify cases as indigenous, imported, relapse, recrudescence, induced and introduced cases, as given below.

## Case classifications

Correct epidemiological classification of malaria cases is crucial in malaria elimination, as it is the basis for further surveillance and implementing appropriate elimination measures. The classification of cases as per WHO is as follows:

**Relapse:** Malaria case attributed to activation of hypnozoites of *P. vivax* or *P. ovale* acquired previously. The latency of relapsing case can be >6-12 months. The occurrence of relapsing cases is not an indication of operational failure, but their existence should lead to evaluation of the possibility of ongoing transmission.

**Recrudescence:** Malaria case attributed to the recurrence of asexual parasitemia after anti-malarial treatment, due to incomplete clearance of asexual parasitemia of the same genotype that cause the original illness.

**Indigenous case:** A case contracted locally with no evidence of being imported or being directly linked to transmission from an imported case.

**Induced case:** A case the origin of which can be traced to a blood transfusion or other form of parenteral inoculation of the parasite but not to transmission by a natural mosquito-borne inoculation.

**Imported case:** Malaria case or infection in which the infection was acquired outside the area in which it is diagnosed.

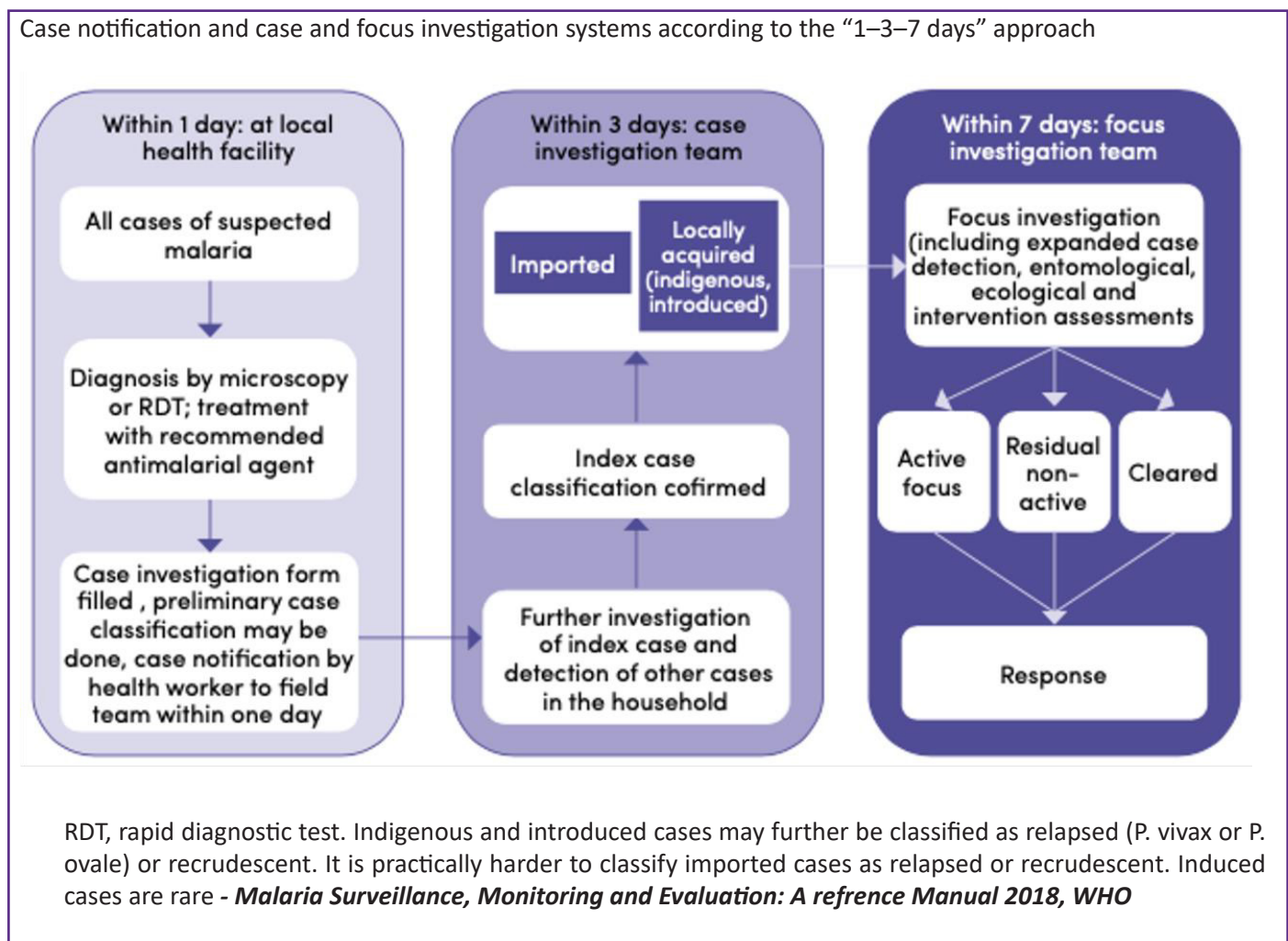
**Introduced case:** A case contracted locally, with strong epidemiological evidence linking it directly to a known imported case (first-generation local transmission).

Locally acquired case (also called 'autochthonous'): A case acquired locally by mosquito-borne transmission (Note: Locally acquired cases can be indigenous, introduced, relapsing or recrudescence; the term "autochthonous" is not commonly used).

<sup>1</sup> WHO malaria terminology 2021 update

4. It is important to decide whether the case is indigenous or imported. This is done by collecting all details of the case, including demographic information, history of the current illness, diagnostic test results, treatment, travel history, where how and from whom the infection might have been acquired and recent contacts to whom malaria could have been transmitted. The epidemiological data from previous cases in the same village, locality or focus, need to be reviewed including age, sex, occupation, timing and species involved in previous cases and maps of the location of cases (by house and village).

5. The case diagnosis and response should follow the 1-3-7-day timeline (by 1st day ensuring case reporting after diagnosis, by 3<sup>rd</sup> day case investigation to be completed and by 7<sup>th</sup> day all preventive measures to be completed) and reporting will be in prescribed form across all the states to have uniformity.



6. Reactive case detection (RACD) in and around the index case will be done after identification and notification of an index case. RACD will be done within the household of the index case, and over a radius of 1km around the household considering the effective flight range of vector species.

7. Case investigations followed by RACD in the foci should be done especially in low endemic areas. RACD is done when there are few cases. Foci investigation will be undertaken after detection of confirmed malaria cases. Foci investigation is carried out to describe the area where malaria occurred and delineate the population at risk. An entomologist should participate in the foci investigation which will identify the features of the location, including the populations at greatest risk, any ongoing control measures, the vector, breeding sites, transmission season and resistance to insecticides among vectors.

A “focus” is a defined, circumscribed area situated in a currently or formerly malarious area that contains the epidemiological and ecological factors necessary for malaria transmission.

These strategies are based on local epidemiological situation as is shown in Table 4.

Table 4: Categorization of malaria foci based on evidence of transmission and presence of cases

Type of foci	Operational criteria
Active A foci with continuing transmission	Locally acquired case(s) have been detected within the current calendar year.
Residual (non-active) Transmission interrupted recently (1-3 years ago)	Last locally acquired case was detected in previous calendar year or in the last 3 calendar years.
Cleared A foci with no local transmission for more than 3 years	There has been no locally acquired case for more than 3 years, and only imported or/and relapsing or/and recrudescence or/and induced cases may occur during the current calendar year.

Specific surveillance strategies for districts falling in different categories based on endemicity of malaria have been indicated in the **Annexure 9**.

Surveillance strategy including case and death investigation in low, moderate and high transmission settings. The country is moving towards the near real time reporting through the implementation of web-based reporting system on IHIP-Malaria portal. The line-list of malaria cases will be visible near real time on the IHIP-Malaria portal. Case and foci investigation reports will be submitted within a week by the district to the state. The death due to malaria will be reported near real time on the IHIP-Malaria portal. The death investigation reports will also be submitted within a week by the concerned district to the state and national level.

### Outbreak preparedness and response

Norms for declaring an outbreak may be adopted as per categorization with local threshold levels of caseload. Currently there are Rapid Response Teams functioning at State/district level. Close interaction with the district surveillance unit to monitor the trends in fever incidence at village /subcenter levels through IHIP-Malaria will be done. A nodal person will be identified for media interaction at central level and states will be advised to do so in states and districts.

Preparedness for early detection of outbreaks and containment
1. Standardized case definitions - confirmed malaria case, uncomplicated malaria, severe malaria
2. Standardized tools for data collection, M&E, Analysis & Feedback
3. Strengthening of Geographical Information System (GIS) for identification of malaria clusters and foci
4. Mandatory reporting of all cases by private sector
5. Capacity building of staff on outbreak preparedness and response
6. Additional surveillance staff capacity to oversee data collection, quality control, submission, evaluation and case investigation



**Surveillance indicator:** Till now, ABER is being used to determine the surveillance activities for malaria case detection through ACD and PCD. The minimum target of ABER of 10% will continue to be applied in Category 2 & 3 districts/CHCs/PHCs.

Operational manual for malaria elimination in India - 2016 has clearly defined that surveillance should sustain monthly blood examination rate (MBER) of minimum 1.5% during transmission season in Category 3 and 1% in Category 2.

According to NVBDCP-Operational manual 2016 in Category 1, ABER should be sustained at minimum 7% in perennial transmission areas and minimum 5% in seasonal transmission areas.

Ensuring quality of surveillance is very crucial in the elimination setting. Apart from the indicators of ABER, SPR/TPR, Pf %, etc., the quality would be ensured by monitoring the efficiency of the activities (Proportion of blood smears collected and examined and/or RDT done within 24, 48 and 72 hours of onset of fever, time lag between sample collected and examined etc.

### Entomological surveillance

The entomological surveillance has been discussed in detail along with integrated vector management in Strategy 3: Ensuring universal access to malaria prevention by enhancing and optimizing vector control.

### Mass surveillance and treatment

Mass surveillance and treatment (MSaT) may be done in specific situations especially remote and inaccessible areas with limited or suboptimal accessibility to health care services. States will be advised to do it in consultation with NCVBDC as the WHO Guidelines for Malaria (June 2022) has mentioned that “The evidence is very uncertain about the effect of Mass Testing and Treatment on the prevalence of infection in the group targeted by the intervention.” The cost effectiveness of such campaigns is also an issue which states should consider before initiating it.

---

Proactive case detection will be undertaken in population that have limited access to facilities or inadequate health seeking behavior and in high risk groups (of remote and migrant population, refugees, armed forces, forest workers etc.)

---

Surveillance for malaria by the private sector will be emphasized. National dialogue, coordination, regulation and accreditation will be used to encourage the private sector to report to the surveillance system. The increasing availability and flexibility of mobile and internet technology will help to improve surveillance in the private sector. The states are advised to improve malaria surveillance in the private sector by:

- i) Mapping private health sector providers
- ii) Setting up a database of private health care providers
- iii) Advocacy on regulation and notification
- iv) Providing the private sector with simple, reporting format and systems
- v) Ensuring consistent feedback from the private sector
- vi) Developing training modules for Private practitioners and sensitization including other informal health care providers
- vii) Identify Professional Associations like IMA, IAPSM, IAP, for mobilization and collaboration of the private sector for malaria elimination activities. The role of private health care sector engagement is at **Annexure-6**.

### 3.3.2 Ensuring universal access to malaria diagnosis and treatment by enhancing and optimizing case management - “testing, treating and tracking”

Universal coverage of malaria diagnosis and treatment is the cornerstone to achieving malaria elimination. Prompt diagnosis and complete treatment will help in reducing the morbidity and mortality in restriction of malaria transmission.

Universal coverage with early diagnosis and effective treatment reduces morbidity, mortality, and transmission. Case detection and management activities aim to find and radically treat all infections according to national treatment policies and ensure that every case and treatment outcome is reported to the national surveillance system. Case management and surveillance are intimately linked. Case management becomes part of surveillance, which has the goal of preventing secondary transmission from any case.

*Regional Action Plan 2017-2030 Towards 0. Malaria-Free South-East Region, WHO*

#### Universal diagnostic testing of all suspected malaria cases

##### Overview:

It is envisaged that the surveillance activities would identify every suspected case of malaria and confirm it by parasitological diagnosis prior to initiation of treatment by a quality assured test, i.e., microscopy or rapid diagnostic test (RDT). Although microscopy is the gold standard and the mainstay for malaria diagnosis in the elimination settings, ensuring availability of RDTs is recommended at all levels of the health system in both public and private settings.

Malaria diagnosis and treatment in India has undergone a paradigm shift after the introduction of antigen detecting HRP2/pLDH based Pf/Pv detecting RDTs, especially in the high endemic areas by leveraging the ASHA network.

To eliminate malaria, the malaria diagnostic tools should be quality assured, sensitive and specific so that all prevailing human malarial parasites in the country are diagnosed and treated.

#### Sub Strategy 1: Ensuring parasitological confirmation of all suspected cases of malaria before treatment.

In India, the predominant species are *P. falciparum* and *P. vivax*. However, in some place *P. malariae* and *P. ovale*, are also reported in limited numbers. Lately, some cases of *P. knowlesi* have also been reported from some areas. The existing commercially available malaria RDTs have a high sensitivity for detection of Pf and Pv infections but their sensitivity and specificity for detection of the lesser known/reported parasites, *Po*, *Pm*, is low. It is often seen that these lesser known/reported malaria parasites often exist as mixed infections with Pf and/or Pv, rendering diagnosis by microscopy alone difficult and inconclusive. In such cases confirmation of diagnosis using molecular tools (PCR) is to be considered in collaboration with research partners/medical colleges for confirmation when needed and for further operational research. These cases should also be reported, notified and treated as per national diagnosis and treatment guidelines.

In all the areas, it would be ensured that any patient with fever and/or any other illness and suspected to have malaria and reports to a health facility or ASHA/health worker is to be tested with an appropriate

diagnostic test, i.e., quality assured microscopy or RDT. A reliable real-time supply chain system to be put in place to minimize wastage as well as ensure adequate availability of quality assured RDTs, stains, reagents, microscopes etc. Capacity building of all frontline health workers as well as lab technicians to be carried out in a well-structured manner and benchmarking of the skills to be done through training, retraining, assessment and certification.

#### **Key activities:**

- i) Assessment of the existing capacity of the health facilities, laboratory staff and health workers involved in malaria diagnosis, treatment and referral.
- ii) Systemic planning and execution of capacity building plans for optimal and quality assured service delivery.
- iii) Mapping of the private and non-govt. facilities in the districts and assessing the population covered by them for malaria case management.
- iv) Ensuring competent, skilled service providers for coverage of the entire population at risk and ensuring access to malaria diagnosis amongst the disadvantaged populations at risk, e.g., children under five years of age, pregnant women, populations in remote and inaccessible areas.
- v) Listing of facilities with non-functional or sub-optimal malaria microscopy services and ensuring malaria diagnosis using RDTs. Rationalization of Lab technicians in high burden health facilities and appropriate use of RDTs and microscopy to ensure EDCT.
- vi) Ensuring availability of quality assured RDTs as well as quality assured microscopy in hospitals and health facilities. For other Govt. sector and private sector, free training and certification opportunities will be offered for malaria microscopy.
- vii) Though RDTs will be adequately provisioned in all epidemiological settings, provision of quality assured microscopy services will be prioritized in elimination settings (Category-0&1). Since the parasite species, count and stage are important in elimination settings therefore microscopy needs to be strengthened in these areas. Capacity building and certification of the Lab. Technicians will be prioritized and scaled up with the support of WHO.
- viii) The health facilities lacking in appropriate amenities will be strengthened and upgraded. Endemicity of the area, workload and microscopy skills of the lab technician will be essentially considered while deciding the minimum RDT stocks required at each level to ensure increased, equitable and timely access to diagnosis using either quality- assured RDTs or microscopy or both as per the recommended criteria. Similarly, it will be ensured that all frontline health workers are adequately supplied with the RDTs so that the healthcare workers as well as health facilities are equipped with minimum RDT stocks.
- ix) Access to malaria diagnosis at the peripheral level will be strengthened by involvement of the CHOs at the sub-centre level.

#### **Recommended selection criteria for a diagnostic test in different settings**

RDTs have the advantage of provision of results immediately at the lowest level of the health facility and this helps in reinforcing the confidence of patients through immediate diagnosis and initiation of treatment. Microscopy should be available at facility level at the PHCs, CHC, district, medical college and tertiary care hospitals. However, microscopy is essentially required in certain instances where there is need to determine parasite densities (practically *Po* and *Pm*) namely follow up of severe malaria cases, monitoring drug resistance, research studies with new diagnostic tools, medicines, differentiation of parasite species and detection of lesser-known malaria parasites other than *Pf* and *Pv*. Microscopy is a basic and important tool which can be helpful in monitoring transmission through detection of parasite stages, especially the gametocytes which are important for transmission.

Level	Test Performed By	RDT	Microscopy	Minimum requirement
<b>Community Level &amp; Sub-center level</b>	<b>ASHA, trained community volunteer</b> <b>MPW(M)(F)</b> <b>CHO</b>	+++	+ (when RDT is not available or RDT -ve suspect case)	i) Training of ASHAs/Health Volunteer/MPW, CHO for use of RDTs ii) Follow RDT test insert instructions for specific RDT make iii) Training of Health workers (MPW, ASHA) on slide preparation to be ensured in case non-availability of RDT specific situations requiring slide preparation.
<b>PHC, CHC Level/ District hospital, Sub-district hospital, tertiary care hospital</b>	<b>Laboratory Technician</b>	+	+++	i) Electricity, water supply, laboratory infrastructure ii) Training and certification of lab. Technician iii) Test duration/results; no. of laboratory technicians (LTs); workload/daily malaria patient load.

Table 5: Recommended criteria for selection of diagnostic tests at different levels of the health system

### Sub Strategy 2: Ensuring access to malaria diagnosis in difficult to reach areas, i.e., forests, forest fringe, tribal, hilly areas with difficult terrain and international borders.

#### Key activities:

- i) Implementation of the joint action plan for malaria elimination in Co-ordination with the Ministry of Tribal affairs to address the need of the tribal community.
- ii) Cluster based approach shall be used instead of village and ASHA based approach in all the hard-to-reach areas for continued services, especially during the transmission season when these villages get cut off due to monsoon.
- iii) Line-listing of other hard to reach areas, building online listing of the MCH Programme of NHM (available with district administration) and a revised map will be used to formulate strategies and monitor all interventions in these areas. Regular supply chain management and estimation of the requirement of drugs and diagnostics, considering the requirement of minimum basic stocks for EDCT will be ensured.
- iv) Maintenance of buffer stocks of RDTs at the sub-centre level to ensure the timely supply of RDTs when stocks drop below the defined minimum level.
- v) Continuous monitoring of logistic stocks and replenishment through local supply chain nets by involving volunteers, health workers, MTS and other relevant staff, along with District, State and Central level monitoring.
- vi) Assessment and appropriate follow up of the outcome of the strategies for achieving the desired results.

### Sub Strategy 3: Quality assurance of malaria diagnostics.

It is important that due consideration is paid to the sensitivity and specificity of the RDTs and that they meet the performance criteria approved and accepted at national and international level. Similarly, the quality of malaria microscopy is expected to be ensured. A fully operational National Quality Management System (NQMS) and systematic capacity building of the ASHAs, health workers and laboratory technicians as per the revised national guidelines and SOPs has been initiated and is being scaled up. There should be a structured plan for QA/QC of microscopy for all levels.

#### Key activities:

- i) The guidelines, manuals and SOPs on quality assurance of malaria diagnostics to be regularly updated and used for strengthening of the malaria diagnosis and quality assurance of diagnostics in the country and disseminated to all states and health facilities.
- ii) The existing guidelines or any amendment made in future for cross-checking mechanism of malaria microscopy to be meticulously followed by all States/UTs.
- iii) Ensuring of quality of RDTs for both centralized as well as decentralized procurements as per national approved specification of Bivalent-RDT.
- iv) Regular update of the technical specification of RDTs and wide dissemination to be used by the states, Medical Colleges and other institutions involved in the quality assurance and quality check.
- v) Structured plan for capacity building:
  - a) The quality of malaria microscopy will be ensured through capacity building and certification of laboratory technicians. The training needs assessment to be done by every state. A training calendar would be developed for induction and refresher trainings through a cascade approach.
  - b) The National Reference Laboratory (NRL) at NCVBDC Hq, Delhi and Regional Laboratories will be involved in the cascade model of capacity building of the microscopist. WHO L1 and L2 certified laboratory technicians would be utilized for cascade training at State, regional and national level trainings and certifications under the overall guidance of the NVBDCP. This core group of certified trainers will be utilized for cascade trainings, slide preparation and validation. They will be the facilitators for the state, regional and national level certifications (NCAMM). Standardized teaching and training materials, training curriculum, SOPs, manuals would be used.
  - c) Having achieved an adequate level of trainings and certifications and establishment of the National slide bank, the Programme will move towards the revised slide validation and EQAS as well as Onsite Training and Supportive Supervision (OTSS).
- vi) Regular updation of National Quality Assurance Guidelines as per the latest available WHO guidelines and will be shared with the states.
- vii) Networking of laboratories for QA of malaria diagnostics and related technical matters.

#### Universal access to malaria treatment

**Early detection and complete treatment** (EDCT) are the key objectives of case management. Once the diagnosis has been made, appropriate antimalarial treatment must be initiated immediately to ensure radical cure. Treatment based on clinical diagnosis is not recommended and should be reserved for extreme circumstances only, when there is a strong clinical suspicion accompanied by severe disease and obtaining prompt parasitological confirmation by microscopy or RDT is not possible.

### **Sub Strategy 1: Ensuring treatment, availability and its compliance for malaria cases as per National guidelines.**

#### **Key activities:**

- i) Ensuring testing, treating and tracking of all patients till the treatment completion.
- ii) Ensuring the availability of anti-malarial as per the different weight bands under the national drug policy.
- iii) Capacity building of ASHA/ MPW/ CHOs/ volunteers (in hard-to-reach areas) improving drug compliance and ultimately treatment completion.
- iv) Create Mass public awareness for treatment availability and its guidelines in public and in private.
- v) Treatment of a malaria case and selection of the appropriate antimalarial drugs should be as per the latest National Malaria Drug Policy. Treatment cards should be maintained for all malaria patients.
- vi) Regular updates in the National treatment guidelines for the treatment of all species of malaria including co-infections like HIV/AIDS, Kala-Azar etc., as well as international traveler based on species of malaria and drug sensitivity of antimalarials in the country of origin.
- vii) All asymptomatic cases identified during the Mass surveillance and treatment campaigns should be given complete treatment as per the national guidelines.
- viii) Severe malaria will be managed as per the standard guidelines of the NVBDCP.

### **Sub Strategy 2: Inclusion of public and private practitioners & informal sector in program activities and their capacity buildings.**

#### **Key activities:**

- i) Dissemination of National treatment guidelines would be done in collaboration with stakeholders.
- ii) Advocacy for facilitating the reporting from all private practitioners in IHIP-Malaria portal as per the notification policy of the state government.
- iii) Training of clinician, pathologist, microbiologist and interns, postgraduates and technicians in public and private institutions/hospitals.
- iv) Training and capacity building of the traditional healers and practitioners of other systems of medicine in early identification of suspected case of malaria and appropriate referral and treatment.

### **Sub Strategy 3: Monitoring of relapse, recrudescence, early treatment failures, drug effects and pharmacovigilance in surveillance activities.**

#### **Key activities:**

- i) All malaria cases to be followed up to ensure complete treatment in all categories of states. Follow up details would be a part of the reporting mechanism as per case-based surveillance.
- ii) Follow up slides for microscopy to assess clearance of parasitemia and compliance to radical cure on the 4th to 7th day in P.f cases and 7th to 14th day in P.v cases may be considered in Category 1.
- iii) *Pv* and *Po* are known to cause relapse. Recrudescence is mainly seen in Pf and Pm cases. The pattern and reasons of relapse and recrudescence to be studied as operational research.
- iv) Follow treatment guidelines for treatment failure and resistance.
- v) Guidelines on early identification of Adverse Drug Reaction and reporting under the program will be developed.

## **Safety and therapeutic efficacy of anti-malarial medicines**

Monitoring antimalarial drug efficacy is essential for the early detection of resistance and in turn taking timely action to prevent its spread. Nation-wide sentinel site systems for monitoring the therapeutic efficacy of ACTs and CQ Therapeutic Efficacy Studies (TES) have been in place under the national program as collaborative research projects executed through ROHFW and ICMR-NIMR with the support of NCVBDC as per the WHO protocol.

### **Sub Strategy 1: To monitor the efficacy of recommended antimalarial medicines for treatment of malaria.**

#### **Key activities:**

Adequate number of TES in endemic sites across the country could be planned for major species (Pf & Pv) covering different treatment regimens, geographical settings and varied population coverage for generating data on the safety and efficacy of recommended antimalarials in the country. More frequent monitoring would be needed where a significantly declining trend in treatment efficacy over time is observed, even if failure rates have not yet fallen to the  $\geq 10\%$  cut-off.

### **Sub Strategy 2: To monitor the safety of recommended antimalarial medicines for treatment of malaria.**

#### **Key activities:**

- i) For quality assessment of antimalarials random checks at National, States and districts level to be planned regularly through designated laboratories.
- ii) The safety profiles of the antimalarial medications that are currently advised are fairly well described. However, pharmacovigilance system using standardized data collection through a network of various health institutions would be put in place for monitoring the safety of recommended antimalarials particularly for young children, pregnant women or people with concurrent illness.

### 3.3.3 Ensuring universal access to malaria prevention by enhancing and optimizing vector control.

A key action to maximize the public health impact of vector control is the deployment and expansion of interventions appropriate to the epidemiological and entomological context. Proven and cost-effective vector control interventions include long-lasting insecticidal nets, indoor residual spraying, space sprays, larvicides, molluscicides and environmental management for specific target vectors. In addition, a rich pipeline of products is under development to address key challenges, such as malaria vector insecticide resistance and residual malaria parasite transmission.

*Global vector control response 2017–2030*

Vector control remains an essential component of malaria control and elimination. Universal access to malaria prevention can be achieved by enhancing vector control strategies. The specific objectives are to maintain adequate integrated entomological surveillance and monitoring, determining and updating the distribution, population density, larval habitats, to update insecticide resistance status, strengthen capacity for evidence-driven vector control and to suggest changes in IVM strategy including insecticide resistance management. The following Figure 5 highlights the current distribution of vectors which forms the basis for area specific strategy.

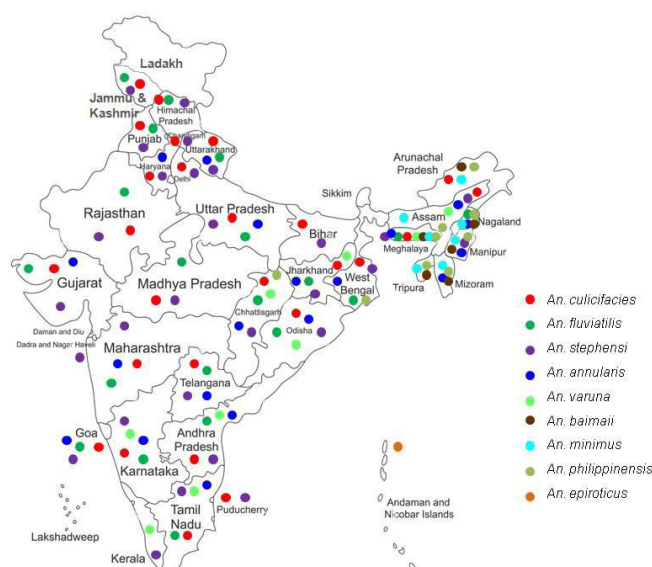


Figure 5: Malaria vector distribution in India, 2022 (Source: NCVBDC)

The overall strategy is based on four facts:

- (i) Knowledge and understanding of vector bionomics,
- (ii) Surveillance of vector species,
- (iii) Incrimination of vector species,
- (iv) Community awareness and implementation of effective control measures.

The emphasis during implementation would be to maximize the impact of vector control, maintain adequate integrated entomological surveillance and monitoring, manage insecticide resistance and residual transmission, strengthen capacity for evidence-driven vector control and implement malaria vector control in the context of integrated vector management.



Based on above mentioned four crucial information, the whole malaria prevention strategy by enhancing and optimizing vector control will be based on following two pillars:

- i) Entomological surveillance
- ii) Integrated vector management

Table 6. Vector control activities to be carried out in various categories

Category 0 (no case) and Category 1 States (Elimination)	Category 2/3 (Pre-elimination/control)
<ul style="list-style-type: none"> <li>• To map potential vector breeding sites including hidden sites (RS-GIS wherever necessary)</li> <li>• Regular adult vector monitoring (prevalence and density)</li> <li>• Environmental management and modification by involving relevant agencies in both rural and urban areas.</li> <li>• Biological control - larvivorous fish, Bti</li> <li>• Foci-based adult vector control interventions in and around 50 houses of positive cases.</li> </ul> <p>Focal IRS as per the program guidelines</p>	<ul style="list-style-type: none"> <li>• Universal coverage with LLINs of all sub-centres with API&gt;1</li> <li>• In sub-centres with API&gt;1, two regular rounds of supervised IRS (sub-centre as unit) to be conducted</li> <li>• In LLIN covered sub-centre (s), the LLIN usage should be ensured.</li> <li>• In outbreak situations, additional round of IRS to be carried out.</li> <li>• Continue anti-larval measures in urban areas with main focus in slums.</li> <li>• Larval control through source reduction, use of larvicides, biological control and environmental measures.</li> </ul>

*\*The criteria of distribution of LLINs and implementation of IRS will be reviewed based on epidemiology and entomology data and submitted to Expert Group and Technical Advisory committee(TAC)keeping in view the malaria elimination target of 2030*

### Sub strategy 1: Entomological Surveillance as a guiding force for intervention

The vector surveillance will be tailored according to different situations and vector control operations. Availability of adequate human resource is critical for entomological surveillance and vector control. The filling of all critical human resource positions such as entomologists and insect collectors from central to state and district level will be ensured. To strengthen the entomological monitoring, the number of zones has now been increased to 114 by sanctioning the posts of entomologists through State PIP. The functionality of zones will be strengthened and monitored closely, and data generated will be compiled and analyzed centrally at state and national level. The districts under the entomological zones will be visited by the zonal team at regular intervals throughout the year. In addition, 17 Regional Offices for Health & FW, Government of India were equipped with entomologists for carrying out entomological activities besides other public health activities.

**Key activities for different category:** The activities will have to be prioritized according to different situations within the area entering into the elimination setting as described below.

### High-to-moderate transmission area- routine and regular surveillance

- i) Measure adult vector density and assess intensity of transmission.
- ii) Identify Sentinel sites based on preliminary surveys and undertake regular entomological surveillance to monitor the trend.

### Low-transmission areas

- i) Vector surveillance to continue
- ii) Spot checks for vector surveillance in known persistent transmission areas to be undertaken.

**Very low transmission & elimination:** The areas entering into very low or zero indigenous transmission category, the priority will be accorded on:

- i) Routine entomological surveillance to be carried out to generate information on receptivity and places where interventions are required.
- ii) Surveillance sentinel sites will be relocated to ensure its optimal position to represent the area within vector influence. The reallocation will also consider ongoing and/or transmission risk. This will be done in consultation with the NCVBDC.
- iii) Surveillance will be intensified for new or resurgent foci.

**Foci investigation and response plan:** Foci investigation will include data of routine entomological surveillance at sentinel sites, data from spot check sites and additional entomological investigations for possible local transmission (i.e., indigenous or introduced cases) in foci where transmission had been interrupted or where transmission has been reduced to a very low level. An entomologist should invariably be part of foci investigation to identify the features of the location, including the populations at greatest risk, any ongoing control measures, the vector *Anopheles* species responsible for transmission, breeding places and insecticide resistance status if available in last 4-5 years. A map for permanent breeding sites or man-made breeding sites, especially in desert areas or in domestic and peri-domestic areas should be prepared. Vector biting will be essential to link with human sleeping behavior (indoor/outdoor) and suggesting the appropriate control measures.

### Areas with specific problems:

#### Spot checks:

If changes in vector composition or behavior are noticed, spot checks will be conducted at more sites. The research inputs will be taken to analyze the behaviour change in vector species including mapping of sibling complex species.

#### Insecticide resistance monitoring:

The insecticide resistance monitoring (IRM) is an important parameter which facilitates in decision making to select appropriate insecticide for IRS. LLINs impregnated with synthetic pyrethroids and use of similar class of insecticide for IRS may lead to development of resistance. The management of resistance becomes crucial especially when not much choice is available for IRS as well as for LLIN. For monitoring the insecticide resistance below action points should be focused:

- i) Strengthening collaboration between state and Indian Council of Medical Research (ICMR) and to create an effective network to support insecticide resistance management.
- ii) Building capacity to interpret data of IRM by training state, district, zonal and regional entomologists/consultants.
- iii) Preparing annual maps of insecticide resistance and intensify IRM for all areas reported to have triple resistance by any research or study under the guidance of NCVBDC. The resistance status will be monitored by Insecticide Resistance Monitoring committee (to be constituted at national level)

annually. The susceptibility studies need to be carried out across the country. ICMR institute need to take a lead in these studies. The findings of these studies will support in the preparation and revision of Insecticide Management Plan if needed. The support under NHM initiated through State PIP for strengthening Entomological zones with human resource and physical facilities will be sustained.

- iv) Capacity building of zonal entomologist and insect collectors for entomological surveillance with specialized training will be organized regularly by NCVBDC with support of WHO, NCDC and ICMR institutions.
- v) If high-intensity resistance is confirmed at one sentinel site then, additional spot checks for vector surveillance in surrounding areas will be done.
- vi) Alternate insecticides to be used as per national policy.

### **Sub strategy 2: Integrated vector management: optimize the effective use of malaria vector control tools available and feasible within infrastructure**

The vector management strategy and its implementation would be reviewed annually and updated based on malaria situation and transmission dynamics in different areas. Vector Control Need Assessment (VCNA) done in states/districts will prioritize the implementation activity and resource mobilization on evidence. The current vector control strategies include the following interventions:

#### **Key activities:**

##### **Indoor Residual Spray**

- i) Indoor Residual Spraying (IRS) is implemented prioritizing high-risk areas for which district-wise micro plans need to be prepared indicating the case load and risk potential. The insecticides of choice currently for IRS are Malathion and Synthetic Pyrethroids.
- ii) IRS has been in use based on API, however, with the progress towards elimination, the presence of any malaria case in any area will be considered for immediate focal spray i.e., in and around 50 houses of a case.
- iii) The regular rounds of spray should be taken only if the area with persistent transmission reports more than 1 API or as **recommendations of expert group and TAC for lowering the API** for a given situation.
- iv) The period of IRS will be flexible to cover the transmission period in targeted areas.
- v) The areas under influence of multiple vectors will need priority considering the transmission dynamics.

##### **LLIN**

- i) Use of Long-Lasting Insecticidal Nets (LLINs) is another core strategy being implemented under programme in high burden areas. The guidelines circulated to states to be used during preparation of micro- plan for its distribution.
- ii) As the country moves towards elimination of malaria the requirement of LLINs will be assessed based on absolute number of cases in consultation with states for which expert consultation will be organized because uniform norms may not be suitable in varying situations.

*Note: The criteria of distribution of LLINs in areas (i) already in replacement cycle and (ii) areas with introduction of new case and/ or vulnerable population will be reviewed and submitted to Technical Advisory committee keeping in view the malaria elimination target of 2030*

### **Larval Source Management**

- i) Larval control using Temephos, Bio-larvicides and Insect Growth Regulators are to be continued in all urban areas.

- ii) The use of larvivorous fish (Gambusia and Guppy) is also promoted under programme in collaboration with the Fisheries Department, Civil Society Organizations (CSOs)/Panchayati Raj Institutions (PRIs) and village health sanitation and nutrition committee (VHSNC).
- iii) Reduction of larval breeding sources using environmental engineering methods.
- iv) Mapping of permanent breeding habitats to be done.
- v) Adequate advocacy is to be ensured especially at community level and other stakeholders on non-creation of mosquito genic conditions.

### **Vector Control in emergency situation**

- i) Vector control by fogging with technical Malathion/ Pyrethrum/ Cyphenothrin for immediate killing of infected mosquitoes is recommended for containment of an outbreak.
- ii) Timing and stratification of vector control response are critical for malaria elimination. If a malaria case appears in a receptive area not protected by LLIN or IRS, the household where the malaria patient resides, and the surrounding area should be covered as per the national guidelines.

### **Policy decision on continuation or withdrawal of a vector control intervention**

Policy decision on continuation or withdrawal of IRS or LLIN in an area would be taken by the task force based on the receptivity and vulnerability of the area based on the risk factors for re-establishment of malaria.

### **Monitoring and evaluation**

- i) The data and the report generated in districts/zones to be regularly transmitted to state and Central HQ consistently from all states. Additional efforts to be taken for incorporating urban local bodies/ supporting institutions of ICMR, NCDC & academic institutions etc. in the regular reporting system (Monthly/quarterly for entomological parameters and yearly for insecticide resistance monitoring).
- ii) In outbreak or upsurge situations, data generated will be shared on daily basis.
- iii) The entomological parameters and formats are provided in detail in the Manual of integrated vector management in India 2022.

### **Safe disposal of insecticides and public health products**

- i) For insecticides beginning from procurement till disposal of containers/associated left over, the Environmental Code of Practice (ECoP) available on the NCVBDC website should be followed.
- ii) National guidelines on Disposal of pesticide containers, LLINs and its packaging material will be circulated to states and districts for effective implementation of the same.

### **Key activities to be undertaken at various levels for effective integrated vector management:**

- i) Central level will monitor performance of reporting on entomological data and will analyse to provide feedback at monthly interval.
- ii) Gaps in HR (entomologists, VBD consultants and insect collectors) will be addressed promptly by central and state agencies (regular sanctioned and Contractual).
- iii) The Guidelines, operational manual and other technical guidance will be circulated to all entomologists and vector control consultants from time to time.

- iv) State programme Officer and State consultants (Entomology/vector control) will collect the data on entomological surveillance and vector control measures on monthly basis and compile for quarterly review to facilitate decisions for any amendments if required to optimize vector control activities.
- v) Associated requirements of commodities and other logistics will be worked. The proposal must be reflected in State PIP with justification and the proposal of physical plan must be shared with central officials by SPO during October to December.
- vi) Implementation Plan must be prepared for district, blocks and Sub-centres following national guidelines and subdistrict malaria elimination plan highlighting the TOR with timeline of supervisory cadre and schedule of all activities with frequency. Intervention measures to be adopted in urban areas must be circulated to all towns, local bodies, municipalities, municipal corporation and mega cities.
- vii) The issues flagged from periphery must be addressed by District VBD Control officer/DMO and SPO within a period of 15 days appropriately. Any constraints in implementation of IVM must be brought to the notice of NCVBDC Delhi to be taken up at appropriate level.
- viii) Training on entomological surveillance and vector control measures as described in NSP need to be organized for all cadres involved and the training plan should be circulated indicating the state-wise batches to be conducted for each year.

### 3.3.4 Accelerating efforts towards elimination and attainment of malaria free status

To succeed in achieving zero indigenous case of malaria in the country the NSP 2023-2027 is backed by effective and targeted strategies and highest level of commitment from the government. This strategic approach encompasses the following core domains:

- i) Strengthening of program management through effective planning and program implementation
- ii) Multisectoral coordination at all levels
- iii) Human resource management including capacity building of all cadres
- iv) Advocacy and Social Behaviour Change & Communication
- v) Procurement and supply chain management
- vi) Finance

#### Strengthen program management and coordination at all levels

Program management refers to the planning, implementation, monitoring and evaluation of malaria programs activities. Program management is critical to improving the quality and accessibility of healthcare services and achieving better health outcomes for individuals and communities. National Center for Vector Borne Diseases Control oversees implementation of malaria program activities, developing policies & guidelines, organizing resources, managing budget, supervising staff and monitoring program outcomes etc.

Adoption of a malaria elimination strategy increases the need for leadership and management in malaria programmes. Operations need to be managed with rigor and flexibility, supported by robust monitoring and quality control. Programmes need to be responsive to the evolving requirements of the elimination effort, and risks will sometimes need to be taken in the interests of innovation to accelerate programmatic impact.

*Regional Action Plan 2017-2030 Towards 0. Malaria-Free South-East Asia, WHO*

The National Center for Vector Borne Diseases Control (NCVBDC) administers an umbrella programme, namely, National Vector Borne Diseases Control Programme (NVBDCP) for prevention and control of vector borne diseases namely Malaria, Japanese Encephalitis, Dengue, Chikungunya, Kala-azar and Lymphatic The States/UTs are responsible for implementation of the programme, whereas NCVBDC provides technical

and financial assistance to the States/UTs in the form of cash & commodity, under the overarching umbrella scheme of National Health Mission (NHM).

The current organizational structure is as follows:

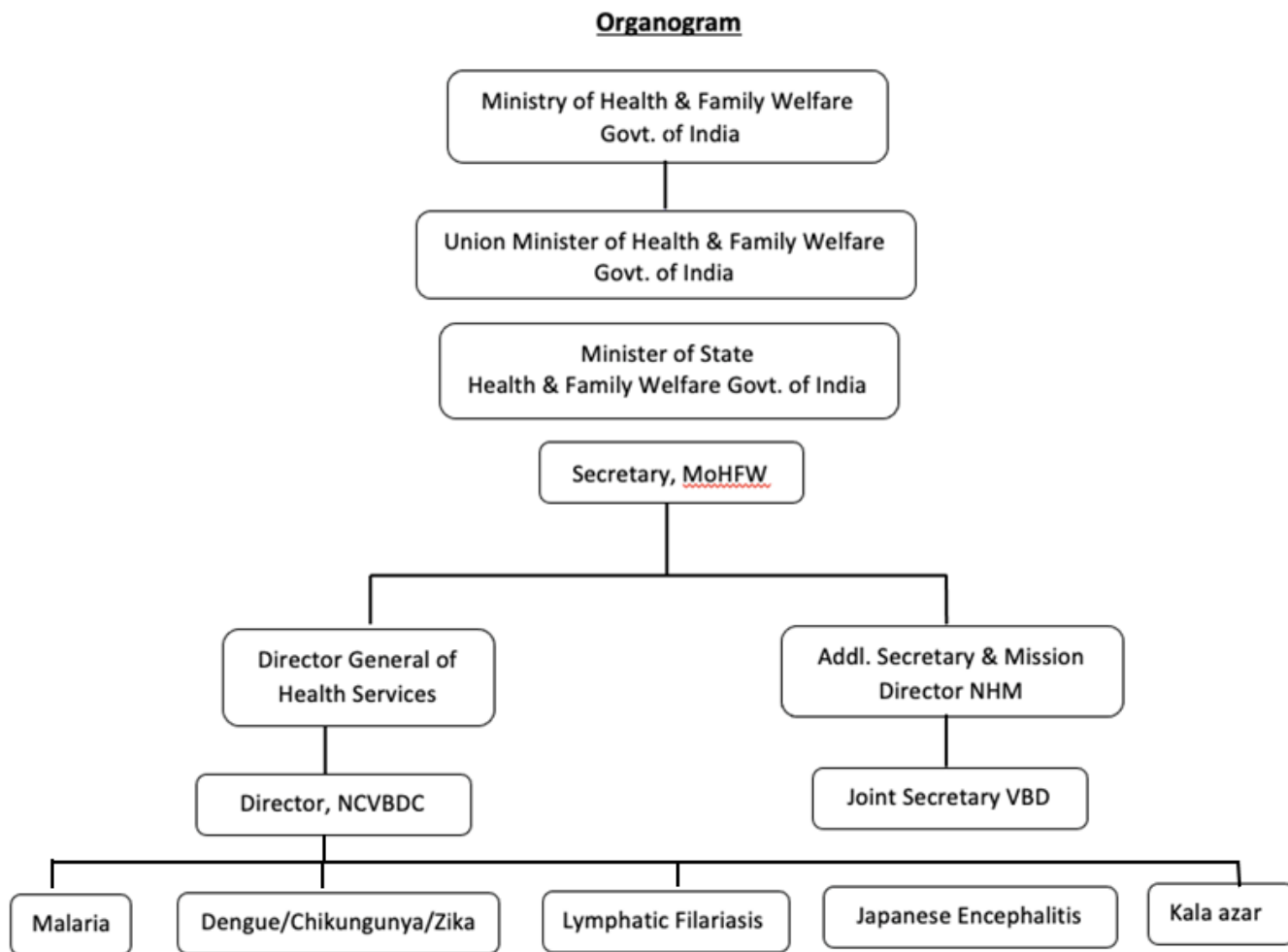


Figure 6: Organogram of the technical divisions of National Centre of Vector Borne Diseases Control

The program works in collaboration with stakeholders such as policymakers, healthcare service providers, and community organizations, line departments, funding organizations etc., for effective & efficient implementation of the program.

As India has a federal system of government, the responsibility of providing healthcare services is shared between the central government and the state governments. The state governments are responsible for the planning, implementation, and management of healthcare services within their respective states, while the central government provides financial and technical support through various programs and schemes. Malaria is a part of comprehensive package of care under NHM. The Health and Wellness centres and ASHAs at the periphery are involved in the malaria elimination activities. The malaria elimination program has robust reporting system from the peripheral areas to the national level. NSP 2023-2027 prioritizes and focuses on Resilient and Sustainable Systems for Health (RSSH) implementation and is adequately reflected in the strategies thus providing for opportunities for gender sensitivity and efficient multisectoral integration at all levels of program implementation. To enhance surveillance near real time web based data reporting system (IHIP Malaria portal) is being rolled out in the country. ASHA is catering to vulnerable populations such as women and children under NHM.

### **Key components of the program management include**

- i) planning and implementation mechanisms
- ii) partnership coordination system
- iii) procurement and supply management system
- iv) financial resource management

### **Planning and implementation mechanisms**

NCVBDC has been functioning under the umbrella of National Health Mission, a flagship program of GoI, aimed at providing accessible, affordable, and quality healthcare services to all citizens. The Planning and Implementation Process is a critical component of NHM to promote bottom to up approach for planning and implementation of health programs at the state level. The State Program Implementation Plan (PIPs) spell out the strategies to be deployed, budgetary requirements and health outcomes. The State PIPs are an aggregate of the district/city health action plans and include activities to be carried out at the state level. This has several advantages like strengthening of local planning at the district/city level, and would ensure adequate resources for high priority districts/cities etc.

NCVBDC closely engages with the state program counterparts at every step of the PIP process to support them technically in identifying the gaps & challenges and setting up of program's priority. The approved activities as per the Records of Proceedings (ROP) of the PIP process are then implemented by the state, however, in close coordination of NCVBDC. Majority of activities like ensuring Early Diagnosis and Complete Treatment, routing monitoring and supervisory visits, procurement of drugs at state level, advocacy and inter-sectoral meetings, IEC/BCC activities, training etc., are implemented by the states. Some of the activities like procurement of drugs, diagnostics, LLINs (under the central procurement list), supervisory & monitoring visits, evaluation, some specialized trainings etc., are undertaken by the center. Also, program management is a continuous cycle that involves regular review and revision of the plan based on the feedback received from stakeholders and the results of monitoring and evaluation. Program implementation will be strengthened through regular review meetings. Quarterly/half-yearly meetings will be organized at all levels (national/state/district/sub-district) to discuss challenges faced in implementation of various programmatic strategies and the actions taken report shall be presented in subsequent meeting. Community feedback mechanism (volunteers, SHGs) will be strengthened through monthly meetings at HWC.

### **Human Resources Management**

Human Resources Management encompasses a wide range of activities, including recruitment, selection, training/capacity building etc. The primary goal is to ensure that the organization has the necessary trained human capital to achieve its strategic objectives.

NCVBDC has carried out a HR need analysis to determine the level of current and required HR up to various levels along with the desired skillsets at different levels. Accordingly, additional HR at various levels have been budgeted in the NSP. However, the existing regular manpower under the health system are not taken into consideration. Due diligence has been taken while preparing NSP so as to make a sustainable and efficient planning in positioning of HRs at various levels.

Opportunity to utilize additional resources under NHM for Malaria Elimination Programme has been noted. Mapping and orientation for the new cadres under NHM would be done as mentioned below:

- i) Involvement of CHO at Health & Wellness Centers in urban & rural areas
- ii) Involvement of Urban ASHA from UPHCs/ HWCs in urban area
- iii) Health work force as part of state specific initiatives to be trained in malaria program.

Also, a training plan has been prepared across all cadres considering the need of the program for malaria elimination. A detailed training need assessment is integrated in the program as a routine mechanism to be carried out by state and center. Training in improved Program Management, diagnosis, treatment, vector control, M&E and overall planning will be given both through virtual and physical mode. SOPs for all the activities managed at state/districts level will also be developed to improve management & accountability of malaria elimination operations.

### Key Activities:

Planning and implementation of **cascade training** would be done covering all the relevant cadres for malaria elimination.

The aim is to ensure that all cadres undergo refresher training at least once a year covering all the relevant strategies covered under NSP 2023-27. Training calendar would be made for planning and implementation of cascade training model covering all the relevant cadres for malaria elimination as shown in Table 7. Key emphasis areas for capacity building are mentioned below:

- i) The state health departments to customize training for different cadres as per scope of work.
- ii) Training in program management and leadership to be prioritized at national, state and district levels considering malaria elimination All relevant staff at each level would be trained on data analysis and interpretation in regard to malaria elimination indicators.
- iii) Considering the large workforce to be trained in Malaria, scope of E-training to be initiated.
- iv) Refreshers training on malaria case management [through CME organized by government in collaboration with NHSRC, IAPSM, IPHA and professional medical associations] of private practitioners and MO through online mode for Malaria case management
- v) Orientation workshops to raise awareness of Rural medical practitioners/other informal healthcare providers on identification of early sign and symptoms and timely referral.
- vi) CHOs will be trained on malaria case detection, treatment, prevention, monitoring and community mobilization towards malaria elimination at level.



S.No.	Participants	Location of Training	Responsibility	Training Schedule	Type of Training
1	SPOs, Officers of Regional Office, State Consultants	National	NCVBDC, NCDC, NIMR and Teaching & Training institutes	Induction training: within 3 months Refresher training: Once a year	Induction/ Refresher training on Malaria, Program Management, subject area specific training
2	VBD consultants	National/ sub- national	NCVBDC, NCDC, NIMR and Teaching & Training institutes		
3	DVBDCO officers	National/ sub- national	NCVBDC, NCDC, NIMR and Teaching & Training institutes		
4	Zonal/State entomologists	Sub-national/ State	ROHFW/ VCRC/ NCDC/ NIMR and its field stations	Induction training: within 3 months Refresher training: once a year	Induction/ Refresher training on Malaria, Entomological aspects
5	Insect-Collector	Sub national/ State	SPO/ ROHFW/ VCRC/ NCDC/ NIMR and its field stations	Induction training and refresher training – 2weeks (10 days)	Entomological techniques and parameters
6	Private practitioners	District/ Sub-district	DVBD officer/ SPO/ DMO/ MO-CHC	Refresher/ Induction training: once a year	Induction/ Refresher training on clinical management of Malaria, National Treatment Guidelines, Aspects of Program Management
7	MTS	Sub-national	DVBD officer/ SPO/ IMA	Induction training: within 3 months of recruitment Refresher training: once a year	Induction/ Refresher training on Malaria, Program Management, Field Visit Planning & Reporting.
8	Physicians of government & private hospitals, and NGOs	Regional/ State/District	Medical College	Induction/Refresher training: Once a year	Induction/ Refresher training on Malaria
9	Medical Officers	District/Sub-district	District/Regional training centers	Induction training: within 3 months of recruitment Refresher training: once a year	Induction/ Refresher training on clinical management of Malaria, National Treatment Guidelines, Aspects of Program Management

10	Laboratory Technician	District/ State/ ROH&FW laboratory	MO in charge of District/ State/ROH &FW laboratory	Induction training: within 3 months of recruitment Refresher training: once a year	Induction/ Refresher training of LTs on Malaria Microscopy, Aspects of Program Management.
11	MPHS, MPH/ CHO/ASHA/ Community Health Volunteers	Sub-District	MO-CHC/PHC	Induction training: within 3 months of recruitment Refresher training: once a year	Training of MPHS/ ANM/CHO/ASHA on Malaria Prevention, treatment, reporting and other aspects of program management

Table 7: Capacity building at various levels

## Advocacy and social behaviour change & communication

### Advocacy

Malaria prevention must go hand in hand with community participation. Unless individuals in communities see the merits of preventing the disease, even the best-designed prevention strategies might not be used. The supportive involvement of local people can be fostered through a variety of means, including community awareness sessions to explain malaria interventions and their benefits.

*Regional Action Plan 2017-2030 Towards 0. Malaria-Free South-East Asia, WHO*

The programme will engage with multiple stakeholders at various levels to strengthen the commitment for malaria elimination by leveraging resources and enabling policy change through the following:

- i) Promote and sustain high-level political advocacy for drawing policy makers' attention to important issues regarding malaria elimination.
- ii) National Task Force for Malaria Elimination (NTFME) is in place and comprises experts from various fields, including public health & line ministries, medical research, and policy making. The NTFME is responsible for guiding the program implementation activities to attain malaria elimination in the country. The task force at national level is to be updated and it will meet biannually to discuss strategies for malaria elimination.
- iii) Similarly, at state and districts level, a state and district task force for malaria elimination has been formed which will continue to meet bi-annually to provide strategic guidance and support for implementation of the NSP at state and districts respectively.
- iv) Sensitizing media and sharing regular updates related to best practices, program achievements, events etc.
- v) Mobilizing the community and engaging local influencers like Panchayat Raj, SHGs members, teachers, local leaders, traditional healers, media to promote message related to malaria prevention and treatment.

### Key activities:

- i) Involvement of relevant representatives from the ministries and departments on occasion of observance of important days pertaining to Malaria like World Malaria Day (25th April), World Mosquito Day (20th August), Anti Malaria Month (June) etc.

- ii) Involvement of elected representatives in review meetings conducted at national, state & district level.
- iii) Identifying spokespersons from the programme at national, state, and district-level and build their capacity to draft and deliver harmonized messaging to ensure sustained momentum.
- iv) Pre and post monsoon IEC drive led by IEC division at national and state level.
- v) Intensifying policy advocacy between the department and the ministry to ensure sufficient and sustained funding to achieve elimination and prevent reintroduction.
- vi) Social media engagement on regular basis.

### Social and behavior change communication

The programme will promote, improve and sustain malaria prevention and treatment behaviors by employing relevant Social Behavioural Change Strategy which focuses on behavior maintenance, rather than one-time trial or intermittent practice, by all priority groups, to achieve malaria elimination.

#### Sub Strategies:

- i) Mentoring and Supportive Supervision - District and block level communication personnel to constantly provide handholding support to frontline functionaries involved in malaria elimination in conducting quality IPC and group communication sessions.
- ii) Convergence - Community-level convergence with other social sector schemes and public health programmes to accelerate malaria elimination efforts.
- iii) Monitoring and Evaluation - Monitoring and evaluation (M&E) of the SBCC component to be included in the overall M&E plan of the Programme.

Key Activities	Responsible person	Timeline
Mass Media & Mid Media	National, State team, District IEC team	Need based
Develop Communication	National, State and district IEC division	Annual Basis
Convergence with other partners (To be covered along with STF / Stakeholder)	National, State Team, district IEC team	Monthly basis
Monitoring & Evaluation of IEC activities	SPO, State IEC consultant, District IEC Consultant	Concurrent
IPC (Interpersonal Communication)	Asha/Health workers at ground level	Monthly
Community Participation	Asha, AWW, ANM	As per plan on regular basis
Capacity Building of various cadres under Malaria program	National, State IEC team, District IEC Team	Quarterly

Table 8: SBCC activities and timeline

## Key activities:

NSP will focus on mix of SBCC activities in the context of malaria elimination such as:

- i) All the state health departments would be requested to develop specific communication plans in consultation with NCVBDC.
- ii) Umbrella campaigns on World Malaria Day (25th April), Anti Malaria month (June), World Mosquito Day (20th August) etc., at the various levels for collective action towards malaria elimination.
- iii) Raising awareness among the community using various forms of media such as traditional media, mid-media, mass media etc.
- iv) IEC materials, mass media programmes, symposia/ panel discussions/ workshops, will be designed, disseminated to reiterate the need for Malaria Elimination including for most vulnerable and hard to reach populations as per their socio-cultural ethos and relevance
- v) Awareness building through digital and social media by regular posting of messages, collaterals on FB/ Twitter/ WhatsApp/ Instagram etc.
- vi) Promoting participation of community at village level and focus on orientation/sensitization regarding EDCT, personal protection, environmental management.
- vii) Community participation - using all the available community structures - both formal and informal.
- viii) Regular Interpersonal communications (IPC) and focus group discussions between households, community and the volunteers/health workers.

## Multi-sectoral collaborations with other ministries and departments and partnerships

- i) The programme is committed to making malaria elimination a collective responsibility transcending beyond the health sector and creating a mechanism to address the socio-economic-developmental agenda of malaria elimination. National Malaria Elimination Task Force would facilitate collaborations with non-health inter-departments. The task force would discuss concerns, best practices that could be replicated; to give directions for policy, planning, implementation and even for effective mobilization/pooling of resources with focus on malaria elimination.
- ii) Multisectoral collaboration with non-government organizations would be ensured.
- iii) Strengthening motivation and creating opportunities for engaging with private sector to bring more partners and resources for malaria elimination. **(Annexure No. 6)**
- iv) Better integration with the research bodies such as the Indian Council of Medical Research through their pan-India presence would be ensured to help in generating relevant, needed, and timely evidence through operational research.
- v) It is imperative to include all government and private institutions to report malaria cases and conform to the national treatment guidelines. Various departments of the medical colleges would be tasked with malaria preventive and curative services and awareness activities in the surrounding areas.

## Multi-sectoral collaboration with other ministries and departments

Collaboration with other ministries and departments is required in view of the multi-factored nature of malaria disease. Some activities undertaken by other non-health departments can also predispose certain populations to higher risk. Hence, the following ministries would be involved towards achieving the national malaria elimination goals. Respective departments of these ministries would be involved at the state-level as well.

<b>Department</b>	<b>Area of collaboration/support</b>
Ministry of Tribal Affairs	Joint work plan with MoTA has been developed to track, treat and prevent Malaria among tribal populations Prioritization of malaria screening services through local tribal welfare bodies (Annexure 4).
Ministry of Rural Development	Active engagement with the “Rural Livelihood Scheme”.
Ministry of Home Affairs	Facilitate bilateral dialogue and cooperation to screen migratory populations from malaria endemic countries.
Ministry of Environment Forest and Climate Change	Surveillance and periodic mass screenings of manpower residing in the national parks, forest areas, buffer zones, and border areas. Additionally, the MoEFCC and relevant research institutions may analyze the effect of changing climate on the epidemiological triad of host, vector, and environment to generate evidence for malaria elimination.
Ministry of Education	Facilitate support to incorporate malaria into middle-school health education programmes for awareness and sensitization of young change-makers for malaria and other vector-borne diseases.
Ministry of Electronics and Information Technology	Leverage the network of CSC (Common Services Centre) platform will be leveraged for malaria prevention and treatment messaging up to the grass-root level.
Ministry of Fisheries, Animal Husbandry & Dairying	The MoFAH&D would support the availability of larvivorous fishes.  Appropriate IEC and SBCC to facilitate interruption in malaria transmission resulting from the co-habitation of cattle and humans by disseminating appropriate messages by the ministry.
Ministry of Railways and Ministry of Defense	Leverage network of MoR and MoD for malaria screening and reporting at state and national borders.
Ministry of Youth Affairs and Sports	The MoYAS can facilitate the involvement of ‘Youth Champions’, to promote community health seeking behaviour with a specific focus on malaria elimination.
Ministry of Information and Broadcasting	Support to boost malaria elimination awareness messages in line with the SBCC strategy.
Municipal Corporations	Urban malaria issues need greater focus. Coordination between state health services and municipal corporations especially regarding sharing of data as well as reporting of cases has to be strengthened. Intervention measures for Integrated Vector Management in urban areas must be developed in close coordination with Local Urban Bodies.
Civil Society Organizations	Promote community ownership and adopt effective behaviour change by enforcing local norms for malaria elimination.
Faith-based organizations	Use of leaders from different faiths to motivate their community by communicating malaria prevention and elimination messages.
CSR foundations	Leveraging CSR foundations for supporting the activities envisaged under the NSP.

Table 9: Areas of collaboration

## Procurement and supply chain management:

### Overview of procurement and supply chain management in malaria

The main objectives of Procurement and supply chain management (PSCM) are planning, acquisition, storage, movement and control of goods and services, so as to optimize resources, facilities and capacity. NSP aims to ensure a continuous supply of quality assured Anti-Malarial drugs, diagnostics and insecticides to the states for storage and distribution to the patients/beneficiaries.

Procurement of anti-malarial drugs, diagnostics and LLIN is being done through centralized and decentralized mechanisms. The financial support for procurement at central level is provided by Domestic Budgetary Source (DBS) and External Aided Component (EAC). Decentralized Procurement at States is being done as per the respective state's procurement mechanism. There is provision of funds under NHM along with the state budget for procurement of drugs and commodities at the state level. List of decentralized items under NVBDCP is placed at **Annexure 11**.

### Activities and process under procurement and supply chain management

Timely procurement processes ensure an uninterrupted supply of drugs, diagnostics, insecticides and other logistics. Annual procurement plan is prepared for the procurement of Drugs, Diagnostics and insecticides etc. All states are required to share the annual requirement of Drugs and Diagnostics with NCVBDC, which is compiled by the program division and the state requirement is rationalized based on the previous consumption and need for emergency stock in high burden districts and stock in hand, latest by November each year.

In view of the reducing number of cases over the period the requirement of drugs/insecticides etc., would decrease in the coming years. Adequate supplies are to be ensured and at the same time the expiry of commodities is to be minimized. This would be done through efficient buffer stocks management, First Expiry First Out (FEFO) principle, inter-state/inter-facility transfer of goods, staggered supply at the time of procurement etc. Further, the states/districts consultants, MTS and healthcare workers will be trained and supervised for efficient stock management.

### Challenges

- i) Delayed and incorrect stock reporting from states/districts, lack of use of Information and Communication Technology (ICT) platform for capturing real time information on stock levels, expiry and potential stock out situations resulting in increased operational strain on supply chain system and also impact the forecasting and procurement planning.
- ii) Procedural delays while ensuring the compliance of codal formalities and long lead time.
- iii) Inadequate storage infrastructure at state and district level stores.
- iv) Lack of training and capacity building for personnel involved in supply chain management.
- v) Vacant positions of Procurement and Supply Chain Management Consultant at state level.

Specific strategic interventions would be put in place to:

- i) Strengthen stock reporting system through online software like LMIS.
- ii) Build capacity of personnel involved in supply chain management of drugs and diagnostics.

- iii) Regular reviews at National and State level with all relevant stakeholders, i.e., GMSD (Government Medical Store Depot), CMSS (Central Medical Services Society), RDs (Regional Directors), SPO, etc.
- iv) Monthly reviews at National and state level and fortnightly reviews at district level and below.
- v) Ensure stock adequacy by quantification/procurement based on the previous consumption as well as the emergency stock policy in high case load districts.
- vi) Provide regular updates on technical specifications of drugs and diagnostics as per new evidence and sharing with the states for facilitating procurement.
- vii) Developing of internal checks & verifications to avoid stock expiry/stock outs and also audits & inquiry of stock expiry at various level.
- viii) Quarterly advisory will be sent to states to monitor equitable supply of stocks to districts and below.
- ix) States to ensure that all the districts and sub-districts levels have adequate supply of drugs, diagnostics and other logistics at all the time. If required, the states should do necessary shifting of drugs and surplus diagnostics from one places of surplus to places facing shortage. Similarly, if states are having inadequate supply, other states may be requested for the drugs, diagnostics and other logistics. This will ensure optimum utilization and minimize expiry and wastage of drugs and diagnostics.

## Finance

### Resources requirement and planning

India has embarked on an ambitious target of ending Malaria by 2030. The resource envelope in the current NSP has been designed to ensure uninterrupted and timely implementation of the program activities and also to provide scopes for research and innovations. An estimated budget of **₹6249.80 crores** will be required over the next five years to achieve the targets enumerated in National Strategic Plan for Malaria elimination.

The expenditure is broadly categorized into three areas, i.e., (a) Interventions costs including estimated expenditure for preventive interventions like LLINs IRS and cost for early diagnosis and complete treatment, (b) Program costs that comprises of cost of HR, Training, Monitoring & Evaluation (M&E) & surveillance, communication, advocacy, procurement of microscopes, cash award to districts for achieving and sustaining zero cases etc., and (c) Governance & other cost like costs on development of guidelines, manuals, SOPs, research and surveys. The detail distribution of component wise cost estimates is as below in Table 14.

Table 14: Distribution of Component wise Cost Estimates

Types of Expenditure	2023-24 (2023)	2024-25 (2024)	2025-26 (2025)	2026-27 (2026)	2027-28 (2027)	Total
	INR in Cr.					
Intervention costs	1,006.35	836.43	546.87	639.27	597.10	3,626.02
Program Costs	384.69	623.13	512.66	531.56	537.37	2,589.40
Governance and others	4.07	10.57	10.58	5.58	3.59	34.38
<b>Total Cost</b>	<b>1,395.11</b>	<b>1,470.13</b>	<b>1,070.10</b>	<b>1,176.40</b>	<b>1,138.05</b>	<b>6,249.80</b>

Note: The figures indicated above are provisional figures and may be revised on further refinement of the estimates/inclusion or exclusion of some other key activities.

The table above provides information on year-wise and key component wise distribution of total spending on NSP for malaria elimination. The intervention cost is significantly high followed by the program costs. It signifies that vector control, case management, monitoring & supervision, provision of qualified and trained HR continues to be the programme’s priority and key tool for achieving malaria elimination. Also, adequate funds have been kept for governance, research, efficacy studies, surveys/evaluation and reviews. Additionally, funds have been provisioned for strengthening of existing entomological units and creation of new units across the state. However, the estimates do not include routine infrastructure maintenance costs at state level to operationalize any health facility, which is assumed to be a part of the broader NHM umbrella and will be fulfilled through the NHM’s funding mechanism.

The component wise budget distribution for FY 2023-2027 is given below in Figure 10.

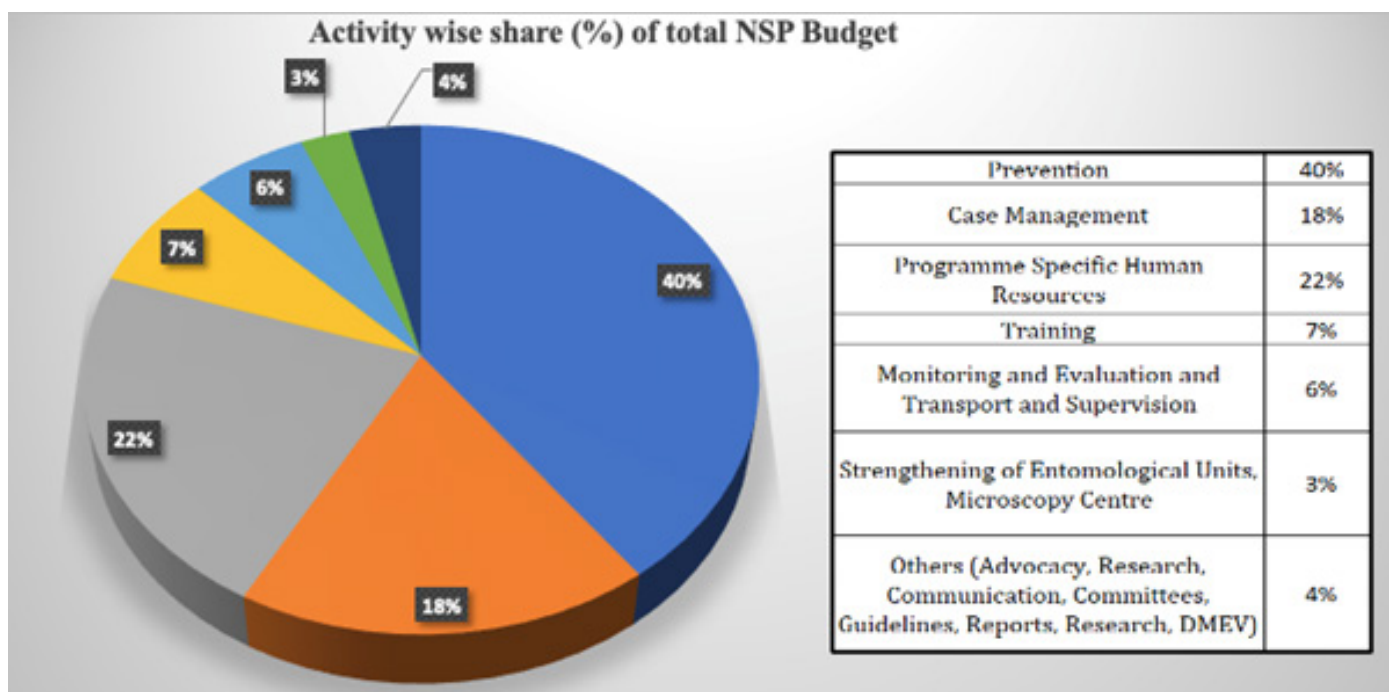


Figure 10: Component wise budget distribution for FY 2023-2027

The above figure provides information on distribution of total spending on NSP for malaria elimination. 40% of fund is required for implementation of various preventive strategies like LLINs & IRS and 18% is for case management. It is followed by funds requirement for remuneration of outsourced Human Resources at various levels which will require approximately 22% of the total budget. Training of staff at various levels will be a continued activity and crucial for the program, a budget share of 7% is for training component. Monitoring & supervision includes mobility support for supervisory visits, strengthening of surveillance and reporting, award for malaria elimination certification etc., accounts for 6% of the budget. Budget share for strengthening of entomological units & microscopes is approximately 3%. Other key activities include advocacy, research, review meetings, committees, Guidelines, Reports, Research, DMEV (District Malaria Elimination Verification) 4%.

Following are the set of activities/assumptions carried out to arrive at NSP cost estimates:

- i) A series of consultative meetings with a broad range of stakeholders and experts were held to arrive at a consensus on the target to be achieved in the next five years considering the current burden of the disease, the country commitment towards Malaria Elimination and the implementation capacity of the programme.
- ii) A list of activities year-wise was defined for each thematic area and each activity was budgeted considering the current costs and assuming the inflationary index forecast for each subsequent year.



- iii) The estimated cost of human resources is considered taking into account parity with the NHM as well as current Global Fund's supported project and, it's proposed for a year-to-year basis salaries increment, as per the projected Inflationary Index of Reserve Bank of India. However, the increment percentage as mentioned above is indicative toward maximum limit of increment whereas actual percentage of increment in salary will be decided based on the performance of the Human Resources.
- iv) The additional human resources have been kept to bare minimum and wherever possible the NSP has leveraged on already existing human resources in the general health system.
- v) The major equipment has been budgeted at current costs adjusted to assuming a life of 10 years.
- vi) Drugs and diagnostics have been budgeted based upon the calculation of requirement based on epidemiological trend for last three years and at last purchase price adjusted to inflation.
- vii) Long Lasting insecticidal nets (LLINs) are budgeted considering the three-year replenishment cycle of LLINs in high endemic sub-centers. Further, since DDT will be phased out, IRS will be done using alternate recommended insecticides as per NCVBDC guidelines. Estimates of insecticides has been done for both routine spray and focal spray.
- viii) For quantifying the drugs and insecticides, it is assumed that the positive cases will decrease gradually by 50% in the year 2024-25, 70% in the year 2025-26, 90% in the year of 2026-27. In year 2027 positive cases are assumed to be Nil.
- ix) Budgeting for advocacy, supervision is based on current programmatic practices and targets.
- x) Budgeting for research & innovations is based on need for various evidence based special research to support elimination activities.
- xi) The existing entomological units will be strengthened, and new entomological units will be developed to 250 units across the country.

### Financing for NSP for elimination of malaria

A coordinated effort by various financing agents is expected to attain the desired goal of malaria elimination in India. The union government will take the lead in putting up more funds by increasing financing allocation through budgetary provisions. This will be supported by similar efforts at the state level and local governments to increase overall public spending on malaria diagnosis and treatment and attain universal coverage of case detection and management. The potential funds required for malaria elimination can be financed through various sources at national and sub-national's levels with coordinated efforts as depicted in Figure 11 as under:

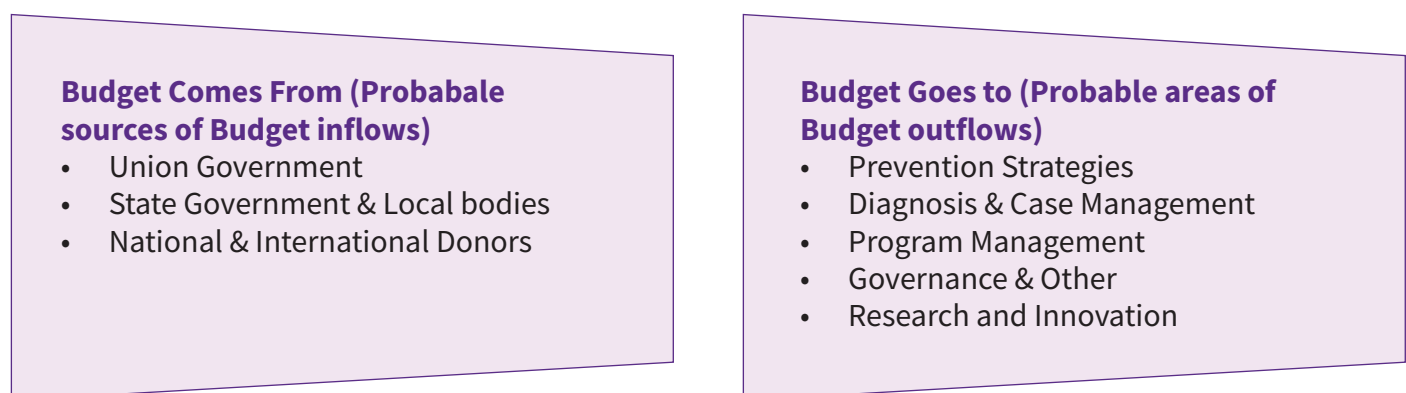


Figure 11: Overview of mapping expenditure with potential sources of financing in India

The above figure provides an overview of mapping expenditure with potential sources of financing in India. In addition to public funds provided by Union and state governments, additional resources may be explored from domestic donors through CSR activities as well as international funding agencies to support the NSP in achieving its desired goal.

The following measures will be taken to improve efficiency, transparency and accountability in resource management:

- i) Financial management information system to be implemented for real-time tracking of financial resources and effective financial planning.
- ii) Logistic and supply chain management system to be upgraded for real-time tracking of medicines, diagnostics, LLINs, and IRS at regional and sub-regional levels.
- iii) Regular review of the program by a team of technical professionals to include clinicians, administrators, program managers and health economist to ensure requisite funds are made available at different levels of service provisioning.
- iv) Capacity building of existing HR to improve the efficiency and effectiveness in program management.

Detailed budgeted activities are given below in Table 15.

Sl. No.	Activity Type	Includes	Amount As per current NSP (INR in Cr.)					Total (INR in Cr)
			2023-24	2024-25	2025-26	2026-27	2027-28	
			2023	2024	2025	2026	2027	
1	Prevention	LLINs & cost of insecticide for IRS	780.50	610.12	319.53	410.33	366.44	2486.91
2	Case management	Diagnosis and Treatment of Malaria cases including ASHA incentived	225.86	226.31	227.34	228.94	230.66	1,139.11
3	Programme-Specific Human Resources	Human Resource for Program upto Block Level	125.83	289.89	305.14	321.45	338.92	1,381.24
4	Training	Training of DMO/SPO, Lab Technician, Medical Officers, ASHA, Consultants, Entomologists, Private provider etc. on various aspects of disease management, financial management, IT, Logistic etc.	131.14	182.03	47.42	49.46	51.44	461.48
5	Transport and Supervision	Mobility support of program's staff at National, State, District and Block	56.75	59.02	61.44	64.02	66.77	307.99
6	Monitoring and Evaluation	Support to staff (State, Districts) for monitoring and supervisory visits, Maintainance cost of CSU, National Malaria Elimination Cell, stranegthening of infrastructure at RD offices	2.00	17.33	18.05	18.80	19.61	75.80
7	Communication, Media & Outreach	Development of communication strategy, mass media campaign development and implementation	12.74	12.74	12.74	12.74	12.74	63.69
8	Advocacy	Advocacy Meetings at National, States and Districts Level	20.03	20.83	21.68	22.59	23.56	108.69

9	Committee/ Task Force/ Advisory Group	National level advisory committee to be formed to provide technical inputs on program implementation meeting twice a year	0.12	0.12	0.13	0.13	0.14	0.63
10	Guidelines and SOPs	Development and publishing of various guidelines, manuals, treatment protocols related to Malaria	0.35	0.35	0.35	0.35	0.35	1.75
11	Reports and Policy Briefs	Publication of annual reports, fact sheets, policy briefs on regular interval.	0.10	0.10	0.10	0.10	0.10	0.50
12	Research & Survey	Research & Survey	3.50	10.00	10.00	5.00	3.00	31.50
13	Strengthening of Entomological Units	Provisioning of Binocular & Dissecting Microscopes, Entomological Kits, Mobility Support for field visits	18.81	13.18	13.72	14.30	14.91	74.91
14	District Malaria Elimination Verification	Cash Award of for District Malaria Elimination Verification	-	2.02	6.39	10.81	9.42	28.63
15	Strengthening of Microscopy Centre	Provisioning of Microscopes	17.40	26.09	26.09	17.40	-	86.98
TOTAL (INR in Cr.) =>			1,395.11	1,470.13	1,070.10	1,176.40	1,138.05	6,249.80

Table 15: Activity wise budget in NSP from FY 2023-27 (In Cr)

As per the previous NSP (2017-22) budget requisition was of Rs.10653.16 Crores, whereas in current NSP (2023-27) the amount of budget requisition has been reduced to Rs.6249.80 Crores, which implies to a gross reduction of 41% in total budget requisition in current NSP (2023-27) in compared to the previous NSP (2017-22). This is due to the preparation of the NSP budget more realistic and economical manner.

The activity group-wise change in the budget as compared to previous NSP is due to change in scale of some input interventions, inclusion and omission of some activities. The major reductions is in Human resource (72% reduction- In the previous NSP, one position of CDW was provisioned against vacant position of MPW. In this NSP this has been removed and also the positions have been considered more realistically based on experience gained in the previous NSP), Case Management (24% reduction attributable to decrease in cases and change in deployment strategy of drugs and diagnostics), Monitoring & Evaluation (82% reduction- In the previous NSP, budget was kept for development and maintenance of IT platform for real-time data reporting, purchase of IT hardware etc., this activity has not been included in the current NSP as IHIP is already being implemented, the procurement of IT equipment's at state/districts and below has not been kept in the NSP as this cost are covered under health systems). Further, there is also a scale up in budget for training. Also, some new activities have been included in current NSP as strengthening of entomological units, costs for districts malaria elimination certifications, strengthening of microscopy centers etc.

### 3.3.4 Promoting research and innovation for malaria elimination and prevention of re-establishment of malaria transmission

NSP has re-affirmed Research and Development as an important and ongoing activity for developing, testing and deploying new tools and strategies and guiding policy change if needed at the national, state, and district level towards malaria elimination. Key focus areas are regular Therapeutic efficacy studies (TES), quality assurance of RDTs, vector control and insecticide resistance studies, GIS mapping at periodic intervals. These studies would generate strategic information for policy makers to review the progress towards malaria elimination. R&D inputs will mainly address the specific programmatic needs for disease prevention, diagnosis, case management, and community engagement. Plasmodium vivax elimination, treatment seeking behavior and compliance to antimalarial medicines in remote and hard to reach areas including tribal populations, monitoring and evaluation and inclusion of private sector in programmatic malaria control operations. Additional needs for operational research (OR) will be identified throughout the implementation of this National Strategic Plan. The research activities will be carried out by ICMR, NCDC, medical colleges and universities in collaboration with SVBDCP. Operational studies that are relevant to the context of the States/ districts will also be supported, to ensure that states apply interventions which are well suited to the local circumstances. Implementation research is also to be expected to identify new tools and technologies.

There may be some gaps in the understanding of how gender disparities and barriers intersect to create gender-specific vulnerabilities to malaria morbidity and mortality, and how malaria control and elimination approaches can be designed to address those gender disparities and barriers. Given this, NSP 2023-2027 recommends research that aims to generate new data and address these vulnerabilities.

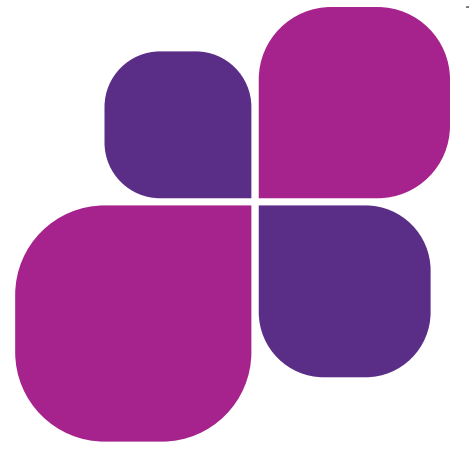
With the roll out of IHIP Malaria portal the national malaria elimination program will have robust real time data. Building on this available resource malaria forecasting and modeling studies may be undertaken. This would guide the program in situations of changing environmental conditions due to climate change and vector distribution patterns.

Priority areas of research are disease surveillance, diagnosis, treatment, vector biology and control. These researches will be done in collaboration with research institutes.

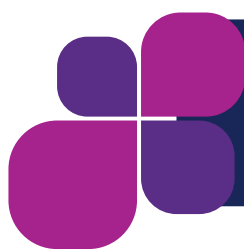
Other focus areas for research identified are:

- i) Elimination models for islands, isolated tribal areas
- ii) Costing studies - economic analysis of malaria elimination
- iii) Social benefits/impact of malaria elimination
- iv) Climate change: new malaria foci identification
- v) Local human migration and their surveillance
- vi) KAP studies in tribal and urban areas
- vii) Operational research on chemoprevention in high transmission setting

Repository of research works/papers published on malaria will also help to update the status. Most of the above-mentioned activities will begin simultaneously in the form of implementation/operational research and as short-term investigations on priority basis to support the goal of malaria elimination and prevention of re-establishment of transmission.



# Unit 4



## Monitoring and Evaluation

- 4.1 Output indicators
- 4.2 Outcome indicators
- 4.3 Impact indicators

The goal of monitoring and evaluation is to improve the effectiveness, efficiency, and equity of programmes. They are critical to achieving the goals of national programmes. Once the malaria situation in a country or area has been assessed, plans are made to ensure the most effective use of resources to either eliminate malaria or reduce its public health impact. As plans are implemented, they should be reviewed periodically to determine whether the programme activities are achieving the desired outcomes or whether they should be adjusted.

*Malaria surveillance, monitoring & evaluation: a reference manual 2018*

The objective of the Monitoring & Evaluation system is to track the execution of the National Strategic Plan for Malaria Elimination, 2023-27, to measure achievements against the targets within the proposed timelines and to identify the activities requiring additional support. The M&E system would allow the program managers at central, state, district and sub-district levels to identify the gaps in program implementation and facilitate evidence-based decision making for course correction.

Quality controls methods will be in place for data reporting. Capacity building of the staff for data analysis and interpretation will be ensured. In an effort to strengthen and sustain the practice of using data for decision-making, dynamic data repositories will be made at national and subnational levels.

Nodal officers will review the indicators monthly. Quarterly and annual reviews would also be undertaken before budgets are prepared, mid-term reviews would be conducted to assess interim progress, and a final programme review would be undertaken before the next strategic plan is developed.

District Vector Borne Diseases Control Officer (DVBDco)/District Malaria Officer DMO is the key person responsible to review indicators each week /month. Feedback on the status of selected key indicators is to be communicated to the CHC/PHCs weekly, monthly or quarterly, including private health facilities when possible.

- i) DVBDco/DMO in co-ordination with District Surveillance Unit would be engaged in data analysis, presentation and interpretation to improve their involvement, performance and programme capacity. Data would be summarized in ways that allow staff in CHC/ PHC/ Sub-center to readily assess their facilities' performance. Data would be presented on a dashboard, by ranking health facilities or by color-coding indicators according to their value.
- ii) DVBDco/DMO would ensure that the feedback would be given to District Health Officer, other district level program officers, and also the administrative heads of the districts like District Magistrate and CEO Zilla Panchayat.
- iii) IHIP would be the main tool for the management information system. To achieve real-time, error-free, convenient, and disaggregate reporting, IHIP Malaria module has been developed for real-

time reporting of Malaria cases, vector control measures, events reporting, outbreak investigation, malaria-specific reports, required administrative functionalities, and to monitor other related Malaria elimination activities.

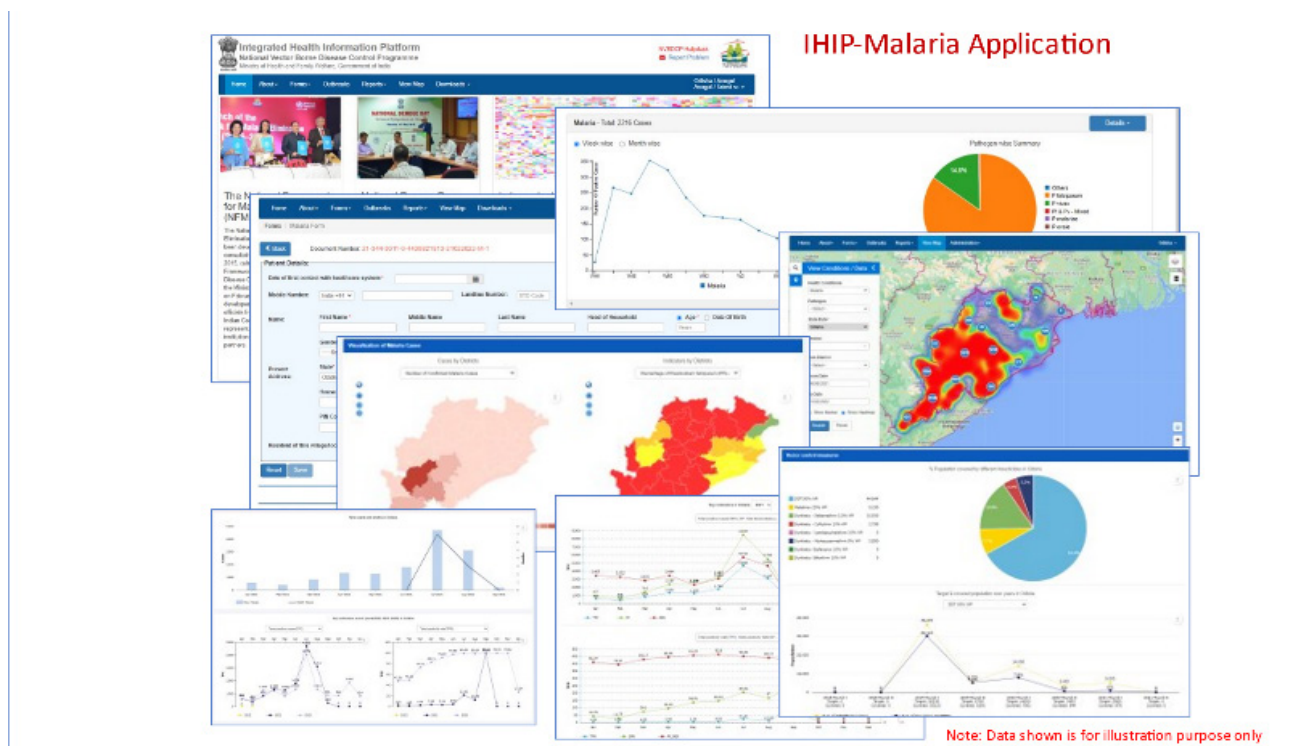


Figure 9: Snapshot of IHIP Malaria dashboard

Completeness, timeliness and reliability of the data collected by NCVBDC would be important for monitoring & evaluation of epidemiological trends, impact of intervention, and improving management and decision making. To support strengthening monitoring & evaluation, NCVBDC will update national monitoring & evaluation plan and review as necessary with the support of WHO country office. The TORs and SOPs/checklist for M&E teams at central, state, district and CHC levels would be updated to ensure quality monitoring of case management, vector control and surveillance activities. Malaria Elimination Assessment Tool (MEAT) would be adapted specific for the Country and aligned with WHO guidelines.

Mid-term corrections as well as modification in the resource allocation plan would be tailored with the findings of mid-term evaluations. The end line evaluation would be carried out preferably by independent agencies such as WHO, in order to ensure unbiased estimation of the progress of the programme against the objectives and would inform the policy about the necessary corrections. Important field level validation of routine data would be done by special surveys through Lot Quality Assurance Sampling (LQAS). Various indicators for M&E of the program are to be measured through routine reporting system or special surveys as per the program guidelines. Apart from the indicators mentioned below new indicators may be added as per the program need in the elimination setting.

## 4.1 Output indicators

- i) Percentage of reporting unit (public sector) submitting timely M4/IHIP and other prescribed reports according to NCVBDC guidelines.
- ii) Percentage of reporting unit (others including private sector) submitting timely M4/IHIP and other prescribed reports according to NCVBDC guidelines.
- iii) Percentage of foci fully investigated and responded as per NCVBDC guidelines (only in Category 1 districts).
- iv) Proportion of suspected malaria cases that receive a parasitological test at public sector health facilities.
- v) Proportion of suspected malaria cases that receive a parasitological test at private and other sector sites.
- vi) Percentage of malaria cases confirmed by parasitological diagnosis that received complete treatment as per national guidelines (public sector).
- vii) Percentage of malaria cases confirmed by parasitological diagnosis that received complete treatment as per national guidelines (private and other sector).
- viii) Percentage of health facilities reporting zero stock-outs as per stocking norms of the national guidelines.
- ix) Percentage of medical and paramedic staff trained/retrained as per national guidelines.
- x) Percentage of confirmed malaria cases fully investigated and classified (only in Category 1 districts).
- xi) Availability of full-time DVBDco and SPO in respective districts and states
- xii) Therapeutic efficacy study completed in each site every second year.
- xiii) Proportion of task force meetings held at national/ state/ district level for the malaria elimination agenda as per the national guidelines.
- xiv) Number of districts validated for sub-national elimination by independent body.
- xv) Number of LLINs distributed to targeted risk groups through mass campaign or through continuous distribution as per national guidelines.

## 4.2 Outcome indicators

- i) Incidence of malaria per 1000 population
- ii) Number of States and UTs reaching Category 0 Status
- iii) No. of districts with API <1
- iv) % IRS population coverage in each round in State
- v) No. of Districts verified as Malaria Free
- vi) Number of parasitological tests carried out per 100 persons (Blood Examination Rate, Monthly and Annually)

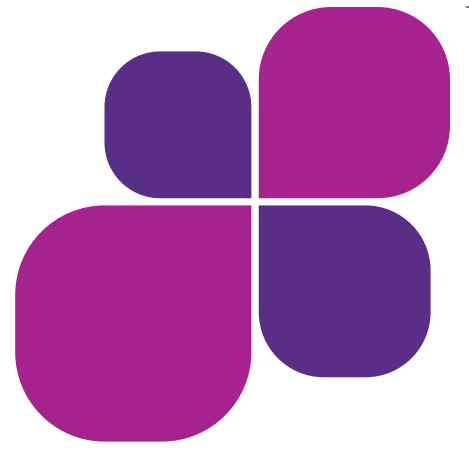
### Other outcome indicators

- i) Proportion of patients with suspected malaria who receive a parasitological test
- ii) Proportion of detected cases that contacted health services within 48 hours of symptoms
- iii) Proportion of suspected malaria who received parasitological test within 24 hours of onset of fever
- iv) Proportion of population aware of symptoms, causes, availability of diagnosis and treatment, and prevention modalities
- v) Proportion of pregnant women who slept under LLINs/insecticide-treated net the previous night
- vi) Proportion of under five children who slept under LLINs/ insecticide-treated net the previous night
- vii) Proportion of eligible population with access to LLINs/insecticide-treated net within their household
- viii) Proportion of eligible population that slept under LLINs/ITN the previous night
- ix) Proportion of eligible households sprayed by IRS within the last 6 months



### 4.3 Impact indicators

- i) Number of confirmed malaria cases per 1000 population per year (API)
- ii) Number of severe malaria cases per 100 confirmed malaria cases per year
- iii) Malaria Mortality Rate: number of malaria deaths per 100,000 persons per year
- iv) Percentage of districts reporting zero indigenous case out of all districts
- v) Number of districts moved from high burden category to lower burden category
- vi) Percentage of active foci liquidated in Category 1 districts
- vii) Test positivity rate (TPR)



# Unit 5



## Preparation for certification and verification of malaria elimination

- 5.1 National certification of malaria elimination
- 5.2 Activities for national verification and certification
- 5.3 Subnational verification of malaria elimination
- 5.4 Activities for sub-national verification

WHO certification of malaria elimination in a country requires proof that local transmission of all human malaria parasites has been interrupted, resulting in zero incidence of indigenous cases for at least the past three consecutive years. Measures to prevent re-establishment of transmission are required indefinitely until eradication is achieved

*A framework for malaria elimination, WHO*

Certification of malaria elimination is the official recognition by WHO of a country's malaria-free status. WHO grants this certification when a country has proven, beyond reasonable doubt, that the chain of local transmission of all human malaria parasites has been interrupted nationwide for at least the past 3 consecutive years, and that a fully functional surveillance and response system that can prevent re-establishment of indigenous transmission is in place.

It is the prerogative of national governments to decide to request certification of malaria elimination. National preparation for certification begins well before elimination is achieved to ensure that the essential documentation and records are available and organized to substantiate the country's claim of elimination. India is a big country having different endemicity, so sub national malaria certification/validation will be processed in a phased manner that will be aligned with WHO national certification process.

For the validation and certification for malaria elimination National Malaria Elimination Assessment Committee and State level Malaria Elimination independent committees will be formed.

### Key activities:

- i) Strengthen plan for verification and certification of malaria elimination at the National level.
- ii) Strengthen plan for verification of malaria elimination at Sub-National Level.
- iii) Awards for Malaria elimination at state and district level.
- iv) Criteria for sustaining zero indigenous malaria cases for next 2 years at districts and states level after achieving zero indigenous malaria cases for year 1.

## 5.1. National certification of malaria elimination

### Procedure to be followed for certification and validation:

- i) The country, after reporting zero indigenous malaria cases for at least the past three years through a sensitive and robust national surveillance system, can submit an official request for certification to WHO (Regional Director or GMP). The country should contact WHO about certification only when it believes it has eliminated all human malaria parasites within its borders.
- ii) The country, in consultation with the corresponding WHO regional office and the GMP, formulates a plan of action and timeline for the certification process. This takes place during an initial WHO assessment mission.
- iii) The country finalizes the required national elimination report and submits it to WHO.
- iv) Subset of Malaria Elimination Certification Panel (MECP) established by WHO reviews the national elimination report and other key documents, conducts field visits to verify its findings, and develops a final evaluation report.
- v) The full MECP reviews the report submitted by the subset of MECP and gives recommendation to WHO Malaria Policy Advisory Committee, after which WHO Director General would issue the certification.
- vi) Re-orientation of elimination programmes to prevent re-establishment after elimination has been achieved in order to maintain malaria-free status.

### 1. Documentation and preparation

Following documents for the Malaria Elimination Certification Panel to be prepared for submission to MECP by National program from the elimination database by the national government:

- i) National elimination report.
- ii) National malaria elimination strategic and operational plan.
- iii) Annual malaria programme report.
- iv) Plan of action for the prevention of re-establishment of malaria.
- v) Organizational structure of the malaria department and malaria activities in general health services.
- vi) Detailed budget and staff information, especially in key positions.
- vii) Training plan and training status of various health cadres.
- viii) Description of health facilities, their functions and activities in malaria surveillance, diagnostics and treatment.
- ix) Guidelines and standard operating procedures for malaria surveillance.
- x) All available annual malaria surveillance reports for at least 10 years, three years of which show zero indigenous cases.
- xi) Full information about malaria foci in the five years before the last indigenous case, with supporting maps (database of malaria focus investigations; focus register and analytical tables and maps).
- xii) National malaria case register with case investigation forms for at least the previous five years.
- xiii) Standard operating procedures for malaria diagnostics and participation in WHO assessment of malaria microscopy competence. Annual reports on performance of laboratory services for malaria diagnostics.
- xiv) Reports of quality-assurance activities for diagnosis, designation of a national reference laboratory and participation in an external quality assurance scheme.
- xv) National anti-malarial treatment policy.
- xvi) Annual report of entomological and vector control activities.
- xvii) Reports of independent committees on malaria (such as the Independent National Malaria Elimination Assessment Committee), the surveillance system and entomological and vector control activities.

- xviii) Recent published reports of studies on malaria epidemiology and malaria vectors.
- xix) Legislation or regulations related to malaria and vector control.
- xx) Reports of inter-sectoral collaboration.
- xxi) Reports of border coordination activities.
- xxii) Documentation of health education and community awareness-raising activities.
- xxiii) Reports of subnational elimination Verification/Validation.

The prerequisites for preventing re-establishment of malaria transmission are:

- i) An adequate system for early recognition and rapid response to malaria outbreaks/ epidemics.
- ii) Inter-country information-sharing and functional border coordination, where-ever relevant.
- iii) An efficient malaria surveillance system which may be integrated into systems for communicable diseases.
- iv) Effective mechanisms for cooperation among all ministries and agencies involved in malaria prevention.
- v) A high-quality system for entomological surveillance, including monitoring of resistance in malaria vectors to insecticides, especially in areas with high receptivity.
- vi) Strategies on prevention and early detection of imported malaria (for nationals travelling to or returning from malaria-endemic countries).
- vii) MECP members to identify the areas that are receptive to resumption of transmission, or likely to become receptive, identify areas vulnerable to parasitic importation and capture changes in vulnerability, and to take adequate measures to prevent reintroduction of transmission.
- viii) Strengthen plan for subnational verification of malaria elimination.

## **2. Report submission and review of report by MECP**

The final evaluation report is reviewed and finalized by the MECP and submitted to the WHO MPAC (Malaria Policy Advisory Committee) with a recommendation to certify malaria elimination or to postpone certification with details on the extra evidence required to demonstrate that malaria elimination has been achieved.

## **3. Granting malaria-free status**

The report is reviewed by all MECP members. The country will be asked to clarify any technical issues or respond to questions. After any further clarification or supplementary information, the MECP submits its final evaluation report to the WHO MPAC with a recommendation to certify malaria elimination or to postpone.

### **Follow up after WHO certification by the country**

Certification confirms to the international community that an entire country has an adequate system for preventing re-establishment of local malaria transmission. It also demonstrates an accomplishment made possible by the necessary political will and vision, the required legislative and regulatory framework, adequate financial and administrative resources, personnel and technological capacity. Reliable information on the global distribution of malaria is necessary to assess the risk of international travelers for exposure to malaria and the epidemiological risk of importation of malaria parasites into malaria-free areas that are receptive to transmission. Therefore, certified countries should continue to report to WHO annually on maintenance of their malaria-free status, providing information on reported malaria cases and their classification.

## 5.2 Subnational verification of malaria elimination

To encourage states and districts to achieve desired pace towards the elimination targets, NSP 2023-27 is proposing subnational malaria elimination verification. This has been done to recognize the achievements of the well performing State/ UT/ District and motivate the low performing State/ UT/ District to improve their performance and create healthy competitions to work towards malaria elimination. All districts under Category Zero have to be validated for malaria elimination. Before validation, these districts would be sensitized to strengthen surveillance. The burden of proof of zero cases is with State/ UT/ District to prove to the Independent National Malaria Elimination Assessment Committee.

### **Definition of malaria elimination status at State/ UT/ District level**

“Zero incidence of indigenous case in all urban and rural areas of a State/ UT/ District as a result of continued efforts in a previously/historically known malaria endemic area for all known human malaria parasites, as evidenced by the relevant data/records and maintenance of the status for three consecutive years.”

The assessment (subnational verification) will be done in the following five core areas:

- i) Programme capacity to deliver services: surveillance (epidemiological & entomological), diagnosis, case management, vector control and periodicity of reporting as per NCVBDC formats.
- ii) Adequacy of Human resource and their capacity.
- iii) Availability and utilization of funds for the activities for which it was released.
- iv) System in place for sustaining surveillance (ABER) and vector prevalence (seasonal trend), insecticide resistance monitoring, LLIN use and or quality IRS.
- v) Weightage will be given to each core area for assessment of the proposed claim for zero indigenous malaria case by the State/ UT/ District.

### **Procedure to be followed for sub national verification:**

The steps in subnational verification for States/UT:

- i) The State submits a request to the NCVBDC for subnational verification as per the approved protocol by NCVBDC.
- ii) The State/UT submits an elimination report and compiles all the supporting documents and records required.
- iii) Upon receiving the request, Independent National Malaria Elimination Assessment Committee (INMEAC) constituted by NCVBDC with the approval of MoHFW, will review the State/ UT/ Districts subnational elimination report and other documents and records and conducts field visits to verify the information. NCVBDC might invite international malaria experts to participate in subnational verification of states.
- iv) Independent National Malaria Elimination Assessment Committee (INMEAC) reports their findings to NCVBDC and recommendation about whether the area may be declared malaria-free, who in turn would forward with recommendation to MOHFW.
- v) MOHFW makes a final decision to grant malaria-free status to the State/UT.

### **The steps in subnational verification for districts:**

- i) The State level Independent Assessment Committee will review and verify the reports submitted by

- District VBD officer.
- ii) A set of criteria should be fulfilled in the desk review including drug sale data of Artesunate and Primaquine. Field verification to be conducted with the team constituted by the State if required.
  - iii) The verification report will be submitted to State/UT level.

### 5.3 Activities for sub-national verification:

#### 1. Capacity building for certification

Training at all levels is essential for awareness regarding dossier preparation and validation process. Initially the state teams including ROHFW would be trained by WHO and NCVBDC, who would in turn train the district teams. State level orientation would be done by WHO and NCVBDC and District level orientation by ROHFW and State.

#### 2. Application submission for Sub-National malaria elimination verification to NCVBDC

- a. The State level Independent Assessment Committee will review and verify the reports submitted by District VBD officer.
- b. A set of criteria should be fulfilled in the desk review including drug sale data of Artesunate and Primaquine. Field verification to be conducted with the team constituted by the State if required.

#### 3. Verification of Documents and Reports submitted for Sub-National elimination verification

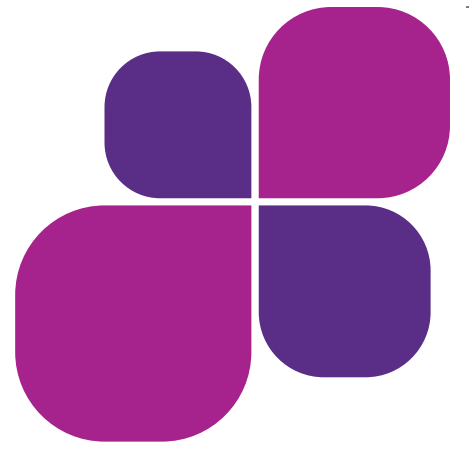
All the reports and documents will be verified by independent committees at State/UT and central level.

### Key activities after subnational verification:

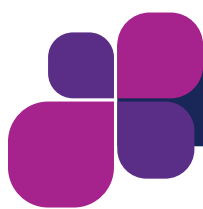
The States/ UT/ Districts certified malaria free, continue to maintain surveillance of disease and vector and vectors control measures to prevent re-establishment. During this period special attention is to be made for surveillance of migrants and international returnees/tourists, especially from high burden countries/states. An indication of reestablishment of malaria transmission in the State/ UT/ District is occurrence of three or more indigenous cases of the same species in the same foci for three continuous years.

In a vast country like India, where different States/UTs are in different phases of malaria elimination, to generate a sense of healthy competition among States/ Districts/ Blocks, GoI approved to incentivize and reward the well-performing states for achieving the target and to motivate states to prioritize and undertake the implementation of the programme.

Monetary awards & certificates have been instituted at all levels of implementation (State and District) for achieving malaria elimination, its sustenance and certification. Eligibility and awards for State and district has been approved by MoH&FW. These awards are being given during WMD events on 25 April every year.







# Annexures

## Annexure 1: Malaria in migrant population

### Introduction:

The developmental activities bring prosperity to an area, but it also results in flow of population or migration from malaria endemic areas which ultimately lead to introduction of transmission of malaria. Though malaria had shown significant reduction in many parts of the country, the elimination aims to achieve zero indigenous malaria in all segments of population and geographical areas. **Migrant malaria** is one of the ecosystems which contribute significantly to malaria outbreaks. In addition, natural calamities such as floods, heavy rains, drought with opening up of relief camps and other relief measures with temporary shelters for **migratory population** may be responsible for an outbreak/epidemic and disruption of operations. The occurrence of such outbreaks may be attributed to climatic changes conducive to vector propagation in and around such areas, lack of facilities for malaria surveillance and logistics which result in build-up of malaria cases without detection by the system. Further, the importation of malaria due to the arrival of migrants from a malarious area clubbed with increase in receptivity due to halted vector control measures may promote re-establishment of malaria transmission. In the absence of appropriate action, the area is likely to become malarious again.

Surveillance and vector control strategies pose a challenge in the context of elimination activities among mobile/migrant population settings. In pursuit to achieve malaria elimination, the issues of access for surveillance, treatment compliance, access and efficacy of vector control measures need to be addressed.

### Key activities:

#### 1. Enhanced surveillance and increased access to diagnosis and treatment.

- i) Health impact assessment (HIA) will have to be planned for all the projects to understand the quantum of migrants expected to arrive for the project. The HIA should be made mandatory.
- ii) At the local level, the Medical Officers/Block Development Officers of the primary health centres/ District VBD Control Officer need to keep track of new projects.
- iii) The subcentre MPWs or ASHAs should note and intimate regarding the migrants coming to their areas.
- iv) Implementation of interventions for prevention, effective screening of migrant/mobile population specially those coming from the endemic States/Districts or any case of fever of Malaria and management of malaria cases.
- v) Labour camps/night shelters would get special focus for periodical visit by DVBDI assisted by MPWs/ IC.

#### 2. Increased focus on IEC and SBCC activities

IEC and SBCC activities should be conducted in appropriate language to create awareness among the migrant population. Passive surveillance in the concerned health facilities will be strengthened to identify the migrant/mobile persons and give due priority to them. They should also be informed about where they can obtain quality treatment for malaria. Recording and reporting formats to be updated to capture

information on prevention and control activities and case management in these areas.

### **3. Integrated vector Management:**

Migratory population camps or areas need to be treated as high-risk areas to accord priority for vector control measures viz., IRS, LLINs and intensive antilarval activities.

### **4. Involvement of relevant stakeholder:**

- Active collaboration with labour department, irrigation department, housing and urban development etc., need to be ensured.
- Ensuring interstate/intercountry cross border consultation activities to strengthen and monitor the situation at State and National borders.

## **Annexure 2: Urban malaria**

### **Introduction:**

Till 1950s, malaria in urban areas was considered to be a marginal problem restricted to mega towns only, which, however, reported a rising trend by 1970s. The difference between rural and urban housing pattern and environment led to the concept of distinctive intervention strategies for tackling urban malaria mainly transmitted by *Anopheles stephensi*. Urban Malaria Scheme (UMS) was launched in 1971. At present, Urban Malaria Scheme is implemented in 131 towns in 19 States and Union Territories. Besides the diagnostics and treatment mainly through passive surveillance under UMS, the vector control is targeted through larval source management (LSM) in these towns.

It is estimated that by 2040, 50% of the country's population will be living in urban areas. The urbanization is related to a risk of malaria due to multiple factors such as migration of labourers from rural to urban, development without civic amenities, increased socioeconomic inequity, lack of efficient drainage system and large-scale construction activities. Malaria risk in urban settings is also based on the determinants of local transmission such as environmental factors, distribution of potential aquatic habitats, level of urbanization (urban, peri-urban, sub-urban), housing and infrastructure (slums and temporary settlements), climate and seasonality etc.

National Urban Health Mission (NUHM) envisages to meet health care needs of the urban population with accessibility to essential primary health care services and reducing their out-of-pocket expenses. NUHM has strengthened Urban CHC, PHC, district hospitals, health centres and health posts with deployment of a large number of health professionals. In urban areas, collaboration and partnership approach with the NUHM and NCVBDC is very crucial towards achieving malaria elimination.

NUHM should accord priority to the strategic approach of NSP and following are the action points:

- a) Developing linkage between the national, state and the local urban bodies need to be emphasized while framing government policy, planning and budgeting.
- b) Regular review of current anti-malaria activities.
- c) Monitoring of hot spots and mother foci need to be consistently done and such spots need to be considered during microplanning.
- d) Access to quality health care with early diagnosis and prompt treatment need to be ensured along with an effective surveillance, monitoring and evaluation system to detect malaria cases and differentiate them from other febrile illnesses.
- e) The control activities need to be tailor made for local area and be periodically evaluated for their impact against malaria vector(s).
- f) Targeted prevention of malaria in urban areas should include combination of environmental management, judicious use of recommended larvicides (chemical, biological and IGR) and effective

legislative measures.

- g) Coordination with the SPOs/ DMOs/ ULB for regular recording and reporting of cases, deaths and vector control activities. Achieve involvement of ULBs for IVM activities at the ward level.
- h) Training and capacity building of the health and other relevant workforce in ULBs and NUHM on Integrated Vector Management.
- i) Intersectoral collaboration among municipality's malaria control unit, State malaria programme, NCVBDC, other municipal departments including finance, planning, housing, sanitation, water supply, education, agriculture, animal husbandry, fisheries, non-governmental organizations, community-based organizations etc., need to be established and its regular meetings be ensured.
- j) Targeted SBCC by involving students, educational institutions, resident welfare associations (RWAs), CBOs/NGOs, and self-help groups etc. need to be implemented.
- k) Use of Modern Technologies like GIS mapping for health resources, cases, permanent breeding sites and use of mobile applications for real time reporting need to be promoted.
- l) Ward level Health and Sanitation Committee (Ward Malaria Samiti) and other institutions of NUHM need to be involved in implementation of all feasible malaria elimination activities.
- m) Nodal officer for malaria under NUHM at Center, State, District and municipal level need to be placed to ensure its implementation.

### Key activities:

1. Enhanced Surveillance and increased access to diagnosis and treatment.
  - a) Screening of suspected cases of Malaria for diagnosis, and those diagnosed positive- ensuring complete treatment and follow up.
  - b) Induction Training of urban ASHAs and orientation of LTs of Urban CHC/PHC/other health units in public, private and voluntary sectors must be ensured.
  - c) Regular sensitization of Mahila Arogya Samiti (MAS) workers and other health workforce
  - d) RDT to be used in all identified health units particularly in slums in addition to lab services.
  - e) Logistic support including required RDT, microscope and drugs must be ensured.
2. Integrated Vector Management to reduce malaria transmission risk: A need for mapping of malaria risk in urban settings is the first step to implement suitable vector control measures.
  - a. Inter-sectoral linkages need to be established for environmental management along with engineering methods for reduction in breeding potential of vectors by streaming flow of freshwater drains, building of "Cunetts" to take care of lean period and flood level flow.
  - b. Source reduction to control breeding by larvicide application in domestic and peri domestic areas need to be ensured as per weekly beat programme.
  - c. Use of larvivorous fish need in fixed, identifiable water-bodies to be emphasized through involvement of the community, and school children.
  - d. Appropriate biolarvicides/ larvicide/ IGR need to be used for larval control as per the guidelines of the program.
  - e. Monitoring of breeding foci and hot spots during the non-transmission season will be undertaken.
  - f. In peri urban and suburban areas, the control measures need to be targeted against more than one vector like combination of *An stephensi* and *An culicifacies*. Larval source management and need based focal spraying to be undertaken in these areas.
3. Adequate advocacy and public-private partnership is intended for enhancing awareness about malaria elimination and promote participation of community, NGO's and private sector.
  - a) The activities for enhancing awareness about malaria elimination, early case detection, prompt treatment and vector control through public-private partnership need to be implemented.
  - b) The roadmap on public-private partnership needs to be developed with flexibility in strategic

approach so that innovative methods may be used as tool for generating evidence. The roadmap should have a scope of considering the interest and capability of partners for various activities.

c) Suitable IEC activities in combination with effective SBCC to ensure community participation.

4. Effective implementation of legislative measures needs to be enforced for prevention of mosquito breeding. The salient points of such byelaws are given below:

a) Civic bylaws

- Domestic cisterns and all type of water storage tanks need to be covered with air-vent having wire mesh/ gauge to prevent breeding of mosquitoes.
- Peri-domestic waste management need to be proper so that waste/discarded containers in trash, used tyres, drums etc., do not get filled with water.
- Extra domestic habitats like solid waste storage in open lands should not be allowed.

b) Building bylaws

- Building plan should have a provision not to construct any such structure on the exterior of buildings which allows water accumulation and its sanction need to be based on its compliance.
- Clauses to be introduced in the contract for builders/ contractors to keep curing tanks and other water storage units free of mosquito breeding during construction phase and dismantling the same before issuance of occupancy certificate.
- Mosquito proofing need to be mandatory part of building byelaws.
- Access to the roof for checking overhead water tanks.

## Annexure 3: Forest malaria

### Introduction:

Up to ~21% of India's geographical area is covered by forest cover. The areas with large forest cover are ecologically more receptive to malaria. Forest and forest fringe regions are reported to be associated with high malaria burden and deaths. The presence of favorable factors like temperature, humidity, stagnant water in the forests make the ecosystems suitable for malaria vector breeding, leading to high transmission. The difficult terrain also presents a more challenging situation to the healthcare system in their efforts towards implementation of malaria elimination activities. To develop effective malaria elimination plans in such areas, it is essential to understand the attitudes and knowledge of local communities about malaria, vector, environment and accordingly generate awareness and demand for services.

It is imperative to control malaria in the forests and forest fringe areas to achieve malaria elimination goal by 2030. To address the challenges of malaria among forest dwellers, the targeted approach with intersectoral partnerships involving forest department and allocation of sufficient resources is essential. The Ministry of Environment, Forest and Climate Change (MoEFCC) is the nodal agency for environmental and forestry policies and programmes in India. The objective is to establish collaboration and coordination with the forest department and integrate environmental knowledge, data and evidence into decision-making for malaria elimination in order to complement the activities of National Strategic Plan for malaria elimination 2023-2027 with the supplemented efforts of MoEFCC.

### Key activities:

- i. Advocacy with the Ministry of Environment, Forest and Climate Change for Pooling of resources and prioritizing the malaria elimination activities in the forested area across the country.

- ii. The technical guidance and capacity building of all the relevant stakeholder for ensuring prevention and control of malaria situation in the forest areas.
- iii. Community Participation/Bottom Level Institutional Linkages: Two types of village level committees are existing under forest department. First one is Joint Forest Management Committee (JFMC) at a village or for cluster of villages situated adjacent to reserved forests (RF), registered with the Territorial Divisional Forest Office. The other one is Eco-development Committees (EDCs) formed around national parks, sanctuaries and tiger reserve areas. The members of these committees are forest resource dependent hence, forest department would act as a facilitator in mapping of inhabitations in and around the forest areas, raising awareness about the malaria symptoms, seeking complete treatment. Health check-up camps should be organized at regular intervals. Promotion of personal protection methods should be encouraged.
- iv. The JFMCs and EDCs would play an important proactive role in mass awareness and provide linkages between the health department and communities living in and around the forest areas through identified volunteers and name them as Malaria elimination Mitra.
- v. The joint plan between local Health Department and Forest Committees will support monitoring and evaluation of malaria elimination output in targeted areas of forests.
- vi. Health department would hold coordination meeting with the forest department at various administrative levels in the planning, implementation, monitoring and evaluation of activities
- vii. The sources in forests as well as in and around forests are wetlands, waterholes, backwater, mangroves, riparian and marshy areas, ponds, water accumulation around settlements etc., are mosquito breeding sites. The traditional knowledge of forest dwellers in effective control of mosquito breeding, prevention of malaria should be promoted to generate evidence as chemical spraying is strictly prohibited in such water sources used for drinking.
- viii. Health and Forest departments will mobilize resources to provide Bed Nets/LLINs to the community and promote its use through intensified SBCC activities.
- ix. The digital facilities and connectivity would be augmented in interior areas in co-partnership of health and forest departments. The synergy of digital resources would be utilized for malaria eradication as well as forest protection. Tele-medicine facility should be made available. Strengthening of IHIP malaria for near real time data monitoring and micro planning of malaria elimination activities

A structured intersectoral convergence for the implementation of the proposed joint action plan has been drawn up. Details are mentioned in Table 1:

<b>Table 1. Intersectoral convergence of Joint Action Plan for malaria elimination with Forest Department</b>			
	<b>Intersectoral Participants</b>	<b>Forum</b>	<b>Frequency</b>
Village level	VHSC/ASHA, forest guard and SHGs, NGO, CBOs/ other social welfare agencies	Community meeting through VHSC on VHN Days and home visits	Monthly
Sub-Centre	MTS/ANMs, forest guard, SHGs, NGO, CBOs	Community meeting through VHSC on VHN Days and home visits	Monthly
BPHC and CHC	MO-In charge/BDO/ Block VBD Officer/Range Forest Officer/ NGOs/ CBOs/ SHGs	Multisectoral Tehsil/ block meetings by BDO	Once in three months

District	Divisional Forest Officer/ District VBD Officer/ NGOs/ CBOs/ SHGs	District Task Force meetings Sensitization workshops Multisectoral Coordination meeting Program review meeting	Once in four months
State	Principal Chief Conservator of Forest/ State Program Officer (VBD)/ other key stakeholders and departments	State Task Force meeting Sensitization workshops Multisectoral Coordination meeting Program review meeting	Six monthly
National	Principal Secretary Forest/Director NCVBDC, State Social Development and BCC Consultants and other key stakeholders and departments	Program review meeting National Task Force meeting	Annually

The Joint Action Plan would strengthen and harmonize all relevant protocols on Malaria Elimination Plan.

- i) The departments of health and forest may seek to engage other stakeholders (e.g., Ministry of Tribal Affairs, social welfare) for input and advice to support the implementation of Joint Action Plan, as needed.
- ii) The implementation arrangements will be reviewed annually and revised periodically. External Evaluation will be synchronized during overall programme evaluation.
- iii) The Joint Action Plan ensures evidence-based implementation and updates will be disseminated to all stakeholders with evidence, data and knowledge generated.

In order to Strengthen governance structures under Joint Action Plan, health and forest department will provide support to the interrelated structures to strengthen accountability for and governance of Joint Action Plan. The structures proposed are mentioned below:

- i) **National Level:** The NCVBDC in the Ministry of Health and Family Welfare (MOHFW) and Forest department under Ministry of Environment, forest and climate change will be jointly responsible for the overall implementation of Joint Action Plan.
  - A National-level joint coordination committee will be established to work in a mission mode under the chairpersonship of Secretary (MOEFCC) and Secretary (MoHFW). It will provide technical & administrative guidance for efficient and effective implementation of Joint Action Plan. Director NCVBDC/ HOD Malaria will be the member secretary of the National level committee. The committee will meet on annual basis.
- ii) **State Level:** Similarly, the principal Secretary, Health and FW and the Principal Chief Conservator of Forest (PCCF) would be administratively responsible for coordination.
  - The Mission Director, NHM and PCCF will be jointly responsible for the program.
  - The state-level action plan will be developed according to the demographic needs of the particular state/district.
  - The plan will include all the necessary logistics for prevention and management of malaria.
  - The resources will be captured in the PIP and the forecasted budget of forest department.

- ii) **District Level:** The District Collector would be administratively responsible for coordination at district level.
- He/ She will form a Technical Committee with District VBD officer and Divisional Forest officer along representatives from all related sectors, including Panchayati Raj, Civil Society and other relevant departments.
  - The Committee will review the Programme quarterly.
  - The District Collector will ensure proper coordination amongst various sectors.

## Annexure 4: Tribal malaria elimination plan

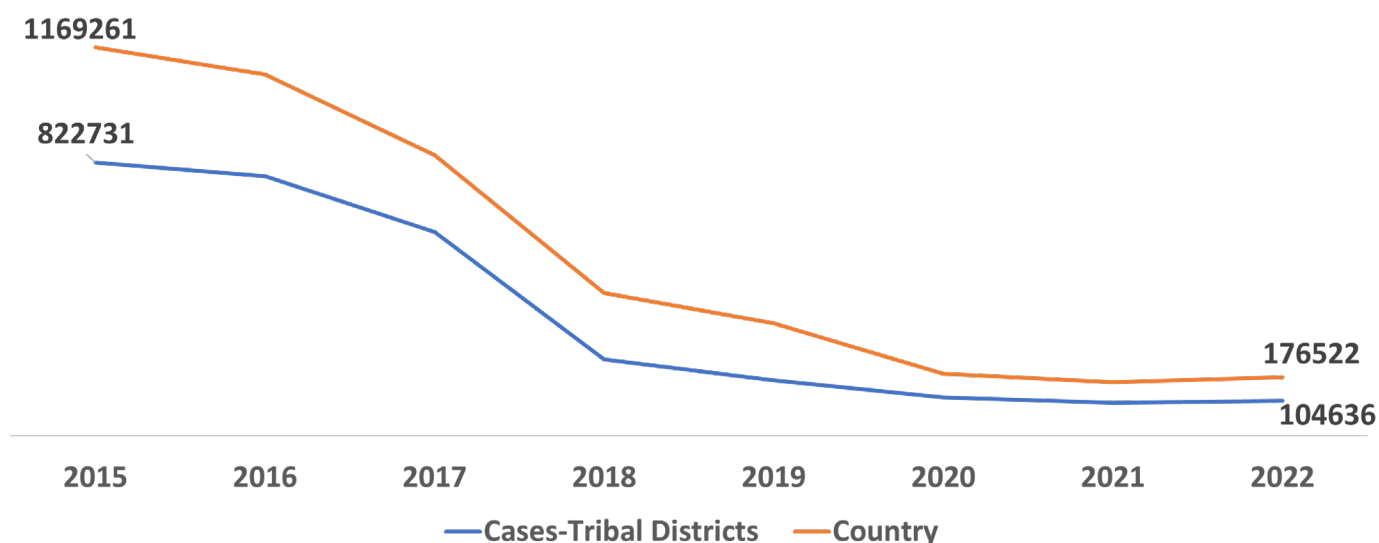
### Introduction

As tribal habitations are concentrated in remote, forest or hilly areas the Government has enhanced the facility by relaxing the norms for health care infrastructure. In many tribal areas, traditional panchayats and tribal Councils deal effectively with tribal issues. In addition to these traditional leadership systems, special legislation, the panchayat extension to Scheduled Areas Act, has introduced the modern system of panchayats to scheduled areas. The NRHM has enhanced the ability of local panchayats to address local needs and priorities to improve health by providing untied funds to Village Health and Sanitation Committees (VHSCs). Additional funds provided to the ANM, and local panchayats have been mandated to ensure optimal resource utilization. Consultations at various levels with such vulnerable communities during programme implementation have been visualized for community involvement in the healthcare.

In 2022, a total of 1,04,636 malaria cases were reported from 182 identified tribal districts which is 59% of the total malaria cases reported from the country (see Figure 1). In 2021 and 2020, a total of 99,397 and 1,15,763 malaria cases respectively were reported from the tribal districts

The malaria problem in these areas is due to multiple factors such as the presence of three or more efficient vectors, triple insecticide resistance in some areas and numerous breeding sites. Large sections of tribal population living in inaccessible terrains and have high degree of mobility, inadequate clothing, outdoor sleeping habits, forest-based economy, inadequate health seeking behaviour etc. Asymptomatic reservoir is also prevalent in such areas. The shortfall in trained manpower, supplies and transport further worsen these complexities.

**Figure 1: Malaria Cases 2015-2022, Tribal Districts vs Country**



Malaria control strategy in tribal areas is driven by several socio-economic factors that require a multi-sectoral response including participation of various line ministries, the key partner being Ministry of Tribal Affairs, with a convergent action to reach key populations. Therefore, Tribal malaria action plan need to be formulated. The important strategies under the plan will be as follows:

### **1. Surveillance:**

In tribal areas the population is scattered and the present norm for health infrastructure is generally inadequate for proper coverage. Hamlets are scattered and therefore, it is difficult for one ASHA to cover an entire village. In this regard, the following modalities would be adopted:

- i) Provision of hamlet- wise ASHAs instead of village- wise.
- ii) Wherever engagement of ASHAs is not possible, Anganwadi Workers of ICDS, faith healers, local medical/ health care providers, village headmen, PRIs or schoolteachers, SHG and Van Suraksha Samiti (VSS) Animators and forest guards deployed by Forest Dept. would be trained to identify a fever/suspected case of malaria and refer the cases to the appropriate HR.
- iii) In forest areas where accessibility of workers/volunteers is impeded due to elephants, the relevant workforce will be trained in diagnosis and appropriate referral for the malaria case.
- iv) Involvement of locally available, credible NGOs.
- v) Strengthening of PHCs with quality microscopy facilities & other necessary requirements).
- vi) Identification of serious cases and early referral to specialized health facilities.
- vii) Ensuring free transport services available under NRHM as well as provisioning traditional transport in areas inaccessible to motor road either through health systems like VHSC, PPP models or involvement of NGOs.
- viii) Provision of a patient card to all patients to record completion of treatment, adverse events and linking of new malaria episodes.
- ix) Screening of Migrants/labourers in the village or forest for providing radical treatment to positive cases and recording of the same.
- x) Use of technology for early communication of laboratory report to health providers, follow- up for treatment compliance, case- reporting by health providers including ASHAs to the health system.
- xi) Implementation of IHIP-malaria portal on priority basis.

### **2. Vector control strategy:**

- i) Advance stocking of required quantity of insecticides at the PHC level.
- ii) IRS planning in consultation with community and tribal leaders, village headmen etc. to ensure that IRS is done only when there is least possibility of mud plastering.
- iii) Community sensitization for enhancing acceptability and to keep the IRS effective for next three months by avoiding mud plastering.
- iv) Supply of LLINs to tribal areas with high malaria endemicity on priority basis and IEC for proper use.
- v) Promotion of the use of community- owned bed nets/ITNs till LLINs are supplied by the programme.
- vi) Organization of promotional activities by involving traditional healers, tribal councils, NGOs, CBO, School teachers, village guards and/ or volunteers for communicating intended benefits.
- vii) Provision of bed nets by contractors/owners of development projects to the labours on site, should be mandated.
- viii) Minor environmental engineering like cleaning/ de-silting of drainage, filling pits and ditches, solid waste management through Village Health, Sanitation and Nutrition Committee (VHSN&C) as well as MNREGA.
- ix) Verification of IRS and bed nets to be undertaken fortnightly by Village Health and Sanitation Committees.



### **3. Enforcing enactment of legislation in the industrial and mining area.**

#### **4. Supply chain management:**

- i) Supply of sufficient RDTs and ACTs based on previous usage with buffer.
- ii) Maintaining buffer stocks of RDTs and ACTs at the sub-centre level to ensure timely supply of RDTs and ACTs when stocks drop below the defined minimum level. In this regard, mobile phone technology could be an efficient and effective tool for rapid communication.
- iii) Timely supply of insecticides for complete coverage of villages by indoor residual spray (IRS) or long-lasting insecticide treated nets (LLINs) as per program guidelines.

#### **5. Mechanism for continuous monitoring of logistic stocks and replenishment through local supply chain nets by involving health workers, MTS and other staff.**

#### **6. Training of ASHAs, Health Workers and Health Providers, NGOs and Community workers:**

- i) Intensive training for all cadres of staff particularly ASHAs/ community volunteers or any other health provider to ensure accuracy in conduction of RDTs when used at different community settings and administration of correct doses of Antimalarials as per NVBDCP treatment policy.
- ii) The training will also cover preparation of quality blood smears so that health providers will be able to prepare blood smears (slides) whenever required.

#### **7. Community- specific IEC/BCC activities:**

Specific activities would be formulated and implemented for desired and sustainable results through the following means:

- i) Utilizing the weekly HAAT (market) for conducting IEC. That should be in local language and preferably by a member of the community.
- ii) Conducting IEC/ BCC activities during local festivals or VHNDs where other health care delivery personnel are also present.
- iii) Preparation of small skits/nukkad natak in local language during the local gathering or community meetings. These should be followed up by sensitization sessions conducted by local health workers.
- iv) Utilization of prevailing folk media for carrying out IEC/ BCC activities.

## **Annexure 5: Malaria in project area and border area**

### **Introduction:**

**Malaria in project areas:** The State health authorities should identify projects, namely, industry, irrigation, mines, power plants, construction or any development projects as well as those which have separate townships and make necessary recommendations on malaria control activities.

### **Key activities:**

- Screening would be done of all incoming labour as well as their families coming from malaria endemic areas entering the project area for malaria by performing RDT and taking blood smears.
- Prompt and effective treatment is to be given to all cases tested positive for malaria. Ensure a reliable epidemiological and entomological surveillance system in the area.
- Use of mosquito nets should be promoted and LSM should be done by environmental modifications and use of larvivorous fishes.
- Actual participation of communities should be ensured. Establish an epidemic preparedness and alert system.

**Malaria in border areas:** Border areas are difficult, hard to reach, forested and remote. Joint surveillance plans for border areas (districts) need to be developed to synchronize operations in disease management, vector control and public awareness campaigns.

**Key activities:**

- Screening of Migrant labours/ refugees/ individuals arriving from high-endemic areas across the borders.
- Real time information of cases should be exchanged between the bordering districts and there should be cross-notification of disease outbreaks.
- Epidemic preparedness and response should be strengthened in border areas. There should be collaboration in monitoring susceptibility of malaria vectors to various insecticides as well as drug-resistant parasites in border areas and in training activities.
- Regular meetings to be convened between the staff of border areas and health staff.
- Intercountry/ Interstate/ inter-district cross border consultation activities will be undertaken.

## **Annexure 6: Private health care sector engagement**

India's healthcare system is characterized by multiple systems of medicines, mixed ownership patterns and different kinds of delivery structures. Government health policies have encouraged private sector expansion in conjunction with the well-designed public health programmes.

### **Private health care sector in India**

The private health sector's plays an important role in providing malaria care in fighting the disease and maximizing treatment coverage. The diversity of the private health sector facilitates in reaching the maximum population. However, the private sector is fragmented and there is limited quality oversight and data reporting. Informal and not-for-profit providers are important for reaching low income and vulnerable groups with malaria care. However formal providers in comparison to informal providers can be better integrated into the health system and can more easily receive trainings on malaria treatment protocols. The not-for-profit health institutions in addition to health care provision, are also involved with the community for SBCC activities.

Private sector health care providers are important as they serve a vast majority of populations and many a times, they are more accessible to the vulnerable population. However, there are many constraints within the private health sector which includes lack of training, variable quality of care and limited dialogue between the public and private health sector. Private sector is not fully integrated into the disease reporting system. To achieve elimination of malaria by 2030, all malaria cases need to be reported including from the private sector. Malaria is a notifiable disease in 34 States and UTs, however compliance is not uniform across the country especially in reporting from the private health care sector. Hence to ensure appropriate treatment as per the national guidelines and strengthen surveillance the private sector engagement is critical for the malaria elimination efforts.

### **Key activities for private sector engagement:**

Following steps will be followed for leveraging private sector engagement for malaria:

**1. Landscaping** to understand the coverage and services provided by the private sector.

The following essential information should be included in landscape/mapping of private healthcare

provider:

- i. Type of Institution
- ii. Location: urban/ rural (preferably GPS coordinates)
- iii. Malaria services currently offered, including information on diagnostic tools used, treatment protocol followed, availability of referral services.
- iv. Functioning hours
- v. number and type of staff with educational qualification and contact information

Malaria program can leverage previous and ongoing investments in private sector engagement for other health areas, like IDSP- IHIP (this includes network of laboratories), NPSP, tuberculosis, reproductive health and other health program to assess opportunities to use information available from other health programs.

Central Bureau of Health Intelligence (CBHI) is the National Nodal agency for Health Intelligence in the Directorate General of Health Services (Dte.GHS), Ministry of Health & Family Welfare, and Government of India. CBHI has mapped all the health institutions both public and private up to the sub-district level. This mapping can be requested through proper channel within the government system

## **2. Orientation and Capacity building of the private sector**

Planning to engage public and private providers would include activities that aim to build dialogue with the private sector providers. Formal engagements like other government programs may be considered. Planning will include provisions of training including e-learning, supervising, and monitoring private providers to promote compliance with national guidelines for reporting, diagnosis, and treatment procedures again. Apart from case management the private sector can be leveraged as advocates for malaria elimination efforts including SBCC activities and vector management and provides support when there are challenges in the implementation of the programs.

Managing malaria cases by engaging private health care providers to expand access to and use of quality diagnosis and case management commodities and referral services. This is significant in contexts where private providers are accessible to and/or already utilized by communities at risk of malaria. Engaging private sector will ensure standardized treatment as per the national guidelines. Endeavor must be made to share the guidelines and updates with all the private health care providers ensuring the availability at the most peripheral areas. The Indian Medical Association, Association of Indian Laboratories and Indian pharmacist Association have State, District and Block Chapters that can be leveraged for wider dissemination of the all the National guidelines related to malaria.

## **3. Enhancing Surveillance through reporting from private sector**

Reporting all suspected cases through timely, accurate surveillance systems covering both private and public providers serving communities at risk. Mapped private health providers can be registered on the IHIP portal with access to data entry screens and dash boards as required. Inclusion of private health sector will facilitate integration of health data from public and private sector facilities under a single operating platform.

## Annexure 7: Salient feature of GTS strategy 2016-30

- i) **Pillar 1. Ensure access to malaria prevention, diagnosis and treatment as part of universal health coverage:** WHO recommends implementing two sets of interventions in a complementary way: (i) prevention strategies based on vector control, and, in certain settings and in some population groups, administration of chemoprevention; and (ii) diagnosis and prompt, effective treatment of malaria in public and private health facilities and at the community level in areas of moderate to high transmission to ensure that populations at risk have equitable access to the appropriate mix of interventions to prevent, diagnose and treat malaria, without financial hardship to reduce mortality and morbidity.
- ii) **Pillar 2. Accelerate efforts towards elimination and attainment of malaria-free status:** Countries need to intensify efforts to interrupt onward transmission of new infections in defined geographical areas, particularly in settings where transmission is low. In addition to prevention, diagnosis and treatment as part of UHC, attaining this objective will entail the targeting of both parasites and vectors in transmission foci, guided by active case detection and case investigations as part of a malaria surveillance and response programme. The development and adoption of innovative solutions will be essential to respond to the spread of insecticide resistance and residual transmission, and to target the hypnozoite reservoirs of *P. vivax*.
- iii) **Pillar 3. Transform malaria surveillance into a key intervention:** Strengthening malaria surveillance is fundamental to programme planning and implementation and is a crucial factor for accelerating progress. An efficient health management information system supporting the national malaria programmes is required to identify coverage gaps in the programme, detect outbreaks, and evaluate the effectiveness of interventions. At all levels of transmission, surveillance should trigger locally tailored packages of interventions and responses at relevant units of operation such as districts or communities. At very low levels of transmission, response may be linked to every detected infection.
- iv) **Supporting element 1: Harnessing innovation and expanding research:** In support of these three pillars, countries where malaria is endemic and the global malaria community should harness innovation and increasingly engage in basic, clinical and implementation research. Basic research is essential for better understanding of parasites and vectors, and for developing more effective diagnostics and medicines, improved and innovative vector control methods, and other interventions such as vaccines. Implementation research and research on the contextual vulnerability of the population will be fundamental to optimizing impact and cost-effectiveness and facilitating rapid uptake and high coverage in populations at risk. Working with countries and stakeholders to overcome market entry barriers for new tools will also be important to ensure an equitable distribution of resources
- v) **Supporting element 2. Strengthening the enabling environment for more sustainable and equitable results:** Strengthening the enabling environment for more sustainable and equitable results. Malaria interventions need to be embedded in, and supported through, a strong enabling environment that can ensure that efforts are expanded in an effective and sustainable manner. Central to success is accountable and trusted national leadership, committed to sustainable and equitable societies and well-functioning, resilient health systems supported by a gender-responsive, equity-oriented and human-rights based approach, with a focus on leaving no one behind. A high quality and integrated approach like political commitment, public private partnership (**Annexure 6.**), multisectoral coordination is important for reducing the burden of malaria. A holistic approach, anchored in the SDGs, is needed to optimally deliver malaria interventions and address the broader determinants of disease.

In line with the GTS, the India NSP is focused on the health-related Sustainable Development Goals (SDGs), national health goals, strategies and priorities. It is also focused on high-burden settings being able to demonstrate impact, with an intensified approach to reducing mortality while ensuring progress is on track to reach the GTS targets for reducing malaria cases. There would be packages of malaria interventions, optimally delivered through appropriate channels, including a strong foundation of primary health care. Some key focus areas would be to:

- i) Increase domestic financing
- ii) Ensure robust health sector response
- iii) Strengthen health workforce and malaria expert base
- iv) Ensure the sustainability of malaria responses
- v) Improve government stewardship and cross-border collaboration of malaria programmes
- vi) Strengthen multisectoral collaboration
- vii) Encourage private sector participation
- viii) Empower communities and engage with nongovernmental organizations

### Annexure 8: Malaria Epidemiological Parameters (2000-2021)

Year	B.S.E.	Cases	Pf Cases	PF%	ABER	API	SPR	AFI	SFR	Deaths
2000	8,67,90,375	20,31,790	10,47,218	51.54	8.94	2.09	2.34	1.08	1.21	932
2001	9,03,89,019	20,85,484	10,05,236	48.2	9.18	2.12	2.31	1.02	1.11	1,005
2002	9,16,17,725	18,41,229	8,97,446	48.74	9.04	1.82	2.01	0.89	0.98	973
2003	9,91,36,143	18,69,403	8,57,101	45.85	9.65	1.82	1.89	0.83	0.86	1,006
2004	9,71,11,526	19,15,363	8,90,152	46.47	9.33	1.84	1.97	0.86	0.92	949
2005	10,41,43,806	18,16,569	8,05,077	44.32	9.62	1.68	1.74	0.74	0.77	963
2006	10,67,25,851	17,85,129	8,40,360	47.08	9.95	1.66	1.67	0.78	0.79	1,707
2007	9,49,28,090	15,08,927	7,41,076	49.11	8.73	1.39	1.59	0.68	0.78	1,311
2008	9,73,16,158	15,26,210	7,75,523	50.81	8.69	1.36	1.57	0.69	0.80	1,055
2009	10,33,96,076	15,63,574	8,39,877	53.72	8.99	1.36	1.51	0.73	0.81	1,144
2010	10,86,79,429	15,99,986	8,34,364	52.15	9.31	1.37	1.47	0.71	0.77	1,018
2011	10,89,69,660	13,10,656	6,65,004	50.74	9.12	1.10	1.20	0.56	0.61	754
2012	10,90,44,798	10,67,824	5,33,695	49.98	9.00	0.88	0.98	0.44	0.49	519
2013	11,31,09,094	8,81,730	4,63,846	52.61	9.26	0.72	0.78	0.38	0.41	440
2014	12,40,66,331	11,02,205	7,22,546	65.55	10.05	0.89	0.89	0.59	0.58	562
2015	12,11,41,970	11,69,261	7,78,821	66.61	9.58	0.92	0.97	0.62	0.64	384
2016	12,49,33,348	10,87,285	7,11,502	65.44	9.74	0.85	0.87	0.55	0.57	331
2017	12,59,77,799	8,44,558	5,29,530	62.7	9.58	0.64	0.67	0.40	0.42	194
2018	12,44,75,724	4,29,928	2,07,198	48.19	9.31	0.32	0.35	0.15	0.17	96
2019	13,42,30,349	3,38,494	1,56,940	46.36	9.95	0.25	0.25	0.12	0.12	77
2020	9,71,77,024	1,86,532	1,19,088	63.84	7.08	0.14	0.19	0.09	0.12	93
2021	11,43,91,977	1,61,753	1,01,566	62.79	8.26	0.12	0.14	0.07	0.09	90
2022	15,20,82,807	1,76,522	98,306	57.26	10.89	0.13	0.12	0.07	0.07	83

## Annexure 9: Specific surveillance for districts in different categories based on endemicity

Classification	Criteria	Type of surveillance	Intervention Strategy
0	Districts/units reporting no indigenous cases	PCD  ACD-RACD need to be initiated after notification of malaria case in any area.  Case based and foci investigation.  Tracking of migrant population	Prevention of re-establishment
1	Districts having API <1 but more than zero	Elimination strategy	
1a.	API >0 but <0.1	PCD  ACD-RACD need to be initiated after notification of malaria case in any area.  Case based and foci investigation for	Accelerated intensified efforts for malaria elimination in next 2 years  Village wise stratification based on absolute number of cases and foci-based investigation and response
1b.	API between 0.1 to 0.5	ACD, PCD	Targeted interventions for high-risk areas (Blocks/ PHCs/sub centres/villages within districts)  Case and Foci based investigation and response
1c.	API between >0.5 to <1	ACD, PCD	Targeted interventions for high-risk areas (Blocks/ PHCs/sub centres/villages within districts)  Foci based investigation and response
2	Districts having API 1 and above but less than 2 per 1000 population	ACD, PCD	Pre-elimination phase  Universal coverage of malaria interventions as per the national guidelines.  Targeted interventions for high-risk areas (Blocks/ PHCs/sub centres/villages within districts)
3	Districts/units having API 2 and above per 1000 population	ACD, PCD	Intensified Control phase  Universal coverage of Intensified control interventions and HBHI approaches

## Annexure 10: Types of surveillance and interventions at health facilities

Type of Surveillance		Key Person involved	Activities
1. Passive Surveillance (in all categories of districts)	a. Routine	All the government or private health facilities	<ul style="list-style-type: none"> <li>To ensure that all suspected malaria case reported at Health Institutes, DH/ SDH/ CHC/ PHC/ HWC of rural and Urban are screened for Malaria.</li> <li>Involvement of Private Practitioners, Private labs, Private Hospitals and Medical Colleges</li> <li>Screening of all antenatal cases</li> <li>Involvement of blood banks for screening of malaria parasite.</li> </ul>
	b. Sentinel Surveillance	Identified nodal of-ficer of sentinel sites	<ul style="list-style-type: none"> <li>100% screening of all suspected cases of Malaria with confirmation of species at all sentinel sites</li> </ul>

2. Active Surveillance (in all districts)	a. Routine	MPWs/ ASHAs/CHOs	<ul style="list-style-type: none"> <li>Regular search of new cases at community level</li> </ul>
	b. Reactive Surveillance in low endemic areas (Whenever a confirmed case is reported in district or cross notification of case from other districts/ state)	MPW / ASHAs/ANMs, Malaria Inspector (MI)/VBD Control Inspector (VBDCI)/ CHO of village/ ur-ban area, MO of PHC /UPHC, DVBD Officer	<ul style="list-style-type: none"> <li>Investigation of Malaria case within 24 hours of reporting</li> <li>Initiation of treatment as per national guidelines dose</li> <li>Case History &amp; Investigation, Close Contacts tracing &amp; slide preparation/RDT</li> <li>Revisit on 3rd day, to verify any complication in case of Pf</li> <li>Revisit on 7th day to ensure the treatment compliance</li> <li>Revisit on 15th day to confirm the completion of treatment and slide preparation in PV cases Update the “treatment card” and forward the Case Investigation report immediately after completion of treatment</li> <li>Foci investigation and response within 7 days of reporting malaria case.</li> </ul>
		State/District Rapid Response Team SPO/VBD officer/MO, Epidemiologist, Microbiologist, Entomologist, Insect Collector, MI/ VBDCI, LTs, MPW	<ul style="list-style-type: none"> <li>Within 48 hours of reporting of case, visit of State/District RRT to Malaria case for</li> <li>Case Investigation and classification. Foci investigation and response plan-IVM within 7 days of reporting</li> <li>Epidemiological Surveillance Fever Survey in and around 50 households of the following: Residence of case</li> <li>Workplace of case i.e., office, factory, school</li> <li>Places of Travel by patients, as per history of last 1 month</li> <li>Micro-plan of district for Surveillance till foci becomes inactive</li> </ul>
a. Proactive Surveillance (category 2,3 and in specific situations especially remote and inaccessible areas with limited or suboptimal accessibility to health care services, mobile migrant population).	SPOs/DMOs/VBD officer, MPWs of ULB in urban areas, LTs, MPWs /CHOs/ASHAs	<ul style="list-style-type: none"> <li>Mass Fever Survey of all the vulnerable areas before and after the transmission season,</li> <li>Treatment should be completed for all diagnosed cases during the survey and should be reported to the center.</li> <li>IVM activities should be simultaneously performed.</li> </ul>	



## **Annexure 11: List of decentralized diagnostics, drugs and insecticides for malaria**

1. Chloroquine Tabs 250 Mg
2. Primaquine Tabs 2.5 Mg
3. Primaquine Tabs 7.5 Mg
4. Quinine Sulphate Tabs 300mg
5. Quinine Injections 2ml (300mg per ml)
6. Artemisinin Combination Therapy (ACT) all age groups: procured both at Center and State
7. Bivalent Rapid Diagnostics Kit (RDKit) for Malaria: procured both at Center and State
8. Consumables like Slides, Lancets, Swabs, Reagents etc. for Microscopy.
9. Insecticides other than DDT (as and when recommended by NCVBDC).
10. Temephos (KL), Pyrethrum Extract 2% (KL), Bti (wp)/ Bti (AS) in MTs.

Note: The updated list of decentralized along with relevant office order may be referred to at NCVBDC, which is updated from time to time.

## Annexure 12: SBCC activities

SBCC Strategy																	
Low Transmission Phase (Jan-April)				High Transmission Phase (May - August)				Intermediate Phase (Sept-Dec)									
Activities	who will do	Jan	Feb	March	April	Activities	Who will Do	May	June	July	August	Activities	Who will do	Sept	Oct	Nov	Dec
Panel discussion/ Talk show on DD and AIR on World Malaria Day	State					Campaign planning for pre-monsoon season in coordination with line department.	State & District					State and district Task Force Meeting ( Quarterly) To review progress made towards joint action plan and way forward	State and dis-districts				
Multi Stakeholder meeting to identify communication issues and needs ( Dec)						Maximize coverage through newspaper Advertisement, article and interviews	State					Mapping of Malaria Prone areas in consultation with Tribal and forest departments	District /Block				
Development of Various communication materials( Print, electronic and social) (Dec-Jan)	State & District					Panel discussion/ Talk show on DD and AIR on Anti Malaria month and Mosquito day	State level					Engagement with medical colleges/ institutions	State and dis-districts				
Pre-testing of materials in the field (Feb)	Block & village					Broadcast and Telecast of AV spot/jingles in DD ,AIR and regional local channels	State & District					Orientation and sensitizations workshops and meeting	District /Block				
Finalize the IEC materials based on field testing (March)	State & District					Wall Writing /painting	State & District					Advocacy meeting with VHSNC	Village				
Dissemination of Communication materials at field level	State					Hoardings and banners display at various key locations.	State & District					Social Mobilization through Malaria Mela/Miking/Haat/ Festivals	State and dis-districts				
State Task Force Meeting with Line Departments for Strengthening coordination with the department for better optimization of resources (HR) and developing joint action plan .	State					Various school level activities such as quiz competition ,poster making, pledge etc.	Districts to village					Various community level activities with support of multiple stakeholder such as cleanliness drives, Rallies, Plogging drive	District /Block				
Media Sensitization workshop	State					Various community level activities with support of multiple stakeholder such as cleanliness drives, Rallies, Plogging drive	Districts to village					On-site sample collection and provision of treatment through mobile outreach services functional under MoTA scheme	District /Block				
						Wide dissemination of social media messages	State					community engagement through IPC and FGD with Panchayat leader, community members, youth groups, SHGs, CBOs, pregnant and lactating mothers and children etc.	Village				



## Annexure 13: Expert Group for the Development of NSP 2023-27

### Core group to develop NSP

1. Shri Rajesh Bhushan, Former Secretary (Health), MoHFW, GoI
2. Shri Sudhansh Pant, Secretary(Health), MoHFW, GoI
3. Dr. Atul Goel, DGHS, MoHFW, GoI
4. Ms. Roli Singh, Additional Secretary, MoHFW, GoI
5. Ms. L. S. Changsan, Additional Secretary & Mission Director (NHM), MoHFW, GoI
6. Mr. Rajiv Manjhi, Joint Secretary, MoHFW, GoI
7. Dr. Tanu Jain, Director, NCVBDC
8. Dr. Roop Kumari, NPO, Malaria & VBDs, WHO India
9. Dr. C. S. Aggarwal, Advisor, NCVBDC
10. Dr. Rinku Sharma, Joint Director, NCVBDC
11. Dr. Vinod Chaudhary, Medical Officer, NCVBDC
12. Ms. Jyoti Nagarkoti, Assistant Director, NCVBDC
13. Dr. Ravi Kumar K, Lead Consultant, WHO

### NCVBDC and Other Ministries/ Institutes

1. Dr. Vinitha Srivastava, Advisor - Health Cell, MoTA, GoI
2. Dr. Kalpana Baruah, Sr. Consultant, Ex. Additional Director, NCVBDC
3. Dr. L A Singh, Regional Director, Imphal
4. Dr. Nirmal Joe, Regional Director RD, Tamil Nādu
5. Dr. Amarjeet Kaur, Regional Director, Chandigarh
6. Dr. Amol R Patil, Regional Director, Gujarat
7. Dr. Nilam Somalkar, Regional Director, Odisha
8. Dr. Sushil Kumar Vimal, Deputy Commissioner, NUHM
9. Dr. Neelima Mishra, Scientist G, NIMR (ICMR)
10. Dr. Himmat Singh, Scientist E, NIMR
11. Dr. Sagar Borkar, Asst Professor, RML
12. Dr. Kuldeep Singh, Specialist, LHMC & Asst. Hospitals
13. Mr. Pavan Kumar, Retd IFS Officer

### Other Independent Experts

1. Dr. Subash Salunke, Ex DGHS, Maharashtra
2. Dr. A P Dash, Vice Chancellor AIPH University, Bhubaneswar
3. Dr. Neeraj Dhingra, Ex-Director, NCVBDC
4. Dr. Neena Valecha, Ex Regional Advisor, WHO-SEARO
5. Dr. Suman Wattal, Ex-Joint Director, NCVBDC
6. Dr. Shampa Nag, Independent Expert
7. Dr. S N Sharma, Ex-Joint Director, NCDC
8. Dr. R S Sharma, Ex-Additional Director, NCDC
9. Dr. Ashok Rawat, Additional Municipal Health Officer
10. Dr. Harsh Rajvanshi, Associate Director, APLMA
11. Dr. B K Tyagi, Ex-Director (Scientist G), CMRE (ICMR), Madurai
12. Dr. Amol Patil, BMGF

## WHO

1. Dr. Polin Chan, Team Lead, Communicable Diseases, WCO
2. Dr. Pavana Murthy, NPO (High Threat Pathogens), WCO
3. Ms. Sophia Lonappan, NPO (Public Health & Risk Communication), WCO
4. Dr. Naveen Agarwal, Data and ICT Associate, WCO
5. Dr. Jayanti Singh, National Consultant (Malaria IHIP), WCO
6. Dr. Aditi Sajwan, Malaria Officer, WCO
7. Dr. P K Srivastava, WHO Consultant
8. Dr. Anju Viswan, WHO Consultant

## State Program Officers/State Officials

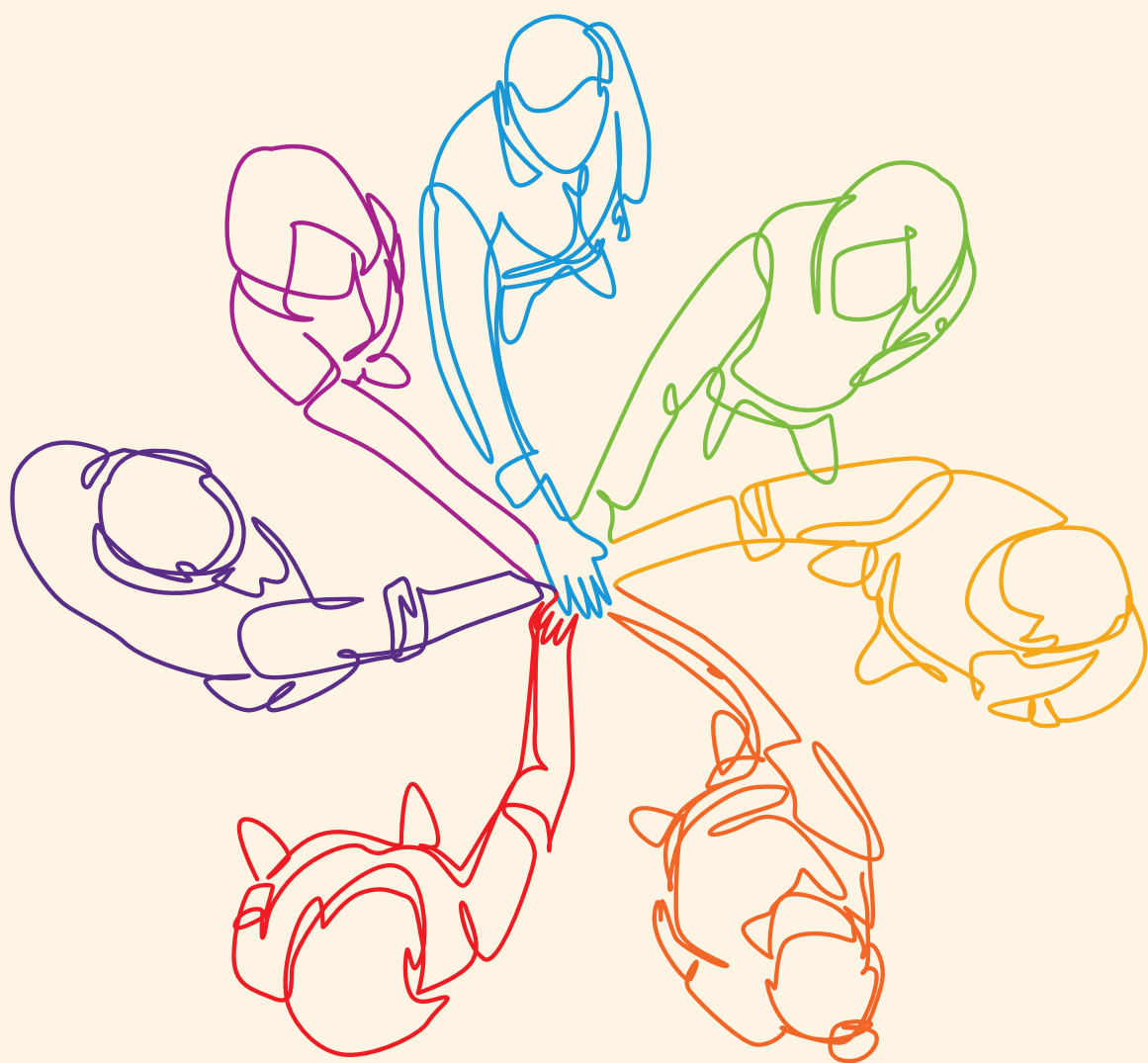
1. Dr. Lalrinfela, Senior Medical Officer, Mizoram
2. Dr. Mahamood Sharif, Deputy Director & SPO, Karnataka
3. Dr. Himanshu Jayswar, SPO, Madhya Pradesh
4. Dr. Gagandeep Kaur, Assistant Director, Punjab
5. Dr. Rakesh Sahni, Deputy Director, Haryana
6. Mr. Sasi M S, Assistant Director (Entomology), Kerala
7. Dr. Mamta Dattani, State Entomologist, Gujarat

## NCVBDC CONSULTANTS

1. Dr. Shikhar Chaudhary, National Consultant M&E, NCVBDC
2. Dr. Pallika Singh, National Consultant M&E, NCVBDC
3. Mr. Devis Saha, National Consultant M&E, NCVBDC
4. Dr. Sweta Bhan, National Consultant Entomology, NCVBDC
5. Mr. Shailender Kumar, National Consultant Procurement, NCVBDC
6. Mr. Samrat Banerjee, National Consultant Finance, NCVBDC
7. Dr. Meenakshi Singh Raghuvanshi, NCVBDC
8. Ms. Jasmin Shah, NCVBDC
9. Ms. Manisha Wadhwa, Senior Programme Officer, Malaria Surveillance, CHAI







National Centre for Vector Borne Disease Control  
Dte.GHS, MoH&FW, Government of India  
22, Sham Nath Marg, Delhi – 110054  
[www.nvbdc.gov.in](http://www.nvbdc.gov.in)