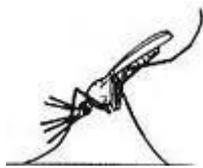




# **PUNJAB MALARIA ELIMINATION CAMPAIGN (PMEC) 2017-2021**

***Action Plan & Road Map for Malaria  
Elimination in Punjab, India***



**DEPARTMENT OF HEALTH AND  
FAMILY WELFARE, PUNJAB**

## BACKGROUND

There have been profound changes in the incidence of malaria since the beginning of the millennium – the risk of acquiring malaria has been reduced by 37% since 2000 and the risk of deaths has decreased by 60%. Many countries are moving towards eliminating malaria, and zero indigenous cases were reported from the WHO European Region for the first time since record keeping began. The incidence rate of malaria, which takes into account population growth, is estimated to have decreased by 37% globally between 2000 and 2015; in the same period, the estimated malaria mortality rate decreased by 60%. In addition, substantial progress has been made towards the World Health Assembly target to reduce the malaria burden by 75% by 2015, and the RBM target to reduce deaths to near zero. Reductions in the incidence of malaria cases are estimated to have been greatest in the WHO European Region (100%), followed by the WHO Region of the Americas (78%), the WHO Eastern Mediterranean Region (70%) and the WHO Western Pacific Region (65%). The malaria mortality rate is estimated to have declined by 66% in the WHO African Region between 2000 and 2013. The World Malaria Report 2015 has shown that more than 80% cases of *P.vivax* are reported from 3 countries including India<sup>(2)</sup>.

From the beginning of the 21st century, India has demonstrated significant achievements in malaria control with a progressive decline in total cases and deaths. Overall, malaria cases have consistently declined from 2 million in 2001 to 0.88 million in 2013, although an increase to 1.13 million cases occurred in 2014 due to focal outbreaks. The incidence of malaria in the country therefore was 0.08% in a population of nearly 1.25 billion. In 2015, 1.13 million cases (provisional) were also reported. It is worthwhile to note that confirmed deaths due to malaria have also declined from 1005 in 2001 to 562 in 2014. In 2015, the reported number of deaths has further declined to 287 (provisional). Overall, in the last 10 years, total malaria cases declined by 42%, from 1.92 million in 2004 to 1.1 million in 2014, combined with a 40.8% decline in malaria related deaths from 949 to 562.). India contributes 70% of malaria cases and 69% of malaria deaths in the South-East Asia Region. However, a WHO projection showed an impact in terms of a

decrease of 50–75% in the number of malaria cases by 2015 in India (relative to 2000 baseline), which showed that the country has been on track to decrease case incidence 2000–2015<sup>(3)</sup>

Malaria interventions are highly cost-effective and demonstrate one of the highest returns on investment in public health. In countries where the disease is endemic, efforts to reduce and eliminate malaria are increasingly viewed as high-impact strategic investments that generate significant returns for public health, help to alleviate poverty, improve equity and contribute to overall development. The world has reached a critical juncture in the fight against malaria. There is both an opportunity and an urgent need to accelerate progress by reducing morbidity and mortality in all countries, by increasing the number of malaria-free countries, territories and areas, and by identifying approaches that aim to reduce transmission. Progress can be hastened through a major expansion of existing interventions, by making the response to malaria a higher technical, financial and political priority, and by ensuring that the development and use of new tools and solutions are maximized. As programmes approach elimination or work to prevent re-establishment of transmission, all cases of malaria infection need to be detected and managed by general health services, both public and private, and reported as a notifiable disease to a national malaria registry. Patients diagnosed with malaria must be treated promptly with effective antimalarials in order to avoid preventable deaths and to decrease the probability of onward transmission in the community. In addition, entomological surveillance systems should be maintained so that appropriate vector control interventions can be introduced or modified as necessary<sup>(4)</sup>

**Table 1 Classification of States/ UTs based on API (2014)**

S.No.	Category	Definition	States/ UTs
1	<b>Category 0</b> (Prevention of re-establishment phase)	States/ UTs with zero indigenous cases of Malaria	
2	<b>Category 1</b> (Elimination phase)	States/ UTs (15) including their districts reporting an API of less than 1 case per 1000 population at risk	Chandigarh, Daman & Diu, Delhi, Goa, Haryana, HP, J &K, Kerala, Lakshadweep, Manipur, Puducherry, Punjab, Sikkim, Uttrakhand
3	<b>Category 2</b> (Pre-elimination Phase)	States/ UTS (11) with an API less than 1 case per 1000 population at risk, but some of the districts are reporting an API of 1 case per 1000 population at risk or above	Andhra Pradesh, Assam, Bihar, Gujarat, Karnataka, Maharashtra, Nagaland, TN, Telangana, UP, WB
4	<b>Category 3</b> (Intensified Control Phase)	States/UTs (10) with an API of 1 case per 1000 population at risk or above	Andaman & Nicobar Islands, Arunachal Pradesh, Chhatisgarh, Dadra & Nagar Haveli, Jharkhand, MP, Meghalya, Mizoram, Odisha, Tripura

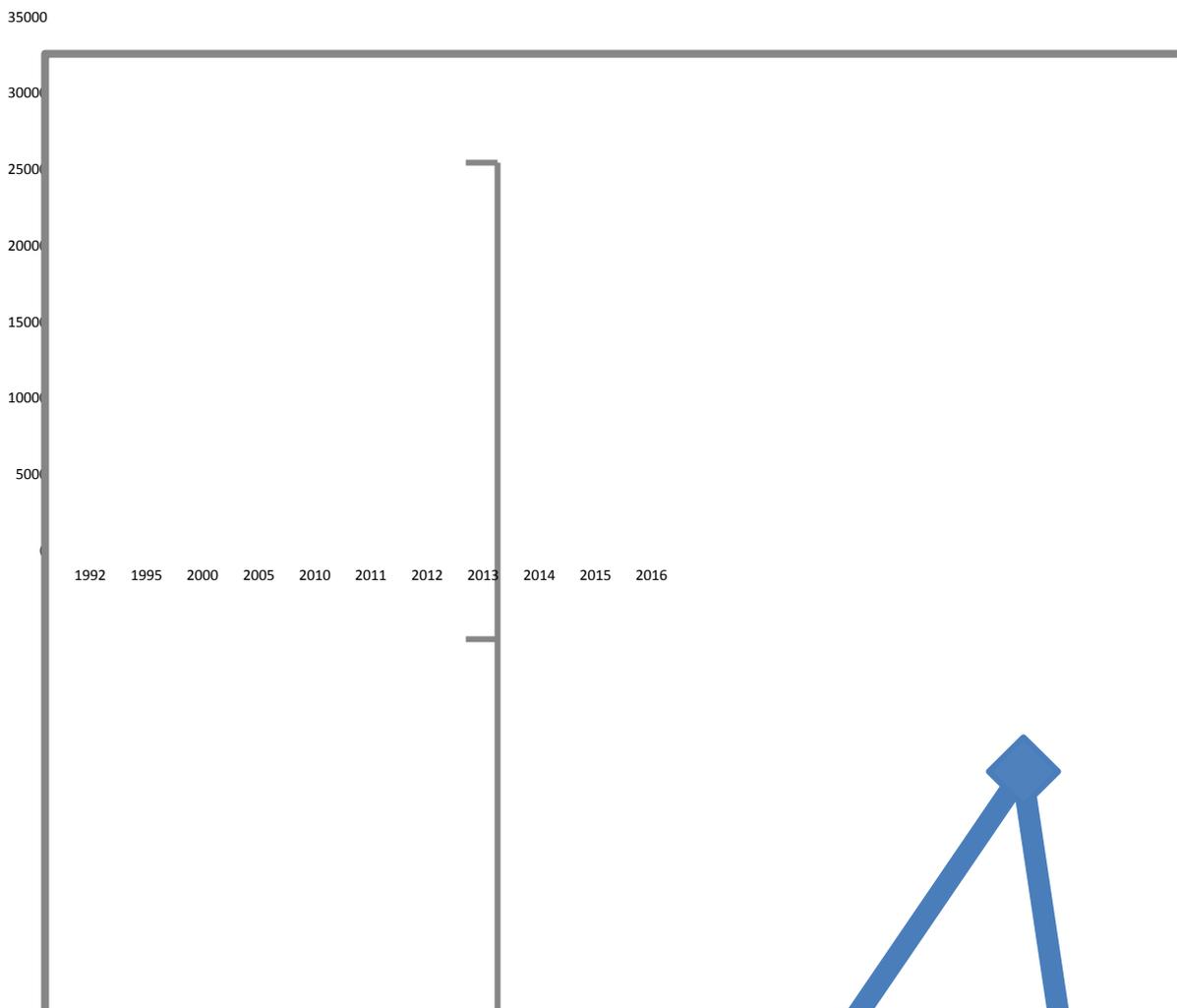
Adapted from NFME document, Dte NVBDCP, New Delhi

In line with Global Technical Strategy (2016-2030), India is confident to embark upon a paradigm shift from control to elimination of malaria. India has launched the National Framework for Malaria Elimination (NFME) 2016-2030 on 11<sup>th</sup> Feb. 2016. NFME has clearly defined goals, objectives, strategies, targets and timelines for malaria elimination in the country. By the end of 2016, all States/UTs are expected to include malaria elimination in their broader health policies and planning framework; and by end of 2020, 15 States/UTs under category 1 (elimination phase) are expected to interrupt transmission of malaria and achieve zero indigenous cases and deaths due to malaria.

## MALARIA SITUATION IN PUNJAB:

Malaria is very ancient vector borne disease transmitted by Anopheles mosquito. The State of Punjab has history of high number of cases of malaria although proportion of falciparum malaria has been less and the case fatality rate due to malaria has been insignificant.

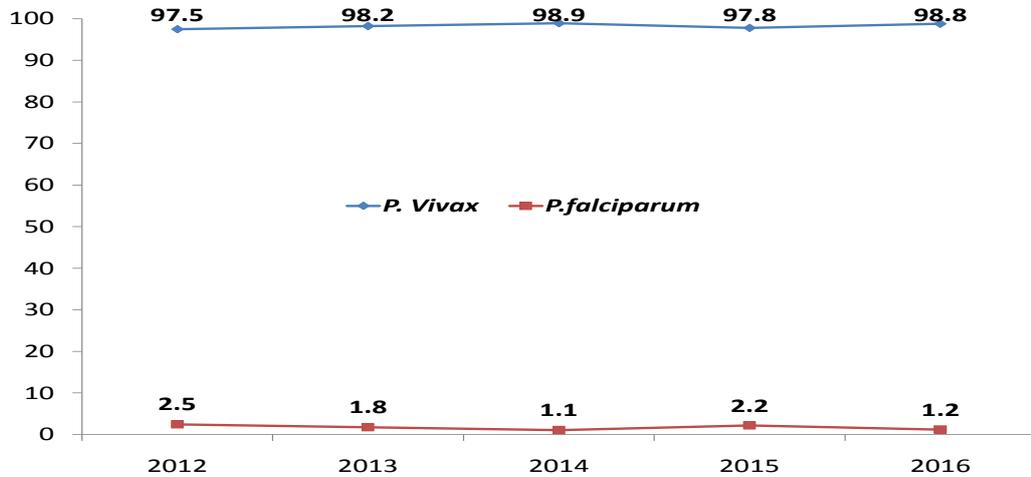
**Graph 1: Year wise total malaria positive cases in Punjab**



Source: Epidemiological data NVBDCP, Punjab

The State of Punjab has seen a decline in the number of total malaria cases since 2010 and the decline has been witnessed in all the districts of the State. Taking 2015 as base year, the state of Punjab has witnessed a decline of total malaria cases of 42% since 2014 and approximately 82% since 2010.

**Graph 2: Incidence of different types of Malaria**

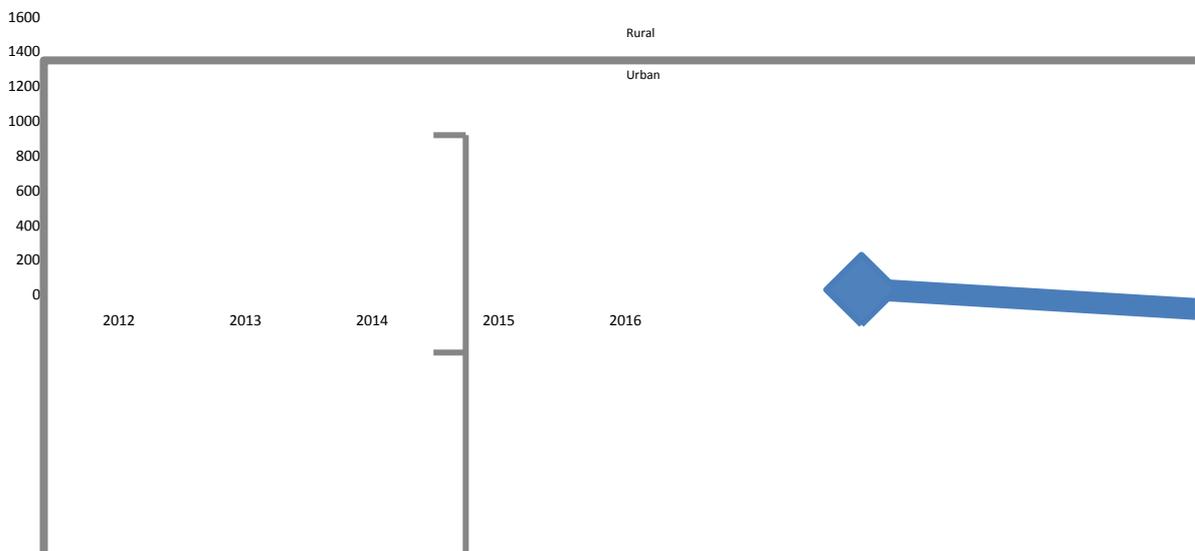


Source: Epidemiological data NVBDCP, Punjab

P. vivax malaria constitutes the major proportion of the total cases of malaria in the State. Approximately 97% - 99% cases out of the total cases are due to P.vivax and remaining due to P. falciparum.

Majority of the malaria cases are reported from the rural areas of the State. With integrated vector management like IRS and LLINs in the rural areas, the cases of malaria have shown a sharp decline in the rural areas in last few years.

**Graph 3: Malaria cases in urban and rural areas**



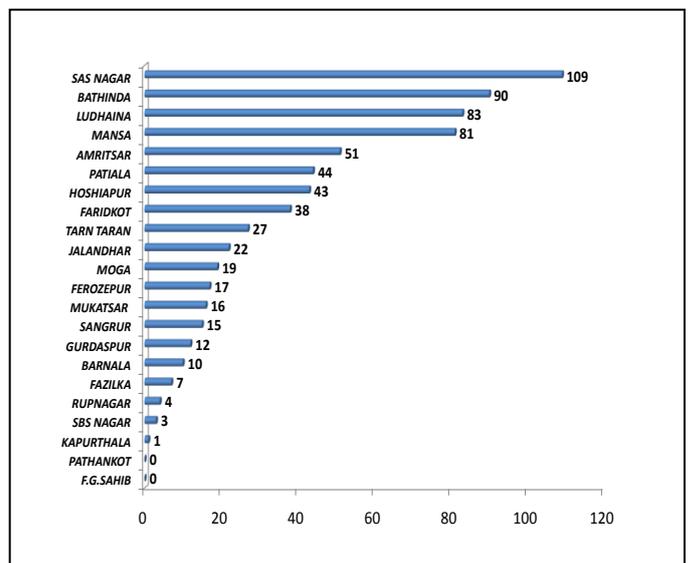
Source: Epidemiological data NVBDCP, Punjab

The epidemiological data of the State over the years shows that there has been a sharp decline of Malaria in the rural areas while the Malaria cases in urban areas are static.

As per NFME (National Framework for Malaria Elimination), API (Annual parasite Incidence) has to be taken as a yardstick for measuring the progress towards malaria elimination. The State of Punjab has seen a decline in number of areas falling in high API over the years thus paving the way for malaria elimination.

**Graph 4: District wise Malaria 2016 in Punjab**

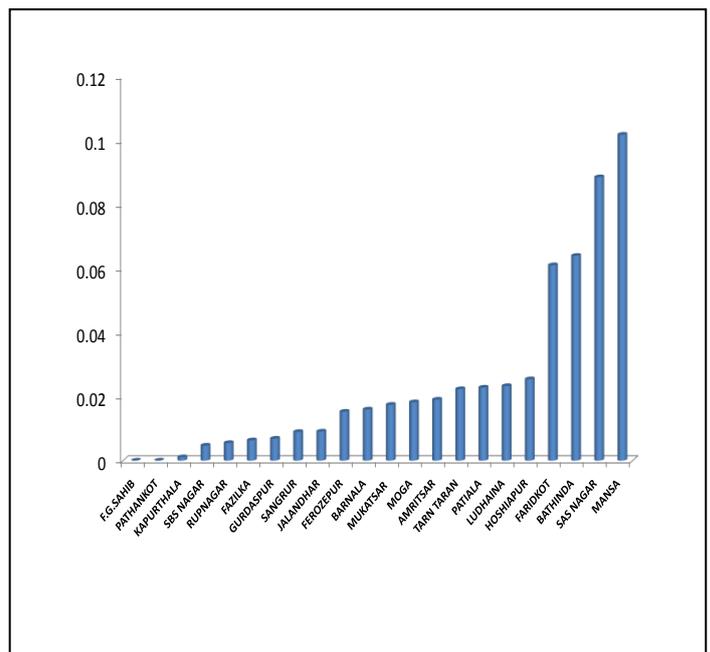
- 17 districts have malaria cases less than 50
  - 5 districts have malaria cases between 50 & 110
  - 7 districts out of 22 districts have cases of Malaria less than 10
- The data of Malaria indicates that The absolute case load of Malaria is low in the districts across the State



Source: Epidemiological data NVBDCP, Punjab

**Graph 5: District wise API (Annual Parasite Incidence) 2016 in Punjab**

- 2 districts have zero API
  - 19 districts have API between 0 to 0.1
  - Only one district has API > 0.1
- API (Annual Parasite Incidence) of all the districts show that incidence of Malaria is low throughout the State.



**Table 2: API (Annual Parasite Incidence) wise distribution of health blocks & urban areas**

API	2012	2013	2014	2015	2016
	No. of Blocks/area	No. of Blocks	No. of Blocks	No. of Blocks	No. of Blocks
➤ 1	1	1	0	0	0
0.5 – 1	2	2	1	0	0
0.1 – 0.5	16	21	14	5	8
0 – 0.1	83	76	77	75	73
0	41	43	61	63	63

Source: Epidemiological data NVBDCP, Punjab

It can be interpreted from Table 2 that since 3 years, none of the health block/urban area in the State has API >1, showing the constant decline of the load of malaria in the State.

**Table 3: API (Annual Parasite Incidence) wise distribution of villages**

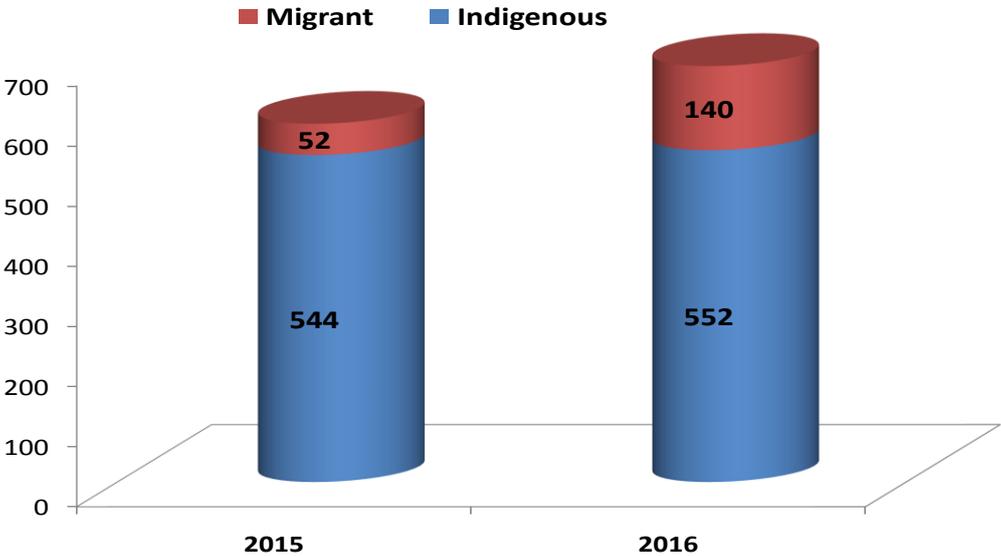
API	2012	2013	2014	2015	2016
	No. of villages				
➤ 10	1	4	0	0	1
5 – 10	10	11	0	1	2
2-5	623	72	25	9	21
1-2	131	115	73	42	41
0.1 – 1	374	383	372	341	241
0 – 0.1	11534	12088	12203	12280	12367

Source: Epidemiological data NVBDCP, Punjab

Table 3 shows that the API (Annual Parasite Incidence) of Malaria has shown a decline in the State and more area is having less incidence of Malaria over the years. With regular interventions, the number of high malarious areas has decreased and now the disease has been limited to certain areas. It becomes evident that 65 villages have API > 1 and need intervention to bring down the incidence of the disease.

As evident from the epidemiological data of the State, slight increase in number of cases of Malaria has been seen in 2016 as compared to 2015. Moreover, number of villages/area with API more than 1 is more in 2016 in comparison to that of 2015. The increase can be attributed to the increased surveillance for Malaria especially for migrants visiting the State. The following figure is self explanatory that proportion of migrant malaria cases has increased in Punjab in 2016 as compared to that in 2015:

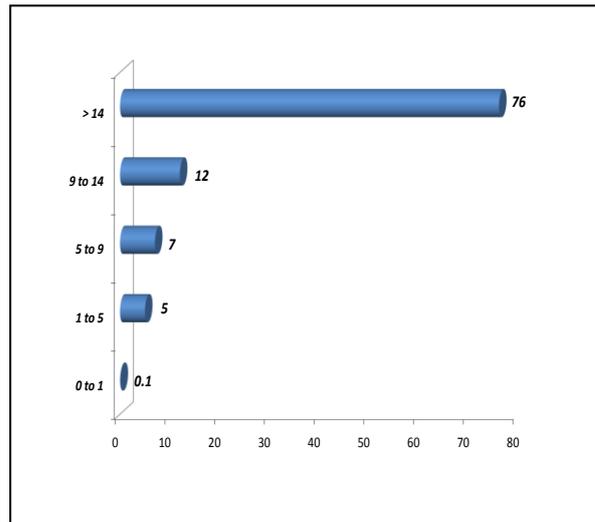
**Graph 6: Migrant malaria cases in Punjab**



As per the above graph, the proportion of migrant cases out of total malaria cases in 2015 was 9% which has increased to 20% in 2016 thus leading to an increase in number of malaria cases.

### **Graph 7: Age wise Malaria cases in Punjab**

- ❖ The proportion of malaria cases in the paediatric age group in the state is very less.
- ❖ Malaria cases in infancy stage are negligible.
- ❖ Majority of the cases are in older age Group.



The epidemiological data of Malaria in Punjab shows that the State has witnessed a decline in cases of Malaria and the decline has been more in the rural areas of the State indicating a need for strategy for urban areas. The disease has been reported in the older age group and majority of the cases of vivax malaria which means advocacy of counselling of the patients will be an important tool to ensure complete radical treatment in order to prevent relapse. The data also shows that there is a strong need to strengthen the surveillance among migrants in the State as proportion of malaria cases among migrants has increased and there always remains a possibility of transmission of infection to unexposed indigenous population.

Epidemiological data shows that all the districts and all the health blocks including the urban areas have API (Annual Parasite Incidence) less than 1.0. 65 villages in the State out of appx 13000 villages have API >1 and another 100 villages have API) 0.5 to 1.0 showing that interventions in 165 villages can help in decreasing the case load further in the State and can be a step towards the vision of Malaria Elimination.

**PUNJAB MALARIA ELIMINATION CAMPAIGN (PMEC)  
ACTION PLAN & ROADMAP FOR MALARIA ELIMINATION IN  
PUNJAB 2017-2021**

The roadmap for Malaria Elimination in Punjab named “Punjab Malaria Elimination Campaign (PMEC) 2017-2021” will be in line and accordance with the National Framework for Malaria Elimination (NFME) in India. This road map will be act as a set of principles for the State, District and Sub district officers for planning and execution of the activities for Malaria Elimination in the State.

**VISION**

Zero case of indigenous Malaria in the State of Punjab by 2021 and making state free of Malaria.

**GOALS**

- Malaria elimination from 22 districts of the State by 2021
- Prevent reintroduction of Malaria in areas where the transmission of malaria has been interrupted

**OBJECTIVES**

The roadmap will have following objectives in order to achieve the goals:

- I) To interrupt the transmission of Malaria from areas from where cases are still being reported
- II) To identify the foci of infection and efforts to eliminate the foci with IVM
- III) To prevent reintroduction of malaria transmission in areas where interruption has been achieved

## PHASING AND TIME LINE OF MALARIA ELIMINATION IN PUNJAB

As per the case load of Malaria and API in all the districts as per 2016 data, the timeline for elimination has to be different in different districts as below:

**Table 4: Categorization of the districts as per API (Annual Parasite Incidence)**

S.No.	Category	Target of Zero API	No. Of Districts	Districts
1	Category I	2017	5	Fatehgarh Sahib, Kapurthala, Pathankot, Ropar, SBS Nagar
2	Category II	2018	8	Barnala, Fazilka, Ferozepur, Gurdaspur, Jalandhar, Sangrur, Moga, Mukatsar
3	Category III	2019	4	Tarn Taran, Faridkot, Hoshiarpur, Patiala
4	Category IV	2020	2	Amritsar, Ludhiana
5	Category V	2021	3	SAS Nagar, Bathinda & Mansa

Source: Epidemiological data NVBDCP, Punjab

The situation of malaria is different in different districts of the State. As per the epidemiological data of the districts, the 22 districts of the State have been divided in the categories as per API. Category I include 5 districts which have very low API and can proceed for elimination immediately. Category II includes 8 districts which have very low to moderate API (in comparison to the API of the State), Category III includes 4 districts which have mild to moderate API in the State. 2 districts fall in category IV which have moderate API while three districts are in Category V which have the highest API in the State.

## **UNIT OF PLANNING**

Each district will have to further do micro-stratification at the block/ PHC/ Subcentre/ Village level and plan the elimination of Malaria in each district.

District Programme Officer NVBDCP will have to play a key role in mapping the areas, populations, planning and execution of activities of elimination of Malaria in each district.

## **KEY INTERVENTIONS IN MALARIA ELIMINATION**

Key interventions are the modalities to be undertaken by all the districts of the State in order to achieve the objectives of Malaria Elimination of the State keeping in mind the goals with a vision of Malaria free State. The State will be undertaking Malaria Elimination in a campaign mode with strong commitment. The key interventions for Malaria Elimination in Punjab under Punjab Malaria Elimination Campaign will be

- A) Surveillance**
  - i.** Epidemiological Surveillance
  - ii.** Case Based Investigation and Line Listing
  - iii.** Entomological Surveillance
  - iv.** Surveillance of migrants and mobile population
- B) Case Detection and Management**
- C) Private Sector Reporting of Malaria**
- D) Prevention of Malaria**
- E) Intersectoral Coordination and Monitoring**
- F) Legislation**
- G) Awareness activities & Capacity Building**

**A) Surveillance:** Systematic approach towards finding a case of malaria under epidemiological surveillance and entomological surveillance to find the vector responsible for transmission of the disease and foci of infections in the State.

**i. Epidemiological Surveillance:** The following will be undertaken under epidemiological surveillance:

• **Active Surveillance:** ASHA, MPHW-M, MPHW-F will be involved and will be responsible for active search of fever cases under active surveillance in rural as well as urban areas of the State. There will be collaborative activities with NUHM for strengthening of surveillance in urban areas especially outreach and slum areas.

• **Passive Surveillance:** In order to not miss any case of Malaria reporting to a health agency, State has identified 72 health facilities as Passive Surveillance Centres (PSCs) in the first phase. Remaining public health facilities will be enrolled in the coming time

- 22 District Hospitals
- 41 Subdivisional Hospitals
- 3 Government Medical Colleges
- 6 ESI Hospitals

All 72 Passive Surveillance Centres (PSCs) will ensure that all the fever cases reported in these centres are tested for Malaria. The staff of these 72 PSCs will be sensitized for Malaria reporting.

**Human Resource:** State has initiated the recruitment of paramedical staff especially MPHW-M and Lab Technicians, who will be sensitized for the activity. The Technical Expert Group will be recommending the State for human resource recruitment or redeployment keeping in view the objectives of PMEC.

**ii. Case Based Investigation and Line Listing:** All the cases of Malaria (regardless indigenous or migrant) will be investigated by District Epidemiologist/District VBD Officer in order to know the movement and

travel history of the case. This will enable the teams to eliminate the possible foci of infection.

- All the cases of Malaria will be recorded on the Malaria Treatment Card (Annexure I). The treatment card will be digitalized at district level.

- Line list of malaria cases will be prepared at district level and compiled at State level.

**iii. Entomological Surveillance:** A very important step in progress towards Malaria Elimination. The following will be done in order to strengthen entomological surveillance in Punjab under PMEC:

- Vacant posts of entomologist/biologists/insect collectors will be filled.

- Capacity building of the regular/outsourced entomological staff.

- Involvement of Universities/NGOs to support entomological surveillance for VBDs.

- Sensitivity and susceptibility of the vectors to various insecticides with support of NIMR shall be undertaken in the areas where IRS has to be done.

**iv. Surveillance of migrants and mobile population:** Screening of migrant population for Malaria and availability of health services nearer to their doorstep will enable us to find the case of malaria at the earliest and will also help in providing complete treatment to the case: The following steps will be undertaken:

- Once a month fever survey of all the brick kilns will be undertaken in order to report symptomatic and asymptomatic cases of malaria.

- The owners of brick kilns will be sensitized for early reporting of all fever cases among migrants.

- Inhabitants of other migrant hubs if any, will be screened for fever and malaria.

- ASHA/MPHW-M will be involved in screening of the migrant workers involved in sowing or reaping of the crops during harvesting season which is mobile population.
- The workers in the industrial units/factories will be screened during the transmission season and the factory owners will be sensitized in this regard.
- Services of MMUs (Mobile Medical Units) will be utilized to offer surveillance and diagnostic services in hard to reach rural areas.

## **B) Case Detection and Management:**

- i.** Malaria microscopy will remain the gold standard for diagnosis of Malaria. All 72 Passive Surveillance Centres and other public health hospitals will be using only microscopy for diagnosis of malaria.
- ii.** Antigen based bivalent RDKs (Rapid Diagnostic Kits) may be used by private hospitals/laboratories for diagnosis of Malaria.
- iii.** Bivalent RDKs will be used in those field areas where the laboratory is more than 10 km from the village and transportation of blood slide by ASHA is difficult.
- iv.** The management of all cases of Malaria will be as per National Malaria Drug Policy in all the Govt. hospitals of the State including Govt. Medical Colleges and ESI hospitals.
- v.** Presumptive treatment will not be given to any case of Malaria and the record of each case who has been issued anti-malarial drugs as per clinical malaria has to be kept. District team will interview and investigate all such cases to verify the case as malaria.
- vi.** Full radical treatment to Malaria cases (Urban/Rural) will be provided by ASHA/MPHW-M or any treatment provider under direct observation for 14 days. The treatment provider will collect blood slides of the case on 7<sup>th</sup>, 14<sup>th</sup> and 28<sup>th</sup> day of the start of the treatment.

**vii. Quality assurance of diagnostics:** Quality assurance of RDks and microscopy will be ensured in collaboration with NVBDCP and NIMR.

**viii. Logistics:** The logistics like larvicides, insecticides, LLINs, RDks etc will be on rate contract and supply and availability of logistics will be monitored from State level.

**C) Private Sector Reporting & Management of Malaria:** Private Sector caters a large number of fever cases and thus may be coming across a significant number of malaria cases. A big challenge remains in reporting of malaria cases from private sector for complete radical treatment of all the cases and for undertaking remedial preventive measures in the concerned areas. The following will be undertaken for involvement of private sector for malaria elimination in the State:

- IMA Punjab and other private doctors will be sensitized about Punjab Malaria Elimination Campaign
- Reporting of each malaria (lab confirmed) case will be made mandatory by issuing a separate notification
- A portal will be created for ease of reporting of malaria case by a private doctor
- The management of all cases of malaria in the State will be as per National Malaria Drug Policy. In a case the patient is not responding to conventional drugs as per recommendation of Govt. of India, may be treated with second line drugs with information to the State Deptt. Of Health in order to record resistance to drugs.
- All cases of malaria reported by private sector will be investigated by district team and complete radical treatment will be provided and remedial measures will be undertaken.
- The private sector can act as strong reporting unit in an effort of the State towards malaria elimination.

**D) Prevention of Malaria:** Prevention of Malaria in an area remains an important aspect for elimination of vector in order to prevent further transmission of the disease. The following activities shall be undertaken in the state

**i. Larvivorous Fishes:** There has been phased introduction of larvivorous fishes (*Gambusia affinis*) in perennial water bodies and ponds in different areas of the State. One master hatchery has been constructed at district level and perennial ponds for breeding of *Gambusia* have been identified. Seeding of major water bodies and ponds will be undertaken to reduce breeding opportunities of the vector by using larvivorous fishes.

**ii. Long Lasting Insecticide Nets (LLINs):** LLINs will be introduced in the State in phased manner:

- In first phase LLINs are being introduced in areas having API >1
- In second phase LLINs will be introduced in areas having API 0.5-1 to reduce man vector contact
- Involvement of VHNSCs (Village Health Nutrition and Sanitation Committees) at village level for sensitization of public through Panchayats and sanitation activities in the villages for source reduction being planned in collaboration with Deptt. Of Rural Development and Panchayats.

**iii. Integrated Vector Management:** Area from where a case of Malaria is reported will be sprayed with insecticides & focal vector control measures will be undertaken.

- Larvicides as per recommendation of Deptt. of NVBDCP, GOI will be used in urban/rural areas for prevention of breeding
- Insecticides (Space Spray) shall be used for immediate knocking out the adult mosquito
- IRS (Indoor Residual Spray) will be used in area where API >1 or from where vector density is found very high.

**E) Intersectoral Coordination and Monitoring:** The State has constituted State level and District level Monitoring Committees for Malaria Elimination alongwith an expert group for this activity:

➤ **STATE VBD MONITORING COMMITTEE (SVMC)**

The State VBD (Vector Borne Disease) Monitoring Committee will be chaired by the Chief Secretary, Punjab. The administrative secretary of the department concerned will be a member of the State VBD (Vector Borne Disease) Monitoring Committee. The constitution of the State VBD (Vector Borne Disease) Monitoring Committee will be as following:

<b>Designation</b>	<b>Department</b>
Chairman	Chief Secretary
Vice Chairman	Deptt. Of Health and Family Welfare
Member	Deptt. Of Finance
Member	Deptt. Of Local Government
Member	Deptt. Of Rural Development & Panchayats
Member	Deptt. Of Water Supply & Sanitation
Member	Deptt. Of Labour & Factories
Member	Deptt. Of Animal Husbandry & Fisheries
Member	Deptt. Of Medical Education & Research
Member	Deptt. Of Punjab School Education Board
Member	Deptt. Of Agriculture
Member	Deptt. Of Transport
Member	Mission Director NHM
Member	Managing Director PHSC
Member	President IMA
Member Secretary	Director Health Services

➤ **DISTRICT VBD MONITORING COMMITTEE (DVMC)**

The constitution of the District VBD (Vector Borne Disease) Monitoring Committee will be

Chairman	Deputy Commissioner
Vice Chairman	Civil Surgeon
Member	Local Government
Member	Rural Development & Panchayats
Member	Water Supply & Sanitation

Member	Labour & Factories
Member	Animal Husbandry & Fisheries
Member	Principal Govt. Medical College (wherever situated)
Member	District Education Officer
Member	Agriculture
Member	Transport
Member	District IMA Unit
Member	District Health Officer
Member Secretary	District Epidemiologist

➤ **TECHNICAL EXPERT GROUP VBD & MALARIA ELIMINATION (TEG VBD & ME)**

A Technical Expert Group may be constituted at State level to advice the State for progress in Malaria Elimination and for prevention and control of other vector borne disease. The constitution of TEG VBD & ME will be

Chairman	Director Health & Family Welfare
Vice Chairman	Prof & Head, School of Public Health
Member nominee	Director Medical Education & Research or
Member	Director ESI
Member	Representative from WHO
Member	Director NIMR/nominee
Member	Representative from NVBDCP, New Delhi
Member	Sr Regional Director, MoHFW
Member	Deputy Director Communicable Diseases
Member	Deptt. Of Entomology/Zoology PU
Member	Representative from Deptt of Local Govt
Member	EIS Officer, IDSP Punjab
Member Secretary	State Programme Officer NVBDCP

**F) Legislation:** Malaria is a notified disease in the State of Punjab. The disease has been notified under Epidemic Disease Act. The treatment of Malaria as per National Drug Policy is also being notified for uniform management of the cases of malaria.

**G) Awareness Activities & Capacity Building:** Behaviour change will be an important aspect in journey towards Malaria Elimination as prevention of breeding of mosquitoes and prevention of bite of mosquito by personal protection has to be undertaken by general population at their level. The following interventions may be undertaken:

- i.** 25<sup>th</sup> April: World Malaria Day will be celebrated in the Panchayats for awareness of rural population for prevention and control of Malaria.
  - ii.** 25<sup>th</sup> April to 30<sup>th</sup> April: This period will be marked as Anti Malaria Week and awareness drive will be focussed on schools. Since schools close during summer vacations, the activity will be undertaken in April itself.
  - iii.** May: Radio campaign in last week of May to first week of June for public awareness.
  - iv.** June: Anti Malaria Month will be focussed on brick kilns and factories and other slum areas of the State.
  - v.** Sun boards/ Wall Paintings will be installed in all the health institutions of the State to inform public about free testing and treatment of Malaria.
  - vi.** Awareness of pregnant females coming to each healthcare centre during Mamta Diwas will be undertaken regarding prevention and control of Malaria.
- **Capacity Building:** Capacity building of the following categories of the Staff will be undertaken:
- Civil Surgeons and SMOs: Disease and monitoring of the measures
  - Medical Officers and RMOs: Early detection and treatment of Malaria
  - Lab Technicians: Capacity building of MLTs for microscopy in collaboration with NIMR
  - MPHS (M) and MPHWS (M): For epidemiological surveillance and early detection. Sensitization of public and migrants. Use of RDKs in far areas.
  - ASHA: For epidemiological surveillance and early detection. Sensitization of public and migrants. Use of RDKs in far areas. Complete radical treatment of the cases.
  - Entomological Staff: In collaboration with NIMR.

# ANNEXURE I

## MALARIA TREATMENT CARD

	<b>Government of Punjab</b> <b>Department of Health &amp; Family Welfare</b> <b>National Vector Borne Disease Control Programme</b>	
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### Malaria Treatment Card

District		PHC/CHC		Sub Centre		Case No.	
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Patient Details				Area Details			
Name				District Name			
Father/Husband Name				Block Name			
Age (In years)				CHC/PHC			
Gender				Sub Centre			
Pregnant				Village/Ward			
Occupation				Area Type			
Present Address				Case Number			
Phone Number				Travel Details for last month			
No. of Members staying in the house				From Location	Destination	From Date	To Date
Permanent Address							
Name of Contact Person							
Address of Contact Person							
Phone Number of Contact Person							

Follow-Up Details								
Disease Classification	Day	Date	BSC/RDK	B.S.No.	Name of Lab	Smear/RDK Result		
						PV	PF	Mixed
Complication								

Investigator Details							
Name of (Initial) Visitor				Name of Treatment Provider			
Initial Home Visit Date				Designation of Treatment Provider			

## Annexure II

### Recommendations of NFME

Specific Objectives	Key Interventions
<ul style="list-style-type: none"> <li>• Interrupt transmission of malaria.</li> <li>• Immediately notify each detected case.</li> <li>• Detect any possible continuation of malaria transmission.</li> <li>• Determine the underlying causes of residual transmission.</li> <li>• Forecast and prevent any unusual situations related to malaria, ensure epidemic preparedness and respond in a timely and efficient manner to outbreak situations.</li> <li>• Prevent re-establishment of local transmission of malaria.</li> <li>• Ascertain elimination of malaria.</li> </ul>	<ul style="list-style-type: none"> <li>• In elimination areas, where transmission is focal and incidence/ risk has become extremely low, all efforts will be directed at interrupting local transmission in all active foci of malaria.</li> <li>• Mandatory notification of each case of malaria from the private sector, other organized government sectors or any other health facility.</li> <li>• Adequate case-based surveillance and complete case management established and fully functional across the entire country to handle each case of malaria.</li> <li>• Investigation and classification of all foci of malaria.</li> <li>• A strict total coverage of all active foci by effective vector control measures.</li> <li>• Early detection and treatment of all cases of malaria by means of active and/or passive case detection to prevent onward transmission.</li> <li>• State and national level malaria elimination database established and operational.</li> <li>• Implementation of interventions for effective screening, management and prevention of malaria among mobile and migrant populations.</li> <li>• Establishment of an effective epidemic forecasting and response system.</li> <li>• Ensuring rigorous quality assurance of all medicines and diagnostics.</li> <li>• Setting up a national-level reference laboratory which will serve the following two functions.               <ul style="list-style-type: none"> <li>— All positive and a fixed percentage of negative slides will be referred to this laboratory for confirmation of diagnosis and cross-checking. After elimination has been achieved in each State/UT, 100% of cases will be notified to this laboratory for confirmation of diagnosis. The laboratory will be notified immediately on all positive cases of malaria by each state/UT through either SMS, e-mail or telephone with information on name, gender, address (village and district), date and type of testing and type of parasite for each positive case of malaria so that a national level database can be maintained.</li> <li>— Training of master trainers and accreditation/certification of microscopists as per Indian Public Health Standards shall also be undertaken at this laboratory.</li> </ul> </li> <li>• During investigation of foci, all suspected cases of malaria are to be screened for malaria. These could include household members, neighbours, schoolchildren, workplace colleagues and relatives.</li> <li>• Surveillance of special groups, migrant populations or populations residing in the vicinity of industrial areas are also to be covered under surveillance operations.</li> </ul>

## Annexure III

### List of villages with API >1

S.NO	District	Sr.No.	Subcenter	Sr.NO	Village	PV	PF	Total Malaria Cases	API
1	Amritsar	1	Gopalpura	1	Kotla	1	0	1	1.07
		2	Suffian	2	Kot Razada	1	0	1	1.42
		3	Mohleke	3	Chuchakwal	1	0	1	1.62
		4	Kot Sidhu	4	Ummarpur	2	0	2	1.69
2	Bathinda	1	Ramannwas	5	Harkrishanpura	1	0	1	1.06
		2	Mehma Sarja	6	Mehma Sarja	9	0	9	1.29
		3	Kamalu Swath	7	Kamalu	6	0	6	3.61
		4	Gulabgharh	8	Phus Mandi	9	0	9	4.84
3	Faridkot	1	Bajakhana	9	Bajakhana	7	0	7	1.12
		2	Ran Singh Wala	10	Ran Singh Wala	3	0	3	1.12
		3	Ran Singh Wala	11	Behbal Khurd	3	0	3	1.21
		4	Kameana	12	Sangu Romana	1	0	1	4.65
4	Ferozepur	1	Khalchian Qadim	13	Khalchian Jadid	1	0	1	1.24
		2	Bare Ke	14	Habbib Wala	5	0	5	1.85
		3	Khalchian Qadim	15	Luthar	1	0	1	1.54
		4	Wakha	16	Dulle Wala (B)	1	0	1	1.19
5	Gurdaspur	1	Bhadurpur Rjoa	17	Bhetpattan	2	0	2	2.11
		2	Bohja	18	Sadha Wali	1	0	1	3.37
6	Hoshiarpur	1	Bathulla	19	Mochpur	1	0	1	1.01
		2	Bariana	20	Bariana	1	0	1	1.03
		3	Dhamian	21	Begpur Kamloh	1	0	1	1.27
		4	Choutala	22	Mirjapur	1	0	1	1.28
			Choutala	23	Choutala	2	0	2	1.36
			Bathulla	24	Bathulla	1	0	1	1.43
		5	Dhamian Kalan	25	Kalkat	1	0	1	1.77
		6	Kangmai	26	Rora	1	0	1	1.99
		7	Ghumiala	27	Hallowal	2	0	2	2.68
		8	Chagran	28	Kondla	1	0	1	3.77
	Bassi Umar	29	Bassi Kale Khan	2	0	2	5.38		

			Khan						
		10	Sotla	30	Khaliyala	1	0	1	8.47
7	Jalandhar	1	Khusropur	31	Pahra Pind	1	0	1	1.06
8	Ludhiana	1	Dehlon	32	Siaan Kalan	2	0	2	1.01
			Dehlon	33	Dehlon	6	0	6	1.11
		2	Dhandra	34	Kheri	3	0	3	1.72
		3	Butahri	35	Guram	6	0	6	2.72
			Butahri	36	Butahri	10	0	10	2.81
9	Mansa	1	Barnala	37	Narinder Pura	2	0	2	1.07
		2	Khiala Malakpur	38	Khiala Khurd	1	0	1	1.23
		3	Atla Kalan	39	Atla Kalan	4	0	4	1.28
		4	Gharaghna	40	Gharaghna	4	0	4	1.62
		5	Chekeria	41	Khilan	4	0	4	2.59
		6	Burj Rathi	42	Bhai Desa	4	0	4	2.61
10	Patiala	1	Shadipur	43	Shadipur	1	0	1	1.09
		2	Fatehpur	44	Kakra + Dere	1	0	1	1.16
		3	Gajju Majra	45	Kuka	1	0	1	1.19
		4	Kalomajra	46	Jansla	2	0	2	1.21
		5	Mangewal	47	Sakrali	2	0	2	1.26
			Gajju Majra	48	Gajju Majra/ Dera Bazigar	3	0	3	1.54
		6	Phagan Majra	49	Dayalgarh	1	0	1	4.2
11	SAS nagar	1	Aganpur	50	Toffapur	1	0	1	1.04
		2	Nagla	51	Kathgarh	2	0	2	1.06
		3	Sangatpura	52	Boothgarh	1	0	1	1.62
			Sangatpura	53	Manakpur Sarff + Bhatte	6	0	6	1.76
		4	Jawaharpur	54	Dandrala	1	0	1	1.97
		5	Malakpur	55	Balonpur+ Koulimajra	4	0	4	2.05
		6	Majra	56	Siswaan	1	0	1	2.06
			Nagla	57	Pirmuchhala	2	0	2	2.25
		7	Bairmajra	58	Lehli	3	0	3	2.35
		8	Durali	59	Papri	1	0	1	2.98
		9	Chhat	60	Adda Jhungia	1	0	1	3.01
		10	Bakarpur	61	Rurka	5	0	5	3.93
			Nagla	62	Gazipur Jattan	1	0	1	4.21
	Bhadonjia	63	Parolbhatthe+Farmhouse	11	1	12	25		
12	Sangrur	1	Nagra	64	Akbarpur	2	0	2	1.33
13	Tran Taran	1	Kang	65	Kang The	1	0	1	2.28
<b>Grand Total</b>		<b>56</b>		<b>65</b>		<b>171</b>	<b>1</b>	<b>172</b>	<b>1.88</b>

## **WAY FORWARD: Collaboration with NIMR**

The State of Punjab has collaborated with NIMR (National Institute of Malaria Research), New Delhi for its effort in Malaria Elimination.

NIMR has established a field station at CHC Dhakoli in SAS Nagar, Punjab adjacent to State headquarter. NIMR will provide technical support to Punjab in

- i.** Finding the case load of Malaria with analysis
- ii.** Entomological Surveillance
  - i. Type of prevalent vector for Malaria transmission
  - ii. Sensitivity and Susceptibility of vectors
- iii.** Capacity Building
  - i. Medical & paramedical staff
  - ii. 3 batches of Lab Technicians already been trained in 2016-17
- iv.** Gap Analysis

There is a gradual decline in malaria cases including *P.falciparum* cases over the years. However, the actual burden of disease has not been estimated to strategize malaria elimination in the state. This as a first step to elimination of malaria, the disease burden study will be carried out by NIMR along with situation analysis in respect of vector bionomics, health system analysis and distribution of disease. Based on the estimated disease burden and detailed situation analysis, NIMR will conduct regular studies as per standard operating procedures to achieve the above objectives and to advise the state government from time to time if any change/modification is required in the intervention strategy to eliminate the malaria foci from the state.

## Glossary

**Active case detection:** The detection by health workers of malaria infections at community and household level in population groups that are considered to be at high risk. Active case detection can be conducted as fever screening followed by parasitological examination of all febrile patients or as parasitological examination of the target population without prior fever screening.

**Annual blood examination rate:** The number of patients receiving a parasitological test for malaria (blood slide for microscopy or malaria rapid diagnostic test) per 100 population per year.

**Case-based surveillance:** Every case is reported and investigated immediately (and also included in the weekly reporting system).

**Case definition** (control programmes)

**Confirmed malaria:** Suspected malaria case in which malaria parasites have been demonstrated in a patient's blood by microscopy or a rapid diagnostic test.

**Presumed malaria:** Suspected malaria case without a diagnostic test to confirm malaria but nevertheless treated presumptively as malaria.

**Suspected malaria:** Patient illness suspected by a health worker to be due to malaria. The criteria usually include fever. All patients with suspected malaria should receive a diagnostic test for malaria, by microscopy or a rapid diagnostic test.

**Case definition** (elimination programmes)

**Autochthonous:** A case locally-acquired by mosquito-borne transmission, i.e. an indigenous or introduced case (also called 'locally transmitted').

**Imported:** A case the origin of which can be traced to a known malarious area outside the country in which the case was diagnosed.

**Indigenous:** Any case contracted locally (i.e. within national boundaries), without strong evidence of a direct link to an imported case. These include delayed first attacks of *P. vivax* malaria due to locally acquired parasites with a long incubation period.

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

**Introduced:** A case contracted locally, with strong epidemiological evidence linking it directly to a known imported case (first generation from an imported case, i.e. the mosquito was infected from a case classified as imported).

**Locally transmitted:** A case locally-acquired by mosquito-borne transmission, i.e. an indigenous or introduced case (also called 'autochthonous').

**Malaria:** Any case in which, regardless of the presence or absence of clinical symptoms, malaria parasites have been confirmed by quality-controlled laboratory

**Case investigation:** Collection of information to allow classification of a malaria case by origin of infection, i.e. whether it was imported, introduced, indigenous or induced. Case investigation includes administration of a standardized questionnaire to a person in whom a malaria infection is diagnosed.

**Case management:** Diagnosis, treatment, clinical care and follow-up of malaria cases.

**Case notification:** Compulsory reporting of detected cases of malaria by all medical units and medical practitioners, to either the health department or the malaria elimination service (as laid down by law or regulation).

**Certification of malaria-free status:** Granted by WHO after it has been proven beyond reasonable doubt that the chain of local human malaria transmission by *Anopheles* mosquitoes has been fully interrupted in an entire country for at least 3 consecutive years.

**Control charts:** Figures summarizing information on key malaria indicators collected by surveillance for regular, periodic review by malaria control programme personnel.

**Discharge register:** List of patients who leave inpatient hospital care. Discharge registers should contain the date of admission, patient's name, residence, age, sex, diagnosis, length of stay and reason for leaving (discharged, died, transferred, absconded). This information should be abstracted from the patient file by appropriately trained staff.

**Elimination:** Reduction to zero of the incidence of infection by human malaria parasites in a defined geographical area as a result of deliberate efforts. Continued measures to prevent re-establishment of transmission are required.

**Endemic:** Applied to malaria when there is an ongoing, measurable incidence of cases and mosquito-borne transmission in an area over a succession of years.

**Epidemic:** Occurrence of cases in excess of the number expected in a given place and time.

**Eradication:** Permanent reduction to zero of the worldwide incidence of infection caused by human malaria parasites as a result of deliberate efforts. Intervention measures are no longer needed once eradication has been achieved.

**Evaluation:** Attempts to determine as systematically and objectively as possible the relevance, effectiveness and impact of activities in relation to their objectives.

**False negative (or false positive):** A negative (or positive) result in a test when the opposite is true.

**Focus:** A defined, circumscribed locality situated in a currently or former malarious area containing the continuous or intermittent epidemiological factors necessary for malaria transmission. Foci can be classified as endemic, residual active, residual non-active, cleared up, new potential, new active or pseudo.

**Gametocyte:** The sexual reproductive stage of the malaria parasite present in the host's red blood cells.

**Incubation period:** The time between infection (by inoculation or otherwise) and the first appearance of clinical signs, of which fever is the commonest.

**Intervention (public health):** Activity undertaken to prevent or reduce the occurrence of a health condition in a population. Examples of interventions for malaria control include the distribution of insecticide-treated mosquito nets, indoor residual spraying with insecticides, provision of effective antimalarial therapy for prevention or curative treatment of clinical malaria.

**Line list:** Information on cases recorded in rows and columns, with data for each case in columns across one row. The information may include case identification number; demographic factors (patient's name, address, age, sex); clinical factors (date of attendance, type of test, test result, treatment received); intervention factors (house sprayed, insecticide-treated net ownership, preventive therapy).

**Local mosquito-borne malaria transmission:** Occurrence of human malaria cases acquired in a given area through the bite of infected *Anopheles* mosquitoes.

**Malaria-free:** An area in which there is no continuing local mosquito-borne malaria transmission, and the risk for acquiring malaria is limited to introduced cases only.

**Malaria incidence:** The number of newly diagnosed malaria cases during a specified time in a specified population.

**Malaria prevalence:** The number of malaria cases at any given time in a specified population, measured as positive laboratory test results.

**Monitoring (of programmes):** Periodic review of the implementation of an activity, seeking to ensure that inputs, deliveries, work schedules, targeted outputs and other required actions are proceeding according to plan.

**National focus register:** Centralized computerized database of all malaria foci in a country.

**National malaria case register:** Centralized computerized database of all malaria cases registered in a country, irrespective of where and how they were diagnosed and treated.

**Outpatient register:** List of patients seen in consultation in a health facility; the list may include the date of the consultation, patient's age, place of residence, presenting health complaint, test performed and diagnosis.

**Parasite prevalence:** Proportion of the population in whom *Plasmodium* infection is detected at a particular time with a diagnostic test (usually microscopy or a rapid diagnostic test).

**Passive case detection:** Detection of malaria cases among patients who on their own initiative went to a health post for treatment, usually for febrile disease.

**Population at risk:** Population living in a geographical area in which locally acquired malaria cases occurred in the current and/or previous years.

**Rapid diagnostic test:** An antigen-based stick, cassette or card test for malaria in which a coloured line indicates that plasmodial antigens have been detected.

**Rapid diagnostic test positivity rate:** Proportion of positive results in rapid diagnostic tests among all the tests performed.

**Receptivity:** Sufficient presence of anopheline vectors and existence of other ecological and climatic factors favouring malaria transmission.

**Re-establishment of transmission:** Renewed presence of a constant measurable incidence of cases and mosquito-borne transmission in an area over a succession of years. An indication of the possible re-establishment of transmission would be the occurrence of three or more introduced and/or indigenous malaria infections in the same geographical focus, for 2 consecutive years for *P. falciparum* and for 3 consecutive years for *P. vivax*.

**Relapse (clinical):** Renewed manifestation of an infection after temporary latency, arising from activation of hypnozoites; therefore limited to infections with *P. vivax* and *P. ovale*.

**Sensitivity (of a test):** Proportion of people with malaria infection (true positives) who have a positive test result.

**Slide positivity rate:** Proportion of microscopy slides found positive among the slides examined.

**Specificity (of a test):** Proportion of people without malaria infection (true negatives) who have a negative test result.

**Surveillance (control programmes):** Ongoing, systematic collection, analysis and interpretation of disease-specific data for use in planning, implementing and evaluating public health practice.

designed for the identification, investigation and elimination of continuing transmission, the prevention and cure of infections and final substantiation of claimed elimination.

**Transmission intensity:** Rate at which people in a given area are inoculated with malaria parasites by mosquitoes. This is often expressed as the 'annual entomological inoculation

rate', which is the number of inoculations with malaria parasites received by one person in 1 year.

**Transmission season:** Period of the year during which mosquito-borne transmission of malaria infection usually takes place.

**Vector control:** Measures of any kind against malaria-transmitting mosquitoes intended to limit their ability to transmit the disease.

**Vector efficiency:** Ability of a mosquito species, in comparison with another species in a similar climatic environment, to transmit malaria in nature.

**Vectorial capacity:** Number of new infections that the population of a given vector would induce per case per day at a given place and time, assuming conditions of non-immunity. Factors affecting vectorial capacity include: (i) the density of female anophelines relative to humans; (ii) their longevity, frequency of feeding and propensity to bite humans; and (iii) the length of the extrinsic cycle of the parasite.

**Vigilance:** A function of the public health service during a programme for prevention of re-introduction of transmission, consisting of watchfulness for any occurrence of malaria in an area in which it had not existed, or from which it had been eliminated, and application of the necessary measures against it.

**Vulnerability:** Either proximity to a malarious area or frequent influx of infected individuals or groups and/or infective anophelines. **Surveillance (elimination programmes):** That part of the programme

(Glossary Adapted from Disease Surveillance for Malaria Elimination: An Operational Manual(1)

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